CALIFORNIA DEPARTMENT OF
TOXIC SUBSTANCES CONTROL

Draft Subsequent Environmental Impact Report

for the

Pacific Gas And Electric Company Topock Compressor Station Final Groundwater Remediation Project

SCH# 2008051003

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ACRONYMS AND ABBREVIATIONS

AB	Assembly Bill
ACEC	Area of Critical Environmental Concern
ADEQ	Arizona Department of Environmental Quality
ADT	Average Daily Traffic
ADOA	Arizona Department of Administration
ADOT	Arizona Department of Transportation
afa	acre feet per annum
AFY	acre-feet per year
AGFD	Arizona Game and Fish Department
ANSI	American National Standards Institute
AOC	Area of Concern
APE	Area of Potential Effect
AQAP	*1991 Air Quality Attainment Plan*
ARAR	applicable or relevant and appropriate requirement
AR4	*IPCC's Fourth Assessment Report*
A.R.S.	Arizona Revised Statutes
ASTM	American Society for Testing and Materials
AT&SF	Atchison, Topeka and Santa Fe Railway
BACT	Best Available Control Technology
bgs	below ground surface
BIAMP	Bird Avoidance and Minimization Plan
BLCA	Beal Lake Conservation Area
BLM	U.S. Bureau of Land Management
BMP	Best Management Practice
BNSF	Burlington Northern Santa Fe
BOR	U.S. Bureau of Reclamation
CAAQS	California ambient air quality standards
CAA	Clean Air Act
CalEEMod	California Emissions Estimator Model
CALFIRE	California Department of Forestry and Fire Protection
Cal/OSHA	California Division of Occupational Safety and Health
Caltrans	California Department of Transportation
CARB	California Air Resources Board
CBC	California Building Code
CCAA	California Clean Air Act
CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act

CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CGP	Construction General Permit
CH_4	methane
CHPMP	*Cultural and Historical Properties Management Plan*
CHQ	Construction Headquarters
CHRIS	California Historical Resources Information System
CIP	Clean-In-Place
CLP	USEPA Contract Laboratory Program
CMS/FS	*Corrective Measures Study/Feasibility Study*
CNDDB	*California Natural Diversity Database*
CNEL	Community Noise Equivalent Level
CNPS	California Native Plant Society
CO	carbon monoxide
COC	chemical of concern
CO_2	carbon dioxide
CO_2e	CO_2 equivalents
COPC	chemical of potential concern
CPUC	California Public Utilities Commission
Cr(III)	trivalent chromium
Cr(T)	total chromium
Cr(VI)	hexavalent chromium
C/RAWP	*Construction/Remedial Action Work Plan*
CRHR	California Register of Historical Resources
CRIT	Colorado River Indian Tribes
CRPR	CNPS California Rare Plant Rank
CSLC	California State Lands Commission
CTR	California Toxics Rule
CUPA	Certified Unified Program Agency
CWA	Clean Water Act
dB	decibels
dBA	A-weighted decibels
DEIR	draft environmental impact report
DEM	digital elevation model
DOI	United States Department of the Interior
DOT	U.S. Department of Transportation
DPM	diesel particulate matter
DPR	California Department of Parks and Recreation
DQO	Data Quality Objective
DTSC	California Department of Toxic Substances Control
EHS	Division of Environmental Health Services

EIR	environmental impact report
EM	electromagnetic induction
EPA	Environmental Protection Agency
EPAct	Energy Policy Act of 1992
EPCRA	Emergency Planning and Community Right-to-Know Act
EZ	exclusion zone
FAA	Federal Aviation Administration
FCAA	Federal Clean Air Act
FCAAA	Federal Clean Air Act Amendments of 1990
FCR	field contact representative
FESA	Federal Endangered Species Act
FEIR	final environmental impact report
FEMA	Federal Emergency Management Agency
FESA	Federal Endangered Species Act
FHWA	Federal Highway Administration
Final RFI/RI Report	Final RCRA Facility Investigation and Remedial Investigation Report (RFI/RI Report)
FLPMA	Federal Land Policy and Management Act
FMIT	Fort Mojave Indian Tribe
FTA	Federal Transit Administration
FWPTS	freshwater pre-injection treatment system
GANDA	Garcia and Associates
Groundwater FEIR	Topock Compressor Station Groundwater Remediation Project Final EIR (January 2011)
HDCR	Hualapai Department of Cultural Resources
HDPE	high-density polyethylene
GHG	greenhouse gas
GIS	Geographic Information System
gpm	gallons per minute
GPR	ground-penetrating radar
H_2S	hydrogen sulfide
HAZWOPER	Hazardous Waste Operations and Emergency Response
HAPs	hazardous air pollutants
HMBP	*Hazardous Materials Business Plan*
HMD	Hazardous Materials Division
HOV	high occupancy vehicle
HNWR	Havasu National Wildlife Refuge
HSWA	Hazardous and Solid Waste Amendments
NTH	National Trails Highway
Hz	hertz
I-40	Interstate 40
IAMPO	International Association of Plumbing and Mechanical Officials
IDW	investigation-derived waste

IEPR	Integrated Energy Policy Report
IM	Interim Measure
Interested Tribes	Chemehuevi Indian Tribe, Cocopah Indian Tribe, Colorado River Indian Tribes, Fort Mojave Indian Tribe, and the Hualapai Indian Tribe
IPCC	Intergovernmental Panel on Climate Change
IRZ	in situ reactive zone
IS	Initial Study
kWh	kilowatt-hours
LACM	Natural History Museum of Los Angeles County
LCR MSCP	Lower Colorado River Multi-Species Conservation Program
LCWSP	Lower Colorado River Water Supply Project
LDL	Larson Davis Laboratories
LES	Liquid Environmental Solutions
L_{eq}	energy-equivalent noise level
L_{max}	maximum noise level
L_{min}	minimum noise level
LOS	Level of Service
LUST	Leaking Underground Storage Tank
MACT	Maximum Achievable Control Technology
MBTA	Migratory Bird Treaty Act
MCL	maximum contaminant level
MDAB	Mojave Desert Air Basin
MDAQMD	Mojave Desert Air Quality Management District
MG	million gallons
mg/L	milligrams per liter
mg/kg	milligrams per kilogram
MLD	Most Likely Descendant
MMRP	Mitigation Monitoring and Reporting Program
$MMTCO_2e$	gross million metric tons of carbon dioxide equivalent
mph	miles per hour
MPO	metropolitan planning organization
MRZ	Mineral Resource Zone
MS4	municipal separate storm sewer system
msl	mean sea level
MW	monitoring well
MWh	megawatt-hour
my	million years
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission
NED	National Elevation Dataset
NEPA	National Environmental Policy Act

NESHAP	national emissions standards for hazardous air pollutants
NHPA	National Historic Preservation Act
NO_2	nitrogen dioxide
NOI	Notice of Intent
NOP	Notice of Preparation
NO_x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NPS	U.S. National Park Service
NRCS	National Resource Conservation Service
NRHP	National Register of Historic Places
NSF	National Sanitation Foundation
NTH	National Trails Highway
NTR	National Toxics Rule
NWP	Nationwide Permit
O&M Manual	*Operation and Maintenance Manual Final (100%) Design Submittal*
OEHHA	Office of Environmental Health Hazard Assessment
OHV	Off-Highway Vehicle
OSHA	U.S. Occupational Safety and Health Administration
PA	Programmatic Agreement
PAH	polycyclic aromatic hydrocarbon
PBA	*Programmatic Biological Assessment for Pacific Gas and Electric Topock Compressor Station Remedial and Investigative Actions*
PCBs	polychlorinated biphenyls
PFC	perfluorocarbon
PFYC	Potential Fossil Yield Classification
PG&E	Pacific Gas and Electric Company
$PM_{2.5}$	fine particulate matter with an aerodynamic resistance diameter of 2.5 micrometers or less
PM_{10}	fine particulate matter with an aerodynamic resistance diameter of 10 micrometers or less
ppd	pounds per day
PPV	peak particle velocity
PQS	professional qualifications standards
PRC	Public Resources Code
PRMP	*Paleontological Resources Management Plan*
PRPA	Paleontological Resources Preservation Act
RAO	Remedial Action Objective
RAWP	*Human Health and Ecological Risk Assessment Work Plan*
RB	River Bank
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
RFI/RI	Resource Conservation and Recovery Act Facility Investigation and Remedial Investigation Report

RMA	Risk management analysis
RMP	Resource Management Plan
RMS	root mean square
ROG	reactive organic gases
ROW	right-of-way
RV	recreational vehicle
RWQCB	Regional Water Quality Control Board
SBAIC	San Bernardino Archaeological Information Center
SBCM	Museum of San Bernardino County
SCADA	Supervisory Control and Data Acquisition
SCAG	Southern California Association of Governments
SCF	standard cubic feet
SCH	State Clearinghouse
Scoping Plan	*AB 32 Climate Change Scoping Plan*
SCRMA	Special Cultural Resource Management Area
SCS	sustainable communities strategies
Section 106	Section 106 of the National Historic Preservation Act
SEIR	subsequent environmental impact report
SEL	sound exposure level
SENEL	single event noise exposure level
SERC	State Emergency Response Commission
SF_6	sulfur hexafluoride
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SFL	Sacred Land File
SLM	sound level meter
SO_2	sulfur dioxide
SO_X	oxides of sulfur
SOP	Standard Operating Procedure
Station	Topock Compressor Station
SVOC	semivolatile organic compound
SWMU	Solid Waste Management Unit
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TACs	toxic air contaminants
TAL/TCL	Target Compound and Target Analyte Lists
TBC	“To Be Considered” criteria
TCA	Topock Cultural Area
TCP	Traditional Cultural Property
TCS	Topock Compressor Station
TCRA	Time critical removal action

TDS	total dissolved solids
TMDL	Total Maximum Daily Load
TOC	total organic carbon
TPH	total petroleum hydrocarbons
TRC	Technical Review Committee
TW Bench	Transwestern Bench
TWG	Technical Working Group
UA	Undesignated Area
ug/kg	micrograms per kilogram
ug/L	micrograms per liter
URBEMIS	Urban Emissions model
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
US 95	United States Route 95
VdB	decibel notation
VMG	Vertical Magnetic Gradient
VOC	volatile organic compound
VRM	Visual Resource Management
WDR	Waste Discharge Requirements
WWII	World War II
XRF	x-ray fluorescence
ZEV	zero emission vehicle
ZNE	zero net energy

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CHAPTER 1
Summary

1.1 Introduction

This summary provides an overview of the Pacific Gas and Electric Company (PG&E) Topock Compressor Station Final Groundwater Remediation Project (Final Groundwater Remedy Project or proposed Project) and the environmental analyses that are contained within this draft subsequent environmental impact report (SEIR) as required by the California Environmental Quality Act (CEQA). This SEIR has been prepared according to Public Resources Code, Section 21000 et seq. and California Code of Regulations Title 14 Section 15000 et seq. (CEQA Guidelines) and specifically Public Resources Code Sections 21094, 21166 and CEQA Guidelines Sections 15128, 15152, 15162, 15168, which govern, among other items, tiering from a previously certified EIR and preparation of an SEIR. This SEIR is an informational document prepared by the lead agency, the California Department of Toxic Substances Control (DTSC), which must be considered by decision makers before approving or denying a proposed project.

1.2 Background

In 1951, the PG&E Topock Compressor Station (Station) began compressing natural gas for transportation through pipelines to PG&E's service area in Central and Northern California. As natural gas is compressed, its temperature increases and the compressed gas must be cooled. From 1951 to 1985, PG&E added chromium to the water used in the cooling towers and other equipment to prevent corrosion of the cooling tower equipment. During parts of those years, cooling tower wastewater containing hexavalent chromium [Cr(VI)][1] was discharged into a natural wash adjacent to the Station. Over time, Cr(VI) accumulated in the soil, seeped into the groundwater, and created a groundwater contaminant plume that extends from below the Station toward the Colorado River. Based on results from periodic testing of the river water, the Cr(VI) plume is not impacting Colorado River water.

Remediation of contaminated groundwater at the Station is being conducted under the Resource Conservation and Recovery Act of 1976 (RCRA) and the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA). Both RCRA and CERCLA are federal laws. RCRA provides a framework for the U.S. Environmental Protection Agency (USEPA) to remediate hazardous waste sites in the United States. This authority under RCRA,

[1] Cr(VI) is a form of chromium. Chromium is a metal naturally found in rocks, soil, and the tissue of plants and animals. Cr(VI) is used in industrial products and processes and is a known carcinogen when inhaled (i.e., through breathing). On May 28, 2014, the California Department of Public Health adopted a new Maximum Contaminant Level for Cr(VI) of 0.01 mg/L, effective July 1, 2014.

however, can be delegated to states. In California, DTSC implements RCRA under such delegated authority from the federal USEPA through state law. The approval of the Final Groundwater Remedy Project to clean up the contaminated groundwater at the Station is a discretionary action that will be made by DTSC as lead agency. Activities associated with the corrective action would result in direct and/or indirect change in the physical environment. The SEIR is intended to address the potentially significant adverse effects of the proposed Project on the physical environment.

1.3 CEQA Environmental Review Background

The CEQA Guidelines Section 15160 provides for variations in EIRs so that environmental documentation can be tailored to different situations and intended uses, and these variations are not exclusive. This SEIR relies on a prior EIR, the Topock Compressor Station Groundwater Remediation Project Final EIR (Groundwater FEIR), certified on January 31, 2011 (SCH No. 2008051003), which provided analysis for the conceptual technical methods selected for the remedy that would remediate contaminated groundwater at the Station. The proposed remedial options were described in the *Final CMS/FS for Solid Waste Management Unit 1 (SWMU 1)/Area of Concern 1 (AOC 1) and AOC 10* (Final CMS/FS), and Alternative E—In Situ with Freshwater Flushing was identified as the preferred alternative. The Groundwater FEIR provided both a programmatic and, in certain instances, a project-level analysis of the construction, operation, and decommissioning of facilities that would be necessary to implement the preferred remedy (Alternative E from the Final CMS/FS), which had not yet been developed to specific plans and designs. On January 31, 2011, DTSC adopted Alternative E after certifying the Groundwater FEIR. DTSC also adopted an Addendum to the Groundwater FEIR in 2013, which expanded the Project Area and considered the potential environmental effects of alternate well locations for a freshwater source in Arizona (DTSC 2013).

1.4 Summary of the Proposed Project

This SEIR evaluates the reasonably foreseeable and potentially significant adverse environmental effects associated with modifications or changes to the Final Groundwater Remedy Project since the certification of the Groundwater FEIR that were identified through completion of the *Basis of Design Report/Pre-Final (100%) Design Submittal for the Final Groundwater Remedy, PG&E Topock Compressor Station, Needles, California, November* (Final Remedy Design; CH2M Hill 2015a). The Final Remedy Design and its associated appendices A through L; the *Construction/Remedial Action Work Plan for the Final Groundwater Remedy, PG&E Topock Compressor Station, Needles, California* (C/RAWP) (CH2M Hill 2015b) and its associated Appendices A through X; and the Supplemental and Errata to the Final Remedy Design are incorporated by reference throughout this SEIR and are found collectively as Appendix BOD as an electronic appendix to this SEIR (C/RAWP; CH2M Hill 2015b). This SEIR evaluates, at a project level, the environmental effects associated with the construction, operation and maintenance, and decommissioning of the Final Groundwater Remedy Project, based on the Final Remedy Design and as further described in Chapter 3 of this SEIR, relative to the program-level impact analysis in the certified Groundwater FEIR.

1.4.1 Project Location

The proposed Project would be implemented at and in the vicinity of the Station, which is located in the Mojave Desert approximately 12 miles southeast of the City of Needles, California, and approximately 4 miles south of the community of Golden Shores, Arizona (see Figure 3-1 in Chapter 3 of this document). The Station is within a 66.8-acre parcel of land owned by PG&E that is located approximately 1,500 feet west of the Colorado River and less than 1 mile south of Interstate 40. In addition to lands owned by PG&E, property adjoining the Station and within the Project Area continue to be owned and/or managed by a number of government agencies and private entities, including the Havasu National Wildlife Refuge, which is managed by the U.S. Fish and Wildlife Service (USFWS); lands managed by the U.S. Department of the Interior (DOI), Bureau of Land Management (BLM); U.S. Bureau of Reclamation (BOR) managed by the BLM; the Burlington Northern Santa Fe Railway (BNSF); California Department of Transportation (Caltrans)-leased land; Arizona Department of Transportation (ADOT); lands owned by the FMIT; lands owned by San Bernardino County (and managed by BLM);and privately owned lands.

The Groundwater FEIR identified a 779.2-acre Project Area within which all activities were anticipated to occur. The Addendum to the Groundwater FEIR resulted in an additional 74.5 acres to the Project Area, on the Arizona side of the Colorado River, to account for the additional freshwater supply source. The combined area of the Groundwater FEIR and Addendum totals 853.7 acres. After completion of the Final Remedy Design and to support the analysis of Project impacts for this SEIR, DTSC in coordination with DOI, further refined the Project Area to reflect the refined area that would be used for the Final Groundwater Remedy Project (see Figure 2-1 in Chapter 2, “Introduction”). This process resulted in including additional areas that may be needed for construction, access improvements, long-term Project operation and maintenance, decommissioning, and the removal of several areas that were determined no longer needed to support the Final Groundwater Remedy Project. The resulting Project Area that is the basis for the analysis presented in this SEIR is the area in which the Final Groundwater Remedy Project would occur, including construction, long-term operation and maintenance, and decommissioning phases, and encompasses 762 acres.

1.4.2 Project Objectives

The fundamental objective of the proposed Project as presented in the Groundwater FEIR certified in January 2011, is to clean up the groundwater contamination related to the historical release of chemicals at the Station, including into Bat Cave Wash and the East Ravine near the Station, in a manner that would be consistent with all applicable regulatory requirements and to do so within a reasonable period of time when compared between viable alternatives. The Remedial Action Objectives (RAOs) are developed by considering the conclusions of the Ground Water Human Health and Ecological Risk Assessment and identification of applicable or relevant and appropriate requirements (ARARs), which established specific cleanup goals for Cr(VI) and Cr(T), as well as addressing the COPCs (molybdenum, selenium, and nitrates) through monitoring and institutional controls. The RAOs were used for remedy selection in the Groundwater FEIR.

The following are the Project RAOs for groundwater:

- Reduce the mass of Cr(T) and Cr(VI) in groundwater at the Project Area to achieve compliance with the ARARs,[2] which will be achieved through the cleanup goal of the regional background concentration of 32 µg/L of Cr(VI).
- Ensure that the geographic location of the target remediation area (contaminated groundwater plume) does not permanently expand following completion of the final remedy.
- Prevent ingestion of groundwater as a potable water source having Cr(VI) in excess of the regional background concentration of 32 micrograms per liter (µg/L).
- Prevent or minimize migration of Cr(T) and Cr(VI) in groundwater to ensure concentrations in surface water do not exceed water quality standards that support the designated beneficial uses of the Colorado River (11 µg/L Cr[VI]).

In addition to the objectives stated above, the following objectives are defined by DTSC pursuant to CEQA Guidelines Section 15124(b):

- Provide consistency with the Remedial Design/Remedial Action Consent Decree between PG&E and the United States which was approved by the U.S. District Court for the Central District of California (November, 2013), the DOI/DTSC Memorandum of Understanding concerning the coordination in overseeing the implementation of the groundwater response action (November 22, 2011), and any other legal agreements applicable to the Project, including the 2006 and 2012 Settlement Agreements entered into between DTSC and the Fort Mojave Indian Tribe (FMIT).
- Achieve the cleanup levels or performance goals delineated in the DTSC's Statement of Basis and the DOI's Record of Decision for the final groundwater remedy.
- Protect biological, historical, and cultural resources by minimizing ground disturbance to the extent feasible.
- Minimize aesthetic impact to the extent feasible by limiting the amount of aboveground infrastructure.
- Consider public safety, ensuring efficiency, and compliance with health and safety standards.
- Ensure remedy achieves compliance with RAO's within a reasonable time frame as required by California State Water Resources Control Board Resolution No. 92-49.

[2] CERCLA Section 121 requires cleanups to meet ARARs: any "legally applicable or relevant and appropriate standard, requirement, criteria or limitation" that has been promulgated under federal or state environmental laws. The ARARs include such things as the federal and state "Safe Drinking Water Act" and the Solid Waste Control Act's land disposal restrictions.

1.4.3 Abbreviated Description of the Proposed Project

As described and considered in the Groundwater FEIR, the Final Groundwater Remedy Project involves in situ treatment of contaminated groundwater with freshwater flushing. In situ treatment of groundwater refers to the reduction in mass, toxicity, mobility, volume, and concentration of the chromium plume using treatment technologies that treat groundwater in place, as opposed to pumping and circulating water through a separate aboveground treatment plant. In situ treatment would be performed by placing a degradable food-grade organic compound (termed a carbon substrate or carbon amendment) in the groundwater to create reducing conditions to convert Cr(VI) dissolved in groundwater to relatively insoluble trivalent chromium [Cr(III)]. The reduced chromium would precipitate or become adsorbed onto soils below the water table and thereby be removed from groundwater. The organic carbon substrate would be released into the aquifer by injection after mixing on-site with a water source, such as extracted contaminated groundwater or clean water. The Final Groundwater Remedy Project includes the following primary components, which are described in detail in Chapter 3, "Project Description," subsection 3.6.1:

- Development of an in situ reactive zone (IRZ) along National Trails Highway (NTH IRZ) using a line of injection and extraction wells to distribute groundwater amended with a carbon substrate for treatment of Cr(VI).
- Implementation of an inner recirculation loop (IRL) composed of injection wells upgradient of the NTH IRZ plume and extraction wells along the Colorado River that would induce groundwater flow through the NTH IRZ, capture contaminated groundwater downgradient of the NTH IRZ, and control NTH IRZ–generated byproducts.
- Installation of freshwater injection wells upgradient (west and south) of the NTH IRZ to further induce groundwater flow through the NTH IRZ and prevent westward migration of the plume.
- Installation of extraction and injection wells on and near the Station referred to as the Topock Compressor Station Recirculation Loop (TCS Recirculation Loop). This system would capture contaminated groundwater and circulate that groundwater after amendment with a carbon substrate creating an IRZ for the treatment of Cr(VI).
- Construction of a Remedy-Produced Water Conditioning System to treat and condition and reuse water from construction and maintenance activities including well backwashing and rehabilitation, purge water from monitoring well sampling, equipment decontamination wastewater, and rainfall that collects in remedy facility secondary containment. The system includes a contingency Dissolved Metals Removal System to remove scale-forming ions from the remedy-produced water prior to injection, if needed.
- Construction of a Clean-In-Place system for routine maintenance of the NTH IRZ water conveyance pipelines.
- Acquisition of freshwater for injection into the wells included to assist in flushing contaminated groundwater through the treatment zones. The source of the freshwater would be from existing Well HNWR-1A and possibly secondary contingent wells, all located in or near the Havasu National Wildlife Refuge in Arizona. The freshwater flushing system

includes the Contingent Freshwater Pre-Injection Treatment System to reduce the concentrations of arsenic, if needed.

- Construction of monitoring wells to augment the existing monitoring well network to further evaluate site conditions, monitor contaminant levels, and assess the performance of the remediation system.
- Construction of fluid conveyance, utilities, buildings, and roadways in support of the Final Groundwater Remedy Project, including the following facilities (in addition to those mentioned in the bullets above):
  - TW Bench - operations building and decontamination pad,
  - MW-20 Bench - carbon substrate building, carbon storage tank, reused frac tanks, and truck containment pad,
  - Near Moabi Regional Park - Construction Headquarters, Long-Term Remedy Support Area, Temporary Construction Laydown Area, and the Soil Processing/ Clean Soil Storage Area.
  - PG&E Topock Compressor Station - improvements to the Topock Compressor Station Evaporation Ponds (TCS Evaporation Ponds), and the shared use of the Station's Hazardous Material Storage Building.
- Implementation of monitored natural attenuation as a long-term component to address residual Cr(VI) that may remain in recalcitrant (difficult-to-treat) portions of the aquifer after optimization of IRZ treatment and flushing.
- Institutional controls to restrict surface land uses and prevent the use of groundwater until the RAOs are achieved.

In addition to the Project features described above, there may be a need for additional facilities and associated activities beyond the parameters set forth in the Final Remedy Design. A Future Activity Allowance has been included in the Project Description and the SEIR to ensure that a comprehensive environmental analysis is included should additional activities be warranted over the decades long Project implementation. More information can be found in Chapter 3 "Project Description," Section 3.6. **Table 1-1** and **Table 1-2** provide a summary of the main components that comprise the Project, and that are evaluated in this SEIR.

TABLE 1-1
SUMMARY OF REMEDIATION AND MONITORING WELL BOREHOLES

Proposed Well Boreholes for the Final Remedy Design[1]	Remediation Wells	Monitoring Wells	Total Wells
Known Project Components (Based on Final Remedy Design)			
Groundwater FEIR Limit	110	60	170
Installed Boreholes	2	16	18
Planned Boreholes to Be Installed	47	56	103
Future Provisional Boreholes that Might Be Installed	46	24	70
Total Boreholes Identified in the Final Remedy Design	95	96	191
Future Activity Allowance (Locations Unknown at this Time)			
25 Percent Potential Allowance	24	24	48
Additional Monitoring Well Boreholes	0	10	10
Totals			
Total SEIR Boreholes	119	130	249
Difference Between FEIR Limit and Total New SEIR Boreholes[3]	7	54	61

NOTES:
1 Boreholes may have multiple wells installed within the same borehole
2 Remediation wells include injection and extraction wells
3 Difference equals Total SEIR Boreholes minus Groundwater FEIR Limit boreholes minus Installed Boreholes.

SOURCE: CH2M Hill 2015a.

TABLE 1-2
SUMMARY OF NON-WELL INFRASTRUCTURE

Infrastructure Component	Groundwater FEIR Estimate	Final Remedy Design	25 Percent Potential Allowance
Fluid Conveyance Piping and Trenches	50,000 linear feet	127,500 linear feet of piping in 43,200 linear feet of trenches	31,875 linear feet of piping in 10,800 linear feet of trenches
Electrical/Communications Conduits and Trenches	50,000 linear feet	124,000 linear feet of conduits in 43,200 linear feet of trenches	31,000 linear feet in the same 10,800 linear feet of trenches listed above
Natural Gas Pipeline at TCS Evaporation Pond	Not envisioned at that time	670 feet	None needed
Buildings and Structures	100,000 square feet	42,000 square feet	10,500 square feet
Roadway Improvements	6,000 linear feet	8,150 linear feet (new) and 4,060 linear feet (improvements to existing)	2,038 linear feet (new) and 1,015 linear feet (improvements to existing)

SOURCE: CH2M Hill 2015a.

The Final Groundwater Remedy Project is a long-term remediation effort anticipated to last over 50 years (approximately 30 years of active remediation followed by approximately 10 years of long term monitoring, and up to approximately 20 years of arsenic monitoring). Construction of the proposed Project is estimated occur over a 5-year period, following DTSC and DOI approval of the Final Remedy Design and C/RAWP, which is anticipated to occur in 2017. Construction would occur in two phases, one to construct the NTH IRZ and infrastructure, and the second to construct the remaining systems (IRL, TCS Recirculation Loop, and injection of freshwater). Operation and maintenance would begin following the start-up of the various remedy systems, and would consist of approximately 30 years of active remediation followed by up to approximately 10 years of long-term monitoring and up to approximately 20 years of arsenic monitoring. Decommissioning and restoration would begin following the attainment of the cleanup objectives and/or the determination that the remedy facilities are no longer needed.

1.5 Summary of Project Alternatives

The alternatives analysis included in this SEIR is focused on specifically reducing the identified significant environmental impacts of the proposed Project (per the intent of CEQA Guidelines Section 15126.6), and does not revisit the remedial technology alternatives previously considered in the Groundwater FEIR or those suggested during the Project's design phase which are not potentially feasible or which would involve substantially redesigning the Project.

The following provides a summary of the three alternatives that are considered in this SEIR. In addition to these three viable Project alternatives, four alternatives were considered but rejected from further consideration because they would not meet the basic objectives of the proposed Project. For a full discussion of the alternatives selected for evaluation, evaluations of their potential environmental effects, and a discussion of the reasons for rejection, refer to Chapter 7, "Alternatives to the Proposed Project."

1.5.1 Aboveground Pipeline Infrastructure Alternative

The proposed Project includes an extensive network of fluid conveyance pipelines to implement the remediation system, the vast majority of which would be located underground in subsurface trenches. The Aboveground Pipeline Infrastructure Alternative would place piping aboveground in three upland segments east and west of the IM-3 Facility, instead of belowground. The preference for aboveground pipelines was presented to DTSC and DOI from Interested Tribes who explained that further subterranean intrusion into the land resulting from belowground pipelines was objectionable. Accordingly, the intent of this alternative is to reduce the amount of overall ground disturbance and subsurface excavation. The Final Remedy Design includes approximately 43,200 linear feet of trenches for fluid conveyance piping (about 8.2 miles) with most of the conveyance piping placed belowground in trenches. The Aboveground Pipeline Infrastructure Alternative would include 4,800 linear feet of aboveground fluid conveyance piping and 800 linear feet of underground trenching (less than 1 mile) which is substantially less trenching than the 43,200 linear feet of underground trenching that would be required by the proposed Project. All other wells/boreholes, and Project infrastructure would be located in the same locations as described in the proposed Project. While overall ground disturbance and subsurface excavation would be achieved, increased worker safety risks and maintenance requirements, and potentially increased impacts on wildlife movement corridors and linkages, could result.

1.5.2 Elimination of On-site Soil Storage Alternative

Under the Elimination of On-site Soil Storage Alternative, soil storage would be eliminated entirely at the Soil Processing Area/Clean Storage Area, and all, or a significant majority of, excavated soil would be exported off-site. While this alternative would eliminate the need for soil storage, a location near the Project Area would still be required for temporary soil staging for import soil, reusable site soil, and soil to be disposed of off-site. For purposes of this alternative, the existing BOR quarry area, which is located between the Station and the TCS Evaporation Ponds, could be used. The intent of this alternative is to minimize construction-related impacts to sensitive receptors at the nearby Moabi Regional Park, and to potentially reduce overall construction-related efforts. The use of the BOR quarry location for temporary management of site soil would increase soil transit time to work areas within the Project Area compared to use of the Soil Processing Area/Clean Soil Storage Area near Moabi Regional Park under the proposed Project. In addition, the use of the BOR quarry as a temporary soil staging area would likely increase consumption of construction water for dust control along unpaved roads, whereas the Soil Processing Area/Clean Soil Storage Area proposed for the Project is accessed primarily via paved roads.

1.5.3 Freshwater Supply in California Alternative

Under the Freshwater Supply in California Alternative, freshwater supply well(s) would be installed in California instead of in Arizona, which is the location proposed in the Final Remedy Design. The intent of this alternative is to avoid potential water quality impacts related to injection of Arizona freshwater in California that exceeds the maximum contaminant levels (MCL) of arsenic. Data from existing wells in the vicinity of the remedy suggest the aquifer near Moabi Regional Park is much less productive than that on the Arizona side of the river. Due to the less productive aquifer conditions, the volume of water obtained for use in the remedy would be greatly reduced, which would lengthen the amount of time it would take to clean up groundwater contamination. Moreover, the installation of freshwater supply wells on the California side of the Colorado River would require locating the wells far enough from the contaminated groundwater plume so that the drawdown created by freshwater pumping would not adversely affect the operation of the remedy. As a result, a California freshwater supply well must be located a sufficient distance away from the groundwater remedy; therefore, the length of freshwater pipelines in California to be installed would result in more ground disturbance than the proposed Project pipeline in Arizona.

1.6 Summary of Known Controversial Issues

CEQA Guidelines require that the summary of an EIR include a synopsis of known issues of controversy that have been raised by agencies and the public (CEQA Guidelines, Section 15123). A notice of preparation (NOP) for the Project was released on May 5, 2015, and is included in this SEIR as Appendix NOP. The NOP and the scoping process are described in Chapter 2, “Introduction,” of this SEIR. Agency and public scoping meetings were held on May 19 and 20, 2015, to receive oral comments on the scope and content of the SEIR. The following is a summary of the known controversial issues that have been received regarding the Project:

- **Issue:** Concerns regarding the appropriateness of proceeding with Alternative E – Freshwater with Flushing as the preferred remedial approach.
    - **Where Addressed in the SEIR:** The consideration of potential remedial alternatives is considered in Section 7.5.1 of this SEIR.

- **Issue:** Concerns regarding the need for assessment of potential impacts to cultural resources and appropriate involvement of the Tribes in the SEIR process.
    - **Where Addressed in the SEIR:** Cultural resources are discussed Section 4.4, “Cultural Resources.” Tribal involvement is documented in subsection 4.4.3.2, “Native American Heritage Resources.”

- **Issue:** Questions regarding the appropriateness of an SEIR as the appropriate CEQA document for the Project.
    - **Where Addressed in the SEIR:** The appropriateness of an SEIR to address environmental impacts of the Final Groundwater Remedy Project are discussed in Section 2.2.

- **Issue:** Requests for future updates about the Final Groundwater Remediation Project and SEIR process.
    - **Where Addressed in the SEIR:** All commenters on the NOP and SEIR will receive future updates on the environmental review process associated with the Final Groundwater Remedy Project.

- **Issue:** Concerns about public health risks associated with potential exposure to contaminated water.
    - **Where Addressed in the SEIR:** Potential environmental effects associated with potential exposure to contaminated water are addressed in Section 4.6, “Hydrology and Water Quality.”

- **Issue:** Questions about incorporating biological studies included in the Partially Recirculated Draft EIR for the Soil Investigation Project into the Final Groundwater Remediation Project SEIR.
    - **Where Addressed in the SEIR:** All biological resource studies and reports completed to date have been included and analyzed in Section 4.3, “Biological

Resources," including studies associated with bat species which were the subject of the Soil Investigation Project Recirculated Draft EIR.

- **Issue:** Concerns regarding the water source to be used in the remedy and naturally occurring arsenic in the water.
    - **Where Addressed in the SEIR:** Water supply proposed to be used as part of the Final Groundwater Remedy Project is discussed in Chapter 3, "Project Description," Section 4.6, "Hydrology and Water Quality," and Section 4.9, "Water Supply."

1.7 Issues to Be Resolved

DTSC has prepared this SEIR using the review of available technical information regarding potential alternatives to the remediation of the groundwater. As required by CEQA, DTSC must evaluate the material in this SEIR, including the identified mitigation measures and potentially feasible alternatives, before deciding whether to approve the Project or an alternative to the Project. Aside from those basic decisions, at this time, there are no issues to be resolved regarding the selection of alternatives or regarding implementation of the proposed Project.

1.8 Summary of Impacts and Mitigation

Information in **Table 1-3**, "Summary of Impacts and Mitigation," has been organized to correspond with the environmental issues discussed in Chapter 4, "Environmental Analysis."

TABLE 1-3
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
Aesthetics			
Impact AES-1: Substantial Adverse Effects on Scenic Vistas. The proposed Project could introduce additional wells, roads, pipelines, and other associated infrastructure, including the Future Activity Allowance, which could have a substantial adverse effect on a scenic vista.	Potentially Significant	**Mitigation Measure AES-1: Substantial Adverse Effects on Scenic Vistas (Groundwater FEIR Measure with Revisions).** The proposed Project, including the Future Activity Allowance, shall be designed and implemented to adhere to the design criteria presented below: a) Existing mature plant specimens (i.e., medium- to large-sized trees, large or prominent shrubs, and tall predominately herbaceous) shall be protected in place during construction, operation, and decommissioning phases consistent with CUL-1a-5. The identification of plant specimens that are determined to be mature and retained shall occur as part of the design phase and mapped/identified by a qualified plant ecologist or biologist and integrated into the final design and project implementation consistent with CUL-1a-5. b) Revegetation of disturbed areas within the riparian vegetation along the Colorado River shall occur concurrently with construction operations. Plans and specifications for revegetation shall be developed by a qualified plant ecologist or biologist before any riparian vegetation is disturbed and shall be implemented consistent with CUL-1a-5. The revegetation plan shall include specification of maintenance and monitoring requirements, which shall be implemented for a period of 5 years after project construction or after the vegetation has successfully established, as determined by a qualified plant ecologist or biologist. c) Plant material shall be consistent with surrounding native vegetation. d) The color of the wells, pipelines, reagent storage tanks, control structures, and utilities shall consist of muted, earth-tone colors that are consistent with the surrounding natural color palette. Matte finishes shall be used to prevent reflectivity. Integral color concrete should be used in place of standard gray concrete. e) The final revegetation plans and specifications shall be reviewed and approved by an architect, landscape architect, or allied design professional licensed in the State of California to ensure that the aesthetic mitigation design objectives and criteria are being met. Planting associated with biological mitigation may contribute to, but may not fully satisfy, visual mitigation. f) The requirements of the Aesthetics and Visual Resources Protection and Revegetation Plan (C/RAWP Appendix N) shall be implemented throughout the construction, operation and maintenance, and decommissioning phases of the Project, including	Less than Significant

TABLE 1-3
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		but not limited to replacement planting procedures (see Section 4.3), maintenance and adaptive management (see Section 5.2), and photo-monitoring (see Section 5.3). These measures apply to new Project components added as part of the Future Activity Allowance, should they be visible from Key View 5 or any of the other key views identified in the SEIR.	
Impact AES-2: Substantial Damage to Scenic Resources within a Scenic Corridor. The proposed Project could introduce new features in the Colorado River floodplain, at the TCS Evaporation Ponds, and near the existing HNWR-1A well site in Arizona that could adversely impact scenic resources within a scenic corridor.	Potentially Significant	**Mitigation Measure AES-2: Substantial Damage to Scenic Resources within a Scenic Corridor (Groundwater FEIR Measure with Revisions).** The proposed Project shall be designed and implemented to adhere to the design criteria presented below: a) A minimum setback requirement of 20 feet from the water (ordinary high water mark or OHWM) shall be enforced, except with regard to any required river intake facilities, to prevent substantial vegetation removal along the river bank. b) Existing mature plant specimens (i.e. medium- to large-sized trees, large or prominent shrubs, and tall predominately herbaceous plants) shall be protected in place during construction, operation, and decommissioning phases. The identification of plant specimens that are determined to be mature and retained shall occur as part of the design phase and mapped/identified by a qualified plant ecologist or biologist and integrated into the final design and project implementation consistent with CUL1a-5. c) Revegetation of disturbed areas within the riparian vegetation along the Colorado River shall occur concurrently with construction operations. Plans and specifications for revegetation shall be developed by a qualified plant ecologist or biologist before any riparian vegetation is disturbed. The revegetation plan shall include specification of maintenance and monitoring requirements, which shall be implemented for a period of 5 years after project construction or after the vegetation has successfully established, as determined by a qualified plant ecologist or biologist. d) Plant material shall be consistent with surrounding native vegetation. e) The color of the wells, pipelines, reagent storage tanks, control structures, and utilities shall consist of muted, earth-tone colors that are consistent with the surrounding natural color palette. Matte finishes shall be used to prevent reflectivity. Integral color concrete should be used in place of standard gray concrete. f) The final revegetation plans and specifications shall be reviewed and approved by an architect, landscape architect, or allied design professional licensed in the State of California to ensure that the	Less than Significant

TABLE 1-3
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		aesthetic mitigation design objectives and criteria are being met. Planting associated with biological mitigation may contribute to, but may not fully satisfy, visual mitigation. g) The requirements of the Aesthetics and Visual Resources Protection and Revegetation Plan (C/RAWP Appendix N) shall be implemented throughout the construction, operation and maintenance, and decommissioning phases of the Project, including but not limited to replacement planting procedures (see Section 4.3), maintenance and adaptive management (see Section 5.2), and photo-monitoring (see Section 5.3). These measures apply to new Project components added as part of the Future Activity Allowance, should they be visible from Key View 11 or any of the other key views identified in the SEIR.	
Impact AES-3: Substantial Degradation of Existing Visual Character or Quality. The proposed Project could introduce additional wells, roads, pipelines, and other associated infrastructure, including the Future Activity Allowance, which could substantially degrade existing visual character or quality.	Potentially Significant	Implement **Mitigation Measures AES-1 and AES-2**.	Less than Significant
Substantial Light and Glare. The proposed Project would not create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area.	Less than Significant	No mitigation measures required.	N/A
Air Quality and Greenhouse Gas Emissions			
Impact AIR-1: Short-term Construction-Related Emissions of Criteria Pollutants and Precursors. The proposed Project could violate the MDAQMD air quality standards for NO_X during construction activities.	Potentially Significant	**Mitigation Measure AIR-1: Short-Term Construction-Related Emissions of Criteria Air Pollutants (Groundwater FEIR Measure).** PG&E shall implement the fugitive dust control measures below for any construction and/or demolition activities: • Use periodic watering for short-term stabilization of disturbed surface area to minimize visible fugitive dust emissions during dust episodes. Use of a water truck to maintain moist disturbed surfaces and actively spread water during visible dusting episodes shall be considered sufficient; • Cover loaded haul vehicles while operating on publicly maintained paved surfaces; • Stabilize (using soil binders or establish vegetative cover) graded site surfaces upon completion of grading when subsequent development is delayed or expected to be delayed more than 30 days, except when such delay is caused by precipitation that dampens the disturbed surface sufficiently to eliminate visible fugitive dust emissions;	Less than Significant

TABLE 1-3
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		• Cleanup project-related track out or spills on publicly maintained paved surfaces within twenty-four hours; and • Curtail nonessential earth-moving activity under high wind conditions (greater than 25 miles per hour) or develop a plan to control dust during high wind conditions. For purposes of this rule, a reduction in earth-moving activity when visible dusting occurs from moist and dry surfaces due to wind erosion shall be considered sufficient to maintain compliance. **Mitigation Measure AIR-1a: Short-Term Construction-Related Emissions of Criteria Air Pollutants and Precursors (New Measure).** PG&E's construction contractor shall ensure that all off-road equipment with a horsepower greater than 50 horsepower have USEPA certified Tier 4 interim engines or engines that are certified to meet or exceed the NO_X emission ratings for USEPA Tier 4 engines. This measure excludes specialty construction equipment where Tier 4 interim engines cannot currently be obtained within the industry, or older equipment cannot be retrofitted to meet Tier 4 emissions standards. During construction and decommissioning, the construction contractor shall maintain a list of all operating equipment in use on the Project site. The construction equipment list shall state the makes, models, and numbers of construction equipment on-site. For specialty equipment where Tier 4 interim engines are not available, documentation supporting this conclusion shall be included in the equipment files. Once Tier 4 equipment is available for a piece of specialty equipment, it shall be incorporated into the construction fleet, replacing the existing non-Tier 4 piece of equipment. Equipment shall be properly serviced and maintained in accordance with the manufacturer's recommendations. Construction contractors shall also ensure that all nonessential idling of construction equipment is restricted to five minutes or less in compliance with California Air Resources Board's Rule 2449.	
The proposed Project would not violate MDAQMD air quality standards for PM_{10} or other criteria pollutants during construction activities.	Less than Significant	No mitigation measures required.	N/A
Long-term Operational-Related (Regional) Emissions Criteria Pollutants and Precursors. The proposed Project would not violate the MDAQMD air quality standards for any criteria pollutant during operational activities.	Less than Significant	No mitigation measures required.	N/A
Long-term (Regional Emissions of Greenhouse Gases. The proposed Project would not generate greenhouse gas emissions that would have a significant impact on the environment, nor would it conflict with applicable plans, policies, or regulations adopted for the purposes of reducing	Less than Significant	No mitigation measures required.	N/A

TABLE 1-3
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
GHG emissions.			
Impact AIR-2: Result in a Cumulatively Considerable Net Increase. The proposed Project could result in a cumulatively considerable net increase in criteria pollutant emissions with respect to NOx emissions during construction activities.	Potentially Significant	Implement **Mitigation Measure AIR-1a.**	Less than Significant
The proposed project would not result in a cumulative considerable net increase in any other criteria pollutant emissions.	Less than Significant	No mitigation measures required.	N/A
Long-Term Operations Related to (Local) CO Emissions. The proposed Project would not expose sensitive receptors to substantial pollutant concentrations.	Less than Significant	No mitigation measures required.	N/A
Short-Term Construction-Related and Long-Term Operational-Related Emissions of TACs. The proposed Project would not expose sensitive receptors to substantial TAC pollutant concentrations.	Less than Significant	No mitigation measures required.	N/A
Biological Resources			
Impact BIO-1: Potential Fill of Wetlands and Other Waters of the United States/California, and Disturbance or Removal of Riparian Habitat. Implementation of the proposed Project could result in disturbance to ephemeral waters under USACE and CDFW jurisdiction.	Potentially Significant	**Mitigation Measure BIO-1: Potential Fill of Wetlands and Other Waters of the United States and Disturbance or Removal of Riparian Habitat (Measure Completed – no longer applicable).** **Mitigation Measure BIO-1a: No-net-loss of Jurisdictional Wetlands/Waters Function or Value (New Measure).** Unavoidable direct impacts to jurisdictional areas shall be documented by a wetland specialists or Field Contact Representative (FCR) during implementation of the proposed Project. To document unavoidable direct impacts, the extent of work areas near jurisdictional areas shall be delineated in the field using GPS technology and pre- and post-impact conditions of jurisdictional areas documented with photographs. The nature of construction within work areas shall also be described, including the Project facilities installed, equipment utilized, and duration of construction activities. Documentation of unavoidable impacts shall be submitted to CDFW and DTSC to ensure adequate mitigation is provided consistent with the requirements below. Unavoidable direct impacts to non-disturbed jurisdictional ephemeral waters (estimated at up to approximately 1.61 acres including direct impacts resulting from planned facilities and additional facilities constructed under the Future Activity Allowance) shall be mitigated to ensure no-net-loss of function or value. Mitigation shall include both (a) and (b) detailed below. Mitigation for ground disturbance associated with restoration and enhancement activities shall not be required. a) In-place restoration of jurisdictional areas directly impacted by	Less than Significant

TABLE 1-3
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		construction at a 1:1 ratio (i.e., 1 acre of restoration for each acre of direct impact to non-disturbed jurisdictional area) shall occur. In-place restoration of areas directly impacted during construction will occur in two phases. The first phase will involve restoration within the areas directly impacted by construction where it will not interfere with continued operation and maintenance of the proposed Project (e.g., restoration of temporary construction work areas). The first phase of restoration shall begin within 1 year of completing construction. The second phase will involve restoration of areas that will be occupied by Project facilities to occur following decommissioning of the proposed Project. Restoration of jurisdictional areas following decommissioning of the proposed Project will be guided by a Final Habitat Restoration Plan (refer to Mitigation Measure BIO-1b). b) To address temporal loss of jurisdictional areas directly impacted by construction, PG&E shall provide compensatory mitigation at a minimum 2:1 ratio (2 acres of compensation for each acre of direct impacts to non-disturbed jurisdictional area). Compensatory mitigation to address temporal loss shall be agreed upon with CDFW prior to the start of construction, involve the same amount and quality of jurisdictional area(s) disturbed, and include one or more of the following approaches: 1) acquisition and preservation in perpetuity; 2) restoration; and/or 3) enhancement. Acquisition and preservation may include establishment of a conservation easement or purchase of credits from a CDFW-approved mitigation banking program. Restoration may include conversion of non-wetland habitat to functioning wetland habitat. Enhancement may include removal of non-native species in existing wetland habitat. As summarized in the technical memorandum, *Assessment of Proposed Mitigation Planting Areas for Final Groundwater Remedy Impacts,* included as Appendix V to the C/RAWP (CH2M Hill 2015b), PG&E has identified restoration areas within the historical floodplain of the Colorado River. The historical floodplain no longer functions as a riparian habitat with hydrologic connectivity to the river; therefore, restoration in the historical floodplain may qualify as compensatory mitigation to address temporal loss if hydrologic function can be restored. PG&E shall prepare a mitigation plan prior to the start of construction to specify methodology, success criteria, and monitoring and reporting for compensatory mitigation. The plan shall be subject to CDFW approval and in conformance with the identified performance standards, and submitted to DTSC, BLM, BOR, USFWS, and DOI for review, as appropriate based on location of impacts.	

TABLE 1-3
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		Restoration of jurisdictional areas within the Project Area shall be guided by the *Havasu National Wildlife Refuge Habitat Restoration* Plan (Appendix G to the C/RAWP [CH2M Hill 2015b]) and *Habitat Restoration Plan for Riparian Vegetation and Other Sensitive Habitats* (Appendix O to the C/RAWP [CH2M Hill 2015b]), as approved by CDFW, USFWS, and DOI. Implementation of these plans will be informed by the technical memorandum, *Assessment of Proposed Mitigation Planting Areas for Final Groundwater Remedy Impacts*, included as Appendix V to the C/RAWP (CH2M Hill 2015b), which provides preliminary information on the condition within fourteen proposed mitigation planting areas. The habitat restoration plans also specify on-site restoration success criteria, monitoring and reporting requirements, and adaptive management guidelines for salvage and replanting of trees, shrubs, and perennial species. In accordance with the habitat restoration plans, removal of riparian trees (e.g., palo verde trees) shall be replaced at a 3:1 ratio (i.e., planting 3 trees in restoration areas for each tree removed during construction). The success criteria for mitigation plantings shall be a final minimum plant replacement ratio of 2.25:1 (75% overall survival rate) of mitigation plantings at the end of a minimum 5-year monitoring period. Adaptive management guidelines outline modifications to restoration approaches, as appropriate, to ensure successful establishment of native vegetation and desired density of cover of plants. As required by the plans, the following adaptive management actions shall be implemented if success criteria are not being met: weed control, irrigation modification, herbivory protection, and additional plantings. Reporting to DTSC, CDFW, and USFWS shall be completed within 90 days of completing each monitoring year. The habitat restoration plans also specify design and construction avoidance and minimization measures, including: • Locating pipelines, wells, and staging and storage areas along roadways, pipeline rights-of-way, and other previously disturbed areas to avoid impacts to vegetation to the extent feasible. • Performing pre-activity surveys prior to ground disturbance to identify and demark with flagging, fencing, and/or signage areas of native vegetation and sensitive habitats in the immediate vicinity of the construction areas. • Providing construction workers with environmental awareness training regarding biological resources including sensitive species and habitats. **Mitigation Measure BIO-1b: Final Habitat Restoration Plan (New Measure).** A final habitat restoration plan shall be developed and implemented following decommissioning of the proposed Project. The final habitat restoration plan will address restoration of areas that were impacted	

TABLE 1-3
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		during construction, operation and maintenance, and decommissioning of the proposed Project, specifying salvage/replanting measures, as well as success criteria, monitoring, and adaptive management requirements for restored areas. Success criteria for restoration areas will be similar to that identified in the existing habitat restoration plans (i.e., 75% overall survival rate of mitigation plantings at the end of a minimum 5-year monitoring period). Adaptive management actions to ensure successful establishment of native vegetation and desired density of cover of plants will include weed control, irrigation modification, herbivory protection, and additional plantings. The plan shall be submitted to DTSC, CDFW, BLM, BOR, USFWS, and DOI for review.	
Impact BIO-2: Direct Disturbance of and Loss of Habitat for Special-Status Birds, Desert Tortoise, Ring-Tailed Cat, Nelson's Bighorn Sheep, Special-Status Bats, Northern Mexican Gartersnake, and Special-Status Plants. Implementation of the proposed Project could affect special-status species either directly or through habitat modifications.	Potentially Significant	**Mitigation Measure BIO-2a: Disturbance of Special-Status Birds and Loss of Habitat (Groundwater FEIR Measure with Revisions).** The proposed Project has been designed to minimize removal of habitat for special-status birds. Impact avoidance and minimization measures required by the BIAMP shall be implemented (refer to Appendix S of the C/RAWP [CH2M Hill 2015b]). Avoidance and minimization measures required by the BIAMP include prohibiting construction near or in special-status bird habitat; limiting construction during the breeding seasons; requiring an on-site biological monitoring during field activities; implementing buffers around active nests to the extent practical and feasible to limit noise and visual disturbances; and conducting worker awareness training and monitoring to assess the activity effect, ambient activities, site conditions, and bird behavior to determine the efficacy of nest avoidance buffers. **Mitigation Measure BIO-2b: Disturbance of Desert Tortoise and Loss of Habitat (Groundwater FEIR Measure with Revisions).** To the extent feasible, project construction (including planned facilities and those potentially constructed as part of the Future Activity Allowance) shall be designed to minimize removal of habitat for the desert tortoise. Before any ground-disturbing project activities begin, a qualified desert tortoise biologist shall identify potential desert tortoise habitat in areas that could be affected. Through coordination with the designated qualified biologist, PG&E shall ensure that the footprints of Project elements and construction zones, staging areas, and access routes are designed to avoid direct or indirect effects on potential desert tortoise habitat to the extent feasible. Through coordination with the designated qualified biologist, PG&E shall ensure that the footprints of Project facilities and construction zones, staging areas, and access routes are designed to avoid direct or indirect effects on potential desert tortoise habitat to the extent feasible. In areas where impacts to potential desert tortoise habitat are unavoidable, measures outlined in the PBA and in the USFWS letter concurring with the PBA, shall be implemented, as described below. A qualified desert tortoise biologist shall conduct pre-activity desert tortoise clearance surveys immediately prior to activities that would result in	Less than Significant

TABLE 1-3
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		unavoidable impacts to tortoise habitat. The pre-activity survey will occur immediately prior to ground-disturbance. Pre-activity clearance surveys shall be in full accordance with the substantive requirements of USFWS protocols. Any desert tortoise burrows and pallets outside of, but near, work areas shall be flagged so that they may be avoided during work activities. At conclusion of work activities, all flagging shall be removed. Should any live tortoises be found during the clearance survey, or if a tortoise moves into the work area, all work shall stop immediately and the animal shall be left to move out of the work area on its own accord. To the extent feasible, tortoises shall not be handled. PG&E will have a USFWS-approved desert tortoise handler available if and when a tortoise requires active relocation. USFWS shall be contacted prior to handling any live tortoises. All encounters of desert live desert tortoises shall be reported to USFWS, BLM, CDFW, and DTSC. Information to be reported will include for each individual: the location (narrative, vegetation type, and maps) and date of observation; general conditions and health; any apparent injuries and state of healing; and diagnostic markings. PG&E shall designate a field contact representative (FCR) who will be responsible for overseeing compliance with proper execution of the mitigation measures. The FCR will be on-site during implementation of all ground disturbing activities. The FCR shall be trained by the qualified desert tortoise biologist and have authority to halt activities that are in violation of the mitigation measures/or pose a danger to listed species. The FCR will have a copy of the mitigation measures and may be a project manager, PG&E representative, or qualified biologist. All employees and contractors shall be required to attend a worker awareness training prior to working on the proposed Project. The FCR shall maintain record of all employees and contractors who have completed the worker awareness training. USFWS may identify additional conservation measures should Project plans change, or if new information regarding the distribution or abundance of desert tortoise becomes available. PG&E shall implement any additional conservation measures identified by USFWS through the Section 7 consultation process. **Mitigation Measure BIO-2c: Disturbance of Special-Status Species and Loss of Habitat Caused by Decommissioning (Groundwater FEIR Measure with Revisions).** To avoid impacts on special-status species that may occur within the project area as a result of decommissioning activities, an Avoidance and Minimization Plan shall be developed and implemented through consultation with CDFW, BLM, and USFWS. The Avoidance and Minimization Plan will specify species-specific measures, including seasonal restrictions for decommissioning activities (i.e., avoidance of the avian breeding season and maternity roosting season for bats where habitat exists) as needed, as well as avoidance buffers around known locations of special-	

TABLE 1-3
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		status species or their habitats. Avoidance and minimization measures identified in the plan shall be based on surveys conducted prior to decommissioning, and during the breeding season (as previously defined in the Groundwater FEIR for each species or suite of species). To the extent appropriate, the Avoidance and Minimization Plan for decommissioning activities will include applicable measures identified in the existing BIAMP and PBA. Restoration of any disturbed areas shall include measures to achieve no net loss of habitat functions and values existing before project implementation. These measures shall be achieved by developing and implementing a final habitat restoration plan (refer to Mitigation Measure BIO-1b). The plan shall include a revegetation seed mix or plantings design, a site grading concept plan, success criteria for restoration, a monitoring plan for achieving no net loss of habitat values and functions, and an adaptive management plan. Success criteria for restoration areas will be similar to that identified in the existing habitat restoration plans (i.e., 75% overall survival rate of mitigation plantings at the end of a minimum 5-year monitoring period). Adaptive management actions to ensure successful establishment of native vegetation and desired density of cover of plants will include weed control, irrigation modification, herbivory protection, and additional plantings. The final habitat restoration plan shall be submitted to DTSC, CDFW, BLM, BOR, USFWS, and DOI for review. **Mitigation Measure BIO-2d: Disturbance to Ring-Tailed Cat Individuals and Habitat (New Measure).** The following measures shall be implemented to avoid and minimize impacts to ring-tailed cat: i. Pre-activity surveys for ring-tailed cats shall be conducted by a qualified biologist with species-specific experience prior to the start of ground disturbing activities (including during construction, operation and maintenance, and decommissioning phases) where suitable denning habitat is present. No activities that will result in disturbance to dens or individual ring-tailed cats will proceed prior to completion of the surveys. If no active dens are found, no further action is needed. If a ring-tailed cat den is present, additional measures shall be implemented as outlined below, and the CDFW shall be notified of any active dens within the proposed disturbance area. ii. If an active ring-tailed cat den is found during pre-activity surveys, Project facilities that may result in direct impacts to the active den shall be reconfigured to avoid the loss of the den if feasible. If Project facilities cannot be modified to avoid a den, activities with the potential to disturb the den shall cease and CDFW shall be contacted immediately. If approved by CDFW, demolition of the den site shall commence only outside of the breeding season (February 1 to August 30) when the den has been confirmed to be vacated. If	

TABLE 1-3
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		an occupied non-breeding den is found in an area scheduled to be impacted, prior to disturbance, the CDFW shall be notified to review and approve the proposed procedures to ensure that no take of the species occurs as a result of the action. Areas with unoccupied dens that need to be removed shall first be disturbed at dusk, just prior to removal that same evening, to allow adult ring-tailed cats to escape during the darker hours. **Mitigation Measure BIO-2e: Disturbance of Nelson's Bighorn Sheep (New Measure).** If a Nelson's bighorn sheep is observed during ground-disturbing activities (including during construction, operation and maintenance, and decommissioning phases), work within 125 feet of individuals shall be halted (CDFW 2016). Project activities can recommence after the bighorn sheep moves more than 125 feet away on its own. If proximity of Nelson's bighorn sheep to a proposed construction area may result in construction delays, PG&E shall contact CDFW prior to proceeding with ground disturbing activities to determine an appropriate course of action. **Mitigation Measure BIO-2f: Disturbance or Loss of Special-status Bat Species (New Measure).** Bats occupying Roost 9 (refer to Figure 4.3-7) shall be safely excluded after the maternity season (which ends August 31) and before bats go into hibernation or torpor (which begins October 31) through the use of a one-way door. Exclusion of bats shall be performed by a biologist holding a Memorandum of Understanding from CDFW to handle bats in California or a biologist otherwise licensed by the State of California to do so. After bats are safely excluded, fast drying foam shall be used to fill the void to prevent bats from re-entering the cavity. To the extent possible, ground disturbance within proximity of suitable maternity roosting habitat for special-status bat species as shown in Figure 4.3-7 should occur outside the maternity season (March 15 through August 31). If activities critical to meeting the Project objectives are determined necessary during the maternity season, measures (i) through (v) below will be implemented. Measures (i) through (v) are not required for activities implemented outside the maternity season. i. High- and low-frequency noise disturbance shall be minimized by establishing avoidance buffers around known roost locations. Required buffer distance will vary by roost site and noise source. Table 4.3-5 provides buffer requirements for known roosting sites and noise source. Note, vehicles and heavy equipment may travel under the railroad bridges on National Trails Highway as these vehicles are generally moving quickly and are not expected to create much frequency noise while passing under the bridges. ii. To minimize potential effects to bats during nighttime activities, the Project must reduce or eliminate light levels at night. If artificial	

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SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		lighting at night is needed, floodlights shall be adjusted so that the angle of the beam is less than 70 degrees and directed away from roost sites. All nighttime lights shall be directed downward if possible. If lighting is required for minimum safety and security purposes, light barriers shall be used to reduce the potential for light to reach roosts. For example, if lights are needed to ensure safety of a work area, the light could be positioned so that a hillside blocks the light reaching the roosts sites. Smaller barriers, such as plywood sheeting, can be used, but lighting shall not surround a roost within the given buffer zones. Lights with high blue-white or ultraviolet content shall be avoided. When using nighttime lighting a buffer of 250 feet shall be maintained between every light source near roost sites 2 through 9, and a buffer of 400 feet shall be maintained near roost sites 1 and 10 (Table 4.3-5). iii. To minimize effects of increased human activities, pedestrians shall not approach active roosts during the maternity season, and a 65-foot buffer shall be maintained between roosts and foot traffic. iv. To minimize air quality degradation near roosts, stationary heavy equipment vehicles, large generators, and large idling trucks producing diesel exhaust shall not operate for more than 2 minutes within 250 feet of a bat roost (Table 4.3-5). Vehicles shall not idle their engine while under a bridge. v. A biological monitor shall be on-site during ground disturbing activities within proximity of roosts to ensure avoidance and minimization measures (including avoidance buffers) are properly implemented. Because roosting bats, including maternity colonies, switch roosts especially on a season-by-season basis, roost locations shall be identified by a qualified biologist specializing in bats at least once each for the spring and summer periods of the maternity season once every 3 years. Additionally, because western red bats could potentially breed in the large tamarisk groves located in Arizona, acoustic surveys for a minimum of three consecutive nights during fair weather (above 50 degrees Fahrenheit, no rain or high winds) during the summer maternity season shall occur once every 3 years. If western red bats are recorded acoustically, an attempt to locate active roost sites shall occur to establish appropriate buffer zones around each roost. If known roost sites do not change locations after three sets of surveys (over the course of 9 years) roosts shall be surveyed for spring and summer periods once every 5 years thereafter. Avoidance and minimization measures described (i) through (v) shall be implemented when activities are planned near newly discovered roosting locations between March 15 and August 31.	

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SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		Table 4.3-5 Bat Roost Buffer Distances Per Equipment Category[1]	

Roost Site	Buffer Distance (feet) by Equipment Category[2]					
	Construction Trucks and Heavy Equipment	Small Vehicles	Drilling, Trenching, and Light Equipment	Light Source	Pedestrian Traffic and Water Sampling Equipment	Stationary Diesel Sources > 2 minutes
1	120	90	150	400	65	250
2	90	65	150	250	65	250
3	90	65	150	250	65	250
4	90	65	150	250	65	250
5	90	65	150	250	65	250
6	90	65	150	250	65	250
7	90	65	150	250	65	250
8	90	65	150	250	65	250
9	90	65	150	250	65	250
10	90	65	150	250	65	250
Hypothetical Townsend's big-eared bat roost	400	200	200	400	200	250

[1] Roost buffers shall be implemented when ground disturbing activities are scheduled to occur during the maternity season (March 15 through August 31). Roost buffers are not needed for activities occurring outside the maternity season.

[2] Equipment Categories (see Appendix BOD for more detail):
Construction Trucks and Heavy Equipment/Stationary Diesel Exhaust Sources: e.g., dump trucks, 18-wheeled flatbed trucks, front-end loaders, water trucks.
Small Vehicles: e.g., pick-up trucks, UTVs.
Drilling, Trenching, and Light Equipment: e.g., excavators, backhoes, road graders, drill rigs, trenching machines.
Pedestrian Traffic and Water Sampling Equipment: e.g., hand tools, water quality instruments.
Source: H.T. Harvey & Associates 2016

Mitigation Measure BIO-2g: Disturbance of Northern Mexican Gartersnake (New Measure). The following measures shall be implemented for activities undertaken within 600 feet of potential northern Mexican gartersnake habitat at the southern end of Topock Marsh in Arizona. These measures are additional to the general measures required by Section 3.4 of the PBA (included as Appendix U to the C/RAWP).

1. Workers shall exercise caution when traveling near potential gartersnake habitat along the southern margin of Topock Marsh.

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SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		During the most-active season for northern Mexican gartersnakes (February 1st to November 30th), workers will not exceed 10 mph when traveling off-road to maximize the likelihood that gartersnakes would be seen and avoided by drivers. During the inactive season (December 1st to January 31st) workers will not exceed 25 mph when traveling off-road. Construction personnel will abide by the posted speed limit while traveling on the Oatman-Topock Highway. 2. Work will stop if a gartersnake is found within the immediate area to be disturbed and the gartersnake will be allowed to leave the site on its own volition. 3. A qualified biologist shall perform preconstruction surveys prior to ground disturbing activities with the intention of identifying potential microhabitat sites (artificial or natural cover such as debris, wood, or rock piles, wildcat dump sites, high rodent burrow densities, etc.) favorable to gartersnakes in the disturbance area to focus search effort for potential gartersnakes. 4. When possible, ground disturbing activities should be avoided when snakes may be inactive and underground, in order to avoid injury to snakes. Construction will be completed when the northern Mexican gartersnake is active (February1st through November 30th). 5. Material stockpiles located near the southern margin of Topock Marsh shall be limited to designated storage areas that are more than 600 feet from potentially suitable northern Mexican gartersnake habitat or on the opposite side of the Oatman Highway. 6. All open holes and trenches shall be inspected for trapped gartersnakes at the beginning, middle, and end of the work day, at a minimum. During excavation of trenches and to the extent possible, earthen ramps or wooden planks shall be provided to facilitate the escape of any wildlife species that may inadvertently become entrapped and to leave the site on its own volition (adapted from General Project Management Measure Number 17 of the PBA [Appendix U to the C/RAWP (CH2M Hill 2015b)]). **Mitigation Measure BIO-2h: Disturbance of Special-Status Plants (New Measure).** To reduce potential construction-related impacts to populations of mousetail suncup and other potentially occurring special-status plant species, at least one pre-construction survey shall be conducted prior to the start of any ground-disturbing activities in areas of suitable habitat. The survey shall be conducted in areas where construction is planned and during the blooming period of those species which are either known to occur or likely to occur in the area (i.e., generally March through May but dependent on rainfall patterns). The survey shall be conducted by a qualified botanist skilled at identification of the plant species in the region. The qualified botanist shall	

TABLE 1-3
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		determine where pre-construction surveys are required based on existing habitat conditions. The locations of identified special-status plants shall be flagged and mapped using GPS, and an avoidance buffer of at least 50 feet shall be established identified locations to ensure no direct or indirect impacts occur. To the maximum extent feasible, additional Project facilities to be constructed under the Potential Future Activity Allowance shall be sited to avoid suitable habitat for special-status plant species. If additional Project facilities to be constructed under the Potential Future Activity Allowance cannot be sited to avoid suitable habitat, one of the following measures shall apply. • Assume suitable habitat is occupied by special-status plant species and provide mitigation (as prescribed in (i) through (iii) below); or • Verify absence or avoidance of individuals by performing focused presence/absence surveys within the suitable habitat to be impacted. Verification of presence/absence shall require data from at least 2 years of focused surveys within the previous 5 years. Focused presence/absence surveys shall be performed by a qualified botanist during the blooming period of potentially occurring species (i.e., generally March through May but dependent on rainfall patterns). If special-status plant species are observed and avoidance cannot be achieved, mitigation shall be provided (as prescribed in (i) through (iii) below). Results of all surveys performed following construction of the Proposed Project shall be incorporated onto a comprehensive map of suitable habitat and known rare plant populations within the Project Area. If disturbance within 50 feet of a special-status plant species cannot be avoided, PG&E shall contact CDFW prior to removing individuals to determine appropriate minimization and mitigation measures. Such measures may include, but may not be limited to, the approaches listed below. PG&E shall not proceed with ground disturbing activities that may directly or indirectly impact areas within 50 feet of special-status plants without first conferring with CDFW. The appropriate means to mitigate unavoidable impacts shall be determined based on coordination with CDFW while taking into account the nature and extent of unavoidable impacts and the species' rarity and known distribution within the Project Area. Mitigation may include a combination of the approaches outlined below, or other approaches determined by CDFW to sufficiently mitigate the impact. To the extent possible, mitigation of unavoidable impacts to special-status plants may occur in conjunction with mitigation for temporal loss of jurisdictional wetlands and waters.	

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SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		i. *Seed Collection for Restoration*: Seed from individuals to be impacted would be collected prior to ground-disturbing activities. The seed would be collected following the protocols set forth by the Center for Plant Conservation and, if long-term storage is necessary, placed in a secure seed bank facility such as the Agricultural Research Service National Center for Genetic Resources Preservation in Fort Collins, Colorado. Collected seed would be applied to restoration areas within the Project Area. Restoration plans developed for the proposed Project would be revised to include success criteria for restoration of the special-status plant species to ensure successful re-establishment of the impacted species. Success criteria for impacted special-status plants would be developed through coordination with CDFW. ii. *Enhancement of Known Populations*: Known populations of the species to be impacted would be enhanced by undertaking actions to increase the size of the known population. Such actions may include improving the quality of occupied habitat (e.g., invasive species removal) and/or seeding to facilitate population expansion. Enhancement of known populations may occur at off-site populations that are currently conserved or within the occupied portions of the Project Area that can be conserved. An enhancement plan for impacted special-status plants would be developed through coordination with CDFW. The plan shall be approved by CDFW and submitted to DTSC, BLM, BOR, USFWS, and DOI for review. iii. *Preservation of Occupied Habitat*: Habitat occupied by the species to be impacted would be permanently protected by establishing a conservation easement. PG&E would coordinate with CDFW to determine the conditions of the conservation easement, including the required acreage of occupied habitat to be conserved and requirement monitoring and management of the conserved population. The agreed upon conditions would be detailed in a mitigation plan for impacted special-status plants. The plan shall be approved by CDFW and submitted to DTSC, BLM, BOR, USFWS, and DOI for review.	
Impact BIO-3: Fish Mortality, Interference with Spawning Habitat, and Other Adverse Aquatic Effects. Increased sedimentation and turbidity, the release of contaminants, and standing during construction activities could also adversely affect fish habitat and movement in the Colorado River.	Potentially Significant	Implementation of **Mitigation Measure HYDRO-1**.	Less than Significant
Impact BIO-4: Substantial Interference with Fish or Wildlife Movement Corridors or Nursery Sites. The Project	Potentially Significant	Implementation of **Mitigation Measure BIO-2f**.	Less than Significant

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Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
could impede the use of bat maternity roosts, which are considered a type of native wildlife nursery site. Modifying, destroying or impeding the use of active maternity roosts of special-status bat species could result in substantial interference to the species reproduction and distribution.			
Cultural Resources			
Impact CUL-1: Cause Substantial Adverse Change in the Significance of a Historical Resource as Defined in CEQA Guidelines Section 15064.5. Construction, operation and maintenance, and decommissioning activities of the proposed Project could result in substantial adverse changes to historical resources in the Project Area, including the (1) the Topock TCP; (2) other historical resources listed in Table 4.4-2, and (3); historical resources that could be identified during construction. Impacts could occur through ground disturbance and other Project-related activities or through the introduction of out-of-character visual or auditory intrusions to historical resources that gain their significance in part because historical associations or aesthetic values. This impact would be **potentially significant**, as previously identified in the Groundwater FEIR.	Potentially Significant	**CUL-1a-1: Avoidance and Preservation in Place (Groundwater FEIR Measure with Revisions).** During the construction, operation and maintenance, and decommissioning phases of the Project, PG&E shall carry out and require all subcontractors to carry out all Project activities in ways that avoid, minimize, and mitigate significant impacts resources associated with the Topock TCP, consistent with the CEQA Guidelines and with Stipulation I.B of the PA and Section 7.1 of the CHPMP, and to the maximum extent feasible as determined by DTSC, in coordination with PG&E, Interested Tribes, and respective landowners. **CUL-1a-2: Develop Tribal Access Plan (Measure Completed – Tribal Access Plan attached as Appendix P of the C/RAWP).** **CUL-1a-2a: Implement Tribal Access Plans (New Measure).** During the construction, operation and maintenance, and decommissioning phases of the Project, on non-federal land, Tribal access shall be permitted in a manner consistent with Section 2.1 "*Protocols for Continued Tribal Coordination*" of the CIMP (as described below in Mitigation Measure CUL-1a-8q) and "*Protocol to Preserve Tribal Member's Access to, and Use of, the Project Area*" as included in Appendix P of the C/RAWP, and on federal land, Tribal access will be governed by the provisions of Appendix B "*Tribal Access Plan*" of the CHPMP. Procedures required by Appendix P of the C/RAWP include protocols and timelines for requesting access for religious, spiritual, or other cultural purposes and notification procedures (for additional details on requirements of the CIMP see below Mitigation Measure CUL-1a-8q, Section 2.11). Procedures required by Appendix B of the CHPMP include allowing Interested Tribes to access federal lands without specific authorization for the purposes of collecting materials (such as plants and minerals) or for traditional or ceremonial noncommercial uses; protocols for obtaining access permission for other purposes (such as larger or overnight gatherings); privacy measures that prohibit recording Tribal activities; and closure of some areas and roads to public access. **CUL-1a-3: Site Security (Groundwater FEIR Measures with Revisions).** During construction, operation and maintenance, and decommissioning of the Project, PG&E shall enhance existing measures to prevent and reduce incursions from recreational and/or other outside users from affecting unique	Significant and Unavoidable

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Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		archeological and historically significant resources, including resources within the Topock TCP, by implementing Measures CUL-1a-3a, -3c, -3d, and -3e: **CUL-1a-3a: Professional Qualifications and Annual Historical Resource Condition Inspection (Groundwater FEIR Measure with Revisions).** PG&E's approved Qualified Cultural Resource Consultant shall carry out all cultural resources work associated with the Project and implement the Mitigation Monitoring and Reporting Program (MMRP). Cultural resources consulting staff shall meet, or be under the direct supervision of individuals meeting, the minimum professional qualifications standards set forth by the Secretary of the Interior (codified in 36 CFR Part 61; 48 FR 44739), as provided in Stipulation XI.A of the PA. In the event that PG&E needs to retain a new Qualified Cultural Resource Consultant, or additional cultural consultants, DTSC shall have approval authority over PG&E's selection of cultural resources consultants. During construction, operation and maintenance, and decommissioning of the Project, the Qualified Cultural Resources Consultant shall conduct yearly condition inspections of documented historical resources (as identified in Table 4.4-2 of this SEIR, as well as any future resources identified within the Project Area, and any additional resources that the BLM requests be included in the annual condition inspections), including inspections of the Topock TCP, to determine if substantial adverse changes have occurred relative to the condition of the historical resources during the past year. Inspections may occur less frequently or may be limited in geographic scope upon approval by DTSC and in coordination with PG&E, Interested Tribes, and BLM. PG&E shall offer to retain a Tribal monitor at historic rates of compensation or Tribal representatives designated by the Tribal Council or chairperson, if so requested, to accompany the Qualified Cultural Resources Consultant during the condition inspections. Historical resources condition inspection reports in the established format shall be prepared documenting the results of the inspection. PG&E shall provide reports to DTSC and the Interested Tribes for review and comment in accordance with Section 6.6.5 "Periodic Site Monitoring" of the CHPMP. Based on the results of the report, DTSC may request that PG&E initiate a meeting with agencies and Interested Tribes to discuss the findings within 30 days of submittal of the reports. **CUL-1a-3b: Develop Site Security Plan (Measure Completed – Site Security Plan attached as Appendix Q of the C/RAWP).** **CUL-1a-3c: Coordination with BLM and San Bernardino County (Groundwater FEIR Measure with Revisions).** PG&E shall continue to coordinate with BLM and San Bernardino County to facilitate outreach to the staff at Moabi Regional Park, requesting that they communicate to visitors the parts of the Project Area that are off limits to off-road vehicle usage because of health and safety concerns, public lands management plans, or landowner requests. PG&E shall make a good faith effort to involve Interested Tribes in	

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Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		this outreach effort, providing Interested Tribes with the opportunity to comment on outreach materials or provide a Tribal representative the opportunity to participate in the outreach activities. As part of this outreach effort, PG&E shall work with Moabi Regional Park and offer to design, develop, and fund the installation of an informational display (e.g., bulletin board, kiosk) within Moabi Regional Park that informs visitors of the work being done in connection with the Project. As provided in Appendix P of the C/RAWP, PG&E shall use information gathered during previous meetings with BLM, San Bernardino Regional Parks Department, Moabi Regional Park concessionaires, and Interested Tribes to facilitate the execution of visitor outreach materials. PG&E shall develop draft visitor outreach materials; develop a draft training session for Moabi Regional Park visitor-contact employees; develop display design concepts and draft informational content; and develop a draft plan for executing other outreach ideas identified during meetings. Once initial materials and plans are drafted, PG&E shall consult with the BLM, San Bernardino Regional Parks Department, Moabi Regional Park concessionaires, and Interested Tribes and provide these stakeholders an opportunity to review and comment on any outreach plan prior to its implementation. PG&E shall initiate conversations with key stakeholders (i.e., BLM, San Bernardino County, Moabi Regional Park, and Interested Tribes) within six months of approval of the Final Remedy Design. In addition to Appendix P of the C/RAWP, PG&E shall complete and implement outreach materials and plans prior to the start of construction. Materials shall be reviewed by PG&E at each phase of the Project and may be updated with input from Interested Tribes and with approval by DTSC, as the Project progresses. **CUL-1a-3d: Signage (Groundwater FEIR Measure with Revisions)**. PG&E shall post signage to indicate those parts of the Project Area that are off limits to off-road vehicle usage due to possible health and safety concerns and to reduce potential damage to environmental resources. If agreed to by land owners and/or local, state, or federal management entities within the Project Area, PG&E shall work with the relevant land owner or land management entity to develop, design, and fund the installation of easily visible and clear signage. This may include coordination with BLM to install signage noting the designation of the area as an Area of Critical Environmental Concern owing to its biological and cultural resources, while ensuring that signs are placed in a way that does not draw unwanted attention to specific resources. As provided in Appendix P of the C/RAWP, PG&E shall initiate conversations with key stakeholders (i.e., BLM, San Bernardino County, Park Moabi) within six months of the final approval of the Final Remedy Design. In addition to requirements set forth in Appendix P of the C/RAWP, PG&E	

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Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		shall install signage prior to the start of construction, if possible, dependent on cooperation and input from land owners and land management entities. **CUL-1a-3e: Site Security (New Measure)**. Site security procedures shall be implemented in a manner consistent with the Site Security Plan (C/RAWP Appendix Q). The Site Security Plan includes, but is not limited to, protocols for regular inspections of the Project Area during working and non-working hours; ensuring construction zones and protective measures are being maintained; ensuring personnel use designated travel routes and parking areas; notification and reporting of outside disturbances to the environment; worker cultural resources sensitivity training; and visitor access controls. **CUL-1a-4: Technical Review Committee (Groundwater FEIR Measure with Revisions)**. PG&E shall work with representative members of the Interested Tribes to convene and retain a multidisciplinary panel of independent scientific and engineering experts as part of a Technical Review Committee (TRC). TRC may be called upon by the Interested Tribes to review Project-related documents and attend Project-related meetings. TRC efforts must be specific to that person's area of expertise and with the objective of advising interested tribal members on technical matters relating to the remedy design and its construction. The TRC shall be made up of not more than five multidisciplinary experts. The TRC shall include only persons with technical expertise limited to geology, hydrology, water quality, engineering, paleontology, toxicology, chemistry, or biology. TRC members shall be retained at rates comparable to those paid historically to tribal experts by PG&E. TRC members shall be selected by majority vote amongst participants from the Interested Tribes. For the purposes of contracting, this grant may be awarded to one tribal government to manage or, alternatively, PG&E may reimburse the tribe or TRC members directly. The entirety of the monies shall be used to fund the scientific and engineering team exclusively, and shall not be used to fund other tribal government expenses or used to support legal counsel. A stipulation of the contract shall be that the scientific and engineering team shall provide all deliverables and results to all involved tribes, despite a possible contract agreement with only one tribe or with PG&E. Activities shall be reported to DTSC for review and to ensure PG&E is in compliance at least annually. Upon conclusion of the construction phase of the Project, the necessity of the TRC shall be assessed by DTSC, at which time the provision of the TRC may be extended, reduced, or terminated. During the operation and maintenance and decommissioning phases, the necessity of the TRC shall be periodically evaluated by DTSC. This is the same committee referenced by CR-1e-8 in the Topock Soil Investigation Project EIR and MMRP. **CUL-1a-5: Avoidance of Indigenous Plants of Biological and Cultural Significance (Groundwater FEIR Measure with Revisions)**. During construction, operation and maintenance, and decommissioning of the	

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Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		Project, should any indigenous plants of traditional cultural significance and listed in Appendix PLA of the Groundwater FEIR be identified within the Project Area, PG&E shall avoid, protect, and encourage the natural regeneration of the identified plants. In the event that impacts to the identified plants cannot be avoided and such plants are displaced, provisions included in the Plan for Culturally Significant Plants (Appendix A of the CIMP) shall be implemented. This mitigation measure is not meant to replace or subsume any actions required by state or federal entities with regard to the protection of species listed as rare, threatened, or endangered. Appendix A of the CIMP requires preconstruction surveys of works areas, staging areas, and access routes to identify and demarcate culturally significant plants; protocols for transplanting culturally significant trees and plants; protocols for salvaging topsoil for re-use during site rehabilitation to encourage regrowth of desert annuals; collecting seeds for future planting; protocols for replacement planting by container grown plants/trees; and future monitoring of transplanted trees and shrubs. **CUL-1a-6: Noise (Groundwater FEIR Measure with Revisions).** During construction, operation and maintenance, and decommissioning of the Project, all phone calls and alarms associated with remediation activities or facilities shall not be routed through PG&E's existing alarm system utilized at the Station. The notification system for remediation-related alerts and/or phone calls shall not introduce additional noise to the Project Area, to the maximum extent feasible, provided there is ongoing compliance with applicable safety regulations or standards of the Federal Energy Regulatory Commission, Occupational Safety and Health Administration, and other agencies. **CUL-1a-7: Nighttime Lighting (Groundwater FEIR Measure with Revisions).** During construction, operation and maintenance, and decommissioning of the Project, nighttime construction-related activities shall be limited to circumstances that require the continuation of work into the nighttime periods because it cannot be disrupted or suspended (including but not limited to conditions during drilling or concrete pouring) or work may require an early morning start to ensure completion within 1 day or because of heat constraints including with regard to personnel health and safety. To minimize lighting impacts, lighting shall include shrouding or shielding for portable lights, the use of the lowest allowable height and fewest feasible numbers of lights consisting of downward-facing fixtures fitted with cutoff shields to reduce light diffusion. No permanent light poles shall be installed. However, lighting would also be required to comply with the minimum county, state, and federal security and safety standards (as described in Appendix P – Cultural Resources Protocols). **CUL-1a-8 (a through p): Develop Cultural Impact Mitigation Program (CIMP) (Measure Completed – Cultural Impact Mitigation Program**	

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Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		attached as Appendix H of the C/RAWP). **CUL-1a-8q: Implement Cultural Impact Mitigation Program (New Mitigation Measure).** All activities related to the Final Remedy Design, as well as implementing the Future Activity Allowance, long-term operation and maintenance, and future decommissioning activities, shall be implemented consistent with provisions of the Cultural Impact Mitigation Program (CIMP). In addition to the parties listed in Section 2.15 of the CIMP as requiring consultation regarding discoveries and review of draft documents, DTSC shall also be included in these processes. PG&E, in consultation with the Interested Tribes, may amend the CIMP if protocols or procedures require modification due to unforeseen circumstances, as deemed necessary by DTSC. The CIMP, which is based upon Groundwater FEIR measures CUL-1a-8 (a through p), is summarized below. The text below is intended to provide a brief summary of the primary impact-reducing components of the CIMP, some of which reference the federal requirements of the PA and CHPMP (the CIMP, PA, and CHPMP may be amended or revised from time to time). Where this summary text differs from the CIMP (or the PA or CHPMP) or subsequent revision, the language of the CIMP (or PA or CHPMP) shall govern. ***Section 2.1- Protocols for Continued Tribal Communication*****:** This provides methods for facilitating open communication with Interested Tribes; documenting the Interested Tribes' preferences for method of open communication; and reporting Tribal outreach to DTSC. This protocol incorporates reference to Section 6.7 "*Protocols for Tribal Notification and Consultation in Advance of Certain Activities*" of the CHPMP, which requires the BLM to establish email and mail distribution lists for all Points of Contact (POCs) and distribution of documents in accordance with Appendix B of the PA. ***Section 2.2 - Protocols for Appropriate Treatment of Archaeological Materials:*** This describes how PG&E will continue to collaborate with Interested Tribes, respecting their preferences for avoidance and other treatment of archaeological discoveries; pre-construction field verifications; implementing procedures in Section IX of the PA and Section 8.1 and Appendix C of the CHPMP (i.e., cease work measures, notification protocols, inspecting and evaluating significance of discoveries, avoiding discoveries if possible and establishing protective measures, and treatment of discoveries that cannot be avoided). This section also outlines collection and curation protocols and data recovery procedures. ***Section 2.3 - Protocols for the Review of Cultural Resource-Related Documents:*** This describes the dissemination and review of cultural resource-related documents; outlines types of documents available for review and comment; provides a timeframe for review and comment; and provides an	

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Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		opportunity for Interested Tribes to present their unique perspectives on cultural significance of the area, including natural and cultural resources, Tribal beliefs, religions, customs, and current practices. This protocol incorporates reference to Section XI of the PA. ***Section 2.4 - Protocols for the Review of Project Design Documents:*** This documents the procedures for dissemination and Tribal review and comment on the completed groundwater remedy design documents prior to the beginning of construction. The Final Remedy Design document was completed and submitted to DTSC on November 18, 2015. ***Section 2.5 - Protocols for Restoring the Environment to Its Preconstruction Conditions Upon Decommissioning:*** This protocol includes a description of the general approach to restoring areas affected by the Final Remedy Design (e.g., backfill and compaction; grading and contouring; habitat restoration and revegetation; and consideration/accommodating requests for Tribal ceremonies); completion of a restoration plan within 120 days of the Department of the Interior's (DOI's) certification of the completion of the remedy; development of the restoration plan in consultation with land owners and managers; and consultation with Signatories, Interested Tribes, and Invited Signatories to the PA. (Mitigation Measure CUL-1a-17, described below, requires implementation of the restoration plan.) ***Section 2.6 - IM-3 Decommissioning Plan (Appendix B of the CIMP):*** The IM-3 Decommissioning Plan includes procedures for IM-3 system lay-up; procedures for decommissioning and removing the IM-3 system; waste management procedures; best management practices and mitigation measures compliance; soil confirmation sampling; a general approach for restoring areas originally affected by IM-3 operations; approvals and reporting requirements during the phases of IM-3 system closure; and a proposed work schedule. ***Section 2.7 - Protocols for Repatriation of Clean Soils During Construction:*** The approach and management to soil displacement was documented in "Revised Management Protocol for Handling and Disposition of Displaced Site Material" (Appendix B of the Soil Management Plan) and outlines the procedures and measures to minimize the amount of displaced material that leaves the Project Area and to provide for the eventual return, reuse, or restoration of the material onto the lands from which it was displaced. The management protocol was incorporated into the Soil Management Plan (Appendix L of the C/RAWP) – see Mitigation Measure CUL-1a-18 below for additional details on the procedures in the Soil Management Plan. ***Section 2.8 - Noise Protocol:*** This protocol includes establishing a disturbance coordinator for Project-related noise concerns; implementing	

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SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		engineering controls to minimize construction-related noise (e.g., install temporary noise barriers such as berms, stockpiles, dumpsters, bins, and/or engineered acoustical barriers) within identified noise buffers; selecting noise monitoring locations in coordination with Interested Tribes; maintaining all construction equipment according to manufacturer guidelines and fitting equipment with the best available noise suppression devices; shrouding or shielding impact tools; muffling or shielding exhaust ports on power equipment; limiting idling of construction equipment; procedures for addressing Project-related noise concerns; and communication/notification with Interested Tribes. ***Section 2.9 - Protocols for the Appropriate Methods, Consistent with Mitigation Measures AES-1 and AES-2, to Reduce Visual Intrusions:*** This protocol includes the measures listed in SEIR Mitigation Measures AES-1 and AES-2, including a minimum setback of 20 feet from the water to prevent substantial vegetation removal along the riverbank; protecting mature plants; revegetation of disturbed areas within the riparian vegetation along the Colorado River; using plant material consistent with surrounding native vegetation; construction wells, pipeline, and utilities in muted, earth-tone colors consistent with the surrounding natural color palette. The protocol also summarizes the design concepts that PG&E incorporated into the Project, including locating final aboveground facilities within existing facilities when appropriate; building designs that are harmonious with existing buildings and nearby landforms; flush-mount or below-ground installations whenever feasible; construction within existing transportation corridors; working within previously disturbed sites whenever possible; placing aboveground facilities away from traffic where feasible; and designing lighting to minimize glare. The protocol also describes the opportunities afforded to agencies, Interested Tribes, and other stakeholders to provide their input on visual aspects of the Project design, such as providing visuals in design packages and allowing reviewing parties to request additional visualizations or key views. The protocol also provides notification procedures to address temporary visual intrusions during Project implementation. ***Section 2.10 - Protocols for Tribal Notification in Advance of Project-Related Activities:*** Whenever possible, PG&E will notify Interested Tribes at least two weeks in advance of project-related ground-disturbing activities (such as grading, trenching, boring, drilling, or other excavation) whenever possible. Methods of notification may include, but are not limited to: through workplans and Project schedules; formal presentation or announcements at meetings; posting schedules online; email; telephone when advance notification was not possible; monthly schedules of field activities; weekly look-ahead schedules; and/or daily information sheets during times of intensive Project activity. ***Section 2.11 - Protocols to Accommodate Tribal Ceremonies or***	

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SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		Activities Involving Topock Cultural Area: The first step in the protocol is a request for access by Interested Tribes to conduct Tribal ceremonies by phoning, emailing, or writing to PG&E's Site Manager. PG&E will consider the request and decide if the request can be accommodated as is, with modifications, or not at all, and will notify the requestor by phone or in person as soon as possible. PG&E staff, consultants, contractors or subcontractors will conduct themselves appropriately and, if invited to participate, will be respectful, turn off cell phones, and refrain from photography without permission. PG&E will maintain confidentiality of documents and sensitive information to the maximum extent allowed by the law. ***Section 2.12 - Protocols for Tribal Monitors to Observe Ground-Disturbing Activities:*** PG&E will notify Interested Tribes of planned ground-disturbing activities and other scientific surveying within a minimum of one week and in the event of schedule changes. Tribal monitors will prepare and submit Daily Monitoring Logs. This protocol references Section 6.6.4 "*Construction Monitoring*" of the CHPMP, which requires advance notification and inviting Tribal monitors to observe ground-disturbing activities in accordance with Appendix C of the PA. ***Section 2.13 - Provision of Reasonable Compensation for Tribal Monitors:*** PG&E will provide reasonable compensation for Tribal monitors who work on the Project consistent with historic rates. ***Section 2.14 - Protocols for Protective Measures for Archaeological/Historical Sites During Construction:*** This protocol provides for identifying protective measures cultural sites, to the extent feasible, prior to construction; modifying construction zones to avoid discoveries identified during construction; implementing protective measures (such as covering, flagging, or fencing); if needed, modifying exclusion zones in consultation with the parties in the field; providing for archaeological and Tribal monitoring of implementation and removal of protective measures; periodic inspection of protective measures during construction; inspection, documentation, evaluation, and protection of discoveries; notification to Tribal monitors of discoveries; and restoration of areas to pre-constructions conditions after removal protective measures. ***Section 2.15 - Protocols for Reporting Discoveries of Cultural Importance:*** This protocol outlines how PG&E will notify DTSC and BLM of discoveries of previously unidentified or suspected historic or archaeological resources (including human remains and/or associated funerary objects or graves), as well as Interested Tribes if the resource is Native American in origin; will cease work within the vicinity of the discovery until the discovery has been evaluated and treatment developed; implement protective measures, if necessary; choose avoidance as the preferred method for the treatment of cultural resources, particularly for human remains, items of cultural patrimony, or funerary objects; and document discoveries in a	

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SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		culturally sensitive manner, and invite Interested Tribes to assist with documentation to identify Tribal cultural values. If further studies are required for any discovery, PG&E will consult with BLM, who will consult with Interested Tribes. Documentation will be provided to BLM and Interested Tribes (for Native American resources) for review and comment and final documents will be distributed to DTSC, BLM, Interested Tribes, and PG&E, and to ASM or CHRIS as appropriate. ***Section 2.16 - Protocols for Inspecting Remediation Facilities and/or Staging Areas During Construction:*** The locations of remediation facilities and staging area will be examined for cultural resources throughout the construction phase. Interested Tribes will receive notice at least 2 weeks in advance whenever possible. Previously impacted land will be selected wherever feasible for re-use as staging areas and/or the siting of remediation facilities and direct physical impacts to the Topock Maze as it is manifested archaeologically will be completely avoided when siting any staging area or remediation facility. Any resources present will be avoided to the extent feasible. This protocol also provides for archaeological and Tribal monitoring of earth-disturbing activities at remediation facilities and/or staging areas during construction, and states that these monitors will at all times comply with Project-wide and job site-specific safety requirements. **CUL-1a-9: Preference for Previously Disturbed Areas (Groundwater FEIR Measure with Revisions).** During the design of areas to be used as part of the Future Activity Allowance, PG&E shall, in communication with the Interested Tribes (and subject to their review), and to the maximum extent feasible, as determined by DTSC, give: (1) priority to previously disturbed areas for the placement of new physical improvements; and (2) priority to re-use of existing physical improvements, such as but not limited to wells and pipelines, but not including the IM-3 Facility. “Disturbed” areas in this context means those areas outside of documented archaeological site boundaries that have experienced ground disturbance in the last 50 years. **CUL-1a-10: Avoidance of Topock Maze (Groundwater FEIR Measure with Revisions).** During construction, and operation and maintenance, and decommissioning activities, as well as activities associated with the Future Activity Allowance, PG&E shall consider the location of Loci A, B, and C of the Topock Maze during the design of Project components and is prohibited from creating any direct physical impact on the Topock Maze, as it is manifested archaeologically. The design of facilities as part of the Future Activity Allowance shall also prevent all indirect (e.g. noise, aesthetics) impacts on the Topock Maze, to the maximum extent feasible as determined by DTSC. **CUL-1a-11: Open Grant Funding (Groundwater FEIR Measure with Revisions).** During the construction phase of the Project, PG&E shall provide an open grant for one part-time cultural resource specialist/project manager position for each of the five Interested Tribes: Chemehuevi, Cocopah, CRIT,	

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SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		FMIT, and Hualapai. The award of the grants is for the timely review of Project documents, participating in project-related meetings, coordinating and managing input and interests for the Tribe on the Project, and to act as a Tribal liaison with PG&E and regulatory agencies. The part-time cultural resources specialist/project manager shall be compensated at rates of historic compensation. The payment of grant monies shall be timed to the awarded tribes' fiscal cycles so that the tribes are not forced to front funds for long periods of time. These positions shall act as cultural resources contacts and project managers for interactions between the tribes, PG&E, and DTSC to ensure coordination during construction of the remedy to avoid, reduce, or otherwise mitigate impacts on resources qualifying as historical resources under CEQA. This funding is separate from provisions for tribal monitor positions and shall not be used for routine tribal business or legal counsel. For review and approval, PG&E shall provide DTSC with the names of the selected grant recipients and a report that summarizes activities associated with the grant program, at least annually. Upon conclusion of the construction phase of the Project, the necessity of the cultural resource specialist/project manager positions shall be assessed by DTSC, at which time the positions may be extended, reduced, or terminated. During the operation and maintenance and decommissioning phases, the necessity of the positions shall be periodically evaluated by DTSC. These positions shall be inclusive of those referenced by CR-1e-9 in the Topock Soil Investigation Project EIR and MMRP. **CUL-1a-12: Tribal Ceremonies (Groundwater FEIR Measure with Revisions).** PG&E shall provide reasonable opportunity, as determined by DTSC, for Interested Tribes to conduct a traditional healing/cleansing ceremony (or ceremonies) before and after the construction phase. Accommodations for Tribal ceremonies shall be implemented consistent with Section 2.11 "*Protocols to Accommodate Tribal Ceremonies or Activities Involving Topock TCP*" of the CIMP (as described above in Mitigation Measure CUL-1a-8q) and Section 7.2 "*Accommodation of Tribal Activities and Ceremonies Involving the Topock Maze/TCP*" (see below) and Appendix B of the CHPMP (as described above in Mitigation Measure CUL-1a-2a). As described in Section 7.2 of the CHPMP, the BLM will continue to work with the Interested Tribes to identify Tribal activities and ceremonies that are associated with the Topock TCP and to consult with the Interested Tribes and PG&E to develop treatment measures to accommodate them. **CUL-1a-13: Develop Worker Education Training Program (Measure Completed – Worker Education Training Program is attached in Appendix P of the C/RAWP).** **CUL-1a-13a: Implement Worker Education Training (New Measure).** During construction, operation and maintenance, and decommissioning of the Project, worker education training procedures shall be implemented consistent	

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Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		with the protocols identified in Appendix P of the C/RAWP. The following provides a summary of the worker education training procedures as identified in Appendix P of the C/RAWP. The worker education program will be implemented prior to commencement of any ground-disturbing activities and as personnel are added. The program includes, but is not limited to: mandatory training for PG&E employees, consultants, contractors, and subcontractors who are involved with construction or ground disturbing activities (including decommissioning and restoration); cultural sensitivity training to familiarize personnel with the sacred nature of the area; providing for participation of Interested Tribes, Tribal monitors, archaeological monitors, and Federal agency staff as appropriate; and non-tolerance of any disrespectful behavior in the field and removal of any staff, workers, or contractors who do not comply. Personnel engaged in field activities will be trained prior to conducting fieldwork and personnel engaged in design work will be trained as soon as practicable after being assigned to the Project. Training will be conducted at each Field Project Orientation meeting prior to each substantial Project work phase and at additional opportunities as identified by PG&E in collaboration with the Interested Tribes. Training will include, but is not limited to discussion topics such as: the significance and sensitivity of the Topock TCP; appropriate on-site behavior; protection of significant cultural resources; worker responsibilities (avoidance of sensitive areas, staying on designated routes and work areas, etc.); and consequences of noncompliance. Presentation materials that may be developed will be shared with Interested Tribes for their input. PG&E will maintain training records that will be dated and signed by the trainee and trainer. **CUL-1a-14: Tribal Notification of Potential Future Activities (New Measure).** For any potential future activities that the agencies will require PG&E to prepare a work plan, interested Tribes shall be notified and afforded the opportunity to provide input consistent with the general process described in Section 2.3 and Section 2.4 of the CIMP as defined in CUL-1a-8q. In circumstances where only one design cycle is deemed necessary by DTSC for the potential future work, steps A through H of Figure 2-1 MMRP CUL-1a-8d Design Review Protocol Flow Chart will be followed. PG&E shall, likewise, notify Interested Tribes at least two weeks in advance of project related ground-disturbing activities whenever possible in accordance with Section 2.10 of the CIMP. **CUL-1a-15: Future Activity Allowance Cultural Resources Survey (New Measure).** During the planning phase of any designed Future Activity Allowance activities, all areas that may be subject to construction or operation and maintenance activities as part of the Future Activity Allowance, plus a 50-foot buffer, and have not been surveyed in the past 5 years, shall be subject to archaeological resources survey prior to any ground disturbing activity. The survey shall be conducted by the Qualified Cultural Resources Consultant and	

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SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		shall document resources potentially qualifying as historical resources under CEQA (both as contributors to the Topock TCP and as individual historical resources). Tribal monitors shall be invited to participate in the survey. PG&E's Qualified Cultural Resources Consultant shall document the results of the survey in a *Future Activity Allowance Cultural Resources Survey Report* that follows the "*Archaeological Resource Management Reports guidelines and Department of Parks and Recreation*" guidelines. PG&E's Qualified Cultural Resources Consultant shall also prepare Department of Parks and Recreation 523 forms and file them with the South Central Coastal Information Center (for resources in California) and Arizona State Museum site cards shall be prepared and filed with the Arizona State Museum (for resources in Arizona). PG&E shall distribute draft reports to DTSC, BLM, and the Interested Tribes for review and comment consistent with Section 2.3 "*Protocols for the Review of Cultural Resources-Related Documents*" of the CIMP and Section 6.7 "*Protocols for Tribal Notification and Consultation in Advance of Certain Activities*" of the CHPMP (as described above in Mitigation Measure CUL-1a-8q). PG&E shall submit final reports to DTSC, BLM, and the Interested Tribes no less than 2 weeks prior to the start of ground disturbance in an area. In the event that resources potentially qualifying as historical resources under CEQA (either as contributors to the Topock TCP or as individual historical resources) are identified during the survey, avoidance and preservation in place shall be the preferred manner of mitigating impacts to the resources. If avoidance of the identified resources is determined by DTSC, in coordination with respective landowners, Interested Tribes, and PG&E, to be infeasible because, for example, it would impede the fundamental Project objective of implementing the Final Remedy Design, procedures provided in Section 2.2 "*Protocols for the Appropriate Treatment of Archaeological Materials*" of the CIMP, Section 8 "*Discoveries*" and Appendix C "*Discovery Plan*" of the CHPMP (as described above in Mitigation Measure CUL-1a-8q), and Appendix D "*Plan of Action*" of the CHPMP (as described below in Mitigation Measure CUL-4) shall be implemented. If DTSC determines that an expedited action is necessary in order to respond to the changing needs of the remedy, pre-construction inspection protocols identified in Section 2.16, "*Protocols for Inspecting Remediation Facilities and or Staging Areas During Construction*" of the CIMP shall then be followed. This section requires tribal notification in advance of the pre-construction inspection, archaeological and tribal inspection of the area, avoidance of identified resources if possible, or treatment if necessary, and monitoring of any ground disturbance. In instances where Future Activity Allowance activities are proposed in the field due to the need for immediate deviation from a planned activity from unforeseen circumstances, PG&E shall conduct the activity in consultation	

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Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		with an archaeological monitor and Tribal Monitor on the ground, and notify DTSC and the appropriate DOI agency of the activity within 24 hours. **CUL-1a-16: Implement Restoration Plan (New Measure).** Restoration following decommissioning of the Project shall be implemented in a manner consistent with Section 2.5 "*Protocols for Restoring the Environment to its Preconstruction Conditions Upon Decommissioning*" of the CIMP (as described above in Mitigation Measure CUL-1a-8q) and the Havasu National Wildlife Refuge Restoration Plan (C/RAWP Appendix G; see Mitigation Measure BIO-1a in this SEIR). Additionally, consistent with requirements of Section 6.3 "*Environmental Restoration*" of the CHPMP, a Remedy Decommissioning Plan will be submitted by PG&E to DOI within 120 days of DOI's certification of completion of the CERCLA Remedial Action and determination by DOI that removal of such facilities is protective of human health and the environment. The Remedy Restoration Plan shall be provided to DTSC and Interested Tribes for review and comment. **CUL-1a-17: Displaced Soil Procedures (New Measure).** Procedures for the management and handling of displaced soils resulting from activities associated with construction, operation and maintenance, and decommissioning of the Project shall be treated in a manner consistent Section 2.7 "*Protocols for Repatriation of Clean Soils Cuttings Generated During Construction*" of the CIMP (as described above in Mitigation Measure CUL-1a-8q) and the Soil Management Plan (C/RAWP Appendix L). The following provides a summary of the Soil Management Plan procedures as identified in Appendix L of the C/RAWP. Where this summary text differs from the Soil Management Plan or subsequent revision, the language of the Soil Management Plan shall govern. As indicated in the Soil Management Plan, clean soil (material that is determined to have a representative concentration that is equal to or less than the interim screening level or project-specific cleanup goal) will be labeled and stored on-site in 55-gallon drums/small containers, roll-off bins, and/or stockpiles for return, re-use, and/or restoration. Soil classified as RCRA and non-RCRA hazardous waste, and non-hazardous soil that is unsuitable for final disposition on-site because contaminants are present above the interim screening level or Project-specific cleanup goal, will be labeled and stored temporarily on-site and transported off-site for disposal. Options for return, re-use, and/or restoration on-site that have been identified include: replacement of original material into original or other borings, trenches, or excavations; creation of topographical or landscape barriers to protect sensitive areas; creation of berms or other structures to prevent erosion; on-site road maintenance; and stockpiling in designated areas. **CUL-1a-18: Aesthetics (New Measure).** During construction, operation and maintenance, and decommissioning, protocols for the protection of visual resources shall be implemented in a manner consistent with Section 2.9 "*Protocols for the Appropriate Methods, Consistent with Measures AES-1 and*	

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SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		AES-2 [of the Groundwater FEIR] to Reduce Visual Intrusions" of the CIMP (see also Mitigation Measures AES-1 and AES-2 of this SEIR). **CUL-1a-19: Implement Treatment Plan for the Topock TCP (New Measure).** All activities associated with construction, operation and maintenance, and decommissioning of the Final Remedy Design shall be implemented consistent with provisions of the *Cultural and Historical Property Treatment Plan for the Topock Compressor Station* (Hanes and Price *in progress*), which is being prepared pursuant to requirements of the Stipulation VII.B and Appendix B of the PA and mitigation measure CUL-1b/c-3 of the Groundwater FEIR. The Treatment Plan shall address treatment to the Topock TCP and its contributors, in addition to historical resources other than the Topock TCP (this is the same Treatment Plan referenced in Section 7 "*Cultural Property-Specific Treatment Measures*" of the CHPMP, which can be used to satisfy the requirements of this mitigation measure). PG&E shall submit the Treatment Plan to DTSC for review and approval. PG&E shall submit the Treatment Plan to DTSC for review and approval. PG&E shall also distribute the Treatment Plan to the Interested Tribes for tribal review consistent with Section 2.3 "*Protocols for the Review of Cultural Resources-Related Documents*" of the CIMP and Section 6.7 "*Protocols for Tribal Notification and Consultation in Advance of Certain Activities*" of the CHPMP (as described above in Mitigation Measure CUL-1a-8q). The Treatment Plan may be amended in the future in the event of new discoveries or greater than anticipated impacts. Treatment Plan amendments shall be required in instances where the current content of the Treatment Plan is insufficient to address necessary treatment measures and shall be determined in coordination amongst PG&E, BLM, DTSC, and Interested Tribes. **CUL-1b/c-1: Consider Locations of Historical Resources during Design (Groundwater FEIR Measure with revisions).** PG&E shall consider the locations of the identified historical resources during the design of the physical improvements necessary for the proposed Project and avoid, minimize, or mitigate impacts on historical and archaeological resources to the maximum extent feasible, as determined by DTSC. Future design plans for the Project, in relation to known cultural resources, shall be submitted to DTSC for review and approval. **CUL-1b/c-2: Prepare a Cultural Resources Study (Measure Completed – several cultural resources studies were completed, including "*Geoarchaeological Assessment for the Topock Remediation Project*" [Appendix T of the C/RAWP] and "*Results of Pre-Construction Field Verification Inspections for the Topock Compressor Station Groundwater Remedy*" [Moloney and Price 2014, confidential report on file at DTSC]).** **CUL-1b/c-3: Prepare and Implement a Treatment Plan for Historical Resources other than the Topock TCP (Groundwater FEIR Measure with**	

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SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		Revisions). Prior to the start of construction, PG&E shall prepare and implement a Treatment Plan that identifies measures to lessen impacts to historical resources other than the Topock TCP that cannot be avoided by the Project and that will be subject to significant impacts (this is the same Treatment Plan - *Cultural and Historical Property Treatment Plan for the Topock Compressor Station* [Hanes and Price *in progress*] - described above in Mitigation Measure CUL-1a-19 and is currently being prepared). The Treatment Plan shall identify which criteria for listing on the NRHP/CRHR contribute to the affected resource's significance and which aspects of significance would be materially altered by construction, operation and maintenance, or decommissioning and shall provide for reasonable efforts to be made to permit the resource to be preserved in place or left in an undisturbed state consistent with the CEQA Guidelines and with Stipulation I.B of the PA and Section 7 of the CHPMP, and to the maximum extent feasible as determined by DTSC, in coordination with PG&E, Interested Tribes, and respective landowners. PG&E shall submit the Treatment Plan to DTSC for review and approval. PG&E shall also distribute the Treatment Plan to the Interested Tribes for tribal review consistent with Section 2.3 "*Protocols for the Review of Cultural Resources-Related Documents*" of the CIMP and Section 6.7 "*Protocols for Tribal Notification and Consultation in Advance of Certain Activities*" of the CHPMP (as described above in Mitigation Measure CUL-1a-8q). The Treatment Plan may be amended in the future in the event of new discoveries or greater than anticipated impacts. Treatment Plan amendments shall be required in instances where the current content of the Treatment Plan is insufficient to address necessary treatment measures and shall be determined in coordination amongst PG&E, BLM, DTSC, and Interested Tribes. **CUL-1b/c-4: Cultural Resources Monitoring Program and Inadvertent Discovery Measures (Groundwater FEIR Measure with Revisions).** **CUL-1b/c-4a: Cultural Resources Monitoring Program.** All ground-disturbing activities associated with construction, operation and maintenance, and decommissioning phases of the Project, including the Potential Future Activities, shall require archaeological monitoring and PG&E shall invite Native American monitors to participate. The Cultural Resources Monitoring Program shall be implemented in a manner consistent with Sections 2.10 "*Protocols for Tribal Notification in Advance of Project-Related Activities*" and 2.12 "*Protocols for Tribal Monitors to Observe Ground Disturbing Activities*" of the CIMP, Appendix C "*Topock Remediation Project Programmatic Agreement Tribal and Archaeological Monitoring Protocol*" of the PA, and Section 6.6.4, "*Construction Monitoring*," of the CHPMP (as described above in Mitigation Measure CUL-1a-8q). In addition to the parties that require notification and coordination as listed in Appendix C of the PA, PG&E shall also notify DTSC. During construction, PG&E shall document monitoring activities in the monthly	

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Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		progress reports or quarterly compliance reports described in Section 2.6.3.3 "*Additional Reporting During Remedy Construction*" and Table 2.3-1 "*Communication Framework During Construction and Startup*" of the C/RAWP. During operation and maintenance, PG&E shall document monitoring activities in the quarterly progress reports or annual compliance reports described in Section L2.2 "*Summary of Communication Procedures and Protocols*" and Table L2.2-1 "*Communication Framework During Operation and Maintenance.*" During decommissioning, PG&E shall document monitoring activities in monthly progress reports or quarterly monitoring compliance reports consistent with those described in Section 2.6.3.3 "*Additional Reporting During Remedy Construction*" and Table 2.3-1 "*Communication Framework During Construction and Startup*" of the C/RAWP. Documentation of monitoring shall generally include dates of monitoring, monitoring participants, activities observed, and descriptions of any archaeological resources encountered (resource location information shall be kept separate and confidential). Department of Parks and Recreation 523 forms, following the Office of Historic Preservation's *Instructions for Recording Historical Resources*, shall be prepared and filed with the South Central Coastal Information Center (for resources in California) and Arizona State Museum site cards shall be prepared and filed with the Arizona State Museum (for resources in Arizona) for all newly identified and updated resources, and shall be compiled and provided to DTSC as they become available. **CUL-1b/c-4b: Inadvertent Discoveries.** During construction, operation and maintenance, and decommissioning phases of the Project, procedures for the treatment of inadvertent discoveries of resources potentially qualifying as historical resources under CEQA shall be implemented in a manner consistent with Section 2.2 "*Protocols for the Appropriate Treatment of Archaeological Materials*" of the CIMP, and Section 8 "*Discoveries*" and Appendix C "*Discovery Plan*" of the CHPMP (as described above in Mitigation Measure CUL-1a-8q), and Appendix D "*Plan of Action*" of the CHPMP (as described below in Mitigation measure CUL-4). In addition to the parties listed in Section 2.15 of the CIMP as requiring consultation regarding discoveries and review of draft documents, DTSC shall also be included in these processes. **CUL-1b/c-5: Avoidance and Preservation in Place (New Measure).** During the construction, operation and maintenance, and decommissioning phases of the Project, PG&E shall carry out and require all subcontractors to carry out all activities in ways that avoid, minimize, and mitigate significant impacts to historical resources other than the Topock TCP and unique archaeological resources consistent with the CEQA Guidelines and with Stipulation I.B of the PA and Section 7.3 of the CHPMP, and to the maximum extent feasible as determined by DTSC, in coordination with PG&E, Interested Tribes, and respective landowners. **CUL-1b/c-6: Implementation of Additional Protective Measures (New**	

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Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		Measure). Mitigation Measures CUL-1a-3 (Site Security); CUL-1a-3a (Professional Qualifications and Annual Historical Resource Condition Inspection); CUL-1a-3c (Coordination with BLM and San Bernardino County); CUL-1a-3d (Signage) CUL-1a-3e (Site Security); CUL-1a-8q (Implement Cultural Impact Mitigation Program); CUL-1a-9 (Preference for Previously Disturbed Areas); CUL-1a-13a (Implement Worker Education Training Program); and CUL-1a-15 (Future Activity Allowance Cultural Resources Survey) shall be implemented to further reduce impacts to historical resources other than the Topock TCP and/or unique archaeological resources prior to and during construction, operation and maintenance, and decommissioning, as prescribed in each measure which are described in detail above. **CUL-1b/c-7: Compliance with SOI Standards (New Measure).** Prior to the start of decommissioning activities, PG&E shall retain a qualified architectural historian who meets the Secretary of the Interior's professional qualification standards for architectural history. The qualified architectural historian shall review the decommissioning plan to ensure that removal of the pipeline from the Old Trails Arch Bridge (36-027678), if proposed, would not materially impair the bridge. The architectural historian shall prepare a technical memorandum documenting the results of the review, and provide any recommendations to reduce impacts to less than significant, if necessary, prior to start of decommissioning activities.	
Impact CUL-2: Cause a Substantial Adverse Change in the Significance of a Unique Archaeological Resource. Many of the cultural resources listed in Table 4.4-3 may meet the CEQA criteria for a unique archaeological resource. Construction, operation and maintenance, and decommissioning activities of the proposed Project could result in substantial adverse changes to one or more unique archaeological resource in the Project Area through ground disturbance and other project-related activities.	Potentially Significant	Implement **Mitigation Measures CUL-1b/c-1, CUL-1b/c-3, CUL1b/c-4, CUL-1b/c-5,** and **CUL-1b/c-6**.	Significant and Unavoidable
Impact CUL-3:Directly or Indirectly Destroy a Unique Paleontological Resource or Site or Unique Geologic Feature. proposed Project could result in substantial adverse changes to a unique paleontological resource or unique geologic feature in the Project Area through ground disturbance and other project-related activities.	Potentially Significant	**Mitigation Measure CUL-3: Implement the Paleontological Resources Management Plan (PRMP) and Paleontological Monitoring (Groundwater FEIR Measure with Revisions).** PG&E shall comply with all requirements of the *Paleontological Resources Management Plan* (Arcadis 2015) related to paleontological resources prior to and during construction, operation and maintenance, and decommissioning. The following is a summary of the procedures in the PRMP, which includes: retention of a Principal Paleontologist to oversee paleontological monitoring and to be on-call in the event of discovery; paleontological resources awareness training; future survey of any areas ranked PYFC 3a or above if additional work is planned and they were not previously surveyed; paleontological monitoring of grading and trenching in known sensitives areas and also in the event that sensitive	Less than Significant

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Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		sediments are encountered elsewhere (monitoring of borings, regardless of depth or diameter, is not required); cease work measures and notification protocols in the event of a discovery; recovery of discovered fossils; documentation, preparation, identification, and analysis of recovered fossils; reporting; and curation of paleontological resources of scientific value at an accredited repository.	
Impact CUL-4: Disturb Any Human Remains, Including Those Interred Outside of Formal Cemeteries. Ground-disturbing activities required for all project phases may disturb as-yet undiscovered human remains, including Native American burial remains (i.e., human remains and grave goods).	Potentially Significant	**Mitigation Measure CUL-4: Discovery of Human Remains (Groundwater FEIR Measure with Revisions).** In the event of the discovery of human remains, PG&E shall implement the requirements of Section 2.2 "*Protocols for Appropriate Treatment of Archaeological Materials*" and Section 2.15 "*Protocols for Reporting Discoveries of Cultural Importance*" the CIMP (as described above in Mitigation Measure CUL-1a-8q) and Section 8.2 "*Treatment of Any Human Remains, Funerary Objects, Ceremonial Objects, and Items of Cultural Patrimony"* and Appendix D "*Plan of Action*" of the CHPMP (see below). Consistent with Section D.4 of the CHPMP, the determination of whether remains are human or non-human will be made by qualified personnel, such as a physical or forensic anthropologist. In accordance with the CHPMP Appendix D (D.3.3), the BLM is responsible for notifying the appropriate Interested Tribes regardless of land ownership. Discoveries on federal land shall follow the procedures outlined in sections D.3.3.1 and D.3.9.1 of Appendix D of the CHPMP. Discoveries on non-federal land in Arizona shall follow the procedures outlined in Sections D.3.3.2 and D.3.9.2 of Appendix D CHPMP. Discoveries on non-federal land in California shall follow the procedures outlined in Sections D.3.3.3 and D.3.9.3 of Appendix D of the CHPMP. The following provides a summary of the plans, procedures, and requirements that govern actions to be taken in the event of the discovery of human remains. CHPMP Appendix D – Sections D.3.3.1 and D.3.9.1 (discoveries on Federal land): Additional requirements of this section include: • Complying with the Native American Graves Protection and Repatriation Act (NAGPRA) and its Federal implementing regulations outlined in 43 Code of Federal Regulations (CFR) Part 10, which requires establishing a chain of command for the remains, identifying and notifying lineal descendants, and consultation with the appropriate Tribe(s) to identify and implement appropriate treatment. • Following California Health and Safety Code 7050.5 et seq., which includes notifying the San Bernardino County coroner for discoveries in California and contacting the California Native American Heritage Commission (NAHC). • Following Public Resources Code 5097.98, which includes designation of a Most Likely Descendant by the NAHC and consultation with the MLD. CHPMP Appendix D - Sections D.3.3.2 and D.3.9.2 (discoveries on non-	Significant and Unavoidable

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Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		Federal land in Arizona): Additional requirements of this section include: • Contacting the Director of the Arizona State Museum (ASM) for discoveries in Arizona on “lands, other than lands owned or controlled by this state, any agency or institution of this state or any county or municipal corporations within this state.” • Complying with ARS 41-865, which includes consultation with the ASM, identifying the group with cultural affinity for the remains and/or objects, and consultation with the governing body of the group with cultural affinity to determine appropriate treatment and disposition of the remains and/or objects. CHPMP Appendix D - Sections D.3.3.3 and D.3.9.3 (discoveries on non-Federal land in California): Additional requirements of this section include: • Complying with California Health and Safety Code 7050.5 et seq., which requires notifying the San Bernardino County coroner for discoveries in California and contacting the NAHC. • Complying with Public Resources Code 5097.98, which includes designation of a MLD by the NAHC and consultation between the landowner and MLD to identify and implement appropriate treatment.	
Hazards and Hazardous Materials			
Impact HAZ-1: Spills or Releases of Contaminants during Construction, Operation and Maintenance, and Decommissioning Activities from Routine Transport, Use, and Disposal or the Reasonably Foreseeable Accidental Release of Hazardous Materials that could Expose Workers, the Public, or the Environment. Construction, operation and maintenance, and decommissioning of the proposed Project could result in the potential release of hazardous materials during use or delivery of hazardous materials as a result of component failure (e.g., valve, flange, or pipe), tank failure, or human error (e.g., tank overfilling).	Potentially Significant	**Mitigation Measure HAZ-1a: Spills or Releases of Contaminants during Operation and Maintenance Activities (Groundwater FEIR Measure with Revisions)** a) PG&E shall store, handle, and transport hazardous materials in compliance with applicable local, state, and federal laws. b) All chemical storage and loading areas shall be equipped with proper containment and spill response equipment. BMPs to be implemented may include, but are not limited to, use of secondary containment in mixing and storage areas; availability of spill kits and spill containment booms, and appropriate storage containers for containment of the materials generated during the spill response. The Final Remedy Design provides engineering drawings of chemical storage and loading areas in Appendix D, specifications in Appendix E, and the Contingency Plan in Appendix L (Operation and Maintenance Manual), Volume 3 (CH2M Hill 2015a), which shall all be implemented during construction, and operation and maintenance, and decommissioning of the Project. c) A project-specific Hazardous Materials Business Plan (HMBP), chemical standard operating procedure (SOP) protocols and contingency plans shall be developed to ensure that proper response procedures would be implemented in the event of spills or releases. Specifically, the HMBPs and SOPs shall describe the	Less than Significant

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SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		procedures for properly storing and handling fuel on-site, the required equipment and procedures for spill containment, required personal protective equipment, and the measures to be used to reduce the likelihood of releases or spills during fueling or vehicle maintenance activities. BMPs to be implemented may include, but are not limited to, use of secondary containment in mixing and storage areas; availability of spill kits and spill containment booms, and appropriate storage containers for containment of the materials generated during the spill response. The field manager in charge of operations and maintenance activities shall be responsible for ensuring that these procedures are followed at all times. SOPs are provided in Appendix B to the C/RAWP (CH2M Hill 2015b); the HMBP in Appendix L to the Final Remedy Design (Operation and Maintenance Manual), Volume 1, Appendix E; and the Contingency Plan in Appendix L (Operation and Maintenance Manual), Volume 3 (CH2M Hill 2015a), shall all be implemented during construction, and operation and maintenance, and decommissioning of the Project. **Mitigation Measure HAZ-1b: Spill or Release of Contaminants during Construction and Decommissioning Activities (Groundwater FEIR Measure with Revisions)** a) Fueling areas and maintenance areas would be supplied with proper secondary containment and spill response equipment. The Final Remedy Design provides engineering drawings of chemical storage and loading areas in Appendix D, specifications in Appendix E, and the Contingency Plan in Appendix L (Operation and Maintenance Manual), Volume 3 (CH2M Hill 2015a), which shall all be implemented during construction, and operation and maintenance, and decommissioning of the Project. b) PG&E shall develop fueling SOP protocols and a contingency plan that would be implemented at all fueling areas on-site. The SOPs shall describe the procedures for properly storing and handling fuel on-site, the required equipment and procedures for spill containment, required PPE, and the measures to be used to reduce the likelihood of releases or spills during fueling or vehicle maintenance activities. Potential measures include but are not limited to, fuel storage in bermed areas, performing vehicle maintenance in paved and bermed areas, and availability of spill kits for containment and cleanup of petroleum releases. The field manager in charge of construction and decommissioning activities shall be responsible for ensuring that these procedures are followed at all times. SOPs are provided in Appendix B (CH2M Hill 2015b); the HMBP in Appendix L (Operation and Maintenance Manual),	

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Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		Volume 1, Appendix E; and the Contingency Plan in Appendix L (Operation and Maintenance Manual), Volume 3 (CH2M Hill 2015a)), shall all be implemented during construction, and operation and maintenance, and decommissioning of the Project. c) PG&E shall comply with local, state, and federal regulations related to the bulk storage and management of fuels. The Final Remedy Design provides engineering drawings of chemical storage and loading areas in Appendix D; specifications in Appendix E (Operation and Maintenance Manual), Volume 3; the HMBP in Appendix L (Operation and Maintenance Manual), Volume 1, Appendix E; and the Contingency Plan in Appendix L (Operation and Maintenance Manual), Volume 3 (CH2M Hill 2015a), which shall all be implemented during construction, and operation and maintenance, and decommissioning of the Project. **Mitigation Measure HAZ-2: Reasonably Foreseeable Releases of Chemicals from Excavated or Disturbed Soil (Groundwater FEIR Measure with Revisions)** Subsequent to the Groundwater FEIR and in compliance with Groundwater FEIR Mitigation Measure HAZ-2, PG&E developed a Final Construction Health and Safety Plan provided in C/RAWP, Appendix D, and a Draft Operation and Maintenance Health and Safety Plan in the Final Remedy Design, Appendix L, Volume 5. A final Operation and Maintenance Health and Safety Plan will be submitted to DTSC and DOI during the start-up phase of the remedy, and should include any separate plans provided by contractors. The health and safety plans include procedures to mitigate potential hazards, which include the use of PPE, measures that provide protection from physical and chemical hazards that may be present at the site, decontamination procedures, and worker and health and safety monitoring criteria to be implemented during construction. The worker health and safety plans includes protective measures and PPE that are specific to the conditions of concern and meet the requirements of the U.S. Occupational Safety and Health Administration's (OSHA's) construction safety requirements and Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120). In accordance with OSHA requirements, appropriate training and recordkeeping shall also be a part of the health and safety program. The health and safety plans shall be certified by a Certified Industrial Hygienist in accordance with OSHA regulations. The worker health and safety plan shall be provided to the construction workers for review and all workers shall be required to sign the plan, which will be kept on the construction site at all times. Contractors and subcontractors may also provide their own health and safety plans, providing the contractors and subcontractors health and safety plans are compliant with OSHA requirements and have been provided to PG&E and DTSC for review. Worker safety training shall occur prior to initiation of ground- disturbing	

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Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		activities. Training shall include the review of all health and safety measures and procedures. All workers and engineering inspectors at the site shall provide written acknowledgement that the soils management plan (discussed below), worker health and safety plan, and any existing community health and safety plan were reviewed and training was received prior to commencement of construction activities. The following are specific elements and directives that shall be included in the health and safety plan and implemented by PG&E during construction, operation and maintenance, and decommissioning of this project: a) Vehicles traveling on unpaved roadways or surfaces would be directed to avoid traveling in areas where contaminated soils are known to be present; vehicle speeds shall be controlled (e.g., limited to 15 mph or slower) to limit generation of dust; measures, such as wetting of surfaces, will be employed to prevent dust generation by vehicular traffic or other dust-generating work activities. b) Pre-mobilization planning shall occur during which the likelihood of encountering contaminated soils shall be reviewed along with the Hazardous Materials Business Plan, site-specific health and safety plan, and SOPs so that the procedures are followed and the contingencies for handling contaminated soils are in-place prior to implementing the field operations. c) Should evidence of contaminated soil be identified during ground-disturbing activities (e.g., noxious odors, discolored soil), work in this area will immediately cease until soil samples can be collected and analyzed for the presence of contaminants as directed by the site supervisor or the site safety officer. Contaminated soil shall be managed and disposed of in accordance with the Project-specific health and safety plan and soil management plan. The health and safety plan and soil management plan shall be reviewed by DTSC before beginning any ground-disturbing activities. While the Project is exempt from the requirements of the San Bernardino County Division of Environmental Health, the health and safety plan shall be prepared in general accordance with the substantive requirements of this agency. d) In the event that drilling sites must be located within areas of suspected soil contamination, the appropriate PPE shall be worn by all personnel working in these areas and methods specified in the health and safety plan used to control the generation of dust. When working in these areas, personnel shall be required to follow all guidance presented in the site-specific health and safety plan and soil management plan. The site-specific health and safety plan shall	

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Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		include provisions for site control such as, but not limited to, delineation of the exclusion, contaminant reduction and support zones for each work area, decontamination procedures, and procedures for the handling of contaminated soils and other investigation derived wastes. Soil that is excavated shall be loaded directly into containers such as roll-off bins; dust suppression methods shall be used prior to and during loading of soils into the bins. Suspected contaminated soils shall be segregated from suspected uncontaminated soils. e) Personnel working at the site shall be trained in Hazardous Waste Operations. f) All soil excavated and placed in roll-off bins or trucks for transportation off-site shall be covered with a tarp or rigid closure before transporting, and personnel working in the area shall be positioned upwind of the loading location, as practicable. **Mitigation Measure HAZ-3: Final Groundwater Remedy Decommissioning Plan (New Measure)** Upon achieving the Remedial Action Objectives for the groundwater remedy, PG&E shall provide a written request with documentation to the DTSC and DOI requesting approval for decommissioning the groundwater remedy. Upon approval from DTSC and DOI, PG&E shall then prepare and submit a Final Groundwater Remedy Decommissioning Plan within 120 days to DTSC and DOI for their review and approval. This plan shall comply with the requirements in the Programmatic Agreement (BLM 2010), the Cultural and Historic Properties Management Plan (BLM 2012), the Consent Decree and Appendix C, Scope of Work, to Consent Decree (DOI 2013) (or functional equivalent if those document names change in the future), and the mitigation measures included within this SEIR. This plan shall include the decommissioning specifications and procedures currently described in the Final Remedy Design, but shall be updated to incorporate technology and regulatory changes, if any. In particular, the updated Final Groundwater Remedy Decommissioning Plan shall check for updates to waste disposal acceptance criteria to identify the appropriate disposal or recycling facilities for the Final Groundwater Remedy infrastructure to be removed, and for changes in well abandonment procedures by regulatory agencies (the States of California and Arizona, and the Counties of San Bernardino [California] and Mohave [Arizona]).	
Hydrology and Water Quality			
Impact HYDRO-1: Exceedance of Water Quality Standards, Violation of Waste Discharge Requirements, or Degradation of Water Quality. The ground disturbing	Potentially Significant	**Groundwater FEIR Mitigation Measure HYDRO-1, Exceedance of Water Quality Standards (Groundwater FEIR Measure with Revisions).** **Mitigation Measures HYDRO-1a/2a/3a: Construction Best Management**	Less than Significant

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SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
activities associated with constructing the Final Groundwater Remedy Project, use of carbon substrate to be injected into the aquifer or the use of Arizona freshwater, the generation of byproducts above water quality objectives, the discharge of remedy-produced water to the TCS Evaporation Ponds, and runoff associated with the soils stockpiling could result in the exceedance of water quality standards, violation of waste discharge requirements, or substantial degradation of water quality.		**Practices Plan (Groundwater FEIR Measure with Revisions).** Subsequent to the Groundwater FEIR and as noted in the Regulatory Background, the Construction General Permits were updated for California (2014) and Arizona (2013). In compliance with the Groundwater FEIR Mitigation Measures HYDRO-1, HYDRO-2, and HYDRO-3, and incorporating the construction general permit updates, PG&E prepared a BMP Plan for construction activities (C/RAWP, Appendix M; CH2M 2015b). The BMP Plan complies with the substantive requirements of the California and Arizona Construction General Permits, as well as all other applicable federal, state, and local permit and regulatory requirements, even if a permit is not required pursuant to CERCLA, for purposes of ensuring the protection of receiving water quality. Details of the BMPs are provided in the BMP Plan and are summarized below. Site workers shall be trained in the implementation of these BMPs. Erosion Control BMPs: The following measures shall be used to reduce erosion and control sediment: • Preservation of Existing Vegetation – Existing vegetation will be preserved to the maximum extent practicable to facilitate protection of surfaces from erosion and help control sediments. To the extent practical, remedy facilities have been located on previously disturbed areas. In the event that existing vegetation needs to be disturbed, areas that need to be preserved will be identified by a qualified biologist and marked with temporary fencing. Site workers will be informed of the limits of disturbance within the construction site and will be instructed to keep clear of delineated areas. • Geotextiles and Mats – Natural (e.g., excelsior, straw, coconut) or synthetic (usually polyethylene) materials will be used to reduce soil erosion by wind or water. • Road Preparation and Maintenance – During road preparation activities, loose sediment will be uniformly compacted, consistent with the substantive San Bernardino County Building and Land Use Services Department requirements, to aid in reducing wind erosion. Ongoing road maintenance will include: (1) visual inspections to identify areas of erosion, (2) localized road repair and regrading, installation, and maintenance of erosion control features such as berms, silt fences, or straw wattles, (3) grading for road smoothness, and (4) measures to reduce water erosion, such as clearing ditches and culverts of debris. Sediment Control BMPs – The following materials would be used to retain sediment in place where soil is being disturbed by construction processes, to intercept runoff and reduce flow velocity, and to allow sediment to settle from runoff before water leaves the construction site. • Silt Fences – Silt fences are typically used in combination with	

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Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		sediment basins and sediment traps as erosion control measures. • Fiber Rolls/Sediment Wattles – These consist of aspen wood excelsior, straw, flax, or other similar materials rolled and bound into tight tubular rolls and placed on the face of slopes at regular intervals, depending on steepness of slopes. Fiber rolls/sediment wattles will be inspected prior to a forecasted rain event and after rain events to ensure the fiber rolls are working properly. Sediment accumulated by the fiber rolls will be removed to maintain the effectiveness of the fiber rolls. • Gravel Bag Berms – Gravel bag berms can be used as an alternative to fiber rolls and sediment wattles. If used, they will be installed prior to rain events to form a barrier to intercept runoff or reduce its velocity. Gravel bags will also be used, if necessary, during trenching activities when stockpiles are on-site. In the event that gravel bag berms are used as perimeter erosion control, bags will be stacked, one on top of the other (two high). When used to anchor stockpiles, the bags will be placed one high. • Sandbag Berms – Sandbag berms can also be used as an alternative to fiber rolls and sediment wattles. If used, they will be installed prior to rain events to form a barrier to intercept runoff or reduce its velocity. Sandbags will also be used, if necessary, during trenching activities when stockpiles are left overnight. In the event that sandbag berms are needed, they will be placed around the staging area and trenching area. • Straw-Bale Barriers – Straw-bale barriers can also be used as an alternative to fiber rolls, gravel bag berms, and sandbag berms. Material Delivery and Storage – Proper management practices for delivery and storage of materials will be implemented to ensure minimal discharge or elimination of discharge of these materials to the storm drain systems or waterways. Construction materials and equipment will be parked and stored in the staging area. Materials subject to erosion from rain events within the storage area will be covered during nonworking days and prior to and during rain events. Storage and transfer of toxic or hazardous materials (e.g., ethanol, acids for well cleaning) will be on impervious surfaces appropriate to the stored materials. Material Use – Proper use of materials will be implemented to ensure minimal or complete elimination of discharge to the storm drain systems or waterways. Spill cleanup materials will be kept near the construction and staging areas. Leaks and spills will be cleaned up immediately using proper absorbent materials, which will then be disposed of as hazardous waste, unless determined to be non-hazardous waste.	

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Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		Stockpile Management – Stockpile management was discussed above in "Runoff from Soil Stockpile at Soil Processing Area." Spill Prevention and Control – Spill prevention and control procedures and practices will be implemented in conjunction with the Waste Management Plan to prevent and control spills anytime chemicals and/or hazardous materials are stored on the construction site. Leaks and spills will be immediately cleaned up to the extent possible using absorbent materials, which will then be disposed of properly. Leaks and spills shall not be covered and/or buried or washed with water. Kits with appropriate spill response equipment will be kept near the construction and staging areas. The materials used for cleaning will not be allowed to enter storm drains or watercourses and will be collected and disposed of in accordance with BMPs. In particular, absorbents used to clean up spills of hazardous materials or waste must be managed as hazardous waste unless characterized as non-hazardous. Solid Waste Management – Solid waste management procedures and practices will be implemented at the beginning and throughout the Project. Solid waste, consisting primarily of asphalt concrete waste, shall be loaded directly onto trucks for off-site disposal. Loose debris will be picked up daily. Trash and scrap receptacles shall be placed at convenient locations to promote proper disposal of solid wastes. Receptacles shall be provided with lids or covers to prevent windblown litter. Hazardous wastes shall be accumulated at appropriate collection locations following appropriate labeling and management requirements pursuant to Title 22, California Code of Regulations. Concrete Waste Management – Concrete waste management procedures will be implemented where concrete is used as a construction material or where concrete dust and debris result from demolition activities. The concrete waste containers will be placed a minimum 50 feet from any drainage ways. Washouts will include secondary containment so that there is no discharge into the underlying soil and onto the surrounding areas. Watertight containers with lids and secondary containment, manufactured for the expressed purpose of containing waste concrete and its liquid residue, may be used. Containers will be emptied or removed from the project site when 75 percent of the full capacity has been reached. Sanitary/Septic Waste Management – Sanitary/septic waste management procedures and practices are implemented at construction sites when a temporary or portable sanitary/septic waste system exists. Sanitary facilities will be located away from Staging Areas 6 and 7 (due to proximity to culturally sensitive areas), drainage facilities, waterways, and from traffic circulation. In the event of high winds or a risk of high winds, temporary sanitary facilities will be secured with spikes or weighed down to prevent overturning. The sanitation subcontractor will monitor on-site sanitary/septic waste storage and disposal procedures on a weekly basis in accordance with the sanitary/septic	

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Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		waste management BMPs. Wastewater will not be discharged or buried. Waste will be removed and disposed off-site. Regular waste collection should be arranged before facilities overflow. The sanitary facility will be located a minimum of 50 feet away from drainage facilities and away from waterways and traffic circulation. Liquid Waste Management – Liquid waste management procedures will be employed to prevent the discharge of pollutants from liquid waste to the storm drain systems or watercourses. Liquid waste management will be applied if non-hazardous residuals or wastes are generated by construction activities. Tracking Control BMPs – A temporary construction entrance is defined as a stabilized point of entrance/exit to a construction site to reduce the tracking of mud and dirt onto private or public paved roads by construction vehicles. A temporary construction entrance will be established at applicable paved intersections and entry points to prevent sediment tracking. The temporary construction entrance will be inspected routinely. Good Housekeeping BMPs – Good housekeeping measures will be implemented on-site for the duration of the project and include the following: • Store chemicals in watertight containers (with appropriate secondary containment) in a completely enclosed storage cabinet, trailer, or sealed drums shed to prevent spillage and leakage. • Minimize exposure of construction materials to precipitation. • Cover waste disposal containers at the end of every business day and during rain events. • Prevent discharges from waste disposal containers to the stormwater drainage system or receiving water. • Prevent oil, grease, or fuel from leaking into the ground, storm drains, or surface waters. • Immediately clean up leaked material and dispose of properly. • Establish and maintain effective perimeter controls and stabilize construction entrances and exits to control erosion and sediment discharges from the site. • Conduct regular stormwater tailgate meetings with the workforce when the project is staffed and work is under way. **Mitigation Measure HYDRO-1b/2b/3b: O&M SWPPP (Groundwater FEIR Measure with Revisions).** Subsequent to the Groundwater FEIR and in compliance with the Groundwater FEIR Mitigation Measures HYDRO-1, HYDRO-2, and HYDRO-3, PG&E prepared a SWPPP for operation and maintenance activities (O&M SWPPP; Final Remedy Design, Appendix L, Volume 1, Appendix D; CH2M Hill 2015a) to comply with the substantive	

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Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		requirements of the 2015 California General Industrial Storm Water Permit. The O&M SWPPP requires the BMPs summarized below. Site workers shall be trained in the implementation of these BMPs. Good Housekeeping, including: • Observe all outdoor areas associated with industrial activity; including storm water discharge locations, drainage areas, conveyance systems, waste handling/disposal areas, and perimeter areas impacted by off-facility materials or storm water run-on to determine housekeeping needs. Clean and dispose of properly any identified debris, waste, spills, tracked materials, or leaked materials • Minimize or prevent material tracking • Minimize dust generated from industrial materials or activities • Ensure that all facility areas impacted by rinse/wash waters are cleaned as soon as possible • Cover all stored industrial materials that can be readily mobilized by contact with storm water • Contain all stored non-solid industrial materials or wastes that can be transported or dispersed by the wind or contact with storm water • Prevent disposal of any rinse/wash waters or materials into the storm water conveyance system • Minimize stormwater discharges from non-industrial areas (e.g., stormwater flows from employee parking area) that contact industrial areas of the facility • Minimize authorized non-storm water discharges from non-industrial areas (e.g., potable water, fire hydrant testing) that contact industrial areas of the facility Preventive Maintenance, including: • Identify all equipment and systems used outdoors that may spill or leak pollutants • Observe the identified equipment and systems to detect leaks, or identify conditions that may result in the development of leaks • Establish inspection schedule and maintenance schedule of identified equipment and systems • Establish procedures for prompt maintenance and repair of equipment, and maintenance of systems when conditions exist that may result in the development of spills or leaks Material Handling and Waste Management, including: • Prevent or minimize handling of industrial materials or wastes that	

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SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		can be readily mobilized by contact with stormwater during a storm event • Contain all stored non-solid industrial materials or wastes that can be transported or dispersed by the wind, erosion or contact with stormwater during handling • Cover industrial waste disposal containers and industrial material storage containers that contain industrial materials when not in use • Divert run-on and stormwater generated from within the facility away from all stockpiled materials • Clean all spills of industrial materials and/or wastes that occur during handling • Observe and clean as appropriate, any outdoor material/ or waste handling equipment or containers that can be contaminated by contact with industrial materials or wastes Erosion and Sediment Controls, including: • Implement effective wind erosion controls • Provide effective stabilization for inactive areas, finished slopes, and other erodible areas prior to a forecasted storm event • Maintain effective perimeter controls and stabilize all site entrances and exits to sufficiently control discharges of erodible materials from discharging or being tracked off the site • Divert run-on and storm water generated from within the facility away from all erodible materials The Industrial General Permit requires that the site, to the extent feasible, implement and maintain any advanced BMPs necessary to reduce or prevent discharges of pollutants in its stormwater discharge in a manner that reflects best industry practice considering technological availability and economic practicability and achievability. Advanced BMPs may include: • Exposure Minimization BMPs (such as storm resistant shelters that prevent the contact of stormwater with the industrial materials or areas of industrial activity) • Storm Water Containment and Discharge Reduction BMPs that divert, infiltrate, reuse, contain, retain, or reduce the volume of stormwater runoff • Treatment Control BMPs (the implementation of one or more mechanical, chemical, biologic, or any other treatment technology) • Storm resistant shelters (i.e., buildings) for Operations at the TW Bench, Hazardous Materials storage at the TCS, and Carbon	

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SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		Amendment facilities at the MW-20 Bench • Storm water drainage at the TW Bench to divert stormwater run on and reduce the volume of stormwater runoff • Features in access roads to reduce erosion and divert storm water from remedy facilities such as wells and associated control equipment **Mitigation Measure HYDRO-4: Manganese Treatment System (New Measure).** Sampling as described in the Final Remedy Design, specifically in the Sampling and Monitoring Plan provided in the Operation and Maintenance Manual (CH2M Hill 2015a, Appendix L), shall be implemented throughout the duration of the groundwater remedy and shall include groundwater monitoring for manganese. If manganese exceeds concentrations as specifically identified in Table 2.2-1 of Appendix L, O&M Volume 2 (e.g., 1 to 2.5 mg/L at California wells downgradient of the IRZ, or above baseline concentrations in Arizona wells), then PG&E shall evaluate and implement operational modifications to control the manganese in accordance with Section 2, O&M Volume 2. If operational modifications are unsuccessful at decreasing manganese concentrations to below the action levels cited on the above-referenced Table 2.2-1 and as determined by DTSC, then the contingency measure of manganese treatment shall be implemented. As described in the Project Description (Section 3.6.3.1) of this SEIR and in Appendix J of the Final Remedy Design, PG&E shall install an adsorptive or greensand filtration treatment system (or equivalent), located at the TW Bench, MW-20 Bench, and/or the Station. A manganese treatment system shall remain operational until the manganese concentrations remain below concentrations identified in Table 2.2-1 and DTSC approves of the cessation of the system. **Mitigation Measure HYDRO-5**: **Contingent Freshwater Pre-Injection Treatment (New Measure).** To implement the Final Groundwater Remedy such that PG&E will be able to respond to the triggering conditions described below, PG&E shall implement the following measures. **Mitigation Measure HYDRO-5a: Incorporate Arsenic Monitoring of Freshwater Injection into the Sampling and Monitoring Plan (New Measure).** Sampling as described in the Final Remedy Design, specifically in the Sampling and Monitoring Plan provided in the Operation and Maintenance Manual (CH2M Hill 2015a, Appendix L), shall be implemented throughout the duration of the groundwater remedy, even after injection ceases. Wells used to monitor freshwater supply injection shall be sampled and analyzed in accordance with the Project monitoring program for arsenic and other chemicals as described in the Sampling and Monitoring Plan. PG&E shall install and monitor wells designated in the Final Remedy Design for arsenic monitoring located approximately 150 feet and 225 feet from each freshwater injection well to comply with the SWRCB's requirements for freshwater	

TABLE 1-3
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		injection with arsenic concentrations above the California MCL. Monitoring shall commence prior to freshwater injection and continue until observed arsenic concentrations return to pre-injection levels pursuant to Mitigation Measure HYDRO 5d. Monitoring wells for the freshwater injection area shall initially be sampled monthly for the first two quarters, then quarterly thereafter, unless the monitoring interval is modified with prior DTSC approval. The results of this monitoring shall determine whether Mitigation Measures HYDRO-5b and 5c are implemented. **Mitigation Measure HYDRO-5b: Assessment and Implementation of Interim Action if the California MCL is Exceeded 150 Feet Radially from Freshwater Injection Point (New Measure**). If, as a result of the monitoring required in Mitigation Measure HYDRO-5a, the concentration of arsenic at the leading edge of the arsenic plume is found to exceed the arsenic water quality objective (California MCL) 150 feet radially from the freshwater injection point, PG&E shall immediately reassess their groundwater modeling and identify interim actions to limit the migration of the arsenic plume. PG&E shall submit the assessment and proposed action to DTSC within 60 days (or other timeframe directed by DTSC) of confirmed detections above water quality objectives. **Mitigation Measure HYDRO-5c: Implementation of Alternatives if California MCL is Exceeded for Arsenic 225 feet from any Freshwater Injection Point (New Measure).** If the concentration of arsenic at the leading edge of the plume migrates and exceeds the water quality objective (California MCL) at 225 feet radially from the freshwater injection point, PG&E shall promptly notify DTSC and resample within 30 days. If the expedited resample confirms the exceedance, PG&E shall immediately cease fresh water injection. The injection shall not recommence until PG&E either blends the water source to below the California MCL at the point of injection; constructs and re-routes any contingent freshwater supply lines and appurtenances to the Contingent Freshwater Pre-Injection Treatment System to pre-treat the water and remove arsenic before injection; or proposes a new water source that will comply with the California water quality objectives for injection. PG&E shall obtain approval from DTSC prior to implementation of the options identified above. Pre-injection treatment of the freshwater shall continue until further monitoring indicates that pre-treatment is no longer needed and DTSC approves of cessation of pre-treatment. **Mitigation Measure HYDRO-5d – Post-Remedy Arsenic Monitoring (New Measure).** The SWRCB provided remedy requirements associated with injection of groundwater containing naturally occurring arsenic in a 2013 position letter (SWRCB 2013). To ensure that water quality objectives are not exceeded in groundwater within freshwater injection areas after completion of the remedy, sampling of the arsenic monitoring wells and possibly other wells (as directed by DTSC) would continue under the Sampling and Monitoring	

TABLE 1-3
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		Plan for an estimated 20 years and possibly longer after completion of active treatment to ensure that arsenic concentrations are within and remain at pre-remedy background levels. The sampling would cease after results demonstrate that the concentrations of arsenic remain within water quality objectives and DTSC approves of ceasing the monitoring for arsenic. **Mitigation Measure HYDRO-6, Protection of Non-Project Water Supply Wells (New Measure).** To minimize any potential impacts to non-Project water supply wells associated with the long-term operation and maintenance of the Final Groundwater Remedy Project, PG&E shall implement the mitigation measure described below. **Mitigation Measure HYDRO-6a: Incorporate Non-Project Water Supply Wells and/or Additional Monitoring Wells into the Monitoring Program (New Measure).** • For water supply wells located within about one mile of HNWR-1A (currently Topock-2, Topock 3, Marina-1, Sanders, Smith, PGE-9N, PGE-9S, MTS-1, MTS-2, and GSRV-2), PG&E shall request well construction information and access to sample, test and assess current well conditions. If access is granted, PG&E shall add the non-Project water supply wells to the monitoring program (Appendix L, O&M Volume 2, Sampling and Monitoring Plan, Section 5.4). If access is denied, PG&E will alert DTSC of such response in a timely manner and provide associated documentation. If the well owner does not otherwise respond within 60 days, PG&E shall initiate a second request. If the well owner still does not respond, PG&E will alert DTSC of such response in a timely manner and provide documentation of both attempts to contact the owner. If new water supply non-Project wells are installed or discovered in the general area in the future, DTSC may direct PG&E to take additional action for access and add them to the wells listed above at any time. • PG&E shall submit a well installation work plan to DTSC describing installation of a new nested monitoring well located between HNWR-1 and wells Topock-2/Topock-3 since wells Topock-2/Topock-3 are currently the largest producing non-Project supply wells in the area. The work plan shall also propose the installation of any additional monitoring wells that are needed to ensure protection of the water resource in the vicinity of the non-Project water supply wells. PG&E shall submit the well installation work plan to DTSC within four months of DTSC's approval of the remedy design and would be implemented only after DTSC's review and approval. Up to ten well locations from the total borehole count evaluated in this SEIR can be allocated for the monitoring of water	

TABLE 1-3
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		quality to protect non-Project water supply wells. Overtime, wells may be added to or removed from the monitoring program (with prior DTSC approval) based on accumulated data or lack thereof. • Monitoring of wells identified in this mitigation measure shall initially be quarterly for the first two years of operation and include groundwater levels and chemical constituents to establish baseline conditions and assess seasonal variations in the area of the non-Project water supply wells and monitoring wells. Pressure transducers shall be fitted to monitoring wells, Well HNWR-1, Site B, and the above-listed non-Project water supply wells (some which are not currently pumping) to track and evaluate pumping effects over time and to assist with assessments required below in Mitigation Measure HYDRO-6b and 6c. Chemical testing shall include, at a minimum, Title 22 metals, Cr(VI), stable isotopes of hydrogen and oxygen, general minerals, and TDS. After the second year of monitoring, sampling frequencies may be reduced to semi-annually for two additional years and annually thereafter with DTSC approval. The well network, monitoring frequency, pressure transducer monitoring, and chemical constituents may be modified with DTSC approval. **Mitigation Measure HYDRO-6b: Water Supply Mitigation (New Measure).** • If non-pumping groundwater elevations substantially decrease from baseline conditions established under HYDRO-6a in a monitored non-Project water supply well (e.g., below top of well screen, below pump depths, or causes significant decrease in well yield) or a similar groundwater elevation decrease is observed in a water resource protection monitoring well described in HYDRO-6a, PG&E shall inform DTSC as soon as practicable and no longer than two weeks (unless modified with DTSC approval) after receipt of data documenting such an event. Additionally, PG&E will assess well and aquifer conditions to evaluate if the Project has caused a substantial decrease in groundwater elevations/well yield. PG&E shall promptly provide its assessment to DTSC for review. At a minimum, the assessment shall consider the following conditions: o Historical well usage o Well condition o Anticipated drawdown effects o Regional groundwater level trends • If PG&E or DTSC determines that the Project has adversely impacted a non-Project water supply well to the extent that the Project is determined to be the primary cause, or one of the primary	

TABLE 1-3
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		contributing causes, of the reduction in well yield or elevation such that the well does not provide sufficient water, PG&E shall promptly notify the well owner. PG&E shall coordinate with the well owner(s) to arrange for an interim drinking water supply if necessary, and develop a plan (for DTSC approval) which will assist in restoring the water resource by using measures that may include: o Lowering the well pump o Rehabilitating the well o Deepening the existing well o Providing short and/or long term replacement of water supply o Constructing a new replacement well, o Modifying remedy operations (e.g., placing a packer in HNWR-1A) An alternate course of action may be considered, provided it is mutually agreeable to DTSC, PG&E, and the well owner. Unless an alternative period is approved by DTSC, the plan/alternate course of action should be provided to DTSC for approval within 30 days of determining that the Project adversely impacted a non-Project water supply well. **Mitigation Measure HYDRO-6c: Water Quality Mitigation (New Measure).** • If the groundwater quality of a non-Project water supply well deteriorates by exceeding water quality objectives (e.g., MCLs for drinking water wells) and baseline conditions established pursuant to HYDRO-6a, PG&E will immediately notify DTSC and DOI and take steps to collect confirmation samples from the well within 60 days of original sample collection unless modified with DTSC approval. PG&E shall identify/confirm the specific uses of the well and inform DTSC, DOI, the Arizona Department of Environmental Quality, and the well owner of the deterioration as soon as possible (e.g., within 7 days of receiving confirmation samples results). This shall include PG&E providing both the initial and confirmation sample data to agencies and well owner even if the initial exceedance is not confirmed. • If PG&E or DTSC determines that the Project has adversely impacted a non-Project water supply well to the extent that the Project is determined to be the primary cause, or one of the primary contributing causes, of the reduction in water quality, PG&E shall immediately notify the well owner. PG&E shall coordinate with the well owner(s) to arrange for an interim drinking water supply if	

TABLE 1-3
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		necessary, and develop a plan (for DTSC approval) which will assist in restoring the water resource by using measures which may include: o Deepening the existing well o Providing short and/or long term replacement of water supply o Constructing a new replacement well o Conducting water treatment, o Modifying remedy operations (e.g., placing a packer in HNWR-1A) o An alternate course of action may be considered, provided it is mutually agreeable to DTSC, PG&E and the well owner. The plan/alternate course of action should be provided to DTSC for approval within 30 days, unless modified with DTSC approval, of determining that the Project adversely impacted a non-Project water supply well. • If the groundwater quality of any well installed as part of HYDRO-6a deteriorates by exceeding water quality objectives (e.g., MCLs for drinking water wells) and baseline conditions, PG&E shall conduct confirmation sampling and promptly assess aquifer conditions to evaluate if the Project has adversely impacted the well. PG&E shall promptly inform DTSC, DOI, and the Arizona Department of Environmental Quality of any adverse impacts and provide an assessment with any recommendations for review and approval.	
Impact HYDRO-2: Drainage Pattern Alterations. The proposed Project would require the construction of wells, piping corridors, buildings, and associated infrastructure that could alter the existing drainage system that could result in a substantial increase of erosion and siltation or flooding on and off the Project Area.	Potentially Significant	Implement **Mitigation Measures HYDRO-1** and **HYDRO-2**.	Less than Significant
Impact HYDRO-3: Polluted Stormwater Runoff. The proposed Project does not include discharge to an existing or planned stormwater drainage system. The Project does have the potential to contribute substantial additional sources of polluted runoff if materials and operations are not properly handled.	Potentially Significant	Implement **Mitigation Measure HYDRO-1**.	Less than Significant

TABLE 1-3
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
Noise			
Impact NOISE-1: Long-Term Operational-Related Non – Transportation Noise and Vibration Impacts. Operation-related non-transportation noise sources involve activities such as water filtration pumps, generators, off-road mobile sources such as forklifts, etc. This equipment would not expose sensitive receptors to noise levels in excess of the applicable noise standards and/or result in a substantial increase in ambient noise levels.	Less than Significant	No mitigation measures required.	N/A
Construction activities associated with the Additional Activity Allowance that could occur during long-term operation and maintenance could result in noise levels that exceed applicable standards.	Potentially Significant	**Mitigation Measure NOISE-2: Potential Impacts to Noise Levels and Noise Standards (Groundwater FEIR Measure with Revisions).** • Construction equipment shall be properly maintained per manufacturer specifications and fitted with the best available noise-suppression devices (e.g., mufflers, silencers, wraps). All impact tools shall be shrouded or shielded, and all intake and exhaust ports on power equipment shall be muffled or shielded. • Construction equipment shall not idle for extended periods of time (more than 15 minutes) when not being utilized during construction activities. A notable exception is when a support vehicle is needed to remain running for health and safety reasons (i.e., air conditioning), consistent with health and safety procedures. • Construction activities shall include, but not limited to, the use of berms, stockpiles, dumpsters, and/or bins to shield the nearest noise-sensitive receptor adjacent to construction activities to within acceptable non-transportation noise level standards. When construction activities are conducted within the distances outlined earlier (i.e., 1,850 feet and 5,830 feet from California receptors and 330 feet and 735 feet from Arizona receptors for daytime and nighttime noise, respectively) relative to noise-sensitive uses in the project area, noise measurements shall be under the supervision of a qualified acoustical consultant at the nearest noise-sensitive land use relative to the construction activities with a sound level meter that meets the standards of the American National Standards Institute (ANSI Section S14 1979, Type 1 of Type 2) to ensure that construction noise associated with the project component complies with applicable daytime and nighttime noise standards. Coordination with the Tribes and appropriate landowner(s) shall occur to allow opportunity for input in determining noise monitoring locations. If noise levels are still determined to exceed noise standards, temporary engineered acoustical barriers shall be erected as close to the construction activities as feasible, breaking	Significant and Unavoidable

TABLE 1-3
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		the line of sight between the source and receptor where noise levels exceed applicable standards. Coordination with the Tribes shall occur in a manner consistent with the Cultural Impact Mitigation Program (CIMP; see Appendix H to the C/RAWP) throughout all Project phases, including input in determining constraints in locating temporary noise barriers to avoid or minimize physical impact to cultural resources. All acoustical barriers shall be constructed with material having a minimum surface weight of 2 pounds per square foot or greater and a demonstrated Sound Transmission Class (STC) rating of 25 or greater as defined by the American Society for Testing and Materials' Test Method E90. Placement, orientation, size, and density of acoustical barriers shall be specified by, or under the direct supervision of, a qualified acoustical consultant. • A disturbance coordinator shall be designated by the PG&E, which will post contact information in a conspicuous location near groundwater project activity areas so that it is clearly visible to nearby noise-sensitive receptors as identified in Figure 4.7-1 and Interested Native American Tribes (Chemehuevi Indian Tribe, Cocopah Indian Tribe, Colorado River Indian Tribes, Fort Mojave Indian Tribe, and the Hualapai Indian Tribe). The coordinator will manage and thoroughly investigate complaints resulting from the Project-related noise to ensure resolution. Reoccurring disturbances will be evaluated by a qualified acoustical consultant retained by PG&E to ensure compliance with applicable standards. Noise complaints shall be reported to DTSC as soon as practicable and no more than 72 hours upon receipt of complaint. Resolutions will be recorded, tracked, and reported to DTSC on a monthly basis. The disturbance coordinator will contact nearby noise-sensitive receptors as labeled in Figure 4.7-1 and Interested Tribes, advising them of the Project activity schedule. The disturbance coordinator will also consider the timing of Project activities in relation to Tribal ceremonial events that are sensitive to noise, which will be accommodated by PG&E to the extent practicable. • This shall be achieved in part through annual project update mailings (could be combined with other annual project mailings) to potentially impacted owners/occupants of sensitive land uses to give notice of possible disturbances and impacts. The mailing shall also identify the disturbance coordinator's contact information.	

TABLE 1-3
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
Long-Term Operational-Related Transportation Noise Impacts. Operation of the proposed Project would not result in any transportation noise sources (material/equipment delivery, truck trips for off-site waste disposal, etc.) that would generate noise levels that would result in a noticeable, permanent increase in ambient noise levels at nearby sensitive receptors or vibration impacts in excess of applicable levels.	Less than Significant	No mitigation measures required.	N/A
Impact NOISE-2: Groundborne Vibration Impacts Caused by Construction Activities. Implementation of the proposed Project would result in the exposure of sensitive receptors to groundborne vibration levels that exceed the applicable standards of the San Bernardino County Development Code (83.01.090) and the Mohave County Zoning Ordinance. These groundborne vibration levels could result in annoyance or architectural/structural damage.	Potentially Significant	**Mitigation Measure NOISE–1: Short-Term Groundborne Vibration Levels Caused by Project Activities near Sensitive Receptors. (Groundwater FEIR Measure with Revisions)** • New wells shall be constructed a minimum of 45 feet from vibration-sensitive receptors, as feasible. Constructing new wells within 30 feet of vibration-sensitive land uses located in California and 275 feet of vibration-sensitive land uses located in Arizona shall be avoided. • A disturbance coordinator shall be designated by PG&E, which will post contact information in conspicuous locations near Project activity areas such as on construction fencing or trailers, but with consideration to culturally sensitive areas such as the Topock Maze. Signage will be clearly visible to nearby vibration-sensitive receptors as identified in Figure 4.7-1. The coordinator will manage complaints resulting from the construction vibration. Reoccurring disturbances will be evaluated by a qualified acoustical consultant retained by the project applicant to ensure compliance with applicable standards. The disturbance coordinator will contact nearby vibration-sensitive receptors, advising them of the construction schedule. This shall be achieved in part through annual project update mailings (could be combined with other annual project mailings) to owners/occupants of potentially impacted sensitive land uses to give notice of possible disturbances and impacts. The mailing shall also identify the disturbance coordinator’s contact information.	Less than Significant
Impact NOISE-3: Project-Generated Construction-Related Noise Levels. Implementation of the proposed Project would result in intermittent construction activities associated with the installation of new wells, roadways, water conveyance, utilities, water filtration facilities, and structures. These construction activities could potentially expose sensitive receptors to noise levels in excess of the applicable noise standards and/or result in a substantial increase in ambient noise levels.	Potentially Significant	Implementation of **Mitigation Measure NOISE-2**.	Significant and Unavoidable

TABLE 1-3
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
Impact NOISE-4: Land Use Compatibility of Future Project Noise Levels with the Topock Traditional Cultural Property. Implementation of the proposed Project could result in future noise (construction, operation and maintenance, and decommissioning activities) that could result in conflicts with land use compatibility that exceed San Bernardino County standards for Places of Worship or conflict with Native American values associated with the Topock Traditional Cultural Property (TCP).	Potentially Significant	Implementation of **Mitigation Measures NOISE-1 and NOISE-2**.	Significant and Unavoidable
Utilities, Service Systems, and Energy			
Impact UTIL-1: Potential to Exceed Wastewater Treatment Requirements or Require a New Wastewater Facility. The proposed Project includes several wastewater improvements in order to operate successfully that would not exceed requirements or require new facilities.	Less than Significant	No mitigation measures required.	N/A
The proposed Project does, however, include two new septic tank systems that could exceed requirements or require new facilities.	Potentially Significant	Implement **Mitigation Measure HYDRO-1** (specifically WM-9).	Less than Significant
Impact UTIL-2: Potential to Exceed Landfill Capacity. The Project would generate incidental non-hazardous waste and hazardous waste during construction and operation activities, which would not exceed the available daily capacity of relevant landfills.	Less than Significant	No mitigation measures required.	N/A
Decommissioning of the Project, including the IM-3 Facility, would generate a variety of construction debris, including concrete, metal sheeting, and pipe, which could exceed the available daily capacity of relevant landfills.	Potentially Significant	Implementation of **Mitigation Measure HAZ-3**.	Less than Significant
Result in wasteful, inefficient, or unnecessary consumption of energy, during Project construction or operation or did not incorporate renewable energy or energy efficiency measures into building design, equipment use, transportation or other Project features. The Project would consume energy, including electricity, natural gas, and fuels during Project construction, operation and maintenance, and decommissioning activities, which would not result in wasteful, inefficient, or unnecessary	Less than Significant	No mitigation measures required.	N/A

TABLE 1-3
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
consumption of energy.			
Water Supply			
Increased Demand for Water Supplies. Although the Project would require the use of freshwater supplies from certain Arizona wells for injection upgradient of the Cr(VI) contaminant plume as well as for use during construction activities, the project would not substantially increase overall demand for water supplies.	Less than Significant	No mitigation measures required.	N/A
Impact WATER-1: Depletion of Groundwater Supplies. The Project would require the use of freshwater from water supply wells in Arizona. Localized effects on the groundwater table and the availability of groundwater supplies to other groundwater users near the freshwater water supply wells are possible.	Potentially Significant	Implementation of **Mitigation Measure HYDRO-6**.	Less than Significant
Cumulative Impacts			
Impact CUM-1: Cumulatively Considerable Impacts to Aesthetic Resources. Implementation of the proposed Project, in combination with other projects in the geographic scope, could cause a substantial adverse change to scenic vistas, scenic resources, and the existing visual character and quality of the site and its surroundings.	Potentially Significant	Implement **Mitigation Measures AES-1** and **AES-2**.	Significant and Unavoidable
Impact CUM-2: Cumulatively Considerable Impacts to Cultural Resources. Implementation of the proposed Project, in combination with other projects in the geographic scope, could cause a substantial adverse change in the significance of the historical resource identified as the Topock Traditional Cultural Property (TCP); cause a substantial adverse change in the significance of unknown historical or unique archaeological resources; result in a substantial adverse change to a unique paleontological resource or unique geologic feature; and disturb human remains, including those interred outside of formal cemeteries.	Potentially Significant	Implement **Mitigation Measures CUL-1** through **CUL-4**.	Significant and Unavoidable
Impact CUM-3: Cumulatively Considerable Impacts Related to Noise and Vibration. Implementation of the proposed Project, in combination with Soil Remediation Activities in the Project Area that are in the geographic scope, could cause a substantial adverse increase related to short-term construction-related noise and vibration, as well as compatibility with noise levels at the Topock TCP.	Potentially Significant	**Mitigation Measure NOISE-3: Cumulative Noise Increases from Remedial Activities (New Measure).** Coordination between teams implementing soil remedial activities (including investigation, pilot testing, and remediation) and groundwater remediation shall occur as to avoid cumulative noise impact to any sensitive receptor. If concurrent activities must occur near common sensitive receptors, real time noise measurements of representative activities shall be conducted by a qualified acoustical consultant (or contractor trained	Significant and Unavoidable

TABLE 1-3
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Impact	Significance before Mitigation	Mitigation Measures	Significance after Mitigation
		by an appropriate qualified acoustical consultant) at the nearest noise-sensitive land use with a sound level meter that meets the standards of the American National Standards Institute (ANSI Section S14 1979, Type 1 of Type 2). If exceedances are not observed, monitoring can be discontinued. If exceedances are experienced, temporary barriers shall be erected as close to the construction activities as feasible, breaking the line of sight between the source and receptor where noise levels exceed applicable standards. If noise cannot be effectively mitigated, one or more of the concurrent activities shall be modified to result in appropriate noise levels.	

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CHAPTER 2
Introduction

This draft subsequent environmental impact report (SEIR) has been prepared by Environmental Science Associates, under contract to the California Department of Toxic Substances Control (DTSC), the lead agency under the California Environmental Quality Act (CEQA) (Public Resources Code, Section 21000 et seq., as implemented by the California Code of Regulations [CCR], Title 14, Chapter 3, Section 15000 et seq. [CEQA Guidelines]). This SEIR evaluates the reasonably foreseeable and potentially significant adverse environmental effects associated with the proposed Pacific Gas and Electric Company (PG&E) Topock Compressor Station Final Groundwater Remediation Project (Final Groundwater Remedy Project, or proposed Project) as specifically defined in the *Basis of Design Report/Final (100%) Design Submittal for the Final Groundwater Remedy, PG&E Topock Compressor Station, Needles, California, November* (Final Remedy Design; CH2M Hill 2015a). The Final Remedy Design and its associated appendices A through L; the *Construction/Remedial Action Work Plan for the Final Groundwater Remedy, PG&E Topock Compressor Station, Needles, California* (C/RAWP) (CH2M Hill 2015b) and its associated Appendices A through X; and the Supplemental and Errata to the Final Remedy Design are incorporated by reference throughout this SEIR and are found collectively as Appendix BOD as an electronic appendix to this SEIR.

Under CEQA and consistent with the terms of the various Settlement Agreements entered into by DTSC and PG&E with the Fort Mojave Indian Tribe (FMIT), DTSC must identify and consider the potentially significant adverse environmental effects of the proposed Project before making a final decision to certify the Final Groundwater Remedy Project SEIR and approve the Final Remedy Design. This SEIR will be used in the planning and decision-making process by the lead agency (DTSC) and all responsible and trustee agencies.

This introductory chapter provides: an overview of the environmental review process required under CEQA; background information related to the proposed Project; agency roles and responsibilities; and the organization and terminology used in this SEIR. A detailed description of the proposed Project can be found in Chapter 3, “Project Description,” and is based on the Final Remedy Design (CH2M Hill 2015a) and the C/RAWP (CH2M Hill 2015b) and associated appendices, which DTSC will consider adopting. The proposed Project evaluated in this SEIR is, therefore, the Final Groundwater Remedy Project.

2.1 Purpose of This SEIR

This SEIR provides environmental review and analysis of the Final Groundwater Remedy Project. This chapter provides background information and an explanation of how this SEIR satisfies the requirements of CEQA. Details of the Groundwater Remedy Project, including the Project's location, objectives, and characteristics that form the basis of the SEIR environmental analysis, are presented in Chapter 3, "Project Description."

Remediation of contaminated groundwater at the Topock Compressor Station (Station) is being conducted under the Resource Conservation and Recovery Act of 1976 (RCRA) and the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA). Both RCRA and CERCLA are federal laws. RCRA provides a framework for the U.S. Environmental Protection Agency (USEPA) to remediate hazardous waste sites in the United States. This authority under RCRA, however, can be delegated to states. In California, DTSC implements RCRA under such delegated authority from the federal USEPA through state law. The approval of the Groundwater Remedy Project to clean up the contaminated groundwater at the Station, which includes the Final Remedy Design and associated manuals and work plans, is a discretionary action that will be made by DTSC. Activities associated with the corrective action may result in direct or indirect change in the physical environment. The SEIR is intended to address the potentially significant adverse effects of the proposed Project on the physical environment.

This SEIR has been prepared in compliance with CEQA (California Public Resources Code, Sections 21000 et seq.) and the CEQA Guidelines. It is an informational document for use by governmental agencies, Native American Tribal groups, and the public to aid in the planning and decision-making process by disclosing the physical environmental effects of the Project and identifying possible ways of reducing or avoiding its potentially significant impacts.

Before a lead agency exercises its discretion to approve a project that could result in reasonably foreseeable and potentially significant adverse effects on the environment, an environmental impact report (EIR) must be prepared that fully describes the environmental effects of the project. The EIR is a public information document that identifies and evaluates potentially significant environmental impacts of a project, recommends mitigation measures to avoid or substantially lessen significant adverse impacts, and examines feasible alternatives to the project. The information contained in the EIR must be reviewed and considered by DTSC and by any responsible agencies (as defined in CEQA) prior to a decision to approve, disapprove, or modify the proposed project.

The CEQA Guidelines help define the role and content of an EIR as follows:

- Informational Document. An EIR is an informational document that will inform public agency decision-makers and the public of the significant environmental effect(s) of a project, identify possible ways to minimize the significant effects, and describe reasonable alternatives to the project. The public agency shall consider the information in the EIR along with other information that may be presented to the agency (Section 15121[a]).
- Standards for Adequacy of an EIR. An EIR should be prepared with a sufficient degree of analysis to provide decision-makers with information that enables them to make an informed decision that takes account of environmental consequences. An evaluation of the environmental effects of a proposed project need not be exhaustive, but the sufficiency of an

EIR is to be reviewed in light of what is reasonably feasible. Disagreement among experts does not make an EIR inadequate, but the EIR should summarize the main points of disagreement among the experts. The courts have looked not for perfection but for adequacy, completeness, and a good faith effort at full disclosure (Section 15151).

The CEQA Guidelines, Section 15382, define a significant effect on the environment as “a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project, including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance….” Therefore, in identifying the significant impacts of the Project, this SEIR describes the potential for the Project to result in substantial physical effects within the area affected by the Project (the Project Area) and identifies mitigation measures that would avoid, reduce, or otherwise alleviate those effects.

2.2 CEQA Environmental Review

The CEQA Guidelines Section 15160 provides for variations in EIRs so that environmental documentation can be tailored to different situations and intended uses, and these variations are not exclusive. As described below, this SEIR relies on a prior EIR, which was a project- and program-level EIR.

CEQA authorizes lead agencies to prepare a program-level or “first-tier” analysis for some approval of a series of actions that are related geographically or as part of a suite of activities (Pub. Resources Code Section 21094; 14 CCR Sections 15152, 15168). A program EIR is a type of EIR that allows a public agency to consider broad policy alternatives and program-wide mitigation measures at the early stages of planning. By contrast, a project-level EIR typically involves specific project-related plans and a discretionary approval that may result in significant adverse environmental effects (14 CCR Sections 15168, 5161).

The Topock Compressor Station Groundwater Remediation Project Final EIR (Groundwater FEIR; DTSC 2011), certified on January 31, 2011 (SCH No. 2008051003), provided both a programmatic and, in certain instances, a project-level analysis for the conceptual technical methods selected for the final remedy that would remediate contaminated groundwater at the Station. The proposed final remedy was described in the *Final CMS/FS for Solid Waste Management Unit 1 (SWMU 1)/Area of Concern 1 (AOC 1) and AOC 10* (Final CMS/FS) as Alternative E—In Situ with Freshwater Flushing. The Groundwater FEIR provided a program-level analysis of the construction of physical facilities that would be necessary to implement the final remedy (Alternative E from the Final CMS/FS), which had not yet been developed to specific plans and designs. In 2011, DTSC adopted Alternative E after certifying the Groundwater FEIR. DTSC also adopted an Addendum to the Groundwater FEIR in 2013, which expanded the Project Area and considered the potential environmental effects of alternative well locations for a freshwater source (DTSC 2013).

The Final Remedy Design and related infrastructure needed to complete cleanup are geographically related to the area considered within the 2011 Groundwater FEIR, and involve consideration of the In Situ with Freshwater Flushing project. Although no specific site locations for remedial facilities were known at the time the Groundwater FEIR was prepared, the ultimate development of those facilities was recognized as the logical progression for cleanup. The Groundwater FEIR therefore included a mostly programmatic level of analysis to ensure that the effects of developing the final remedy, and implementation of the final remedy, were considered for purposes of: avoiding duplicative reconsideration of basic policy considerations, ensuring consideration of cumulative impacts that might be slighted in a case-by-case analysis, and to allow DTSC to consider broad policy alternatives and program-wide mitigation measures at an early time, while recognizing that the components are at different stages of planning. (See CEQA Guidelines, Section 15168, subd. (b).)

This SEIR tiers from the Groundwater FEIR and Addendum. This SEIR also evaluates, at a project level, the environmental effects associated with the construction, operation, and decommissioning of the Groundwater Remedy Project, based on the Final Remedy Design and as further described in Chapter 3 of this SEIR, relative to the program-level impact analysis in the certified Groundwater FEIR. CEQA Guidelines Sections 15152, subdivision (f), 15168, subdivisions (c)-(d), and 15162, among others, provide that when an EIR has been certified for a project, a SEIR shall not be prepared unless the lead agency determines that one or more of the following has occurred:

1. Substantial changes are proposed in the project which will require major revisions of the previous EIR due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified effects.
2. Substantial changes occur with respect to the circumstances under which the project is undertaken which will require major revisions of the previous EIR due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects.
3. New information of substantial importance, which was not known and could not have been known with the exercise of reasonable diligence at the time the previous EIR was certified as complete, shows the project would result in one or more significant effects not discussed in the prior EIR, or that significant effects previously identified may be substantially more severe.

(See also Pub. Resources Code, Sections 21094, 21166.)

DTSC has prepared a Modified Initial Study (Appendix IS to this SEIR) to provide an initial evaluation of Final Remedy Design as compared to the analysis conducted in the Groundwater FEIR (see CEQA Guidelines Section 15128). The purpose of the Modified Initial Study is to determine whether certain impacts of the Final Remedy Design were sufficiently covered in the Groundwater FEIR or otherwise do not require additional analysis, and whether the criteria set forth in CEQA Guidelines Section 15162 were triggered. DTSC determined that modifications and/or new levels of specificity contained within the Final Remedy Design, as compared to the Groundwater FEIR and Addendum, trigger the provisions above for requiring preparation of an SEIR. Specifically, the lead agency has determined that several aspects of the Final Remedy Design, including the following, have resulted in the need for this SEIR:

- Use of a freshwater source, Havasu National Wildlife Refuge (HNWR) Well 1A in Arizona as the source for freshwater, that contains levels of arsenic that are elevated above the State of California background levels.
- Inclusion of a new construction headquarters and soil processing/storage area in Moabi Regional Park, in an area that was anticipated to only provide one or more freshwater supply wells in the Groundwater FEIR.
- An overall increase in the total amount of ground disturbance associated with remedy construction and long-term operation. The Groundwater FEIR assumed a maximum of 13,400 cubic yards of soil disturbance. The Final Remedy Design anticipates 45,200 cubic yards of soil disturbance.
- The need to further evaluate potential impacts to cultural resources, specifically related to new information, regarding resources, that has become available since the Groundwater FEIR was prepared. This includes historic, archaeological, and Tribal resources.
- The need to further evaluate potential impacts to sensitive wildlife species based on new information that has become available since the Groundwater FEIR was prepared. This includes but is not limited to sensitive bat species and bighorn sheep.
- An overall increase in the amount of energy that would be used to operate the Final Remedy Design. The Groundwater FEIR estimated a demand of 1.6 million kilowatt hours (KWh) of electricity annually. The Final Remedy Design estimates a higher demand of electricity of up to 7.82 million KWh annually.

In addition, there may be a need for additional facilities and associated activities beyond the parameters set forth in the Final Remedy Design. A Future Activity Allowance has been included in the Project Description and the SEIR to ensure that a comprehensive environmental analysis is included should additional activities be warranted over the decades-long project implementation. More information can be found in Chapter 3, "Project Description," Section 3.6.

The Final Remedy Design is therefore a subsequent activity under the Groundwater FEIR. This SEIR for the Groundwater Remedy Project tiers from the prior analysis in accordance with the above cited Public Resources Code and CEQA Guidelines Sections. A Modified Initial Study has been prepared consistent with CEQA Guidelines in order to limit the content of the SEIR, or incorporate by reference, the content of the Groundwater FEIR on those topics that were previously covered and for which no additional analysis is necessary, and is included as Appendix IS to this SEIR. Consequently, the Modified Initial Study identifies which of the Final Remedy Design's effects were adequately examined in the Groundwater FEIR and which topics warrant more detailed environmental analysis. This SEIR therefore concentrates the environmental analysis on those topics identified in the Modified Initial Study with the potential to have either new significant effects or substantially more severe significant impacts than were previously identified in the Groundwater FEIR. The remaining environmental topics, as documented in the Modified Initial Study, were determined not to have new or more severe significant environmental effects than what was previously identified in the Groundwater FEIR, and these topics are therefore not analyzed in detail in this SEIR. (See *Mission Bay Alliance v. Office of Community Investment and Infrastructure* (2016) ___Cal.App.5th ___.)

The impacts analysis contained in the Groundwater FEIR (including its Errata) and 2013 Addendum also serve as the baseline for DTSC's consideration in this SEIR of the potential effects of the Final Remedy Design as required by CEQA. Although the general rule under CEQA is that the environmental setting in an EIR corresponds to physical conditions at the time the agency undertakes its analysis, the California Supreme Court has acknowledged that subsequent review under Section 21166 is an exception to this rule. (See *Communities for a Better Environment v. South Coast Air Quality Management Dist.* (2010) 48 Cal.4th 310, 326 [acknowledging the "only limited CEQA review under Section 21166 and CEQA Guidelines Section 15162"]; see also *ibid*. at fn. 11 [citing (2010) 48 Cal.4th 310 (1999) 70 Cal.App.4th 238, 242-243; *Benton v. Board of Supervisors* (1991) 226 Cal.App.3d 1467, 1477-1484.)

Under these cases, the SEIR's analysis need not revisit those impacts already disclosed in the Groundwater FEIR and 2013 Addendum; rather, the impacts disclosed in the Groundwater FEIR, Errata, and 2013 Addendum become the "baseline" against which the impacts of the Final Remedy Design are measured. The focus is therefore on whether the refinements to the Project give rise to new, or substantially more severe, environmental impacts. (CEQA Guidelines, Sections 15162–15164.)

2.3 Groundwater FEIR Environmental Review Process

This section presents an overview of the Groundwater FEIR, including the Errata that was adopted in 2011, and the 2013 Addendum, from which this SEIR is tiered, and which is incorporated by reference.

2.3.1 Environmental Review for the 2011 Groundwater FEIR and 2013 Addendum

The Groundwater FEIR considered the potentially significant adverse environmental impacts of adopting the preferred remedy, determined to be the In Situ Treatment with Freshwater Flushing (known as Alternative E) through the Final Corrective Measures Study/Feasibility Study (CMS/FS) process that was completed in December 2009. The In Situ Treatment with Freshwater Flushing remedy alternative, as discussed in the Groundwater FEIR and final project approval documents, involves manipulation of subsurface water flow to move a contaminated groundwater plume with hexavalent chromium Cr(VI) and other chemicals of potential concern (COPCs), originating from past operations, through a treatment zone.

The Groundwater FEIR provides a program-level analysis of the conceptual technical methods and construction of physical facilities that would be necessary to implement the In Situ Treatment with Freshwater Flushing remedy alternative, which at the time of the FEIR had not yet been developed to specific plans and designs. While the Final CMS/FS explains the types of facilities that would be required and are included in the In Situ Treatment with Freshwater Flushing remedy, it does not identify the exact location or quantity of these facilities. The exact location of project facilities was not determined until the future design phase of the project (i.e., Final Remedy Design, which is the subject of this SEIR). As discussed in the Groundwater FEIR, it was anticipated that future environmental review may be needed upon completion of the Final

Remedy Design to determine if the impacts associated with the project-level designs are generally consistent with the significance conclusions in the Groundwater FEIR (see the Groundwater FEIR, page 3-12).

The Groundwater FEIR concluded that there would be significant and unavoidable impacts, even after implementation of mitigation measures, to cultural resources and noise. It concluded that impacts would be reduced to less than significant after the implementation of mitigation measures for aesthetics, air quality, biological resources, geology and soils, hazardous materials, hydrology and water quality, noise, and water supply.

In 2013, DTSC adopted an Addendum to the Groundwater FEIR (referred to as the 2013 Addendum) that considered the potential effects of the Final Implementation Plan for the Evaluation of Alternative Freshwater Sources. That plan allowed for water well installation, testing, and sampling at two exploratory borehole sites (Site B and the HNWR-1 well) located outside the FEIR project boundary on the Arizona side of the Colorado River. The addendum was focused on the testing activities needed to determine the suitability of these borehole locations for use as a freshwater source for the remedy. It did not, however, select a well to be used for the remedy or evaluate environmental impacts associated with infrastructure needed to connect and operate the selected freshwater supply well with the larger remedy system.

2.3.2 Alternatives Considered in the FEIR

In accordance with Section 15126.6 of the CEQA Guidelines, a range of reasonable alternative remedy options that could feasibly accomplish most of the basic project objectives was considered in the Groundwater FEIR. The Final CMS/FS presented the identification and evaluation of various remedial alternatives to address the remedial action goals for groundwater contamination associated with the historic discharges to Bat Cave Wash—Solid Waste Management Unit (SWMU) 1/Area of Concern (AOC) 1—and within AOC 10 (East Ravine) at the Station. The Final CMS/FS examined a total of nine remedy alternatives (Alternatives A through I). This SEIR includes the following summary of the alternatives considered in the FEIR to provide background to the reader. By doing so, however, DTSC does not mean to imply that it is revisiting the policy decision to adopt Alternative E.

The rationale for DTSC’s consideration of alternatives was based on DTSC’s review and participation in the Final CMS/FS process, which provided an exhaustive consideration of potential options and technologies for remediation of the contaminated groundwater plume while meeting the Remedial Action Objectives (RAOs) and other requirements, including the applicable statutory requirements of RCRA/CERCLA and the associated Corrective Action Consent and Administrative Consent Agreements for Topock. As such, the range of alternatives considered in the FEIR was based on feasible remediation alternatives to the proposed project that fell within the parameters of the RAOs for the project identified in the Final CMS/FS.

DTSC selected Alternative E – In Situ Treatment with Freshwater Flushing because it would achieve the RAOs while substantially reducing, through chemical change and physical precipitation, the amount of Cr(VI) in the groundwater (which is the principal threat in groundwater at the site). The selected technology will complete cleanup in a reasonable time frame while achieving best balance with the adverse effects to cultural resources and biological resources than other alternatives considered. Furthermore, Alternative E met both the threshold criteria of (1) protecting human health and the environment, attaining media cleanup goals (over a reasonable timeframe), and controlling sources of releases, and (2) compliance with the identified chemical-, location-, and action-specific applicable or relevant and appropriate requirements (ARARs). Alternative E also was found to provide a sufficient degree of long-term effectiveness, permanence, and reliability; is implementable; is relatively cost-effective; and provides a sufficient degree of protectiveness to the community, workers, and environment during implementation.

The alternatives considered but ultimately rejected in the Groundwater FEIR are summarized in the following pages (Groundwater FEIR, Volume 2, Section 8).

Monitored Natural Attenuation (Alternative B)

Although using the same basic chemistry principles as the selected remedy, under Alternative B in the Groundwater FEIR, no active treatment to reduce Cr(VI) concentrations in groundwater would have occurred. This alternative would have relied only on the naturally reducing conditions, where present, to remove Cr(VI) from groundwater in the Project Area's shallow floodplain. These reducing conditions were derived from naturally occurring organic carbon in the fluvial deposits associated with the Colorado River. Wherever the natural reducing capacity of the fluvial material is present, Cr(VI) would be converted to its stable and less toxic form of Cr(III), which is essentially immobile and binds to the subsurface soil matrix. The reducing conditions in the fluvial sediments provide a natural geochemical zone that limits or prevents the movement of Cr(VI) through the fluvial sediments adjacent to and beneath the Colorado River. However, there is some degree of uncertainty as to whether the natural geochemical zone occurs throughout the area of interest. While Alternative B was found to be the environmentally superior alternative among the alternatives analyzed and generally meets most of the objectives stated in the Groundwater FEIR, it did not meet a fundamental project objective of achieving compliance with RAOs within a reasonable time frame, as required by California State Water Board Resolution 92-49. DTSC therefore rejected Alternative B as infeasible per CEQA Guidelines Section 15126.6(f)(1) because it could not achieve remediation within a reasonable time frame.

High-Volume In Situ Treatment (Alternative C)

Alternative C would have involved active in situ groundwater treatment by distributing an organic carbon substrate across the entire plume through high-volume pumping of wells installed primarily in previously disturbed areas. This alternative would have had the largest amount of remediation wells and infrastructure, and therefore the largest amount of associated ground disturbance. Alternative C proposed to locate injection wells within the center of the plume and extraction wells at the plume margin. An organic carbon substrate would have been injected to create geochemically reduced conditions and convert the harmful and soluble Cr(VI) to the insoluble form of chromium, Cr(III). Since the reduced chromium would be deposited in the soil formation instead of dissolved in groundwater, Cr(VI) would be removed from groundwater. While this alternative was found to meet the objectives stated in the Groundwater FEIR, DTSC rejected Alternative C for environmental and policy reasons. As described in the Groundwater

FEIR, this alternative would have had more severe significant adverse environmental impacts (e.g., to biological resources, aesthetics) when compared to Alternative E and was therefore less desirable. Thus, it would not have met the requirements for selection under CEQA and was rejected as infeasible per CEQA Guidelines Section 15126.6(f)(1).

Sequential In Situ Treatment (Alternative D)

Under Alternative D, treatment of Cr(VI) would have occurred by injecting an organic carbon substrate throughout the plume to create geochemically reduced conditions to convert Cr(VI) to insoluble Cr(III). Since the reduced chromium would be deposited in the soil formation instead of groundwater, Cr(VI) would be removed from groundwater in a manner similar to Alternative C. Treatment would be implemented in several sequential phases involving construction of approximately 12 lines of injection and extraction wells to distribute the carbon food source over the entire plume. Alternative D was found to be environmentally inferior to Alternative E. While this alternative met most of the objectives stated in the Groundwater FEIR, DTSC rejected Alternative D for environmental and policy reasons. As described in the Groundwater FEIR, this alternative would have had greater environmental impacts when compared to the proposed Project's biological impacts from ground disturbance, etc.). Therefore, it did not meet the requirements for selection under CEQA and was rejected as infeasible per CEQA Guidelines Section 15126.6(f)(1).

Pump and Treat (Alternative F)

Alternative F would have involved pumping groundwater, ex situ treatment in an aboveground treatment plant to remove chromium from the groundwater, and reinjection of the treated water back to the aquifer (a process known as pump and treat). The pump and treat process was contemplated to include chemical reduction by addition of ferrous iron; oxidation, pH adjustment, and settling in a clarifier; and final filtration for a process that is essentially similar to the ex situ treatment processes at the current Interim Measure 3 Groundwater Extraction and Treatment Facility (IM-3 Facility), with the exception that it would not include reverse osmosis, as it is assumed salinity removal would not be needed. Alternative F would have included a 1,280 gallons per minute (gpm) treatment plant to remove Cr(VI) from groundwater prior to injection into injection wells. The treatment plant would have been considerably larger than the existing IM-3 Facility. Alternative F was found to be environmentally inferior to Alternative E. While this alternative met most of the objectives stated for Groundwater FEIR, DTSC rejected Alternative F for environmental and policy reasons. As described in the Groundwater FEIR, this alternative would have had greater environmental impacts when compared to Alternative E. Therefore, it did not meet the requirements for selection under CEQA and was rejected as infeasible per CEQA Guidelines Section 15126.6(f)(1).

Combined Floodplain In Situ/Pump and Treat (Alternative G)

Alternative G would have combined floodplain cleanup by in situ treatment with treatment of the upland portion of the plume by extraction and reinjection with ex situ treatment. The floodplain cleanup would have involved construction of in situ reactive zone (IRZ) lines at National Trails Highway and between National Trails Highway and the Colorado River, as described in the initial phase of Alternative C. Chromium in the upland portions of the Project Area would have been addressed by pumping groundwater, ex situ treatment to remove chromium from the groundwater, and reinjection of the treated water back to the aquifer. Concurrent with the floodplain cleanup, treatment of the plume in the upland portions of the site would have been completed by an ex situ process similar to the treatment processes at the current IM-3 Facility: chemical reduction by addition of ferrous iron; oxidation, pH adjustment, and settling in a clarifier; and final filtration. Alternative G would have included a treatment plant of the same dimensions and at the same potential locations as defined under Alternative F. Alternative G was found to be environmentally inferior to Alternative E. While this alternative met most of the objectives stated in the Groundwater FEIR, DTSC rejected Alternative G for environmental and policy reasons. As described in the EIR, this alternative would have had greater environmental impacts when compared to Alternative E. Therefore, it did not meet the requirements for selection under CEQA and was rejected as infeasible per CEQA Guidelines Section 15126.6(f)(1).

Combined Upland In Situ/ Pump and Treat (Alternative H)

Alternative H would have combined in situ treatment in the upland portions of the plume with pump and treat technology in the floodplain. While both Alternative G and Alternative H would have included a combination of in situ treatment and pump and treat, this alternative differed from Alternative G by relying on in situ as the dominant feature of the cleanup rather than pump and treat. The upland in situ cleanup would have involved construction of several IRZ lines across the length and width of the plume. Organic carbon would have been injected in the IRZ lines to treat the existing Cr(VI) in the alluvial zone of the aquifer. IRZ lines would have been constructed by recirculating between adjacent wells within each line or by use of vertical circulation wells. The ex situ process would have been similar to the treatment processes at the existing IM-3 Facility. Alternative H was found to be environmentally inferior to Alternative E. While this alternative met most of the objectives stated in the Groundwater FEIR, DTSC rejected Alternative H for environmental and policy reasons. As described in the Groundwater FEIR, this alternative would have had greater environmental impacts when compared to Alternative E. Therefore, it did not meet the requirements for selection under CEQA and was rejected as infeasible per CEQA Guidelines Section 15126.6(f)(1).

No Project Alternative/Continued Operation of Interim Measure (Alternative I)

Alternative I would have involved continued operation of the IM-3 Facility as the final remedial action at the site. The IM-3 Facility would have operated with the existing equipment with existing procedures using the existing process at the existing flow rate until cleanup goals were attained. As a continuation of existing operations with no new remediation facilities, this alternative was considered the No Project Alternative in the FEIR. While Alternative I was found to generally meet most project objectives, it did not meet a fundamental project objective of achieving compliance with RAOs within a reasonable time frame, as required by California State Water Board Resolution 92-49. DTSC therefore rejected Alternative B as infeasible, per CEQA Guidelines Section 15126.6(f)(1), because it could not achieve remediation within a reasonable time frame.

2.3.3 Project Area of Impacts

The Groundwater FEIR identified a 779.2-acre Project Area within which all activities were anticipated to occur. The Addendum to the Groundwater FEIR resulted in an additional 74.5 acres to the Project Area, on the Arizona side of the Colorado River, to account for the additional freshwater supply source. The combined area of the Groundwater FEIR and Addendum totals 853.7 acres. After completion of the Final Remedy Design and to support the analysis of Project impacts for this SEIR, DTSC, in coordination with the U.S. Department of the Interior (DOI), further refined the Project Area to reflect the actual area that would be used for the Final Groundwater Remedy Project (see **Figure 2-1**). This process resulted in including additional areas that may be needed for construction, access improvements, and long-term Project operation, and the removal of several areas that were determined no longer needed to support the Final Groundwater Remedy Project. The resulting Project Area that is the basis for the analysis presented in this SEIR is the area in which the Final Groundwater Remedy Project would occur, including both construction and long-term operational needs, and encompasses 762 acres.

2.4 Background

2.4.1 Station History

In 1951, the Station began compressing natural gas for transportation through pipelines to PG&E's service area in Central and Northern California. As natural gas is compressed, its temperature increases and the compressed gas must be cooled. From 1951 to 1985, PG&E added chromium to the water used in the cooling towers and other equipment to prevent corrosion of the cooling tower equipment. During parts of those years, cooling tower wastewater containing hexavalent chromium [Cr(VI)][1] was discharged into a natural wash adjacent to the Station. Over time, Cr(VI) accumulated in the soil, seeped into the groundwater, and created a groundwater contaminant plume that extends from below the Station toward the Colorado River. Based on results from periodic testing of the river water, the Cr(VI) plume is not impacting river water. Soil within the Station fence line and in the vicinity of the Station has also been affected by historical releases of COPCs, including Cr(VI) and other metals, acids, petroleum hydrocarbons, polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), dioxins and furans, pesticides, and asbestos (CH2M Hill 2013a).

2.4.2 Station Investigation Activities

Investigative activities at and in the vicinity of the Station date back to the late 1980s with the identification of SWMUs through an RCRA Facility Assessment (RFA). Closure activities of former hazardous waste management facilities at the Station were performed from 1988 to 1993. In 1988, as documented in the Administrative Consent Agreement, executed in 2005 (see Section 5.3, page 6), PG&E also completed a soil investigation in the Bat Cave Wash area that documented the presence

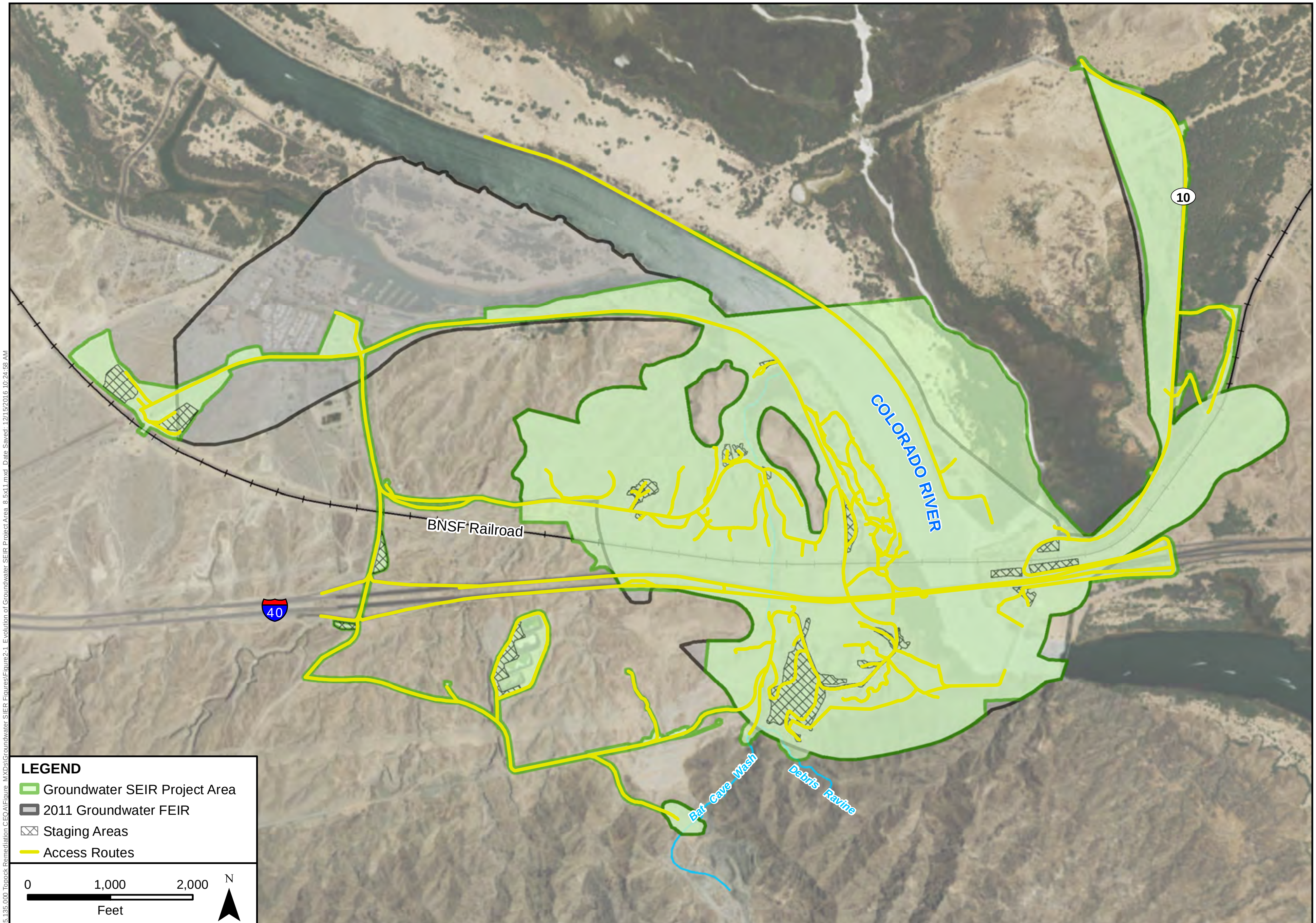
1 Cr(VI) is a form of chromium. Chromium is a metal naturally found in rocks, soil, and the tissue of plants and animals. Cr(VI) is used in industrial products and processes and is a known carcinogen when inhaled (i.e., through breathing). On May 28, 2014, the California Department of Public Health adopted a new Maximum Contaminant Level for Cr(VI) of 0.01 mg/L, effective July 1, 2014.

of chromium in the environment around the former percolation bed. The RCRA Facility Investigation (RFI) began in 1996 when DTSC and PG&E executed a Corrective Action Consent Agreement, summarized later in this chapter in Section 2.4.5. Since that time, additional data collection and evaluation has been performed to characterize the nature and extent of contamination in and around the Station, and to identify potential remedial alternatives.

PG&E completed the *Revised Final RCRA Facility Investigation and Remedial Investigation Report (RFI/RI Report), Volume 1 – Site Background and History* (RFI/RI Report Volume 1) in August 2007 and DTSC and the DOI approved it later in 2007. The RFI/RI Report Volume 1 contains information on Station operations and history, and descriptions of SWMUs, AOCs, and other Undesignated Areas (UAs). In a letter dated August 17, 2007, PG&E proposed an addendum to RFI/RI Report Volume 1 that would include the Monitoring Well (MW)-20 bench and the IM-3 Facility within the RCRA Corrective Action effort at the Station. On March 26, 2013, PG&E submitted a Draft Addendum to the RFI/RI Report Volume 1 containing information on the MW-20 bench, IM-3 Facility, and other investigation areas identified since 2007. The RFI/RI Report Volume 1 Draft Addendum was reviewed by DTSC, Native American Tribes, and other stakeholders. The RFI/RI Report Volume 1 Draft Addendum was approved on June 4, 2014. PG&E completed the *Final RCRA Facility Investigation and Remedial Investigation Report (RFI/RI Report), Volume 2 – Hydrogeologic Characterization and Results of Groundwater and Surface Water Investigation* (RFI/RI Report Volume 2), dated February 11, 2009; DTSC and DOI approved it later in 2009. The RFI/RI Report Volume 2 defines the nature and extent of contamination in groundwater, surface water, pore water, and river sediment. The RFI/RI Report Volume 2 concluded that past releases of contamination have affected groundwater. The data show no effects on surface water, pore water, or river sediment in the vicinity of the Project Area.

PG&E completed the *Final RCRA Facility Investigation and Remedial Investigation Report (RFI/RI Report), Volume 2 Addendum – Hydrogeologic Characterization and Results of Groundwater and Surface Water Investigation* (RFI/RI Report Volume 2 Addendum), dated June 29, 2009; DTSC and DOI approved it later in 2009. The RFI/RI Report Volume 2 Addendum supplements the RFI/RI Report Volume 2 regarding nitrate, molybdenum, and selenium and presents the results of the Arizona groundwater investigation, which verified that nitrate, molybdenum, and selenium are COPCs, and indicated that Cr(VI) and Cr(T) were not present above background levels in eight Arizona wells.

PG&E completed the *Final Groundwater Corrective Measures Study/Feasibility Study Report for SWMU 1/AOC 1 and AOC 10* (Final Groundwater CMS/FS), dated December 2009; DTSC and DOI approved it later in 2009. The Final Groundwater CMS/FS presents the identification and evaluation of various remedial alternatives to address the remedial action goals for groundwater contamination associated with the historic discharges to Bat Cave Wash (SWMU 1/AOC 1) and within AOC 10 (East Ravine) at the Station. The Final Groundwater CMS/FS includes a description of current conditions, remedial action objectives, identification and screening of remedial technologies, and development and evaluation of nine remedial action alternatives. The Final Groundwater CMS/FS recommended Alternative E – In Situ Treatment with Fresh Water Flushing for the remediation of groundwater.



Final Groundwater Remediation Project SEIR

Map Creation Date: 12/15/2016 Sources: ESRI Aerial, PG&E 2015

Evolution of Groundwater SEIR Project Area

Figure 2-1

ESA | North State Resources

Path: G:\Projects\15.135.000 Topock Remediation CEQA\Figure_MXDs\Groundwater SEIR Figures\Figure2-1_Evolution of Groundwater SEIR Project Area_8.5x11.mxd Date Saved: 12/15/2016 10:24:58 AM

2.4.3 Interim Measures

As part of the corrective action process, in 2004 DTSC determined that action (an Interim Measure) was necessary at the Station as a precautionary measure to ensure that Cr(VI)-contaminated groundwater would not reach the Colorado River. Interim Measures (IMs) are cleanup actions that are taken to protect public health and the environment while long-term solutions are being developed and evaluated. There have been three separate but related IMs at the Station since 2004 in response to the need to control the groundwater plume. IM-1, IM-2, and mostly IM-3 are collectively referred to as “the Interim Measure,” or “the IM.” The IM currently consists of three steps: (1) groundwater extraction from the areas of groundwater containing Cr(VI) for hydraulic control in the Colorado River floodplain, (2) treatment of extracted groundwater in a groundwater treatment plant known as the IM-3 Facility, and (3) reinjection of the treated groundwater back into the subsurface through injection wells. This treated groundwater meets the standards set by DTSC and the Regional Water Quality Control Board.

Notices of exemption were prepared pursuant to CEQA for IM-2 (February 2004) and IM-3 (June 2004). It was determined that the notice of exemption was the appropriate level of CEQA review for IM-2 and IM-3 because the project activities were necessary to prevent or mitigate an emergency situation wherein the waters of the Colorado River may be impacted with a hazardous constituent, chromium. Action was necessary to contain the chromium plume near the river and reverse the flow of groundwater from going toward the Colorado River. Litigation ensued and a settlement agreement was ultimately reached with FMIT in 2006 (see *Fort Mojave Indian Tribe v. Department of Toxic Substances Control et a*l. (Superior Court of the State of California, Sacramento County [Case No. 05CS00437]).

As described in Chapter 3, “Project Description,” Section 3.8, once the Groundwater Remedy Project is constructed and is determined by the agencies to be “Operating Properly and Successfully,” PG&E will decommission and remove the IM-3 Facility after receipt of approval for decommissioning by DTSC with concurrence from DOI.

2.4.4 Evaluation of Soil Contamination

Investigation activities conducted to date within and in the vicinity of the Station indicate that contaminants have been released to soils through past management practices such as those associated with hazardous materials handling/disposal, waste discharges, spills, and leaks of cooling water and other fluids at the Station. Investigation and any potential cleanup of contaminated soils associated with the long-term operation of the Station are currently being conducted under both RCRA and CERCLA.

PG&E prepared the *Soil RCRA Facility Investigation/Remedial Investigation (RFI/RI) Work Plan* (Soil RFI/RI Work Plan, or Soil Work Plan) through a multiyear public involvement process. In May 2011, PG&E submitted the Draft Soil RFI/RI Work Plan to the agencies, Native American Tribes, and other stakeholders. Comments were received between July and August 2011. A revised version of the Draft Soil RFI/RI Work Plan was circulated for public review and comment in September 2012. Comments were submitted by DTSC, DOI, and multiple Native American Tribes. Responses to these comments were provided by PG&E. The Soil Work Plan was then revised and presented to DTSC and DOI in a final document dated January 2013 (CH2M Hill 2013a). An Errata to the Soil Work Plan was submitted to provide minor revisions and additional information regarding the boundary marking of staging and investigation areas, and activities within staging areas, dated January 2014 (CH2M Hill 2014a).

On August 24, 2015, DTSC approved the Topock Soil Investigation Project based on the Topock Compressor Station Soil Investigation Project FEIR. The primary purpose of the Soil Investigation Project is to gather sufficient soil samples to be able to reliably characterize the nature and extent of soil and sediment contamination within the project site. The soil investigation project includes soil sampling and analysis as described in the Soil Work Plan (CH2M Hill 2013a) and the potential need for bench scale tests, pilot studies, and geotechnical evaluations to support a future Soil CMS/FS and plant or other biota sampling activities to support an ecological risk assessment within, and in the vicinity of, the Station. The Soil Work Plan sampling began in October 2015 and continued through April 2016; additional activities described above associated with investigation have not yet been completed. Implementation of the soil investigation project will provide DTSC with sufficient data for the completion of the RCRA Facility Investigation/Remedial Investigation (RFI/RI) process that is consistent with state and federal guidance for site investigations and would support evaluation of possible soil cleanup action(s) if determined necessary. The results of the investigation activities will be compiled and combined with past Station investigation data sets for the preparation of the Final RFI/RI Report Volume 3 (Soil), which will enable the evaluation and selection of corrective measures, if necessary, in a future Soil CMS/FS. If any soil remedy is proposed, it would be implemented following completion of the Soil CMS/FS and associated environmental review as required by CEQA.

As described in both the Groundwater FEIR and the Soil Investigation FEIR, the Groundwater Remedy Project and the activities associated with soil investigation and cleanup have independent utility. The Soil Investigation Project will not change the scope of the Groundwater Remedy Project. The Soil Investigation Project is therefore not an expansion of the Groundwater Remedy Project and does not change the nature or scope of the Groundwater Remedy Project. The two projects involve different contaminants and distinct environmental risks; while Cr(VI) may be present in the soil as well as the groundwater, elevated concentrations of various metals, dioxins/furans, PAHs, PCBs, and total petroleum hydrocarbons (TPHs), as well as some SVOCs, have also been detected in the soil. Because of the nature of the contamination and contaminated substrate, the two projects would necessarily employ different technologies on different schedules for different durations.

Potential soil contamination cleanup activities in the future may prove to be a key component of the overall cleanup efforts at the Station, but the Soil Investigation Project effort is a separate project from the Groundwater Remedy Project and has independent utility. In addition, if the soil investigation activities indicate that soil remediation is necessary, future environmental review would be required before initiating any remediation of contaminated soil. Input received from the public on a proposed soil remedy will be considered by DTSC prior to approval. This will be followed by remedy design, if required.

2.4.5 Corrective Action Process

As discussed, and at the present time, the Station and surrounding vicinity are undergoing investigation of soils and review and approval of the Final Remedy for groundwater remediation under both RCRA and CERCLA. In 1996, PG&E and DTSC entered into a Corrective Action Consent Agreement pursuant to DTSC's RCRA Corrective Action Program to more fully investigate the nature and extent of contamination at the Station and in the surrounding area. In July 2005, PG&E entered into an Administrative Consent Agreement with the federal agencies (DOI, U.S. Bureau of Land Management [BLM], U.S. Bureau of Reclamation [BOR], and U.S. Fish and Wildlife Service [USFWS] under CERCLA [DOI 2005]). Later, in 2013, the U.S. District Court for the Central District of California entered the *Remedial Action Remedial Design Consent Decree between the United States of America and Pacific Gas & Electric Company* (DOI Consent Decree) under CERCLA with the DOI as the federal lead agency (DOI 2013). The 2013 DOI Consent Decree governs only the remedial action addressing contaminated groundwater; the terms of the 2005 Administrative Consent Agreement remain in effect for response actions associated with releases of hazardous substances at or from the Station other than the remedial action addressing contaminated groundwater.

In accordance with the 2005 Administrative Consent Agreement between the federal agencies and PG&E (DOI 2005), the various on-site response and corrective actions required to investigate and clean up contamination are exempt from obtaining permits pursuant to CERCLA Section 121(e)(1). CERCLA response actions are exempt by law from the requirement to obtain federal, state, and local permits related to any activities conducted completely on-site. This does not, however, remove the requirement to meet the substantive provisions of applicable laws. Because all groundwater remedy activities are related to cleanup on-site, the federal exemption would apply.

Under RCRA, the term "corrective action" refers collectively to the investigation and cleanup process at a hazardous waste site. The corrective action process encompasses several steps that include: (1) understanding a facility's current and historic operational and environmental practices; (2) data collecting/sampling to determine the nature and extent of any contamination present at the site; and (3) if needed, conducting remedial activities to cleanup identified contamination that poses excessive risk. The following is a general overview and sequence of the main steps undertaken as part of the corrective action process, implemented here in conjunction with the CERCLA response action process:

- Preliminary review of pertinent existing information is executed.
- A visual site inspection is undertaken to verify preliminary information about the site and includes a developed sampling strategy, if needed.
- A sampling visit is undertaken to gather limited field data.
- An RFA is completed. An RFA is a more detailed, preliminary site assessment to determine whether or not potential substances or other constituents of concern exist in soil or groundwater at or near a facility that may be required to undergo some form of corrective action under RCRA.

- An RFI/RI work plan is prepared to gather and sample for possible contamination. Data collected from implementation of the work plan defines the nature and extent of site contamination. An RFI/RI Report is submitted with conclusions and recommendations based on the work plan sampling results.
- A human and ecological risk assessment is completed. A risk assessment is a qualitative and quantitative evaluation of the risks to human health and/or the environment by the actual or potential presence of the COPCs detected during the RFI/RI work plan sampling phase. If necessary, the risk assessment will define the recommended cleanup levels based on anticipated future use of the land. If risks identified are acceptable, no further action may be taken. If unacceptable risks are identified, a CMS/FS is completed. A CMS/FS develops and evaluates alternatives that can be used to remediate/clean up contaminants that are identified as a concern by the risk assessment.
- A statement of basis is completed. A statement of basis is a decision document that describes DTSC's proposed final remedy and cleanup standards and the basis for those findings.
- Corrective Measure Implementation is undertaken, which includes the design, construction, and implementation of the selected remedy.
- A corrective action certification is given when the remedy achieves the predetermined objectives and when DTSC deems the cleanup action complete.

2.4.6 Groundwater Design Process

The Final Remedy Design is a culmination of an extensive preliminary, intermediate, pre-final, and final design process, undertaken by PG&E as directed by DTSC and DOI with review and comment by stakeholders, including Native American Tribes. Tribal involvement was integral to the design process in all stages. The design review process began in 2011 after DTSC and DOI approved the Final Groundwater EIR. A record of all Tribal communication undertaken for the proposed Project (and others associated with cleanup activities at the Station) is included in the PG&E Topock Tribal Communications Summary Table (Appendix COM to this SEIR). In addition, documentation of all stakeholder comment and response on the various design documents is captured in Appendix I of the Final Remedy Design and Appendix X of the C/RAWP (both of which can be found in the electronic Appendix BOD to this SEIR).

On November 18, 2011, PG&E submitted the Draft Basis of Design Report/Preliminary (30%) Design Submittal (CH2M Hill 2011) for review and comment. More than 300 comments were received. Comment resolution occurred from late February through mid-May 2012. Technical Working Group (TWG) meetings were held to discuss the responses to comments.

On April 5, 2013, PG&E submitted the revised 60% Basis of Design (BOD) (CH2M Hill 2013b) for review and comment. The comment period was approximately 4.5 months, from April 8 through August 23, 2014. More than 800 comments were received. Comment resolution occurred over a 7.5-month period from early September 2013 through mid-April 2014. Multiple venues for discussion and resolution of comments were held, including monthly TWG meetings, site walks, and ad hoc meetings.

On September 8, 2014, PG&E submitted the revised 90% BOD (CH2M Hill 2014b) for review and comment. Based on DTSC direction, a supplement to the 90% BOD (Supplemental 90% BOD; CH2M Hill 2015c) was submitted on February 5, 2015, to present additional information regarding certain items included in the 90% BOD. The comment period for the 90% BOD and Supplemental 90% BOD was approximately 6.5 months, from September 10, 2014, through April 2, 2015. More than 1,210 comments were received. Discussion and resolution of comments occurred over a 4-month period from early April 2015 through end of August 2015.

After DTSC and DOI issued final design directives (i.e., directives for proceeding with the final design) to PG&E, on November 18, 2015, PG&E submitted the Final BOD, referred to as the Final Remedy Design (which includes the Operation & Maintenance Manual), and the C/RAWP to DTSC and DOI for approval consideration. Supplemental and Errata to the Final Remedy Design was provided in November 2016, which corrected minor inconsistencies and clarifications. This SEIR is based on the Final Remedy Design and C/RAWP, which reflect modifications and clarifications by PG&E as a result of the collaborative and iterative design process. This Final Remedy Design and C/RAWP form the Project that is described in Chapter 3 and is analyzed in detail in this SEIR.

2.4.7 Tribal Perspectives

The Topock area and adjacent lands along the Colorado River, beginning in the Hoover Dam area and extending to the Mexican border, are the ancestral homes of a number of Native American Tribes, including the Cahuilla, Chemehuevi, Cocopah, Halchidoma, Havasupai, Hualapai, Maricopa, Mojave, Quechan, Serrano, and Yavapai peoples. Six of these Native American Tribes, the Chemehuevi Indian Tribe, Cocopah Indian Tribe, Colorado River Indian Tribes (CRIT), FMIT, the Hualapai Indian Tribe, and the Fort-Yuma Quechan Indian Tribe, have actively participated in Topock projects in the past. Based on recent engagement, Tribes that are actively participating in the Final Groundwater Remedy Project are hereafter referred to as “Interested Tribes,” which includes the first five Tribes. The Fort-Yuma Quechan Indian Tribe is no longer actively participating in the process. Each of these Interested Tribes has been, and continues to be, economically and culturally reliant on the Colorado River and all are historically and spiritually rooted in the Colorado River region. Although each Interested Tribe has its own history and belief system tied to the region and the river, the Interested Tribes share an interest in the health and welfare of all people, the land, wildlife, things above and below ground, and natural resources. As indicated in the *Topock Compressor Station Tribal Cultural Values Assessment*, several of the Interested Tribes feel that:

> Plants, animals, minerals, artifacts, rock arrangements, view-sheds, the Colorado River, and many other tangible and intangible elements are interwoven into the very fabric of tribal cultures. Topock, in being such a significant religious and spiritual “place,” involves a dynamic understanding of traditions, religion, ceremonies, oral histories, and a plethora of other social-communal aspects, that is difficult for non-tribal entities to grasp with its many different layers of existence (McDowell et al. 2013).

More information on the Tribal Perspectives of the five Interested Tribes is found in Section 4.4, “Cultural Resources,” subsection 4.4.3.2 of this SEIR.

2.5 Environmental Review Process for SEIR

As required by CEQA Guidelines Section 15375, a Notice of Preparation (NOP) is a notice sent by the lead agency to notify the responsible agencies, trustee agencies, the State of California Office of Planning and Research, and involved federal agencies that the lead agency plans to prepare an EIR for a project. The purpose of the notice is to solicit information, guidance, and recommendations regarding the scope, focus, and content of the EIR. An NOP was prepared for the proposed project and is included as Appendix NOP of this SEIR. The NOP identified the general area in which the Project is located, described the need for and objectives of the Project, and identified the probable environmental effects of the Project. The NOP was circulated to responsible and trustee agencies, federal agencies, Native American Tribes, and interested members of the public. The NOP public comment period began on May 5, 2015, and concluded on June 4, 2015, providing a 32-day comment period.

Concurrent with the issuance of the NOP, two public scoping meetings were held during the public comment period. Agency and public scoping meetings were held on May 19 and 20, 2015, to receive oral comments on the scope and content of the SEIR. The meetings were open to the agencies mentioned earlier and to any interested organizations and individuals and Native American Tribes that have expressed interest in the potential effects of the proposed Project on cultural resources located on the Project Area.

In addition to the NOP scoping meetings, an extensive communication program was conducted with Native American Tribes that included formal meetings with Native American Tribal councils, informal meetings and field visits with cultural resources personnel and Native American Tribal representatives, and solicitation of written comments. This included a Tribal-focused Scoping Meeting on May 19, 2015. A Tribal outreach meeting was additionally held on October 5, 2015, and Tribes were afforded additional time to comment on the scope and content of the SEIR until March 11, 2016. Information obtained through the Tribal meetings and the subsequent communication program has been incorporated into this SEIR.

Public and agency review of the project will be further facilitated by DTSC through distribution of this SEIR for a 47-day public review period. The public review period will extend from January 12, 2017 to February 27, 2017. This Draft SEIR, as well as appendices and all supporting materials and references, can be found at the project website (www.dtsc-topock.com) and the following locations:

Needles Branch Library
1111 Bailey Avenue
Needles, CA 92363

Chemehuevi Indian Reservation Environmental Protection Office
2000 Chemehuevi Trail
Havasu Lake, CA 92363

Colorado River Indian Tribes Public Library
26600 Mohave Road
Parker, AZ 85344

Parker Public Library
1001 Navajo Avenue
Parker, AZ 85344

Golden Shores Community Library
13136 South Golden Shores Parkway
Topock, AZ 86436

Lake Havasu City Library
1770 McCulloch Boulevard
Lake Havasu City, AZ 86403

California Department of Toxic Substances Control
5796 Corporate Avenue
Cypress, CA 90630

Two public meetings will be held at the locations and times identified below to present the contents of this Draft SEIR and to receive written and oral comments. Public meetings will include an open house where the public is invited to review technical information that is presented in the Draft SEIR, and a public hearing that will give the public opportunity to provide oral public comments to DTSC. Following the close of the Draft SEIR public review period, DTSC will prepare and publish a second document that contains responses to comments received on the Draft SEIR. The Draft SEIR, comments, and responses together constitute the Final SEIR, which will be used by DTSC for consideration during decision making for the Project.

Needles, California:
Needles Senior Center
1699 Bailey Avenue
Needles, CA 92363
January 31, 2017
Open House—5:30 p.m. to 6:30 p.m.
Public Hearing—6:30 p.m. to 8:00 pm.

Golden Shores, Arizona:
Golden Shores Community Center
13136 Golden Shores Parkway
Golden Shores, AZ 86436
February 1, 2017
Open House—5:30 p.m. to 6:30 p.m.
Public Hearing—6:30 p.m. to 8:00 p.m.

Please submit your written comments on the Draft SEIR, with the subject line "Topock Draft SEIR Comments," postmarked or dated (for emails) no later than February 27, 2017, to:

> Aaron Yue
> Project Manager
> California Department of Toxic Substances Control
> 5796 Corporate Avenue
> Cypress, CA 90630
> aaron.yue@dtsc.ca.gov
> Phone: 714-484-5439

2.5.1 Consultation and Coordination

Notice, outreach, and consultation were conducted with trustee and responsible agencies, federal agencies, Native American Tribal representatives, and members of the public and relevant communities during the CEQA scoping process. The results of the scoping process, including received comments, are summarized in the Scoping Report for the Groundwater Remedy Project SEIR, which is incorporated by reference as provided for in the CEQA Guidelines (CCR Section 15150), and is included as Appendix SCO to this SEIR. The report is also available for inspection at the offices of DTSC (5796 Corporate Avenue, Cypress, California 90630). Consultation and coordination with federal, state, and local agencies that would issue permits, approvals, or access to the Project Area are ongoing.

2.6 Scope of This SEIR

The scope of the analysis contained within this SEIR is focused on the following environmental issues:

- Aesthetics
- Air Quality/Greenhouse Gas
- Biological Resources
- Cultural Resources
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Noise
- Utilities, Service Systems, and Energy
- Water Quality

DTSC prepared a Modified Initial Study on the Groundwater Remedy Project, based on CEQA Guidelines Appendix G, which is included as Appendix IS to this SEIR. The Modified Initial Study identifies which of the Project's effects were adequately examined in the Groundwater FEIR and which topics warrant more detailed environmental analysis. This SEIR concentrates the environmental analysis on those topics identified in the Modified Initial Study with the potential to have either new significant effects or substantially more severe significant impacts than were previously identified in the Groundwater FEIR, or those areas for which substantially modified or new mitigation measures have been provided.

Based on the scope and nature of the proposed Project, and as identified in the Modified Initial Study, it was determined that several resource areas do not warrant a detailed analysis in the SEIR. These issue areas include: Agriculture, Geology and Soils, Land Use and Planning, Minerals, Population and Housing, Public Services, Recreation, and Transportation and Traffic.

2.7 SEIR Organization

This SEIR is organized into chapters, as identified and briefly described below and in the following pages. Chapters are further divided into sections (e.g., Section 4.2, "Air Quality").

Chapter 1, "Summary": This chapter presents a summary of the proposed project activities and the potential environmental impacts. It describes mitigation measures that would be implemented and level of significance after mitigation (as fully described in Chapter 4). It also provides a summary of alternatives to the proposed project, a summary of known controversial issues, and a summary of issues to be resolved.

Chapter 2, "Introduction": This chapter presents a discussion of the purpose and use of this SEIR; the history and activities that have occurred at the Station; the soil and groundwater contamination identified in the vicinity of the Station to date; the environmental review and CEQA process; and the organization of this SEIR.

Chapter 3, "Project Description": This chapter provides a detailed description of the Groundwater Remedy Project consistent with CEQA Guidelines Section 15124, including the project objectives.

Chapter 4, "Environmental Analysis": For each environmental issue listed in Section 2.6, this chapter provides a summary of the 2011 Groundwater FEIR setting, conclusions reached for the impacts analysis, and any mitigation measures that had been approved to reduce impacts at that time. The section then identifies the existing setting for this proposed Project, focusing on new information since 2011 and/or features included in the Final Remedy Design that have been revised or added since certification of the Groundwater FEIR in 2011. The chapter then provides a current review of the regulatory framework for each environmental topic analyzed. Each section then evaluates the potential environmental impacts associated with the proposed Project as described in Chapter 3, "Project Description," compared to the impacts identified in the Groundwater FEIR, and identifies mitigation measures for significant impacts (identifying whether mitigation measures haven been revised from those included in the Groundwater FEIR). Lastly, each section within Chapter 4 discusses the level of significance after implementation of those mitigation measures, and compares the significance conclusions to those reached in the Groundwater FEIR.

Chapter 5, "Other CEQA Sections": This chapter identifies those areas where environmental impacts are considered significant and unavoidable based on changes or modifications included in this SEIR based on the Final Remedy Design. The growth-inducing effects of the proposed Project are also considered in this chapter.

Chapter 6, "Cumulative Impacts": This chapter identifies other past, present, and reasonably foreseeable actions at and in the vicinity of the Station that could cause related environmental impacts. It evaluates the cumulative impacts associated with implementation of the proposed Project in combination with the other identified projects. Where necessary, it identifies additional mitigation measures to reduce or avoid significant cumulative impacts.

Chapter 7, "Alternatives to the Proposed Project": This chapter provides additional meaningful information regarding project alternatives to be considered by decision makers in compliance with Section 15126.6 of the CEQA Guidelines. This alternatives analysis evaluates a range of potentially feasible alternatives that may reduce environmental impacts associated with implementation of the Final Groundwater Remedy Project included in the Final Remedy Design and evaluated in this SEIR (not the remedy itself, for which alternatives were considered and evaluated in the Groundwater FEIR certified in 2011). In addition, this chapter summarizes the alternatives that were rejected from further consideration because they did not meet project goals and objectives, or were determined to be impractical or infeasible.

Chapter 8, "Bibliography": This chapter sets forth a comprehensive listing of all sources of information used in the preparation of this SEIR.

Chapter 9, "List of Preparers": This chapter identifies the lead agency personnel and consultants involved with preparation of this SEIR.

Chapter 10, "Glossary": This chapter provides a glossary of key terms and definitions that are used throughout the SEIR.

Appendices: This SEIR includes appendices that provide either background information or additional technical support for the analysis.

2.8 Terminology Used in This SEIR

This SEIR includes the following CEQA terminology to denote the significance of environmental impacts of the proposed project:

- **Less than significant impact:** A less than significant impact does not result in a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project, including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance (see CEQA Guidelines Section 15382). Impacts determined to be less than significant do not require mitigation measures.
- **Significant impact:** Public Resources Code Section 21068 defines a significant impact as "a substantial, or potentially substantial, adverse change in the environment." The environmental checklist included as Appendix G of the CEQA Guidelines provides additional guidance for determining which impacts would be regarded as significant. This SEIR applies the thresholds contained within Appendix G and uses the CEQA definition of "significant impact." Feasible mitigation measures or alternatives to the project must be identified and adopted if they would avoid or substantially reduce the significant impact.
- **Potentially significant impact:** A potentially significant impact is one that, if it were to occur, would be considered a significant impact as described above; however, the likelihood of the impact's occurrence is uncertain. For example, although the SEIR may provide evidence that buried archaeological resources could be found in a particular location, the actual discovery cannot be determined until the time of project construction. For CEQA purposes, a potentially significant impact is treated (i.e., mitigated) as if it were a significant impact. Mitigation measures or alternatives to the project must be identified and adopted if they would avoid or substantially reduce the significant impact.
- **Significant and unavoidable impact:** A significant and unavoidable impact is a substantial adverse effect on the environment that cannot be mitigated to a less than significant level. A project with significant and unavoidable impacts could still proceed, but DTSC would be required to prepare a statement of overriding considerations, pursuant to CEQA Guidelines Section 15093, explaining why DTSC would proceed with the project in spite of the potential for significant environmental impacts.
- **Threshold of significance:** A threshold of significance is a criterion applied by the lead agency to identify significant adverse environmental impacts. A threshold is defined by a lead agency based on examples found in CEQA or the CEQA Guidelines, scientific and factual data relative to the lead agency jurisdiction, views of the public in affected areas, the policy/regulatory environment of affected jurisdictions, and other factors.

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CHAPTER 3
Project Description

3.1 Introduction

As required by the California Environmental Quality Act (CEQA), this chapter provides a description of the proposed Pacific Gas and Electric Company (PG&E) Topock Compressor Station Final Groundwater Remediation Project (Final Groundwater Remedy Project, or proposed Project) at the PG&E Topock Compressor Station (Station) and surrounding area (Project Area). This chapter is prepared for purposes of the Department of Toxic Substances Control's (DTSC's) consideration and approval of the final groundwater remedy design, including approval of the *Basis of Design Report/Final (100%) Design Submittal for the Final Groundwater Remedy, PG&E Topock Compressor Station, Needles*, *California, November* (CH2M Hill 2015a) (Final Remedy Design), which includes the *Operation and Maintenance Manual Final (100%) Design Submittal* (O&M Manual) and the *Construction/Remedial Action Work Plan for the Final Groundwater Remedy, PG&E Topock Compressor Station, Needles, California* (CH2M Hill 2015b) (C/RAWP). In November 2016, the Su*pplemental and Errata Information for the Final (100%) Groundwater Remedy* was provided to DTSC, which corrected minor inconsistencies and clarifications to the Final Design. The Final Remedy Design, including the errata, is included in its entirety as Appendix BOD to this SEIR. This chapter includes: a general description of the location and boundaries of the proposed Project (also referred to as the Project Area); a statement of the objectives sought by the applicant (PG&E) and DTSC and reflecting the underlying purpose of the Project; a general description of the Project's technical, economic, and environmental characteristics; and a statement describing the intended uses of the subsequent environmental impact report (SEIR) as identified in Section 3.12 (see California Code of Regulations [CCR], Title 14, Chapter 3, Section 15000 et seq. [CEQA Guidelines] 15124).

3.2 Background

Groundwater beneath and near the Station has been contaminated through the discharge and release of hexavalent chromium [Cr(VI)], and total chromium [Cr(T)] in the areas known as Bat Cave Wash and East Ravine. Other chemicals of potential concern (COPCs) that might be associated with historical releases from the Station are molybdenum, selenium, and nitrate.[1] In 2004, DTSC determined that immediate actions were necessary within the Project Area as precautionary measures to ensure that Cr(VI)-contaminated groundwater did not reach the Colorado River. Interim Measures (IMs) were therefore instituted to protect the Colorado River.

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1 Although the Final Groundwater Remedy Project is focused on the Cr(VI), the Final Groundwater Remedy Project is also expected to reduce the concentrations of selenium or nitrate and not affect molybdenum.

IMs are cleanup actions that are taken to protect public health and the environment while long-term solutions are being developed and evaluated. There have been three separate but related IMs at the Station since 2004 in response to the need to control the groundwater plume. IM-1, IM-2, and mostly IM-3 are collectively referred to as “the Interim Measure,” or “the IM.”

In 2011, as described in detail in Chapter 2 of this Draft SEIR, DTSC evaluated the potentially significant adverse environmental effects of various potentially feasible remedies associated with cleanup of groundwater contamination at the Station. As a result, DTSC certified the Topock Compressor Station Groundwater Remediation Project Final EIR (Groundwater FEIR), adopted the CEQA Findings of Fact and Statement of Overriding Considerations, and adopted the Mitigation Monitoring and Reporting Program (MMRP) (DTSC 2011). Based on these documents, as well as all other information obtained through the administrative process, DTSC approved a groundwater remedy design that consists of in situ treatment with freshwater flushing (referred to as “Alternative E” in the Groundwater FEIR) (DTSC 2011). In 2013, DTSC adopted an Addendum to the Groundwater FEIR, which expanded the Project Area and considered the potential environmental effects of alternate well locations for a freshwater source located in Arizona (DTSC 2013).

Following certification of the Groundwater FEIR, PG&E initiated an iterative design process by preparing the preliminary (30%), interim (60%), pre-final (90%), and supplemental pre-final 90% designs for the selected groundwater remedy in accordance with the Consent Decree and the Corrective Action Consent Agreement process. DTSC provided Interested Tribes[2] with a public review and comment period at each design phase. Over a 3-year period, PG&E worked with DTSC, as well as the U.S. Department of the Interior (DOI), Interested Tribes, landowners, and other stakeholders to address comments and questions, collect new data, and develop the Final Remedy Design. PG&E prepared and completed the Final Remedy Design (which included the O&M Manual and the Construction/Remedial Action Work Plan (C/RAWP) pursuant to the requirements of the Corrective Action Consent Agreement entered into by PG&E and the DTSC in 1996 and the Remedial Design/Remedial Action Consent Decree, executed by PG&E and the United States, on behalf of the DOI, which was approved by the U.S. District Court for the Central District of California in November 2013. Supplemental and Errata Information for the Final Groundwater Remedy was provided to DTSC in November 2016, which corrected minor inconsistencies and clarifications to the Final Design. PG&E designed the groundwater remedy to comply with the Groundwater FEIR mitigation measures and applicable regulations, and throughout the design period PG&E submitted quarterly mitigation measure compliance reports documenting actions taken to comply with these mitigation measures. This Draft SEIR for the Final Groundwater Remedy Project is based on the Final Remedy Design and the C/RAWP, which reflect modifications and clarifications by PG&E as a result of the collaborative and iterative design process.

[2] Six Native American Tribes, the Chemehuevi Indian Tribe, Cocopah Indian Tribe, Colorado River Indian Tribes, Fort Mojave Indian Tribe, Hualapai Indian Tribe, and the Fort-Yuma Quechan Indian Tribe, have participated in Topock project activities in the past. Based on recent engagement, Tribes that are actively participating in the Topock project and are hereafter referred to as “Interested Tribes.” The first five Tribes mentioned are considered “Interested Tribes,” as the Fort-Yuma Quechan Indian Tribe is no longer actively participating in the process.

The Groundwater FEIR included a general description of the elements that would make up the selected groundwater remedy (e.g., remediation wells, monitoring wells, pipelines, freshwater intake locations, and associated infrastructure) and considered the potentially significant adverse environmental impacts that would result, to the extent such impacts were reasonably foreseeable given the level of detail known at the time. The Project described herein provides more detail on the ultimate number and specific locations of the remedy elements reflected in the Final Remedy Design. This SEIR will consider the differences in environmental impacts of the Final Remedy Design in comparison to the effects identified in the Groundwater FEIR and the 2013 Addendum to the Groundwater FEIR. The analysis will focus on the new design details that were not yet known at the time the Groundwater FEIR was certified.

3.3 Project Purpose

Past activities at the Station have resulted in contamination of groundwater with Cr(VI) and Cr(T) (referred herein as the "plume"). Molybdenum, selenium, and nitrates are additional COPCs from past operational practices. Protection of California's groundwater resources and the Colorado River, which is adjacent to the contaminated groundwater plume, is one of DTSC's highest priorities. Under the requirements of the Resource Conservation and Recovery Act (RCRA), DTSC has concurred with PG&E and selected what was known as In Situ Treatment with Freshwater Flushing, identified as Alternative E in the Final Corrective Measures Study/Feasibility Study (CMS/FS)[3] and Groundwater FEIR as the technology to be used during the final groundwater plume cleanup, which would ensure the long-term effectiveness of the treatment system and protection of human health and the environment, as required under the RCRA and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

3.4 Project Objectives

The fundamental objective of the proposed Project as presented in the Topock Compressor Station Groundwater Remediation Project Final Environmental Impact Report (Groundwater FEIR), certified in January 2011, is to clean up the groundwater contamination related to the historical release of chemicals at the Station, including into Bat Cave Wash and the East Ravine near the Station, in a manner that would be consistent with all applicable regulatory requirements and to do so within a reasonable period of time when compared between viable alternatives. The Remedial Action Objectives (RAOs) are developed by considering the conclusions of the Ground Water Human Health and Ecological Risk Assessment and identification of applicable or relevant and appropriate requirements (ARARs), which established specific cleanup goals for Cr(VI) and Cr(T), as well as addressing the COPCs (molybdenum, selenium, and nitrates) through monitoring and institutional controls. The RAOs were used for remedy selection in the Groundwater FEIR.

[3] Final Groundwater Corrective Measures Study/Feasibility for Solid Waste Management Unit (SWMU) 1/Area of Concern (AOC) 1 and AOC 10 (Final CMS/FS) (CH2M Hill 2009, and included as Appendix CMS to the Groundwater FEIR).

The following are the Project RAOs for groundwater:

- Reduce the mass of Cr(T) and Cr(VI) in groundwater at the Project Area to achieve compliance with the ARARs,[4] which will be achieved through the cleanup goal of the regional background concentration of 32 μg/L of Cr(VI).
- Ensure that the geographic location of the target remediation area (contaminated groundwater plume) does not permanently expand following completion of the final remedy.
- Prevent ingestion of groundwater as a potable water source having Cr(VI) in excess of the regional background concentration of 32 micrograms per liter (μg/L).
- Prevent or minimize migration of Cr(T) and Cr(VI) in groundwater to ensure concentrations in surface water do not exceed water quality standards that support the designated beneficial uses of the Colorado River (11 μg/L Cr[VI]).

In addition to the objectives stated above, the following objectives are defined by DTSC pursuant to CEQA Guidelines Section 15124(b):

- Provide consistency with the Remedial Design/Remedial Action Consent Decree between PG&E and the United States which was approved by the U.S. District Court for the Central District of California (November, 2013), the DOI/DTSC Memorandum of Understanding concerning the coordination in overseeing the implementation of the groundwater response action (November 22, 2011), and any other legal agreements applicable to the Project, including the 2006 and 2012 Settlement Agreements entered into between DTSC and the Fort Mojave Indian Tribe (FMIT).
- Achieve the cleanup levels or performance goals delineated in the DTSC's Statement of Basis and the DOI's Record of Decision for the final groundwater remedy.
- Protect biological, historical, and cultural resources by minimizing ground disturbance to the extent feasible.
- Minimize aesthetic impact to the extent feasible by limiting the amount of aboveground infrastructure.
- Consider public safety, ensuring efficiency, and compliance with health and safety standards.
- Ensure remedy achieves compliance with RAO's within a reasonable time frame as required by California State Water Resources Control Board (SWRCB) Resolution No. 92-49.

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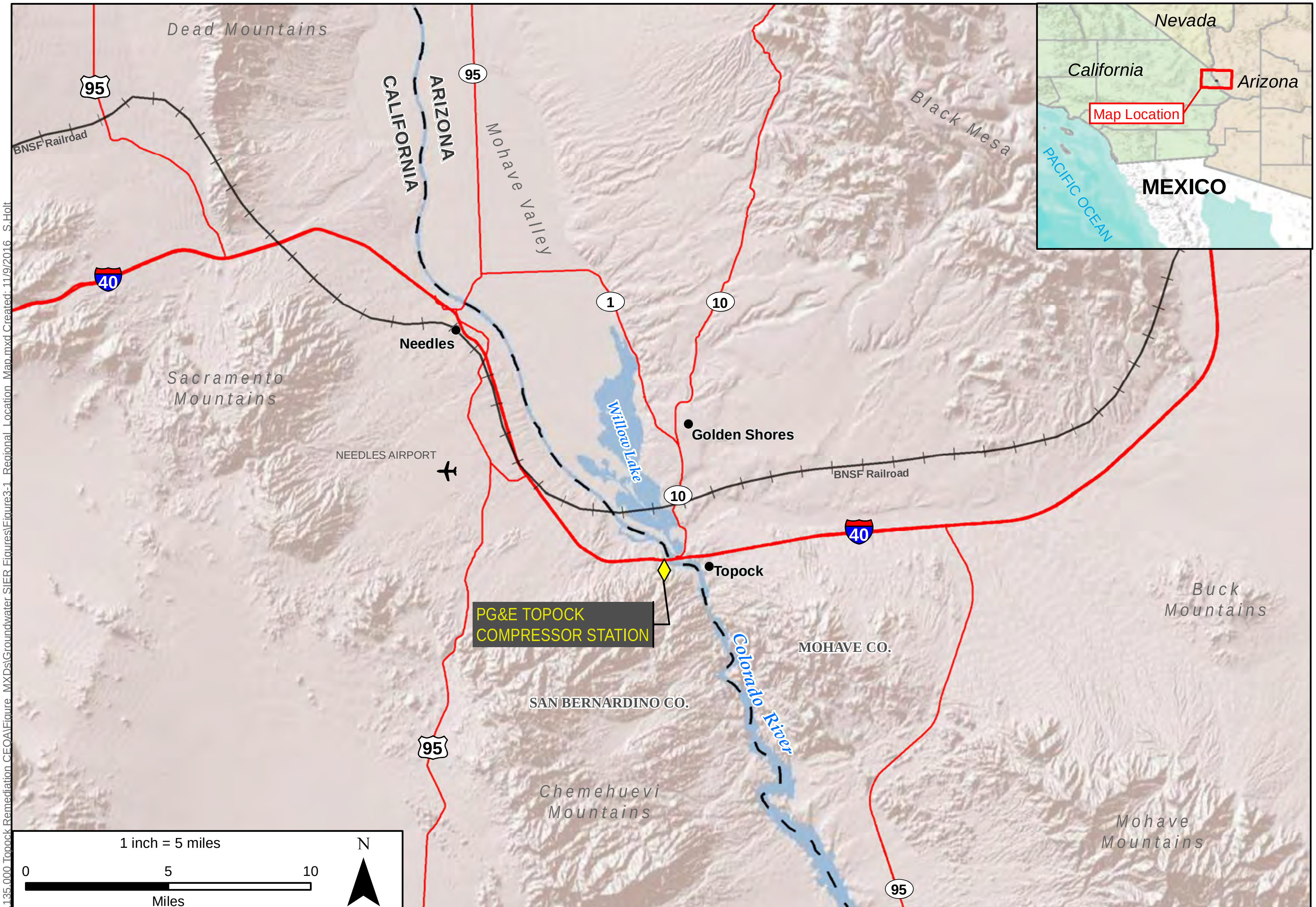
4 CERCLA Section 121 requires cleanups to meet ARARs: any "legally applicable or relevant and appropriate standard, requirement, criteria or limitation" that has been promulgated under federal or state environmental laws. The ARARs include such things as the federal and state "Safe Drinking Water Act" and the Solid Waste Control Act's land disposal restrictions.

3.5 Project Location

The Project Area encompasses the Station, located in the Mojave Desert approximately 12 miles southeast of the city of Needles, California, and 1 mile southeast of the Moabi Regional Park in California (**Figure 3-1**). The Station itself is located within a 66.8-acre parcel of land owned by PG&E and is approximately one-half mile west of, and directly across the Colorado River from, the community of Topock, Arizona (which is 5 miles south of Golden Shores, Arizona). The Station is approximately 1,500 feet west of the Colorado River and less than 1 mile south of Interstate 40 (I-40).

The Groundwater FEIR identified a 779.2-acre Project Area within which all activities were anticipated to occur. The Addendum to the Groundwater FEIR resulted in an additional 74.5 acres to the Project Area, and largely on the Arizona side of the river, to account for the additional freshwater source. Based on the Final Remedy Design, DTSC, in consultation with DOI, further refined the Project Area to include additional areas that may be needed for construction, road improvements, and long-term Project operation. The Project Area also reflects the removal of areas originally included in the Groundwater FEIR, but determined as not necessary for the proposed Project. The resulting Project Area that is the basis for the analyses presented in this Draft SEIR is the area in which the Final Groundwater Remedy Project would occur, including construction and long-term operational, restoration, and decommissioning needs. This area encompasses approximately 762 acres. Figure 2-1 in Chapter 2, "Introduction" shows the Project Area for the Final Groundwater Remedy Project Draft SEIR compared to the Project Area that was analyzed in the Groundwater FEIR and the Addendum to the Groundwater FEIR.

The Project Area includes a 40.3-acre portion of land owned by PG&E as well as additional surrounding areas that could be affected by construction, operation, restoration, and/or decommissioning activities associated with the proposed groundwater remediation activities. As shown in **Figure 3-2**, the lands within the Project Area in California and Arizona continue to be owned and/or managed by a number of government agencies and private entities, including the Havasu National Wildlife Refuge, which is managed by the U.S. Fish and Wildlife Service (USFWS); lands managed by DOI, Bureau of Land Management (BLM); U.S. Bureau of Reclamation (BOR) managed by the BLM; the Burlington Northern Santa Fe Railway (BNSF); California Department of Transportation (Caltrans)-leased land; Arizona Department of Transportation (ADOT); lands owned by the FMIT; lands leased by San Bernardino County (and managed by BLM); and privately owned lands.



Final Groundwater Remediation Project SEIR

Map Creation Date: 11/9/2016 Sources: ESRI Aerial, ESA

Regional Location Map

Figure 3-1

ESA

North State Resources

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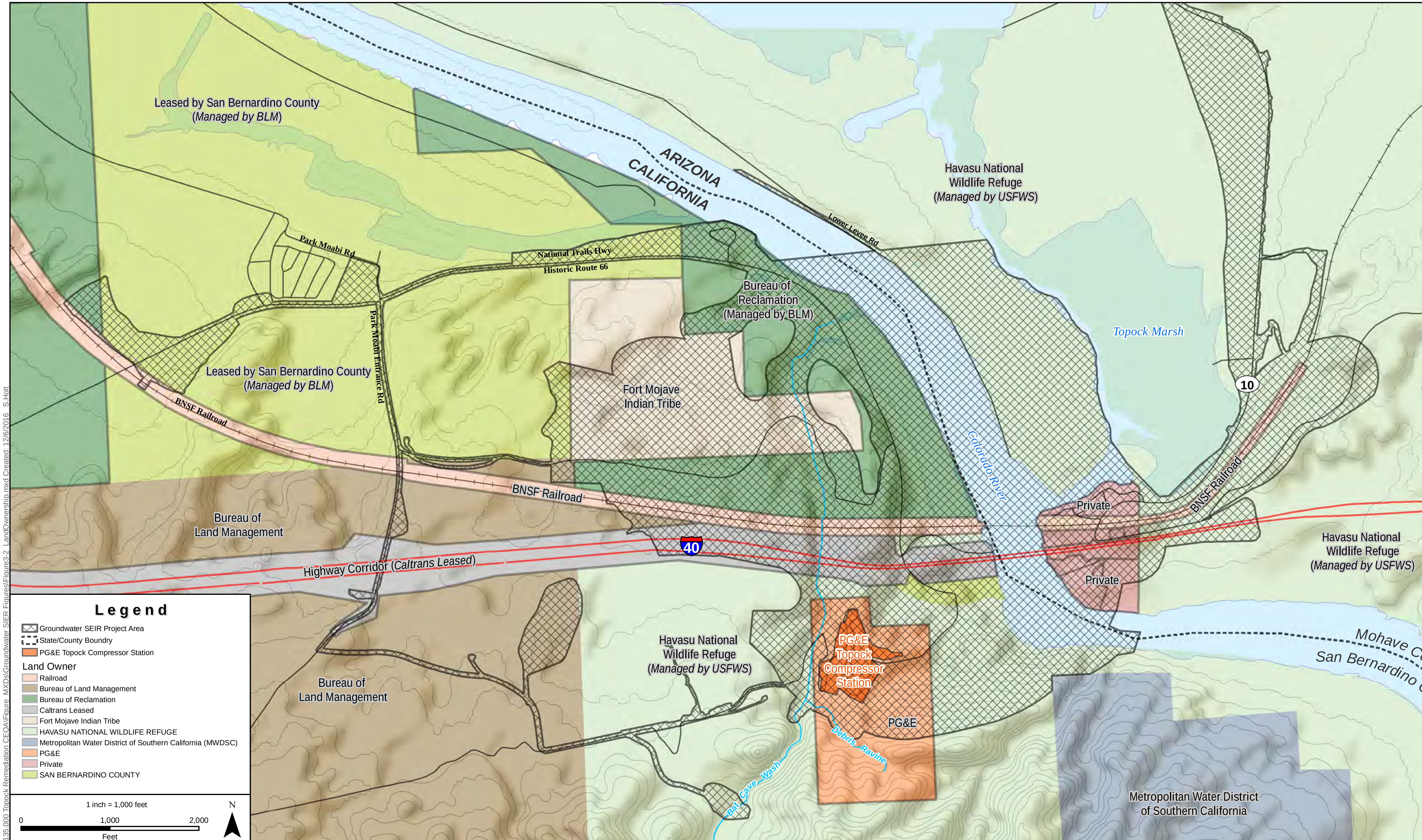

Final Groundwater Remediation Project SEIR

Map Creation Date: 12/6/2016 Sources: ESRI Aerial, ESA

Land Ownership

Figure 3-2

ESA North State Resources

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3.6 Description of the Final Groundwater Remedy Project

This section describes the proposed Project based on implementation of the Final Remedy Design to meet the project objectives stated in Section 3.4. The Final Remedy Design reflects modifications and clarifications made by PG&E as a result of an iterative design, comment, and response to comments process.

As described and considered in the Groundwater FEIR, the Final Groundwater Remedy Project involves in situ treatment of contaminated groundwater with freshwater flushing. In situ treatment of groundwater refers to the reduction in mass, toxicity, mobility, volume, and concentration of the chromium plume using treatment technologies that treat groundwater in place, as opposed to pumping and circulating water through a separate aboveground treatment plant. In situ treatment would be performed by placing a degradable food-grade organic compound (termed a carbon substrate or carbon amendment) in the groundwater to create reducing conditions to convert Cr(VI) dissolved in groundwater to relatively insoluble trivalent chromium [Cr(III)]. The reduced chromium would precipitate or become adsorbed onto soils below the water table and thereby be removed from groundwater. The organic carbon substrate would be released into the aquifer by injection after mixing on-site with a water source, such as extracted contaminated groundwater or clean water. In situ pilot tests demonstrated that ethanol and other acceptable carbon substrates for the remedy, such as emulsified vegetable oil, could also be used for certain situations that may arise over the life of the Project (e.g., during the late operational stages when a low-dosage, slow-release reservoir of carbon is preferred).

The Final Groundwater Remedy Project includes the following primary components, which are described in detail in Section 3.6.1:

- Development of an in situ reactive zone (IRZ) along National Trails Highway (NTH) using a line of injection and extraction wells to distribute groundwater amended with a carbon substrate for treatment of Cr(VI). See Section 3.6.1.1.
- Implementation of an inner recirculation loop (IRL) composed of injection wells upgradient of the NTH IRZ plume and extraction wells along the Colorado River that would induce groundwater flow through the NTH IRZ, capture contaminated groundwater downgradient of the NTH IRZ, and control NTH IRZ–generated byproducts. See Section 3.6.1.2.
- Installation of freshwater injection wells upgradient (west and south) of the NTH IRZ to further induce groundwater flow through the NTH IRZ and prevent westward migration of the plume. See Section 3.6.1.3.
- Installation of extraction and injection wells on and near the Station referred to as the Topock Compressor Station Recirculation Loop (TCS Recirculation Loop). This system would capture contaminated groundwater and circulate that groundwater after amendment with a carbon substrate creating an IRZ for the treatment of Cr(VI). See Section 3.6.1.4.
- Construction of a Remedy-Produced Water Conditioning System to treat and condition and reuse water from construction and maintenance activities (including well backwashing and

rehabilitation), purge water from monitoring well sampling, equipment decontamination wastewater, and rainfall that collects in remedy facility secondary containment. The system includes a contingency Dissolved Metals Removal System to remove scale-forming ions from the remedy-produced water prior to injection, if needed. See Section 3.6.1.5.

- Construction of a Clean-In-Place (CIP) system for routine maintenance of the NTH IRZ water conveyance pipelines. See Section 3.6.1.6.
- Acquisition of freshwater for injection into the wells included to assist in flushing contaminated groundwater through the treatment zones. The source of the freshwater would be from existing Well HNWR-1A and possibly secondary contingent wells, all located in or near the Havasu National Wildlife Refuge in Arizona. The freshwater flushing system includes the Contingent Freshwater Pre-Injection Treatment System (FWPTS) to reduce the concentrations of arsenic, if needed. See Section 3.6.1.7.
- Construction of monitoring wells to augment the existing monitoring well network to further evaluate site conditions, monitor contaminant levels, and assess the performance of the remediation system. See Section 3.6.1.8.
- Construction of fluid conveyance, utilities, buildings, and roadways in support of the Final Groundwater Remedy Project, including the following facilities (in addition to those mentioned in the previous bullets):
    - Transwestern Bench (TW Bench) – operations building and decontamination pad.
    - Monitoring Well (MW)-20 Bench – carbon substrate building, carbon storage tank, reused frac tanks, and truck containment pad.
    - Near Moabi Regional Park – Construction Headquarters, Long-Term Remedy Support Area, Temporary Construction Laydown Area, and the Soil Processing Area/Clean-Soil Storage Area.
    - PG&E Topock Compressor Station – improvements to the Topock Compressor Station Evaporation Ponds (TCS Evaporation Ponds), and the shared use of the Station’s Hazardous Material Storage Building. See Section 3.6.1.9.
- Implementation of monitored natural attenuation as a long-term component to address residual Cr(VI) that may remain in recalcitrant (difficult-to-treat) portions of the aquifer after optimization of IRZ treatment and flushing. See Section 3.6.1.10.
- Institutional controls to restrict surface land uses and prevent the use of groundwater until the RAOs are achieved. See Section 3.6.1.10.

The Final Groundwater Remedy Project is a long-term remediation project anticipated to last over 50 years (approximately 30 years of active remediation followed by approximately 10 years of long-term monitoring, and up to approximately 20 years of arsenic monitoring). Construction of the proposed Project is estimated occur over a 5-year period, following DTSC and DOI approval of the Final Remedy Design and C/RAWP, which is anticipated to occur in 2017. Construction would occur in two phases, one to construct the NTH IRZ and infrastructure, and the second to construct the remaining systems (IRL, TCS Recirculation Loop, and injection of freshwater).

Operation and maintenance would begin following the start-up of the various remedy systems, and would consist of approximately 30 years of active remediation followed by up to approximately 10 years of long-term monitoring and up to approximately 20 years of arsenic monitoring. Decommissioning and restoration would begin following the attainment of the cleanup objectives and/or the determination that the remedy facilities are no longer needed.

PG&E and its consultants and contractors have made their best estimates as to the quantities of wells, soil volumes, buildings, equipment and materials, access roads, and other supporting components, as well as their best modeling efforts to predict the response of the contaminant plume to the final remedy over many years in the future. Nonetheless, it is possible that there may be unanticipated variations in the conditions encountered and the plume response, hence the inclusion of provisional wells and associated infrastructure (well vaults, pumps, instrumentation, electrical/communication conduits, etc.) to address response variations. In addition to certain contingencies that are specifically set forth in the Final Remedy Design and C/RAWP, the Project evaluated as part of this Final Groundwater Remedy Project SEIR also includes a general contingency or allowance for future activities that may be carried out as part of the Project (the "Future Activity Allowance"). The Future Activity Allowance is included in the Project Description and the SEIR to ensure that a comprehensive environmental analysis is included should additional activities be warranted over the decades long project implementation.

The Future Activity Allowance includes two components, the locations of which are not specifically known at this time: (1) an additional allowance for all Project infrastructure, established at up to 25 percent of the parameter set forth in the Final Remedy Design, and (2) up to 10 additional monitoring well boreholes to be installed in Arizona to assess groundwater levels and chemical constituents changes as a result of continued freshwater pumping to protect private groundwater users. The 25 Percent Potential Allowance is intended to apply generally to the development and implementation of the Final Remedy Design, even if a particular parameter or aspect of the Project is not listed in one of the examples set forth in the following subsections.

The Future Activity Allowance could result in construction of additional Project features during the initial 5-year construction phase of the Project and/or during the approximate 30-year operation and maintenance phase that constitutes active remediation. There are a variety of factors that could lead to use of the Future Activity Allowance throughout the duration of the Project. Generally, as information is collected from the construction and operation of the remedy, and as subsurface conditions evolve, it may be necessary or desirable from the viewpoint of maximizing remedy efficiency, to add facilities or equipment, such as utility lines, access roads, wells and associated vaults and structures, and conveyance pipelines, in an amount that would exceed the specific parameters in the Final Remedy Design. The need for additional facilities and equipment may also be necessary for the implementation of the monitored natural attenuation phase of the Project. Furthermore, additional activities could result from the actions of third parties, such as the refusal of a private property owner to allow piping to be installed across its land, necessitating a longer route. Also, the need for additional facilities and activity could result from the discovery of unanticipated contamination or subsurface obstacles in connection with construction. In the case of contaminated soil that is discovered during construction, the C/RAWP calls for PG&E to evaluate and remedy the contamination. These factors are listed as examples of the wide range of factors that could result in a need for additional facilities and associated activities such as ground disturbance beyond the parameters set forth in the Final Remedy Design.

Nevertheless, particular developments in the future may not necessarily result in a need for additional facilities; in many instances, it may lead to a reduction of facilities. If fewer facilities are needed, that reduced amount would inherently be within the scope of the Project as set forth in the Final Remedy Design. If additional facilities are needed, however, that could be beyond the scope of the facilities specifically described in the Final Remedy Design, and thus the Future Activity Allowance has been included in the Project Description and in the environmental impact analysis in this SEIR. Any activities conducted under the Future Activity Allowance will be tracked by PG&E and DTSC to ensure that development of individual components is within the scope of this SEIR.

It should also be noted that additional facilities beyond those specifically described in the Final Remedy Design may require approval from DTSC and perhaps other agencies. Consideration by DTSC of any such future approvals would be consistent with its existing and ongoing duties under the Settlement Agreements with the FMIT and duty to confer, as may be needed, with Interested Tribes. The purpose of including the Future Activity Allowance is therefore to be sure that this SEIR evaluates all the potential effects of the Project, including those that may be needed in the future.

3.6.1 Final Groundwater Remedy Project Components

This section provides detailed information on the Final Groundwater Remedy Project system components, much of which was not available for the Groundwater FEIR. New or changed information developed since the Groundwater FEIR is as noted further in this chapter. **Figure 3-3** provides an overview of the location of known Project facilities and **Figures 3-3a** through **3-3h** provide detailed maps showing the location of proposed Project features.

The proposed Project includes installation of remediation wells that would consist of extraction and injection wells to create and control groundwater treatment zones and monitoring wells to evaluate remedy performance. The Groundwater FEIR considered a maximum of up to 110 boreholes for remediation wells (extraction and injection) and 60 boreholes for monitoring wells, with exact locations not known at the time. Note that some boreholes may have multiple individual wells constructed within the same borehole such that the total number of boreholes can be minimized.

LEGEND

- Groundwater SEIR Project Area

Existing Wells:

- Extraction Well
- Injection Well
- Monitoring Well
- Water Supply Well

Provisional Wells:

- Extraction Well
- Injection Well
- Monitoring Well
- Area for East Ravine Well (ER-7 to ER-11)
- Area for Potential Slant Well Screens
- Area for Inner Recirculation Loop (IRL) Wells
- Area for River Bank Extraction Wells

Planned Wells:

- Extraction, East Ravine
- Extraction, National Trails Highway (NTH) In-situ Reactive Zone (IRZ)
- Extraction, Riverbank
- Extraction, Transwestern Bench
- Injection, Freshwater
- Injection, Inner Recirculation Loop
- Injection, NTH IRZ
- Injection, Topock Compressor Station
- Recirculation Well
- Remedy Monitoring Well
- Alternate Monitoring Well Locations for MW-X, MW-Y and MW-U

Pipeline Corridor for Remedy

- Aboveground Pipe
- Underground Pipe/Conduit

Remedy Facilities

- Planned Transformer
- Future Provisional Transformer

Access Routes

- Existing Access Route (will continue to be used for remedial activities)
- Existing Route (proposed to be used as is for access to remedial activities)
- Roads to be improved or constructed for groundwater remedy
- Temporary Construction Access
- Proposed Staging Areas
- Soil Processing Area/ Clean-Soil Storage Area and Construction Headquarters/ Long-Term Remedy Support Area. Both areas could be used for soil staging and storage.
- Potential Soil Storage and Staging Areas

Approximate extent of hexavalent chromium [Cr(VI)] concentrations exceeding 32 micrograms per liter (µg/L) at any depth ingroundwater based on fourth quarter 2013 sampling events. Dashed where based on limited data.

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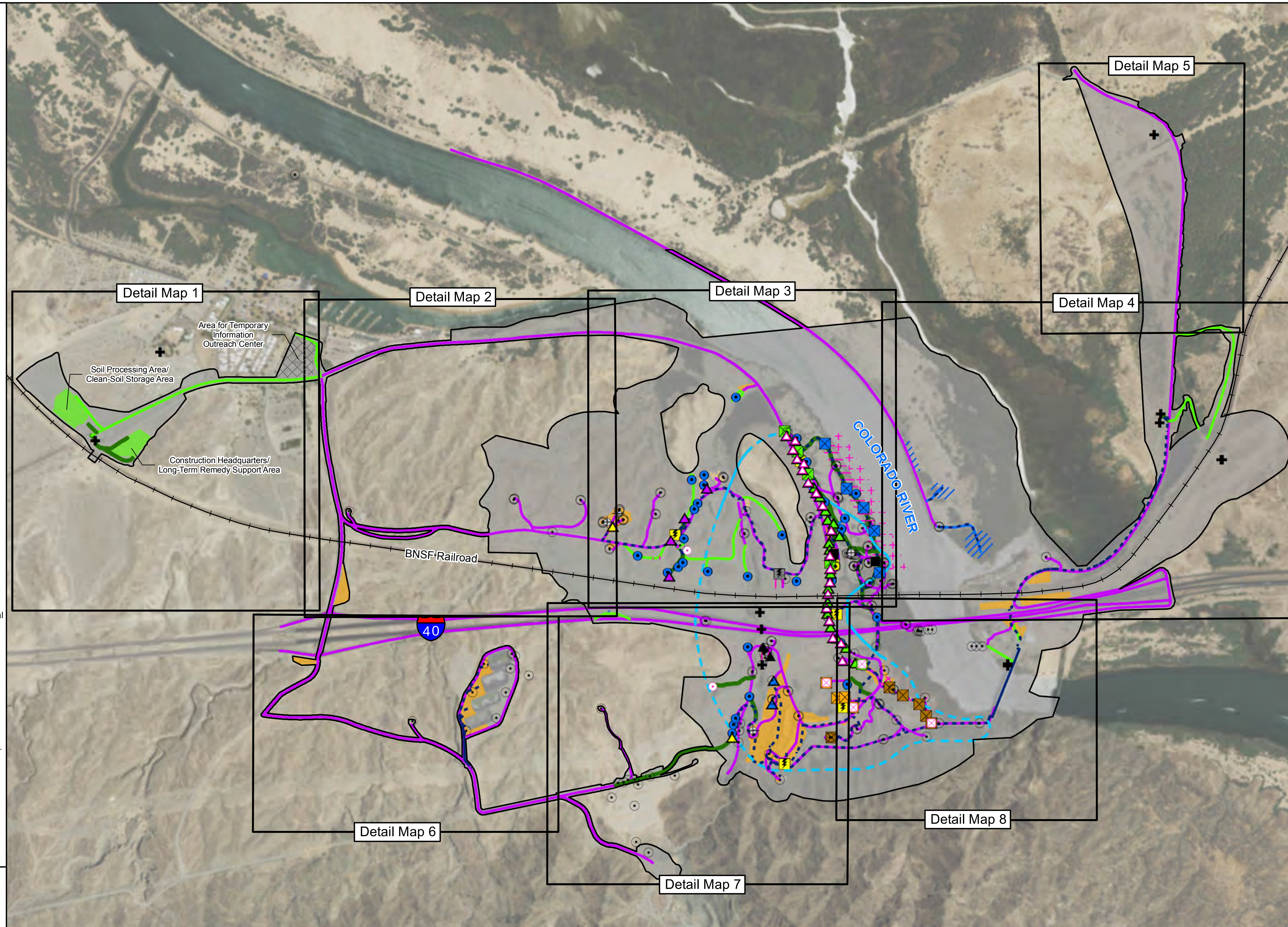
Feet
N



Final Groundwater Remediation Project SEIR

Map Creation Date: 12/12/2016 Sources: ESRI Aerial, PG&E 2015

Final Groundwater Remedy Project Components: Overview Map

Figure 3-3

ESA | North State Resources

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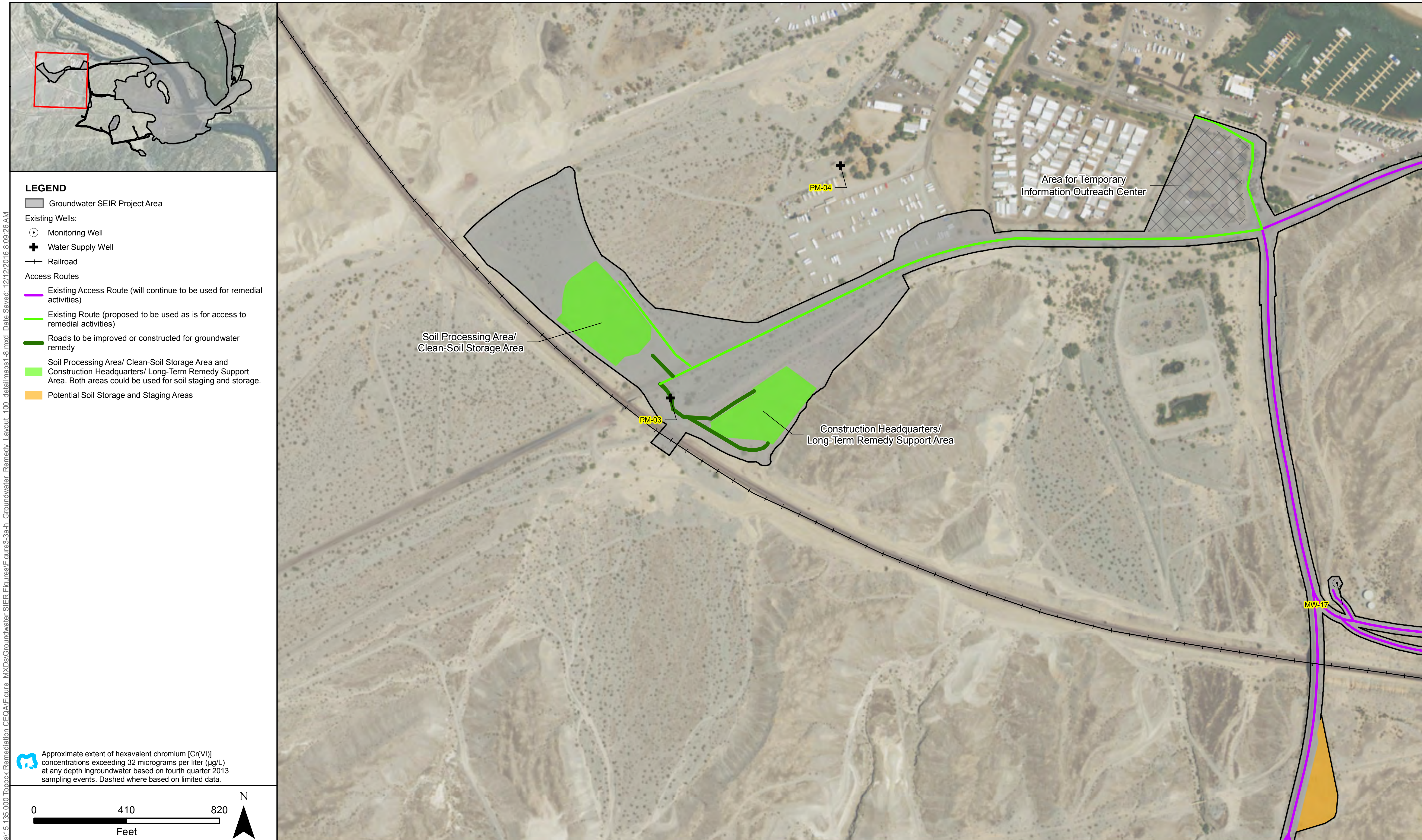


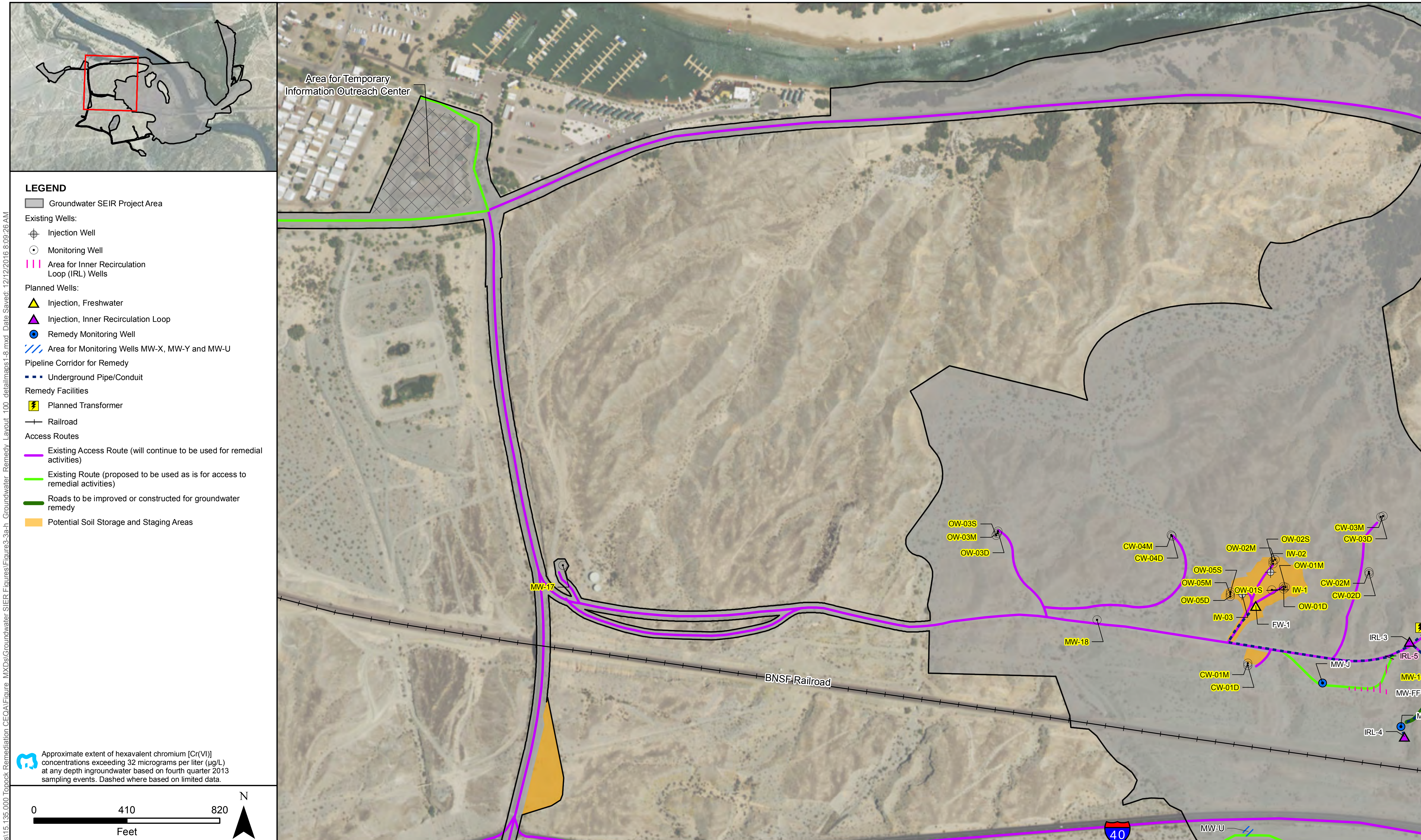
Final Groundwater Remediation Project SEIR

Map Creation Date: 12/12/2016 Sources: ESRI Aerial, PG&E 2015

Final Groundwater Remedy Project Components: Detail Map 1

Figure 3-3a

ESA North State Resources



LEGEND

Groundwater SEIR Project Area

Existing Wells:
- Injection Well
- Monitoring Well
- Area for Inner Recirculation Loop (IRL) Wells

Planned Wells:
- Injection, Freshwater
- Injection, Inner Recirculation Loop
- Remedy Monitoring Well
- Area for Monitoring Wells MW-X, MW-Y and MW-U

Pipeline Corridor for Remedy
- Underground Pipe/Conduit

Remedy Facilities
- Planned Transformer
- Railroad

Access Routes
- Existing Access Route (will continue to be used for remedial activities)
- Existing Route (proposed to be used as is for access to remedial activities)
- Roads to be improved or constructed for groundwater remedy
- Potential Soil Storage and Staging Areas

Approximate extent of hexavalent chromium [Cr(VI)] concentrations exceeding 32 micrograms per liter (µg/L) at any depth ingroundwater based on fourth quarter 2013 sampling events. Dashed where based on limited data.

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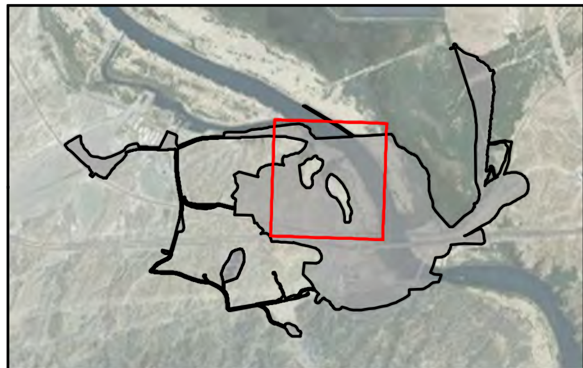
Final Groundwater Remediation Project SEIR

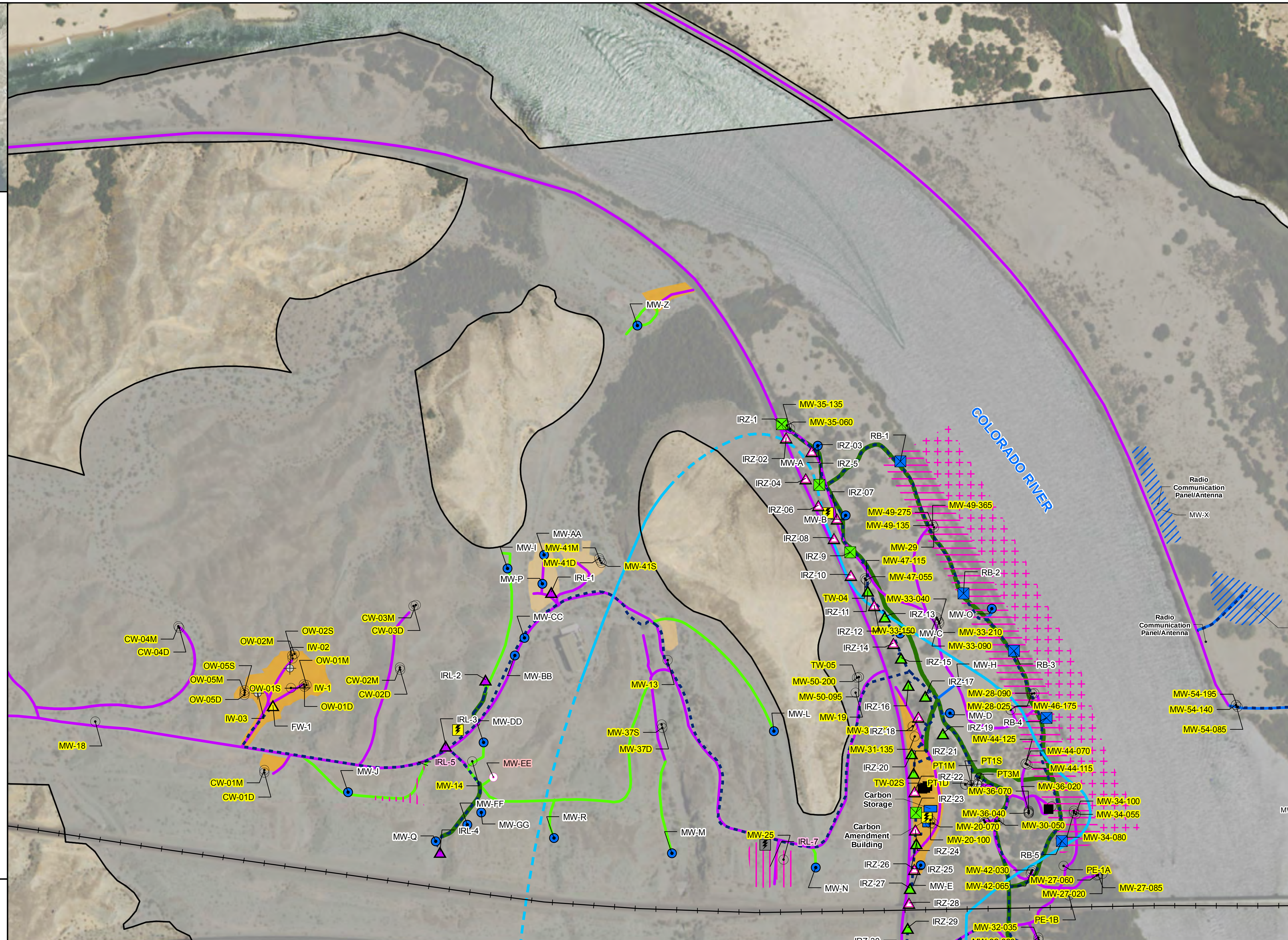
Map Creation Date: 12/12/2016 Sources: ESRI Aerial, PG&E 2015

Final Groundwater Remedy Project Components: Detail Map 2

Figure 3-3b

ESA North State Resources





LEGEND

- Groundwater SEIR Project Area

Existing Wells:

- Extraction Well
- Injection Well
- Monitoring Well

Provisional Wells:

- Injection Well
- Monitoring Well
- Area for Potential Slant Well Screens
- Area for Inner Recirculation Loop (IRL) Wells
- Area for River Bank Extraction Wells

Planned Wells:

- Extraction, NTH IRZ
- Extraction, Riverbank
- Injection, Freshwater
- Injection, Inner Recirculation Loop
- Injection, NTH IRZ
- Remedy Monitoring Well
- Area for Monitoring Wells MW-X, MW-Y and MW-U

Pipeline Corridor for Remedy

- Underground Pipe/Conduit

Remedy Facilities

- Planned Transformer
- Future Provisional Transformer
- Proposed Remedy Structure
- Railroad

Access Routes

- Existing Access Route (will continue to be used for remedial activities)
- Existing Route (proposed to be used as is for access to remedial activities)
- Roads to be improved or constructed for groundwater remedy
- Temporary Construction Access
- Proposed Staging Areas
- Potential Soil Storage and Staging Areas

Approximate extent of hexavalent chromium [Cr(VI)] concentrations exceeding 32 micrograms per liter (µg/L) at any depth ingroundwater based on fourth quarter 2013 sampling events. Dashed where based on limited data.

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Feet

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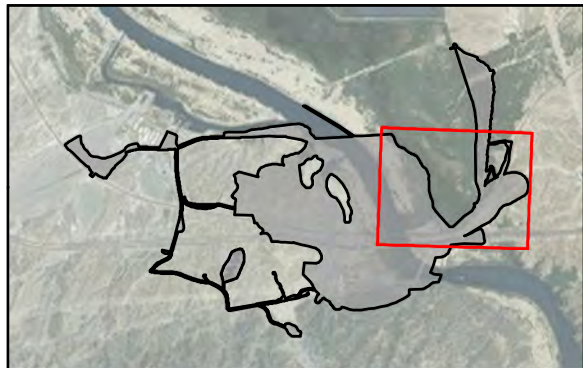
Final Groundwater Remediation Project SEIR

Map Creation Date: 12/12/2016 Sources: ESRI Aerial, PG&E 2015

Final Groundwater Remedy Project Components: Detail Map 3

Figure 3-3c

ESA
North State Resources



LEGEND

- Groundwater SEIR Project Area

Existing Wells:
- Extraction Well
- Monitoring Well
- Water Supply Well
- Area for Potential Slant Well Screens
- Area for River Bank Extraction Wells

Planned Wells:
- Extraction, Riverbank
- Remedy Monitoring Well
- Area for Monitoring Wells MW-X, MW-Y and MW-U

Pipeline Corridor for Remedy
- Underground Pipe/Conduit
- Proposed Remedy Structure
- Railroad

Access Routes
- Existing Access Route (will continue to be used for remedial activities)
- Existing Route (proposed to be used as is for access to remedial activities)
- Roads to be improved or constructed for groundwater remedy
- Temporary Construction Access
- Potential Soil Storage and Staging Areas

Approximate extent of hexavalent chromium [Cr(VI)] concentrations exceeding 32 micrograms per liter (µg/L) at any depth ingroundwater based on fourth quarter 2013 sampling events. Dashed where based on limited data.

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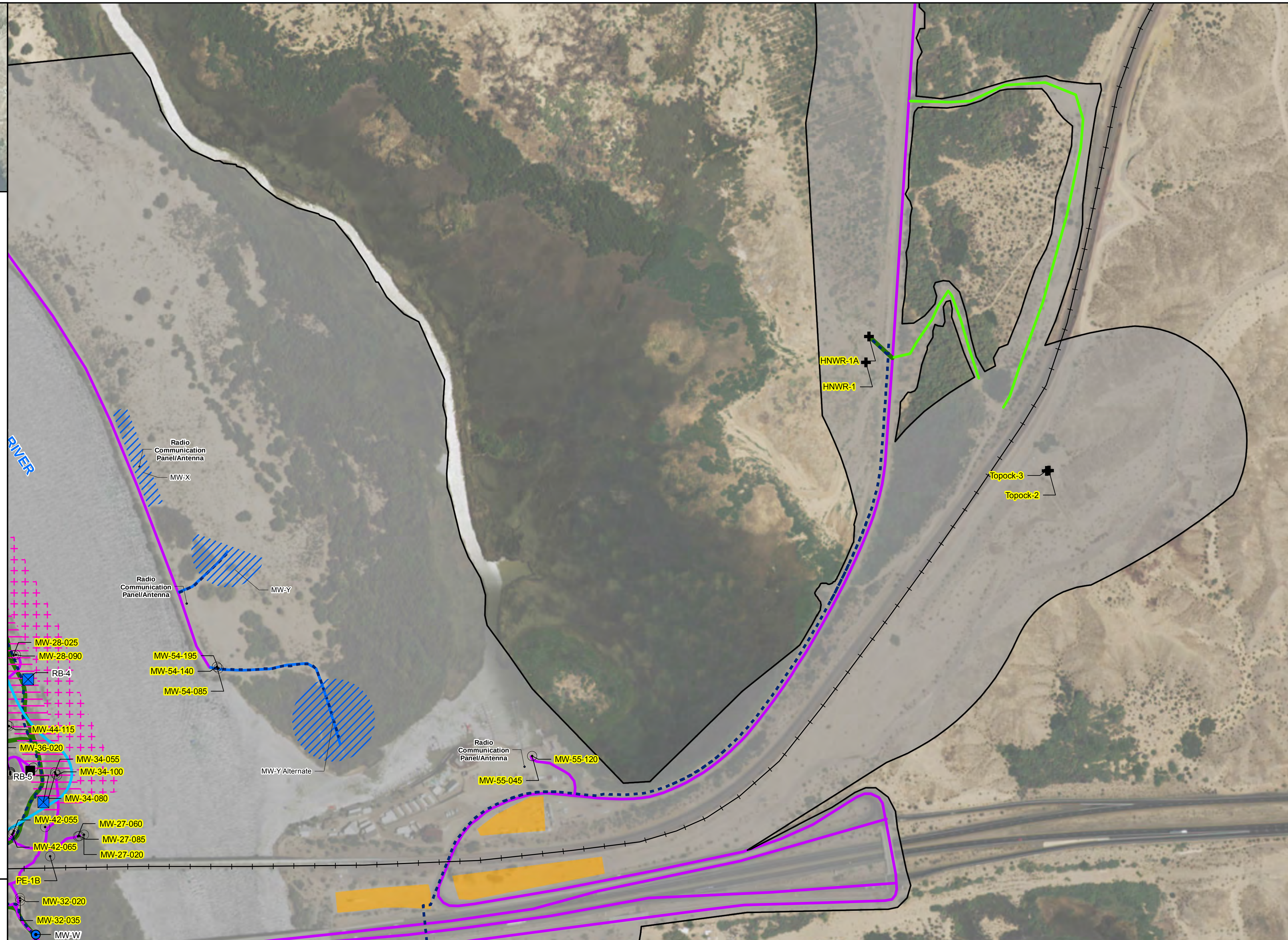

Final Groundwater Remediation Project SEIR

Map Creation Date: 12/12/2016 Sources: ESRI Aerial, PG&E 2015

Final Groundwater Remedy Project Components: Detail Map 4

Figure 3-3d

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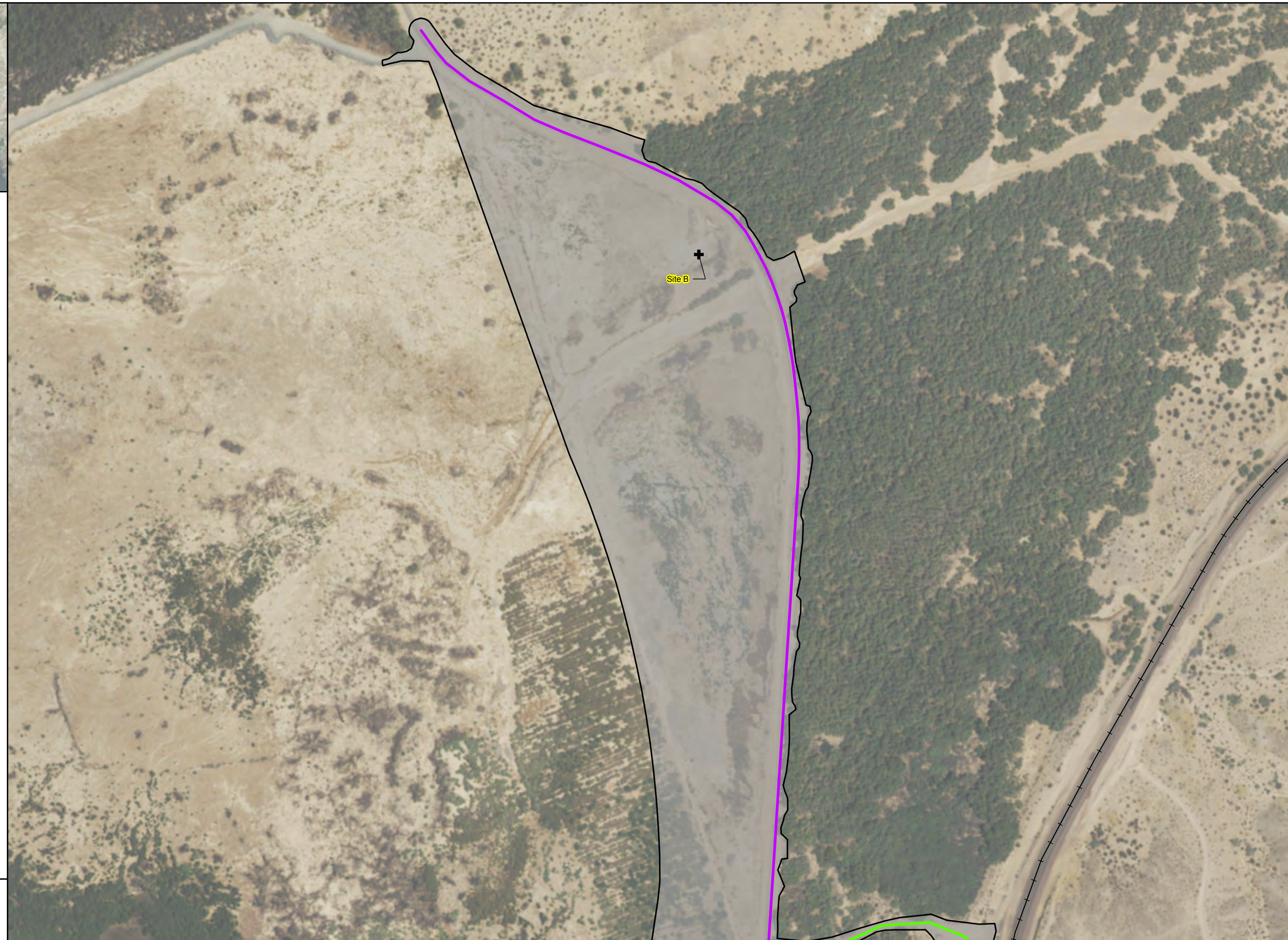

LEGEND

Groundwater SEIR Project Area

Existing Wells:

Water Supply Well

Railroad

Access Routes

Existing Access Route (will continue to be used for remedial activities)

Existing Route (proposed to be used as is for access to remedial activities)

Approximate extent of hexavalent chromium [Cr(VI)] concentrations exceeding 32 micrograms per liter (µg/L) at any depth ingroundwater based on fourth quarter 2013 sampling events. Dashed where based on limited data.

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Feet

N

Final Groundwater Remediation Project SEIR

Map Creation Date: 12/12/2016 Sources: ESRI Aerial, PG&E 2015

Final Groundwater Remedy Project Components: Detail Map 5

Figure 3-3e

ESA North State Resources

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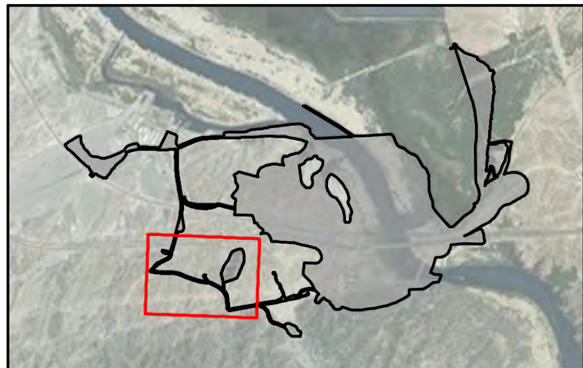

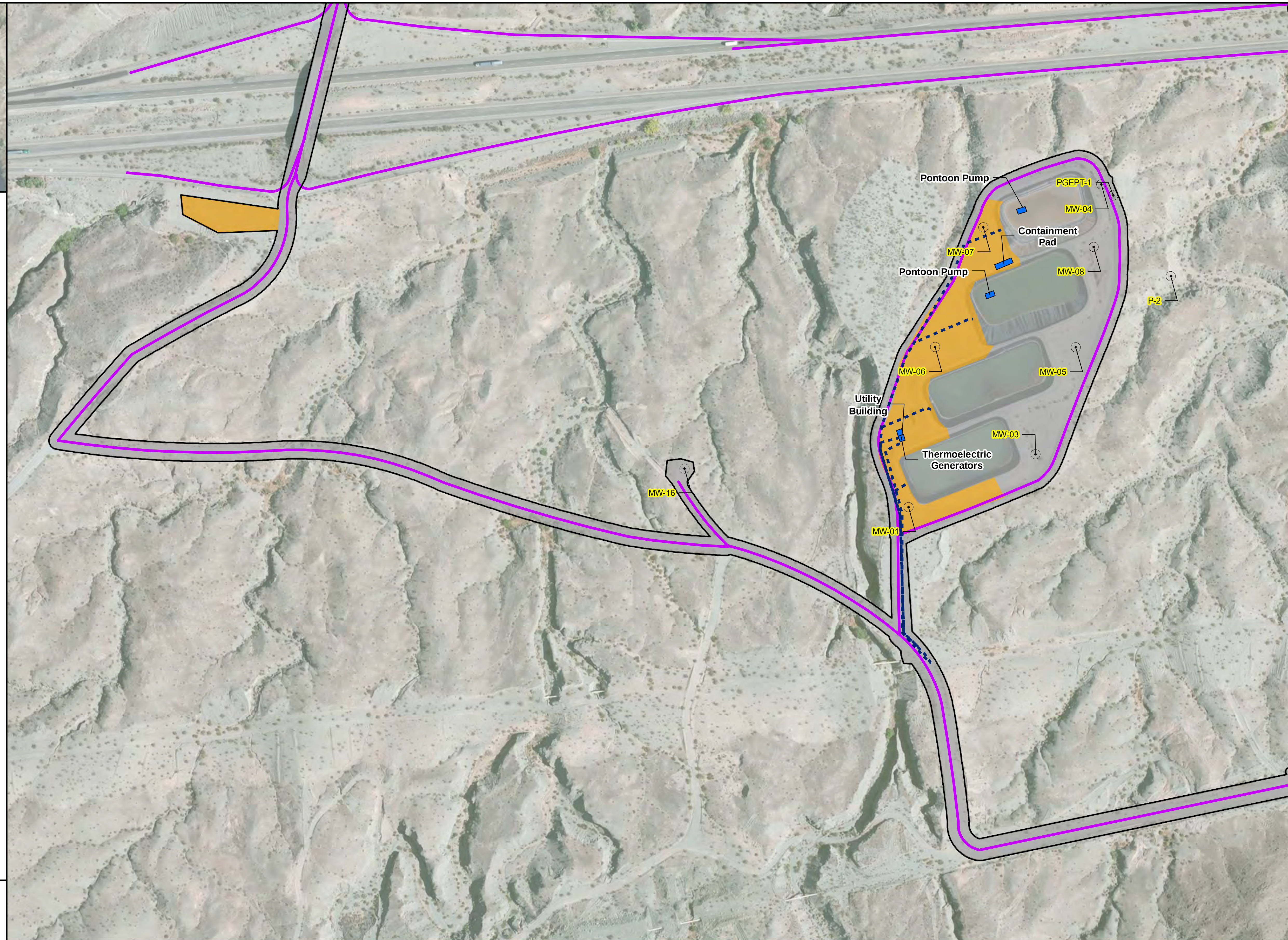

LEGEND

- Groundwater SEIR Project Area

Existing Wells:

- Monitoring Well

Pipeline Corridor for Remedy

- Underground Pipe/Conduit
- Proposed Remedy Structure

Access Routes

- Existing Access Route (will continue to be used for remedial activities)
- Potential Soil Storage and Staging Areas

Approximate extent of hexavalent chromium [Cr(VI)] concentrations exceeding 32 micrograms per liter (µg/L) at any depth ingroundwater based on fourth quarter 2013 sampling events. Dashed where based on limited data.

0 285 570
Feet

N

Final Groundwater Remediation Project SEIR

Map Creation Date: 12/12/2016 Sources: ESRI Aerial, PG&E 2015

Final Groundwater Remedy Project Components: Detail Map 6

Figure 3-3f

ESA North State Resources

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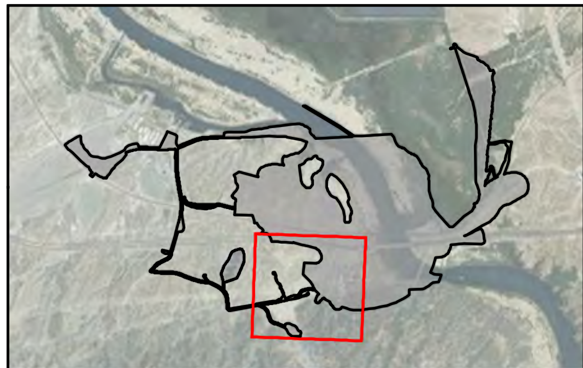

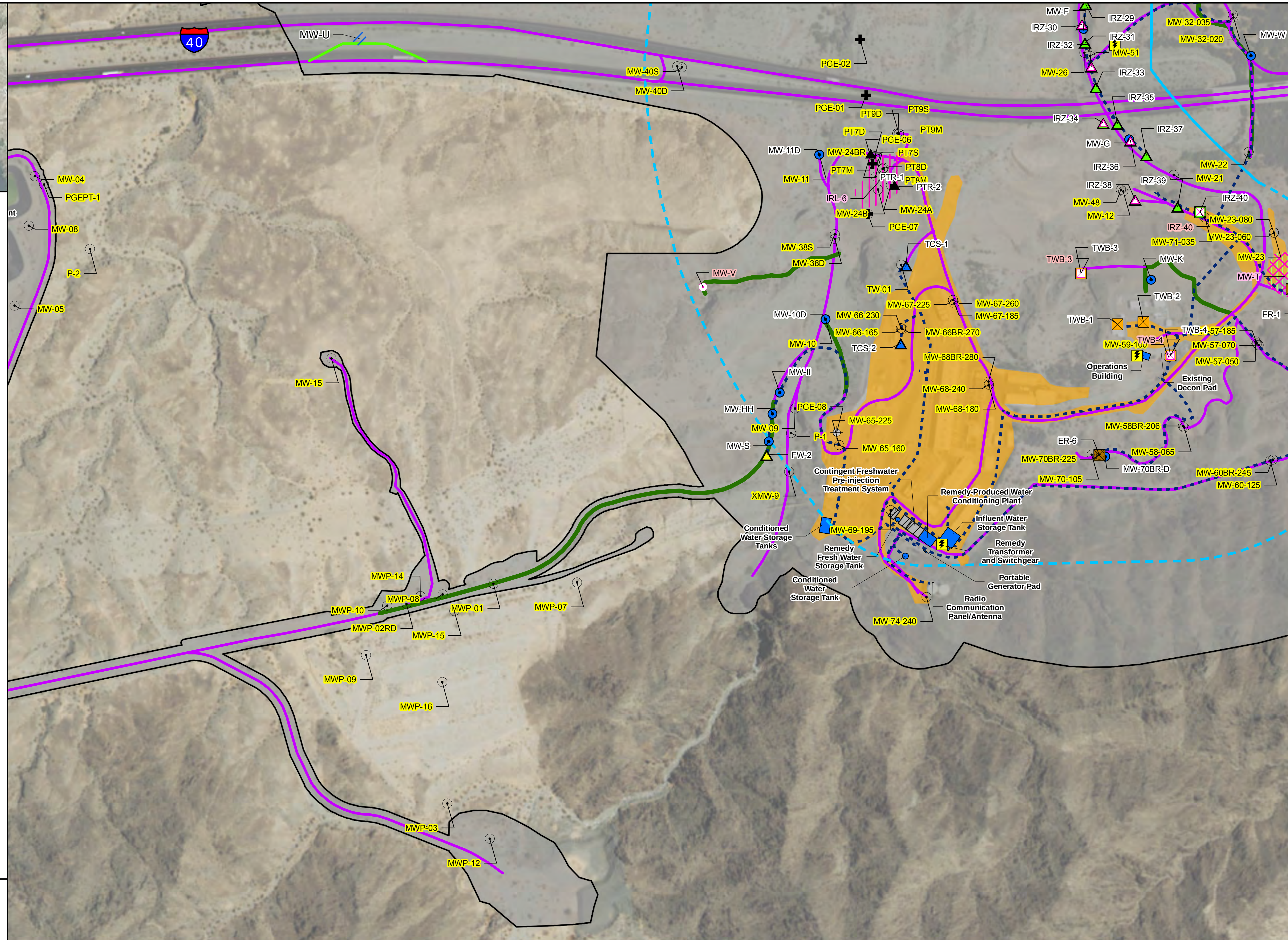

LEGEND

Groundwater SEIR Project Area

Existing Wells:
- Injection Well
- Monitoring Well
- Water Supply Well

Provisional Wells:
- Extraction Well
- Injection Well
- Monitoring Well
- Area for East Ravine Well (ER-7 to ER-11)
- Area for Inner Recirculation Loop (IRL) Wells

Planned Wells:
- Extraction, East Ravine
- Extraction, NTH IRZ
- Extraction, Transwestern Bench
- Injection, Freshwater
- Injection, NTH IRZ
- Injection, Topock Compressor Station
- Remedy Monitoring Well
- Area for Monitoring Wells MW-X, MW-Y and MW-U
- Recirculation Well

Pipeline Corridor for Remedy
- Underground Pipe/Conduit

Remedy Facilities
- Planned Transformer
- Proposed Remedy Structure
- Contingent Freshwater Pre-injection Treatment System

Access Routes
- Existing Access Route (will continue to be used for remedial activities)
- Existing Route (proposed to be used as is for access to remedial activities)
- Roads to be improved or constructed for groundwater remedy
- Potential Soil Storage and Staging Areas

Approximate extent of hexavalent chromium [Cr(VI)] concentrations exceeding 32 micrograms per liter (µg/L) at any depth ingroundwater based on fourth quarter 2013 sampling events. Dashed where based on limited data.

0 360 720
Feet
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Final Groundwater Remediation Project SEIR

Map Creation Date: 12/12/2016 Sources: ESRI Aerial, PG&E 2015

Final Groundwater Remedy Project Components: Detail Map 7

Figure 3-3g

ESA | North State Resources

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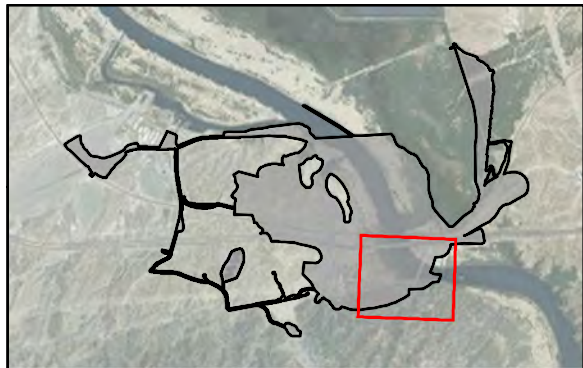

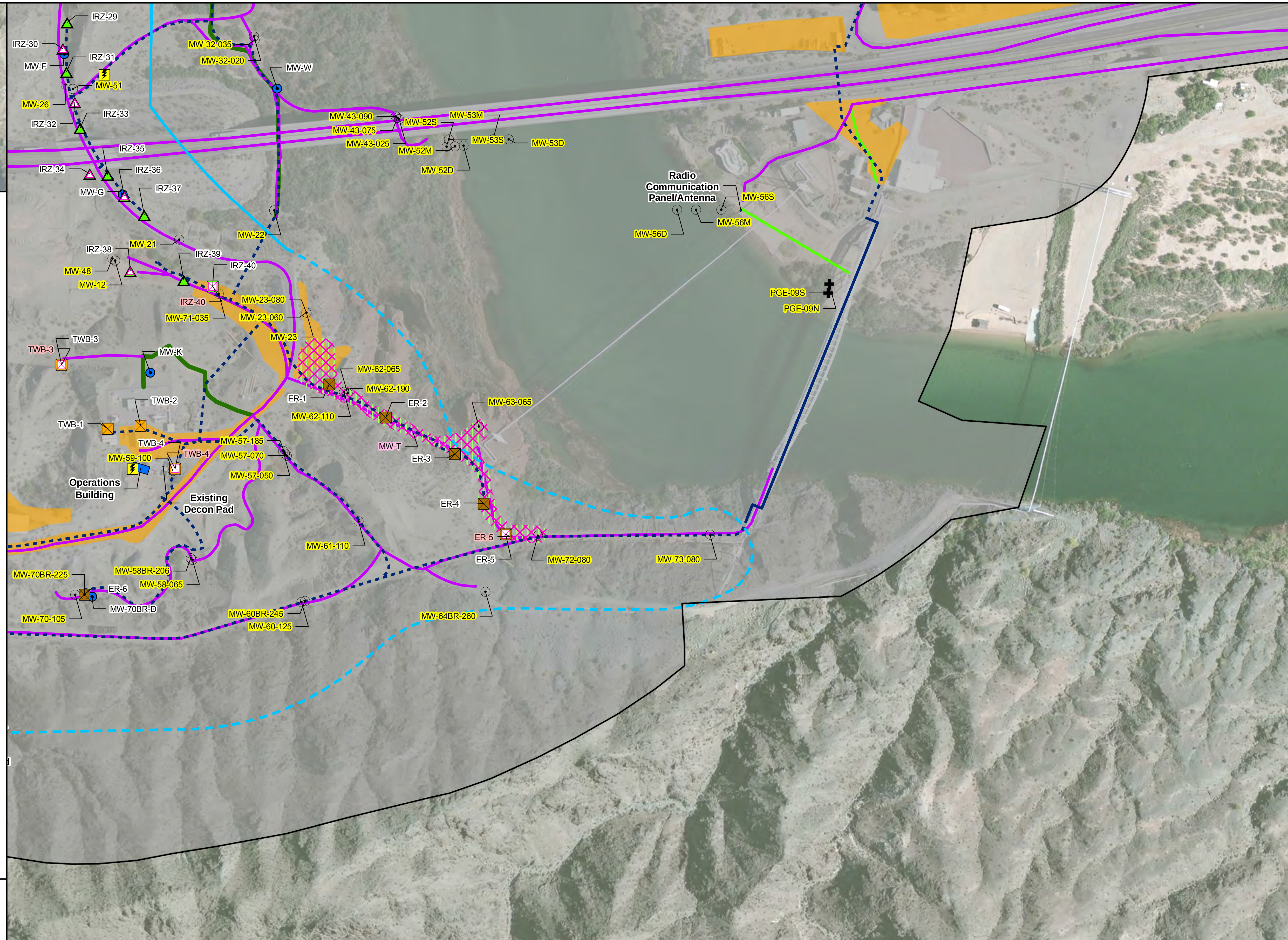

LEGEND

- Groundwater SEIR Project Area

Existing Wells:
- Monitoring Well
- Water Supply Well

Provisional Wells:
- Extraction Well
- Injection Well
- Area for East Ravine Well (ER-7 to ER-11)

Planned Wells:
- Extraction, East Ravine
- Extraction, NTH IRZ
- Extraction, Transwestern Bench
- Injection, NTH IRZ
- Remedy Monitoring Well

Pipeline Corridor for Remedy
- Aboveground Pipe
- Underground Pipe/Conduit

Remedy Facilities
- Planned Transformer
- Proposed Remedy Structure

Access Routes
- Existing Access Route (will continue to be used for remedial activities)
- Existing Route (proposed to be used as is for access to remedial activities)
- Roads to be improved or constructed for groundwater remedy
- Potential Soil Storage and Staging Areas

Approximate extent of hexavalent chromium [Cr(VI)] concentrations exceeding 32 micrograms per liter (µg/L) at any depth ingroundwater based on fourth quarter 2013 sampling events. Dashed where based on limited data.

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Final Groundwater Remediation Project SEIR
Map Creation Date: 12/12/2016 Sources: ESRI Aerial, PG&E 2015

Final Groundwater Remedy Project Components: Detail Map 8

Figure 3-3h

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Approximately 165 wells exist within the Project Area and are being used as part of the monitoring program for the proposed Project (see Table 2.1-2 of the O&M Manual, Volume 2). Most these wells were installed prior to 2011, and thus were considered “existing wells” in the Groundwater FEIR. Of these 165 wells, 20 monitoring wells (constructed in 16 boreholes) were installed subsequent to 2011 and are accounted for in Table 3-1 as “installed boreholes.” Also subsequent to 2011, two remediation wells (freshwater supply wells HNWR-1A and Site B) were installed within two separate boreholes. Additional monitoring and remediation wells that are “planned” for installation as part of the groundwater remedy would require an estimated 56 and 47 boreholes, respectively. “Future provisional” monitoring and remediation wells that might be installed would require up to an estimated 24 and 46 boreholes, respectively. The future provisional wells would be used dependent on the monitored performance of the groundwater remedy over time; thus, some or all of the future provisional well boreholes would be needed depending on future monitoring results. A summary of remediation well boreholes considered in the Groundwater FEIR compared to those proposed in the Final Remedy Design is presented in **Table 3-1**.

Based on this accounting, an estimated total of up to 96 boreholes would be drilled for monitoring well construction and an estimated total of up to 95 boreholes would be drilled for remediation well construction, for a total of 191 boreholes. In addition to these estimated totals, and as part of the Future Activity Allowance, this SEIR considers an additional allowance of 25 percent overage for each of the monitoring and remediation boreholes. Also included as part of the Future Activity Allowance are up to 10 additional monitoring well boreholes to be installed in Arizona as part of the monitoring program to assess groundwater levels and chemical constituents as a result of freshwater pumping. This accounting system, which provides a total number of boreholes to be installed, and a difference between what was analyzed in the Groundwater FEIR and new wells proposed as part of this SEIR, is explained in Table 3-1.

In addition to the remediation and monitoring well network, the proposed Project also includes supporting infrastructure such as roads, pipelines, utility connections, freshwater supply and conveyance infrastructure, storage areas, buildings, and other necessary support structures to ensure long-term effectiveness. These infrastructure components were considered at a general level with anticipated maximum build estimates in the Groundwater FEIR (exact locations were not known with precision) and are now known with a higher level of detail, as described in the Final Remedy Design and herein.

TABLE 3-1
SUMMARY OF REMEDIATION AND MONITORING WELL BOREHOLES

Proposed Well Boreholes for the Final Remedy Design[a]	Remediation Wells[b]	Monitoring Wells	Total Wells
Known Project Components (Based on Final Remedy Design)			
Groundwater FEIR Limit	110	60	170
Installed Boreholes	2	16	18
Planned Boreholes to Be Installed	47	56	103
Future Provisional Boreholes that Might Be Installed	46	24	70
Total Boreholes Identified in the Final Remedy Design	95	96	191
Future Activity Allowance (Locations Unknown at this Time)			
25 Percent Potential Allowance	24	24	48
Additional Monitoring Well Boreholes	0	10	10
Totals			
Total SEIR Boreholes	119	130	249
Difference Between FEIR Limit and Total New SEIR Boreholes[c]	7	54	61

NOTES:
[a] Boreholes may have multiple wells installed within the same borehole
[b] Remediation wells include injection and extraction wells
[c] Difference equals Total SEIR Boreholes minus Groundwater FEIR Limit boreholes minus Installed Boreholes.
SOURCE: CH2M Hill 2015a.

3.6.1.1 National Trails Highway In Situ Reactive Zone (NTH IRZ)

The NTH IRZ area is located in the area north of the Station and along the Colorado River, as shown in Figure 3-3 (in particular detailed maps in Figures 3-3c and 3-3h). The NTH IRZ would be constructed using a series of wells that could be used either as injection or extraction wells to circulate groundwater and distribute the carbon substrate. The water with the carbon substrate would be injected under pressure into the aquifer using a network of wells to form the treatment zone. The final number and specific locations of injection wells were developed subsequent to the Groundwater FEIR in the Final Remedy Design. The Groundwater FEIR envisioned 18 injection/extraction wells at conceptual locations, whereas the Final Remedy Design includes up to a maximum of 59 well boreholes, some with two screen intervals. The design parameters and quantities are summarized below and in the following pages.

- Wells (NTH IRZ wells are labeled as IRZ-## in Figure 3-3):
  - o Total of 24 injection well boreholes (plus up to 30 future provisional well boreholes) spaced along the IRZ well line to ensure adequate lateral distribution of organic carbon, prevent potential breakthrough of the Cr(VI) plume and minimize byproduct formation.
  - o Total of four extraction well boreholes (plus 1 future provisional well borehole) located at the ends and in the central portion of the IRZ well line to provide hydraulic control of the northern end of the Cr(VI) plume and maintain eastern flow component of groundwater. According to PG&E's modeling, the location of these extraction wells would minimize the potential for extraction of reduced water containing organic carbon or dissolved minerals. Minimizing the extraction of reduced water containing organic carbon or dissolved minerals would aid in reducing well and pipeline fouling. Minimizing well and pipeline fouling would maintain operational efficiency, reducing operation and maintenance requirements for the extraction wells, pipelines, and injection wells. The final number and specific locations of extraction wells were developed subsequent to the Groundwater FEIR during the Final Remedy Design.

The IRZ wells would be constructed of 6- to 12-inch nominal diameter well casing with one or two screened intervals to target specific intervals of the unconsolidated alluvial sediments with up to two IRZ wells installed per borehole. Electric-motor-operated submersible pumps would be installed in each extraction well, and the pump intakes would be positioned above the screens to prevent dewatering of the screen and subsequent fouling. Control/monitoring devices (e.g., flow meters, leak-detection sensors, and submersible-pump controls) would be contained within below-grade concrete vaults. The IRZ well vaults and control/monitoring vaults would be belowground vaults that would be 6 feet wide by 5, 6, or 8 feet long. The Groundwater FEIR assumed the well diameters would range from 4 to 12 inches in diameter and that the well vaults would be up to 6 feet wide and 8 feet long. The type and location of pumps and associated equipment was developed subsequent to the Groundwater FEIR during the Final Remedy Design.

- For flexibility in managing the movement of fluids through the NTH IRZ, many wells would be constructed such that they could be used for the injection of carbon substrate-dosed water or extraction of treated groundwater for re-injection along the up-gradient edges of the plume. The NTH IRZ system would be designed using the rates summarized below. Extraction and injection flow rates[5]:
  - o Total nominal injection rate of 300 gallons per minute (gpm) with an anticipated range of 200 to 400 gpm. The Groundwater FEIR assumed 500 gpm, although the Groundwater FEIR did not differentiate between the NTH and Recirculation Loop wells.
  - o Total nominal extraction flow rate is 300 gpm with a range of 200 to 400 gpm. The Groundwater FEIR assumed 640 gpm, although the Groundwater FEIR did not differentiate between the NTH and Recirculation Loop wells.

5 The flow rate is the volume of water flowing through the well pipe over a unit of time, in this case gallons per minute. Note that some wells can be used for either the injection or extraction of water, to achieve the desired direction of groundwater movement.

- Carbon substrate dosing:
  - o The system would be initiated with an anticipated initial carbon substrate amendment dosing concentration, measured as total organic carbon (TOC), of 100 milligrams per liter (mg/L) in the amended water pumped to the NTH IRZ injection wells to achieve sufficient lateral distribution of organic carbon to complete the IRZ while minimizing byproduct generation. This information was developed based on the solute transport model subsequent to the Groundwater FEIR during the Final Remedy Design.

The carbon substrate amendment facility for the NTH IRZ would be located at the Monitoring Well (MW)-20 Bench (see Figure 3-3c) and would consist of the following proposed and existing components. The new carbon substrate amendment facility additions' (tank and building) footprint of approximately 2,400 square feet is less than the 35,000-square-foot area analyzed in the Groundwater FEIR.

- One proposed above-grade, double-walled 15,000-gallon, horizontal saddle storage tank with secondary containment and a maximum footprint area of about 400 square feet. The total tank storage capacity is less than the 100,000-gallon tank storage capacity analyzed in the Groundwater FEIR. The height of the tank is approximately 15 feet (including the catwalk), as was assumed in the Groundwater FEIR.
- One proposed Carbon Amendment Building that would be about 14 feet high with a foundation pad of 36 feet by 53 feet for about approximately 1,910 square feet. This information was not available at the time of the Groundwater FEIR.
- Three existing aboveground 20,000-gallon frac tanks in an approximately 1,350-square-foot area to be used as clean-in-place (pipeline cleaning), backwash (wells and pipelines), and conditioned water holding tanks.
- One proposed 960-square-foot truck unloading containment pad designed to hold 7,700 gallons (which is 110% of the volume contents of one tanker truck), which will replace an existing pad of similar size at that location.
- The NTH IRZ injection well design would include manual addition ports to accommodate the potential use of portable tanks (5- to 1,000-gallon capacity) for the direct injection of dilute carbon substrate solution at the wellheads for added flexibility in long-term system operation and for specific targeted injections on an as-needed basis.

3.6.1.2 Inner Recirculation Loop

The purpose of the IRL is to induce a hydraulic gradient that would flush the plume toward the NTH IRZ, facilitate the cleanup of the Colorado River floodplain, and provide secondary protection for the Colorado River by controlling the migration of potential byproducts generated by the NTH IRZ. The discussion of the components of the IRL was included with the NTH IRZ components in the Groundwater FEIR, and the IRL wells were included within the 110 maximum remediation wells. Details of the IRL were further developed subsequent to the Groundwater FEIR during the Final Remedy Design. The IRL would consist of the following system components:

- Wells (IRL wells are labeled as IRL-## or RB-## in Figure 3-3):
  - o Five River Bank (RB) extraction well boreholes (plus up to four future provisional well boreholes) along the Colorado River to induce groundwater flow through the NTH IRZ, capture Cr(VI) located downgradient of the NTH IRZ, and control NTH IRZ–generated byproducts.
  - o Four IRL injection well boreholes (plus up to three future provisional well boreholes) near the western margin (upgradient) of the groundwater plume north of I-40 to induce groundwater flow through the NTH IRZ.

The IRL wells would be constructed of up to 12-inch nominal diameter well casings with one or two screened intervals to target specific intervals of the unconsolidated alluvial sediments. Electric-motor-operated submersible pumps would be installed in each extraction well, and the pump intakes would be positioned above the screens to prevent dewatering of the screen and subsequent fouling. The Control/monitoring devices (e.g., flow meters, water-level sensors, leak-detection sensors, and submersible-pump controls) would be contained within a below-grade concrete vault. The IRL well vaults and control/monitoring vaults would be belowground vaults that would be 6 feet wide by 5, 6, or 8 feet long. The Groundwater FEIR assumed the well diameters would range from 4 to 12 inches in diameter and that the well vaults would be up to 6 feet wide and 8 feet long. The type and location of pumps and associated equipment was not available at the time of the Groundwater FEIR.

The IRL wells would be designed using the rates summarized below.

- Extraction and injection flow rates:
  - o Total nominal extraction flow rate is 150 gpm with a range of 0 to 500 gpm. The Groundwater FEIR assumed 640 gpm, although the Groundwater FEIR did not differentiate between the NTH and Recirculation Loop wells.
  - o Total nominal injection flow rate is 450 gpm average with a range of 150 to 900 gpm. The Groundwater FEIR assumed 500 gpm, although the Groundwater FEIR did not differentiate between the NTH and Recirculation Loop wells.

- Carbon substrate dosing:
  - o The anticipated TOC amendment concentration range is from 0 to 50 mg/L. The minimum of 0 mg/L TOC is applicable when Cr(VI) concentrations in the extracted groundwater do not exceed the cleanup level of 32 µg/L. Low concentrations of carbon substrate would be added if Cr(VI) treatment is required. The maximum of 50 mg/L TOC was established to allow for: (1) additional consumption of TOC by microbiological activity, (2) promotion of reducing conditions in the subsurface, and (3) accommodation of uncertainties in field implementation. This information was developed subsequent to the Groundwater FEIR during the Final Remedy Design.

The carbon substrate would be added to the IRL wells using the IRZ carbon substrate amendment facility at the MW-20 Bench described for the NTH IRZ.

3.6.1.3 Freshwater Injection Wells

The purpose of the freshwater injection wells are to assist with flushing the contaminated groundwater toward and through the NTH IRZ, to constrain the westward spread of the plume, and to constrain the westward spread of the carbon substrate amended water and in situ byproducts from the IRL. Two freshwater injection wells would be constructed in areas west and south of the plume. The freshwater injection system would consist of the following proposed components. Detailed information on the number and location of freshwater injection wells was not available at the time of the Groundwater FEIR.

- Well location/number of wells:
  - Two freshwater injection wells (FW-1 and FW-2) west and south of the groundwater plume to induce groundwater flow through the NTH IRZ and prevent westward migration of the Cr(VI) plume (see Figures 3-3c and 3-3g). The Groundwater FEIR assumed a third freshwater injection well north of the plume.
  - Wells IRL-1 through IRL-7 (IRL-5, -6, and -7 are future provisional wells) would have the flexibility to be used as freshwater injection wells, if needed. This concept of having the flexibility to use other wells for the injection of freshwater was developed during the Final Remedy Design.

The freshwater wells would be constructed of up to 12-inch nominal diameter well casing with one or two screened intervals to target specific intervals of the unconsolidated alluvial sediments. The freshwater well vaults would be 5- by 7-foot belowground vaults. The control/monitoring devices (e.g., flow meters and water-level sensors) would be contained within 9-foot by 11-foot below-grade concrete vaults. These specific well vault details were developed subsequent to the Groundwater FEIR during the Final Remedy Design.

- Injection flow:
  - Total nominal injection flow rate for the freshwater wells would be 150 gpm, with a range of 75 to 300 gpm. The Groundwater FEIR assumed an injection rate of about 500 gpm.
  - Total nominal injection flow rate for the IRL wells would be 450 gpm, with a range of 150 to 900 gpm. This concept of having the flexibility to use other wells for the injection of freshwater was developed during the Final Remedy Design.

3.6.1.4 Topock Compressor Station Recirculation Loop

The TCS Recirculation Loop would be located in the area of the Station, the East Ravine, and the Transwestern Bench (TW Bench), as shown in Figure 3-3g. The TCS Recirculation Loop would be constructed using a series of extraction and injection wells to circulate groundwater and distribute carbon substrate to treat contaminants. The water with the carbon substrate would be injected under pressure into the aquifer using a network of wells to form a localized treatment zone. The design parameters and quantities are summarized in the following pages. The discussion of the components of the TCS Recirculation Loop was included with the NTH IRZ components in the Groundwater FEIR, and was assumed to be included within the maximum of

110 remediation wells. Details of the TCS Recirculation Loop were further developed subsequent to the Groundwater FEIR during the Final Remedy Design.

- Well location/number of wells:
  - Five East Ravine extraction well boreholes (plus up to six future provisional well boreholes) east of the Station in the southeast portion of the plume that exists in the bedrock to extract Cr(VI)-impacted groundwater located in the bedrock. East Ravine wells are labeled as ER-## in Figure 3-3h. The exact location of these wells was not yet envisioned at the time of the Groundwater FEIR.
  - Two TW Bench extraction well boreholes (plus two future provisional well boreholes) in the area northeast of the Station to accelerate capture and treatment of Cr(VI)-impacted groundwater immediately downgradient of the Station. TW Bench wells are labeled as TWB-## in Figure 3-3h. The Groundwater FEIR assumed a total of four extraction wells.
  - Two injection well boreholes in the northern area of the Station to directly treat Cr(VI)-impacted groundwater in the immediate vicinity and accelerate groundwater flow toward the TW Bench extraction wells to the east and the NTH IRZ to the north. Wells located in the Station are labeled as TCS-## in Figure 3-3g. These wells were not envisioned at the time of the Groundwater FEIR.

The TCS Recirculation Loop wells would be constructed of up to 12-inch nominal diameter casing with one or two screened intervals to target specific intervals of the unconsolidated alluvial sediments. Control/monitoring devices (e.g., flow meters, water-level sensors, leak-detection sensors, and submersible-pump controls) would be contained within below-grade concrete vaults. The TCS Recirculation Loop well vaults and control/monitoring vaults would be belowground vaults that would be 5 feet wide by 6 or 7 feet long. The Groundwater FEIR assumed the well diameters would range from 4 to 12 inches in diameter and that the well vaults would be up to 6 feet wide and 8 feet long. The type and location of pumps and associated equipment was determined subsequent to the Groundwater FEIR during the Final Remedy Design.

- Extraction/injection flow:
  - Total nominal East Ravine extraction flow rate is 5 gpm, with a range of 4 to 9 gpm, to provide hydraulic capture of Cr(VI)-impacted groundwater in the East Ravine bedrock. These wells were not yet envisioned at the time of the Groundwater FEIR.
  - Total nominal TW Bench extraction flow rate is 22 gpm with a range of 2 to 30 gpm, to provide hydraulic capture of Cr(VI)-impacted groundwater.
  - A total extraction flow rate that includes both TW Bench and East Ravine extraction is predicted to range from 10 to 75 gpm. The flow rate for these wells was developed subsequent to the Groundwater FEIR during the Final Remedy Design.
  - Total nominal injection flow rate is 27 gpm, with a range of 10 to 75 gpm, to allow for adequate lateral distribution of organic carbon. The flow rate for these wells was developed subsequent to the Groundwater FEIR during the Final Remedy Design.

- Carbon substrate dosing:
  - o The system would be initiated with an anticipated initial TOC amendment concentration of 100 mg/L to achieve sufficient lateral distribution of organic carbon while minimizing byproduct generation. This information was developed subsequent to the Groundwater FEIR during the Final Remedy Design.

The TCS Recirculation Loop would use the carbon substrate amendment facility at the MW-20 Bench (see Figure 3-3g) described for the NTH IRZ.

3.6.1.5 Remedy-Produced Water Conditioning System

The Final Groundwater Remedy Project is reliant on several dozen extraction and injection wells (see Figure 3-3 series). For all wells, especially for the injection wells, regular maintenance such as backwashing and rehabilitation is vital to maintain efficient and effective operations during the approximately 30 years of active remediation. Well maintenance would also prevent or reduce the need for drilling new replacement wells. These maintenance activities would produce an ongoing wastewater stream that must be managed as part of the remedial action. Other types of produced water with smaller volumes would also need to be managed as part of the proposed Project, such as purge water from monitoring well sampling, equipment decontamination wastewater, and rainfall that collects in remedy facility secondary containment.

The Remedy-Produced Water Conditioning System would be located on the southern portion of the Station within the fence line, as shown in Figure 3-3g. All components of the system would be located within the Station boundary, all of which has been previously disturbed. The total footprint of the system would be approximately 8,700 square feet. In some cases during well rehabilitation, mobile equipment may be used to condition the produced water at the well location. In the event that the produced water is hazardous, permitted transportable treatment units could be used at the well location. During the operation phases of the Project, the system is anticipated to treat about 7.6 million gallons (MG) of water per year at an average of 20 gpm and a maximum of 35 gpm. Water use during construction phases is discussed in this chapter in Section 3.6.2.6 and is estimated at about 25 MG. The concept and details of the Remedy-Produced Water Conditioning System were developed subsequent to the Groundwater FEIR during the Final Remedy Design. The system would consist of the following components, with the following approximate parameters:

- Influent Water Storage Tank Farm – four 21,000-gallon, 15-foot-high (including the catwalk), aboveground storage tanks within a containment structure that is approximately 53 feet by 52 feet for about 2,800 square feet.
- Remedy-Produced Water Conditioning Building (Building 12) – one 38-foot-high, two-story building with a footprint of approximately 51 feet by 33 feet for about 1,700 square feet. Building 12 would include liquid phase separators, processing equipment, chemical storage, a sump, and an office/sample room.
- Decontamination Pad adjacent to Building 12 – one pad that is approximately 50 feet by 33 feet for about 1,700 square feet within the footprint of the contingent arsenic treatment

system.

- Conditioned Water Storage Tank – one 17-foot-high, 600-square-foot 42,000-gallon storage tank on a 48-foot-diameter concrete pad with a retaining wall surrounding about half of the pad.
- Conditioned Water Tank Farm – two 12-foot-high, 21,000-gallon aboveground storage tanks within a containment structure that is approximately (55 feet by 34 feet) 1,900 square feet.
- Contingent granular carbon vessels – in the event that removal of hydrocarbons from produced water is needed, space has been reserved for two 1,000-pound capacity granular carbon vessels. The vessels could be located at the TW Bench, the long-term operation and maintenance support area west of Moabi Regional Park, or the MW-20 Bench.
- Associated conveyance piping, pumps, and controls.
- The proposed Project includes dedicated automatic backwashing systems connected to pipelines that would convey the wastewater produced from the injection and extraction wells to the Remedy-Produced Water Conditioning System at the Station (see Figure 3-3g). The pipelines would be installed within the same utility corridors as the freshwater-flushing conveyance piping described in Section 3.6.1.7.3, resulting in no additional utility corridors.
- A contingent Dissolved Metals Removal System to remove scale-forming ions from the remedy-produced water prior to injection, if needed. The implementation of the Dissolved Metals Removal System would be triggered by significant performance losses in pipelines and/or wells due to heavy scaling of calcium, magnesium, and/or manganese that cannot be managed by the CIP system, described in Section 3.6.1.6. The Dissolved Metals Removal System would be incorporated into and located entirely within the Remedy-Produced Water Conditioning System building. The method would use partial caustic softening, which uses a 25 percent caustic additive and possibly a coagulant to precipitate the ions out of solution. The system equipment would include:
    - One caustic feed system including one approximately 55-gallon, high-density polyethylene tank, a 10-gallon-per-hour pump, conveyance piping, controller, and control valves.
    - One acid feed system, including a 0.01-gallon-per-hour pump and controller.
    - One fiberglass 1,000-gallon backwash tank.
    - One fiberglass 1,000-gallon treated water tank.
    - Two-inch-diameter static mixers.
    - Associated pumps, conveyance piping, controller, and control valves.
- Permitted transportable treatment units – if needed, permitted transportable treatment processes for hazardous remedy-produced water would consist of one or more of the following treatment processes, depending on the produced water chemistry: neutralization (via addition of acid/base), physical filtration (with or without filtering aids), membrane

filtration (such as reverse osmosis), ion exchange, media filtration, precipitation, evaporation or crystallization, electrochemical processes (such as electrodialysis), adsorption, and/or physical separation of solids and liquids (with or without settling aids). The processes typically involve tanks, pumps, and associated instrumentation/controls. The specific equipment needed and the footprint of the permitted transportable treatment unit(s) would depend on which treatment processes are needed.

3.6.1.6 Clean-In-Place System

Routine maintenance of NTH IRZ pipelines would likely to be needed to address biological fouling and/or mineral scaling, requiring a CIP system. The CIP system would include valves and fittings in selected pipeline locations to allow for recirculation of a maintenance solution in a closed loop through the pipelines. CIP events would be scheduled to coincide with the regular system shutdown periods at an expected frequency of once every 1 to 5 years, depending on need.

The CIP system would consist of one 20,000-gallon frac tank and pumping system for the recirculation of acid- or caustic-based maintenance solutions within the pipelines. The reagents used would be those categories of water treatment chemicals approved for use in drinking water systems. Chemical reagents under consideration for use in the CIP system include hydrochloric, glycolic (hydroxyacetic), and phosphoric acids; sodium hydroxide; and hydrogen peroxide. Ultimate selection of an effective reagent(s) would require bench scale testing. The CIP system would be centrally located at the MW-20 Bench area, and may use some components of the carbon substrate amendment system (e.g., pumps, tanks, and metering equipment).

During each CIP event, the carbon-amended water injection system would be temporarily shut off, groundwater extraction would cease, and freshwater or conditioned water would be used to flush the lines. Each conveyance force main valve would be positioned to isolate the wells and create a loop with the associated section of pipeline. This loop would originate and terminate with the CIP tank (frac tank). Freshwater would be added to the CIP tank along with the appropriate quantities of amendments per the recommended recipe as determined based on the bench-scale testing of scale deposit samples. The CIP system would operate by recirculating the amended water in a loop. Upon completion, freshwater would be added to flush the lines. Following completion of the CIP event, the valves would be positioned to facilitate normal operation. CIP system conveyance piping would be operated at velocities between 3 and 10 feet per second.

Water produced during the CIP maintenance cycles (i.e., maintenance solution and freshwater flush) would be conveyed to the Remedy-Produced Water Conditioning Plant for conditioning, or would be shipped off-site for disposal. The volume of spent solution is expected to be roughly 10,000 to 40,000 gallons per event.

3.6.1.7 Freshwater Flushing

To assist with flushing the plume through the NTH IRZ, and with constraining the westward spread of the plume, carbon substrate amended water, and in situ byproducts from the IRL, groundwater imported from Arizona would be injected into the freshwater injection wells previously described. The following sections discuss the proposed sources of freshwater, the chemistry of the Arizona groundwater, the FWPTS, the freshwater supply storage tank, and freshwater conveyance piping network. The Groundwater FEIR included three separate options for a freshwater supply source: (1) well(s) in California; (2) well(s) in Arizona; or (3) surface water from the Colorado River through an intake structure. Subsequently, the use of water from wells in Arizona was investigated in the adopted Addendum to the Groundwater FEIR in 2013, and the results of that investigation concluded that there is water of sufficient quantity to be used in the remedial system.

Although the Arizona groundwater contains concentrations of arsenic above the California and federal Maximum Contaminant Levels (MCLs), PG&E's fate and transport model concluded that the increase in arsenic concentration surrounding the injection wells would be limited to a lateral distance of no greater than 150 feet. Furthermore, the concentration of arsenic is anticipated to return to pre-injection background over time.

PG&E, DTSC, and the SWRCB consulted in 2013 regarding the possibility that pre-treatment of freshwater for injection might be required due to the level of arsenic in the water. The Water Board stated that the use of injection water containing arsenic at levels above the applicable water quality objective was appropriate, subject to several conditions as stated in the Water Board, November 20, 2013, Memorandum to DTSC (included as Appendix WAT to the SEIR). The Water Board required that:

- "Monitoring wells must be established to confirm this modeling prediction" (i.e., that the arsenic exceedance will be limited to 150 feet from the injection wells).

- "If the leading edge of the arsenic plume extends more than 150 feet away from the injection well locations, PG&E must immediately reassess its modeling calculations and quickly identify interim actions it can take to limit the migration of the arsenic plume. These interim actions may include triggering activation of the contingency plan for arsenic pretreatment PG&E was directed by DTSC to include in its 60 percent groundwater remedy design."

- "In the event the arsenic plume exceeding the water quality objective extends 225 feet from any of the points of injection, then PG&E shall immediately cease further injection of untreated water from the HNWR-1 well and DTSC should either (i) require pretreatment to remove arsenic prior to injection or (ii) require another source of freshwater in order to meet the water quality objective." This requirement would apply to whichever freshwater supply wells are being used. Pursuant to this direction, DTSC may direct PG&E to pre-treat the water to remove arsenic prior to injection if the arsenic plume extends 225 feet radially from any point of injection. Alternatively, DTSC may require another source of freshwater.

The Final Remedy Design presents the selected freshwater source, as described in more detail below and in the following pages.

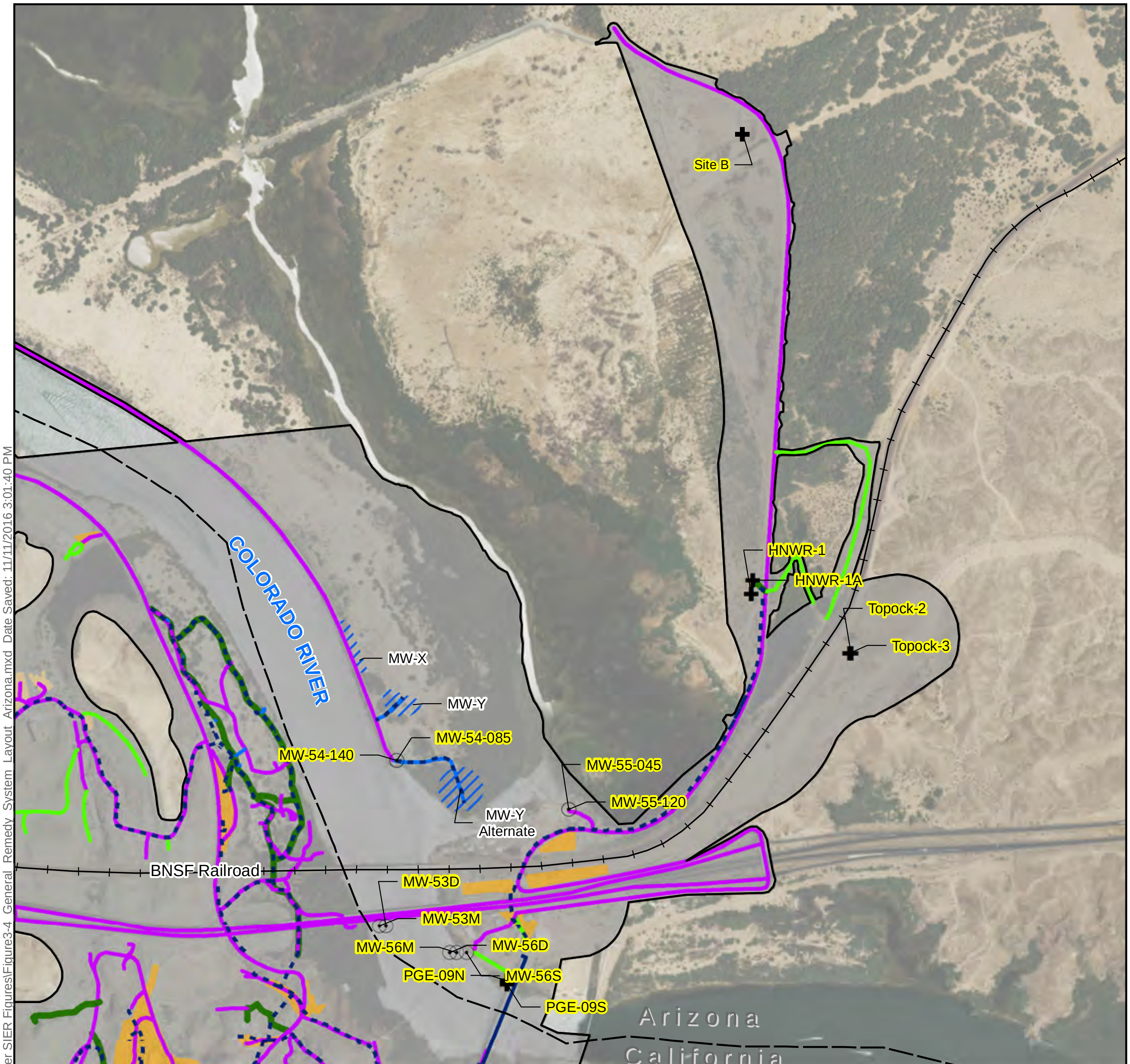
Freshwater Supply Sources

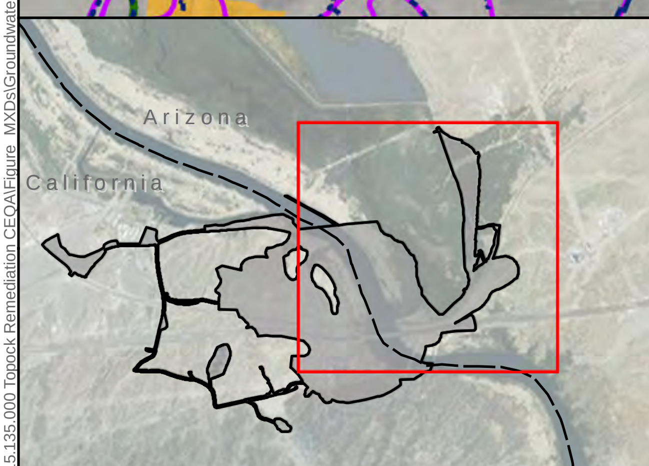
The primary source of freshwater supply would be from the installed 14-inch-diameter Well HNWR-1A, located on the Havasu National Wildlife Refuge in Arizona (see **Figure 3-4**). Freshwater could also be supplied from the existing nearby secondary supply Well HNWR-1, the existing contingent Topock-2/-3 wells, or the contingent installed Site B well (see Figure 3-4). The Final Remedy Design includes a provision to connect the secondary and contingent wells to the remediation system, whereas the Addendum to the Groundwater FEIR assumed the full-time use of two wells (HNWR-1A and the contingent Site B well).

Water from the HNWR-1A, HNWR-1, Topock-2 and -3, and the Site B well in Arizona has concentrations of naturally occurring arsenic that exceed the MCL of 10 μg/L.[6] The arsenic concentration is also higher than the naturally occurring levels of arsenic in the receiving California groundwater basin. Although the SWRCB has provided a conditional approval for the injection of the Arizona groundwater in California, PG&E, as directed by DTSC, has included the design of an FWPTS to reduce arsenic to below the federal/state MCL in the Final Remedy Design as a contingency. This contingent pre-treatment system is also evaluated in this Draft SEIR.

A sand collection system for removing sand from the well water would be constructed within the fenced freshwater well area near Well HNWR-1A (and Site B, should it be used). The sand collection system would be 11 feet by 15 feet (165 square feet) and 6 feet deep.

6 MCLs are also known as drinking water standards and are the maximum concentrations permitted in drinking water at the tap.





LEGEND

Groundwater SEIR Project Area

Area for Monitoring Wells MW-X and MW-Y

Aboveground Pipe

Underground Pipe/Conduit

Proposed Staging Areas

Potential Soil Storage and Staging Areas

Access Routes

Existing Access Route (will continue to be used for remedial activities)

Existing Route (proposed to be used as is for access to remedial activities)

Roads to be improved or constructed for groundwater remedy

Temporary Construction Access

0 1 2

Miles

N

Final Groundwater Remediation Project SEIR

Map Creation Date: 12/12/2016 Sources: ESRI Aerial, PG&E 2015

Final Groundwater Remedy Project Components in Arizona

Figure 3-4

ESA North State Resources

Contingent Freshwater Pre-Injection Treatment System

The contingent FWPTS would be located at the southern end of the Station within the fence line, next to the planned Remedy-Produced Water Conditioning Building (refer to Figure 3-3g). All components of the contingent FWPTS would be located on previously disturbed areas within the Station boundary. The FWPTS was developed subsequent to the Groundwater FEIR during the Final Remedy Design. The FWPTS is designed to treat arsenic, as discussed above. In addition, the FWPTS may have to be modified to treat other chemical constituents, if those constituents exceed the local basin water quality objectives.

The total footprint of this treatment system would be about 2,542 square feet, not counting the second floor of the building. The proposed FWPTS would consist of the following components, as described in Appendix M of the Final Remedy Design:

- One 45.5-foot by 28.5-foot, two-story building for a footprint of approximately 1,166 square feet that would contain cartridge filters, and the three treatment vessels. The building height would be approximately 31 feet at the ridgeline.
- One 12-foot-diameter by 17-foot-tall, 10,000-gallon remedy freshwater storage tank with a footprint of approximately 200 square feet.
- Two 10,000-gallon storage tanks (backwash and treated water) within a secondary containment structure of approximately 600 square feet.
- One 34-foot by 20-foot chemical storage area with one 1,000-gallon sulfuric acid tank, one acid feed skid, one hypochlorite tablet feeder system, and one dechlorination feed system all located within a pre-engineered structure with an internal secondary containment of 576 square feet.
- Associated conveyance piping, pumps, and controls.

If pre-treatment is needed, groundwater would be pumped and conveyed from Well HNWR-1A (or secondary or contingent wells) to the remedy freshwater storage tank. Water would be pumped from this tank and injected with hypochlorite for arsenic oxidation and acid to reduce pH to 6.5 to improve arsenic removal, then through a solids filtration process, then through a treatment media vessel, and ultimately the treated water would be pumped to a treated-water storage tank. The water would then be dechlorinated to remove residual chlorine from the treated freshwater because if the treated freshwater contained residual chlorine compounds, it could adversely affect microorganisms in the in situ reactive zones. Dechlorination would be accomplished by addition of commonly used chemicals such as ascorbic acid, calcium thiosulfate, and hydrogen peroxide. The equipment needed for dechlorination includes chemical storage tanks or totes, metering pumps, and an inline static mixer. Upon dechlorination, the treated water would be pumped to the freshwater injection wells. The backwash water used to periodically clean treatment media, filters, and tanks would be reused in the cooling towers, discharged to the evaporation ponds, and/or trucked to off-site permitted disposal facilities.

Freshwater Conveyance Piping Network

The freshwater well would supply water to the FWPTS via a new 12-inch conveyance pipeline network. The conveyance pipeline network would be approximately 26,000 feet (4.9 miles) long, with most of the pipeline being installed underground, as shown in **Figure 3-5**. This is a decrease from the 50,000 linear feet (9.5 miles) of water conveyance pipelines analyzed in the Groundwater FEIR. While the Groundwater FEIR did not specify underground or aboveground conveyance piping for this location, subsequent design iterations proposed aerial crossings at the Colorado River and Bat Cave Wash; there are no longer any aerial or aboveground pipeline crossings of Bat Cave Wash in the Final Remedy Design. The pipeline alignment would generally follow existing roadways and existing PG&E pipeline rights-of-way (ROWs). Where the ROW is not available, the pipeline alignment would be placed in previously disturbed areas. Typical trench dimensions would be 6 to 8 feet wide by 3 to 4 feet deep.

Starting from the freshwater supply well HNWR-1A in Arizona, the 12-inch underground pipeline would follow the Topock-Oatman Highway (Mohave County Road 10) toward the south and southwest, crossing under the BNSF railroad track and under I-40 (see Figure 3-4). The pipeline would cross privately owned parcels south of I-40 and continue onto the existing Arched Bridge (aboveground), currently co-owned by Kinder Morgan and PG&E, to cross the Colorado River.

After crossing the Colorado River into California via the Arched Bridge, the pipeline would run underground along the existing PG&E Line 300A natural gas pipeline maintenance road toward the Station (see Figure 3-3h). The pipeline would terminate at the remedy freshwater storage tank on the south side of the Station. The remedy freshwater storage tank would be a 10,000-gallon coated carbon steel tank (see Figure 3-5, inset of the Station). Midway along the PG&E Line 300A gas pipeline maintenance road, the freshwater pipeline would branch to the north to connect underground to the conveyance piping corridor located near National Trails Highway and the Station entrance road. However, in the event that treatment of freshwater for naturally occurring arsenic is required, all freshwater would be conveyed directly to the FWPTS treatment facility at the Station. The treated freshwater would then be conveyed along the PG&E Line 300A pipeline maintenance road (underground) prior to rejoining the freshwater pipeline.

The freshwater conveyance piping would continue underground along the National Trails Highway and split down to the floodplain with a short leg crossing under I-40 and the BNSF railroad tracks (see Figure 3-3h). The northern branch would connect to and serve the MW-20 Bench facilities. A western branch of the freshwater conveyance piping would cross the National Trail Highway to the access road west of the highway. This pipeline would continue westward and serve freshwater injection well FW-1 and the four IRL injection wells (IRL-1 through IRL-4), as needed.

At the location where the pipeline crosses the Bat Cave Wash in the uplands north of the Station, the pipeline would be buried in the wash. Once the pipeline crosses the wash, the pipeline would continue underground until it reaches FW-1 (Figure 3-3c). FW-2, located in Bat Cave Wash just west of the Station, would be served by a pipeline from the proposed freshwater storage tank at the Station that would also be buried in Bat Cave Wash (Figure 3-3g).

In the event that freshwater from the contingent Site B well is required, approximately 3,510 feet of additional conveyance piping would be required to connect the Site B well to the freshwater conveyance piping (the connection point would be located near the HNWR-1A well). In the event that freshwater from Topock-2/-3 wells are required, piping, valves, and a meter would be installed at the Station to connect to the existing water supply from these wells to the freshwater supply line for the remedy.

3.6.1.8 Monitoring Wells

As of the second quarter 2015 monitoring event, 146 installed wells were used for monitoring near the Station (CH2M Hill 2015c). These wells were used to collect groundwater samples during completion of the RCRA facility investigation/remedial investigation, and are also used for performance monitoring of the IM-3 Facility. The existing groundwater monitoring program that samples these wells, as well as surface waters of the Colorado River, would continue. Additional groundwater monitoring wells would be installed as part of the Final Groundwater Remedy Project to further evaluate site conditions, monitor contaminant levels, and assess the performance of the remediation system. Monitoring would include the collection, management, and reporting of groundwater quality, surface water quality, and operational data from the remedial system. Monitoring would be required during the construction and operation and maintenance phases and for an estimated 20 years following active remediation.

The Final Groundwater Remedy Project would include a monitoring well network that comprises selected previously installed and new monitoring wells, as shown in **Figure 3-6**. The general areas for MW-U (in California) and MW-X, MW-Y, and MW-Y Alternate (in Arizona) have been identified and are included in Figure 3-6 (see Figure 3-4 for monitoring well areas in Arizona). Although specific well locations within each area have not been identified, placement of a well within any of those locations is considered in the environmental analysis in this SEIR. The Groundwater FEIR considered a maximum of 60 new monitoring well boreholes. The Final Remedy Design provides more detail on the monitoring network that would be associated with the groundwater remedy and consists of 16 installed monitoring well boreholes, 56 planned monitoring well boreholes, plus up to 24 provisional monitoring well boreholes, for a total of up to 96 monitoring well boreholes.

An additional allowance of 25 percent (approximately 24 additional monitoring well boreholes) is included in the SEIR evaluation, as part of the Future Activity Allowance. Also included as part of the Future Activity Allowance are up to 10 additional monitoring well boreholes to be installed in Arizona as part of the monitoring program to assess/monitor groundwater levels and chemical constituents as a result of freshwater pumping. As indicated in Table 3-1, there would be a maximum of 54 additional monitoring well boreholes from what was previously considered and approved in the Groundwater FEIR. Many other existing monitoring wells will be used as part of remedy monitoring, but are not counted towards new well construction. Most boreholes would be up to 12 inches in diameter with 2-inch-diameter well casing(s). Some boreholes may be up to 24 inches in diameter. It should be noted, however, that PG&E may construct multiple individual wells in each borehole.

LEGEND

Groundwater SEIR Project Area

Existing Wells:
- Extraction Well
- Injection Well
- Monitoring Well
- Water Supply Well

Provisional Wells:
- Extraction Well
- Injection Well
- Monitoring Well
- Area for East Ravine Well (ER-7 to ER-11)
- Area for Potential Slant Well Screens
- Area for Inner Recirculation Loop (IRL) Wells
- Area for River Bank Extraction Wells

Planned Wells:
- Extraction, East Ravine
- Extraction, NTH IRZ
- Extraction, Riverbank
- Extraction, Transwestern Bench
- Injection, Freshwater
- Injection, Inner Recirculation Loop
- Injection, NTH IRZ
- Injection, Topock Compressor Station
- Remedy Monitoring Well
- Recirculation Well
- Alternate Monitoring Well Locations for MW-U, MW-X and MY-Y

Pipeline Corridor for Remedy
- Aboveground Pipe
- Underground Pipe/Conduit

Remedy Facilities
- Planned Transformer
- Future Provisional Transformer
- Proposed Remedy Structure
- Contingent Freshwater Pre-injection Treatment System

Access Routes
- Existing Access Route (will continue to be used for remedial activities)
- Existing Route (proposed to be used as is for access to remedial activities)
- Roads to be improved or constructed for groundwater remedy
- Temporary Construction Access
- Proposed Staging Areas
- Potential Soil Storage and Staging Areas

Approximate extent of hexavalent chromium [Cr(VI)] concentrations exceeding 32 micrograms per liter (µg/L) at any depth ingroundwater based on fourth quarter 2013 sampling events. Dashed where based on limited data.

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Feet
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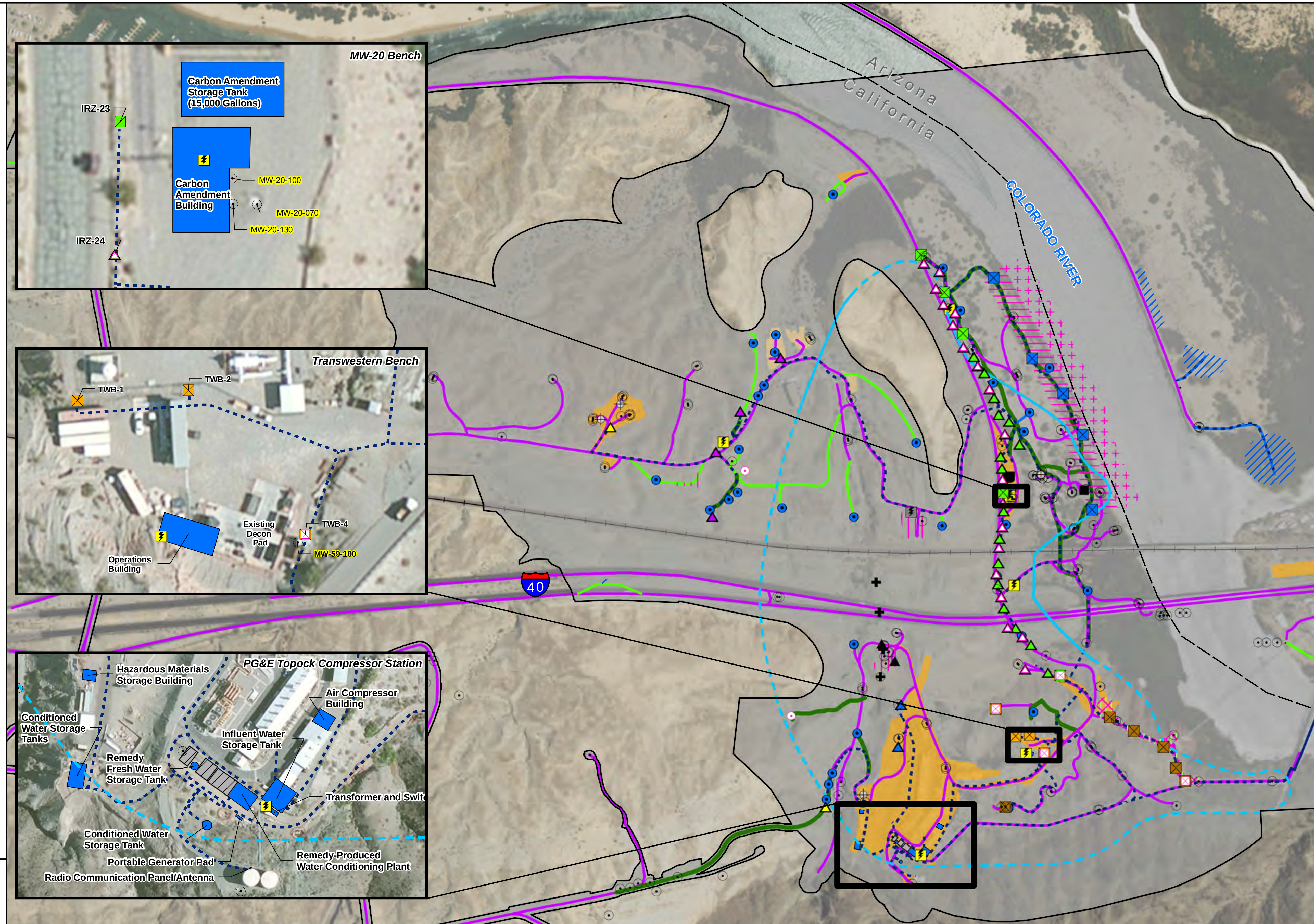

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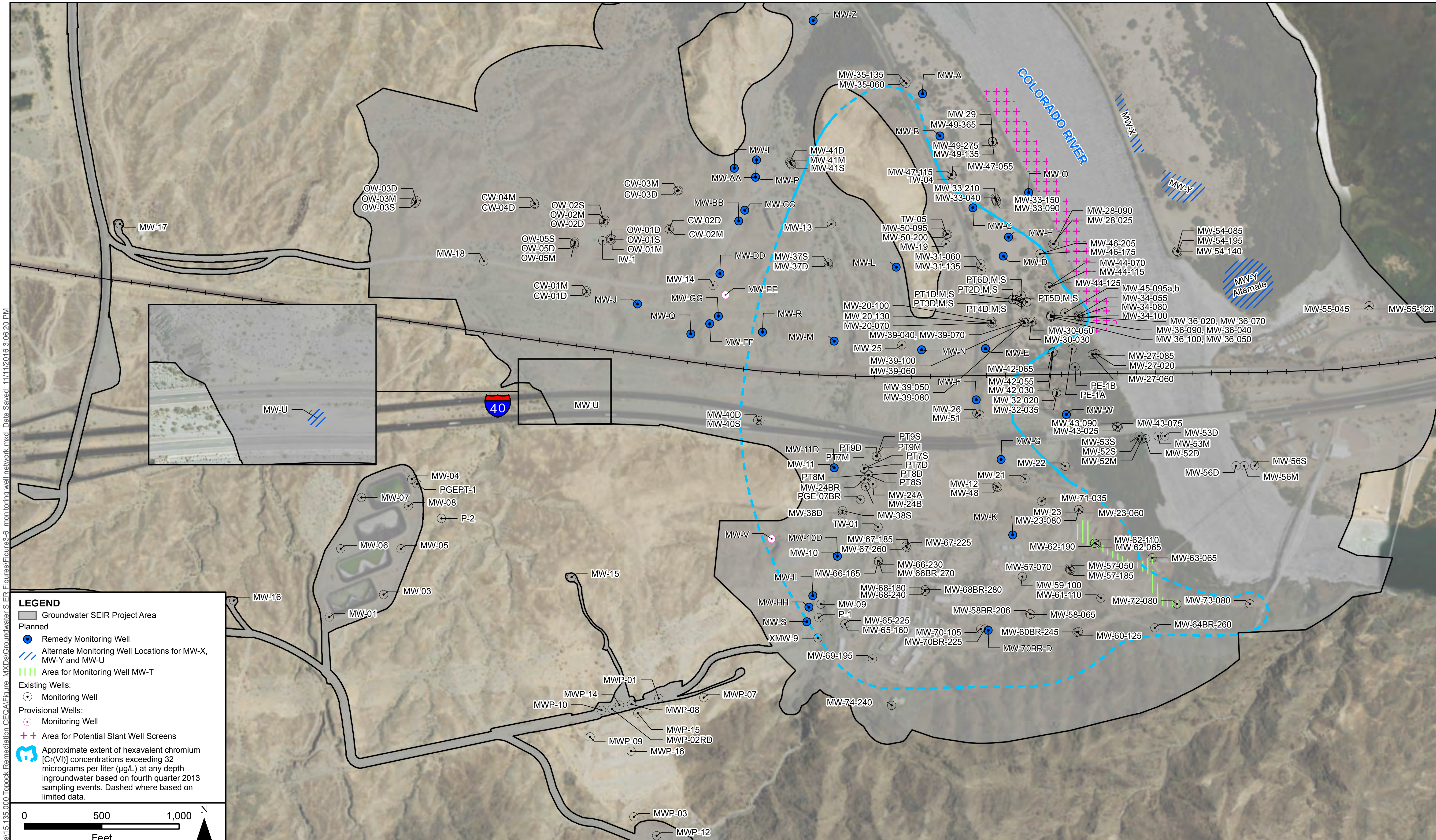
Final Groundwater Remediation Project SEIR
Map Creation Date: 12/12/2016 Sources: ESRI Aerial, PG&E 2015

Final Groundwater Remedy Project Components in California

Figure 3-5

ESA
North State Resources



Final Groundwater Remediation Project SEIR

Map Creation Date: 12/15/2016 Sources: ESRI Aerial, PG&E 2015

Monitoring Well Network

Figure 3-6

ESA

North State Resources

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3.6.1.9 Fluid Conveyance, Utilities, Buildings, and Roadways

The Final Groundwater Remedy Project would require pipelines to transfer freshwater, remedy-produced water (untreated and treated), and carbon substrate-amended water throughout the Project Area. Other utilities and supporting facilities would be needed to ensure proper operations and include electrical power, monitoring and control systems (Supervisory Control and Data Acquisition (SCADA)), and security, as well as access roadways, operator's facilities, equipment and materials storage, equipment maintenance and testing areas, office space, bathrooms, and one on-site laboratory at the Remedy-Produced Water Conditioning Plant. A summary comparison between the Groundwater FEIR estimates and the Final Remedy Design lengths and areas is presented below in **Table 3-2**. The following sections describe these components of the Project.

TABLE 3-2
SUMMARY OF NON-WELL INFRASTRUCTURE

Infrastructure Component	Groundwater FEIR Estimate	Final Remedy Design	Future Activity Allowance
Fluid Conveyance Piping and Trenches	50,000 linear feet	127,500 linear feet of piping in 43,200 linear feet of trenches	31,875 linear feet of piping in 10,800 linear feet of trenches
Electrical/Communications Conduits and Trenches	50,000 linear feet	124,000 linear feet of conduits in 43,200 linear feet of trenches	31,000 linear feet in the same 10,800 linear feet of trenches listed above
Natural Gas Pipeline at TCS Evaporation Pond	Not envisioned at that time	670 feet	None needed
Buildings and Structures	100,000 square feet	42,000 square feet	10,500 square feet
Roadway Improvements	6,000 linear feet	8,150 linear feet (new) and 4,060 linear feet (improvements to existing)	2,038 linear feet (new) and 1,015 linear feet (improvements to existing)

SOURCE: CH2M Hill 2015a.

Fluid Conveyance Piping and Trenches

As previously described, the Final Groundwater Remedy Project would include multiple fluid conveyance pipelines and use an existing wastewater pipeline to the TCS Evaporation Ponds. In total, the Final Remedy Design includes approximately 43,200 linear feet of trenches for fluid conveyance piping (about 8.2 miles) with most of the conveyance piping placed belowground in trenches. Trenches may range from 3 to 22 feet wide, typical trench dimensions would be 6 to 8 feet wide by 3 to 4 feet deep.

To minimize the length of trenches, multiple pipelines would be placed within the same trench. The trenches would contain approximately 92,000 feet for fluid conveyance piping (including 4.9 miles of freshwater conveyance piping previously described), 29,000 feet of spare pipes, 1,400 feet of piping at Moabi Regional Park facilities, 4,900 feet for future Moabi Regional Park utility connections, and 200 feet of sampling tubing for certain monitoring wells, for a total of 127,500 feet of fluid piping. An additional allowance of 25 percent additional liquid conveyance piping (approximately 32,000 linear feet or 6 miles) and belowground trenches (approximately 10,800 linear feet or 2 miles) is included in the SEIR evaluation as part of the Future Activity Allowance. This is an increase over the 50,000 linear feet (9.5 miles) of fluid conveyance pipelines analyzed in the Groundwater FEIR.

Electrical/Communications Conduits and Trenches

Electric conduit and fiber optic conduit would be installed to supply communication and power to pumps and instrumentation associated with the Final Groundwater Remedy Project and would typically be installed underground along the same alignments as fluid conveyance piping. Wherever feasible, trenches would be dug to place conduits underground, which would reduce wear from weather and vandalism. Power conduits would be buried in underground trenches at a minimum depth of 18 inches to 36 inches, depending on voltage. If required in order to avoid conflicts with other utilities, power conduits may have to go deeper; typical vertical separations from pipes and other utilities would be 6 to 12 inches.

In most cases, the conduit would be placed within the same trenches discussed for the fluid conveyance piping and would consist of approximately 80,900 feet for electrical/fiber optic conduit, 15,450 feet of spare conduit, 4,700 feet of conduits at Moabi Regional Park facilities, 23,000 feet of conduits for future monitoring well telemetry system, for a total of 124,000 feet of conduits. An additional allowance of 25 percent additional electric and fiber optic conduit (approximately 31,000 linear feet or 6 miles) is included in the SEIR evaluation as part of the Future Activity Allowance. This is an increase over the 50,000 linear feet (9.5 miles) analyzed in the Groundwater FEIR (see Table 3-2).

Electrical Power Supply

The Groundwater FEIR estimated a demand of 1.6 million kilowatt hours (KWh) of electricity annually. The Final Remedy Design estimates a higher demand of electricity of up to 7.82 million KWh annually (an increase of 6.22 million KWh annually) during the operations phase; energy use during the construction phase would be lower. The increase in power demand is primarily due to the development of system details that were not included in the Groundwater FEIR, such as the TCS Recirculation Loop, the FWPTS, the TCS Evaporation Ponds, and the Moabi Regional Park facilities.

For the Final Groundwater Remedy Project, the primary power supply source for the remedy facilities in California would be power provided by the Station. The power supply at the Station would provide up to 5.12 million kWh/yr to power the remedy systems, including improvements at the TCS ponds (0.020 million kWh/yr), and would be supplemented by two new 480 volt natural gas generators with new switchgear that would be housed in the existing Auxiliary Building. The new generators would be fully integrated into the Station power supply. The estimated amount of natural gas is 1,160,000 million SCF over the remedy operations period of 30 years.

Power for the Construction Headquarters would be provided by the City of Needles Electric Department via an existing overhead service line that runs to an existing water supply source for Moabi Regional Park, near the northwest corner of the Construction Headquarters. The IM-3 Facility also gets its electrical power from the City of Needles. From there, power will be routed underground to the Construction Headquarters utility pad where power distribution panels will allow use throughout the Construction Headquarters. There are no proposed power poles at the Construction Headquarters, however 93 305-watt photovoltaic solar panels are proposed at the workshop building and parking shade structure to provide additional power supply. A backup generator is included in the design to operate some functions at the Construction Headquarters when utility power is not available. Power for the Soil Processing Area would be routed from the existing overhead service line to the area via a new overhead distribution line. It is anticipated that the new overhead distribution will consist of 2 to 3 electrical poles in the area between the existing distribution line and the Soil Processing Area. Once inside the Soil Processing Area, wire will be run down the pole to a conduit and power distribution panel for use throughout the yard. The electrical load for the Moabi Regional Park facilities is estimated to be 1.3 million kWh annually during remedy construction and 0.85 million kWh during remedy operation. Annual kWh would be offset by use of the solar panels the Construction Headquarters, and at remote Arizona wells (described below), for an approximate total of 15,200 kWh.

The Mohave Electric Cooperative would supply power for the freshwater supply well in Arizona where there are 5 existing power poles at the Well HNWR-1A site and one pole at the Site B well site. An additional two power poles proposed at the HNWR-1A well site and one power pole proposed at the Site B well site (three total poles), however, would be necessary to bring the electrical line to the well locations. Power poles were not considered in the Groundwater FEIR. The Mohave Electric Cooperative will provide up to 1.4 million kWh/yr.

For improvements at the TCS Evaporation Ponds, the power supply for the new agitator and pumps would be provided by a new natural-gas-fueled reciprocating internal-combustion engine electrical power generator housed in a new enclosed utility building located within the TCS evaporation ponds fence line. Fuel for the generator would be provided via a new approximately 670-foot-long underground gas line brought in from the main line located south of the ponds. Power for auxiliary equipment (lighting, controls, sensors, security cameras, and valve actuators) would be provided by new 24-volt direct current thermoelectric generators within the fence line adjacent to the new utility building. The electrical load for the TCS Evaporation Ponds facilities is estimated to be 0.020 million kWh annually during remedy operation.

As described in the Groundwater FEIR, small solar panels would be installed to provide supplemental power to serve the electrical demands of remote smaller ancillary facilities. Photovoltaic solar panels are planned to be located at the workshop/sample-processing building and parking shade structure at the Construction Headquarters, as described above, and at select remote well locations to power well data recording instruments. Up to five 140-watt solar panels would be installed for monitoring at remote well locations in Arizona. The anticipated offset of energy from the grid by the planned solar panels at the Arizona wells and at the Construction Headquarters is approximately 15,200 kWh. In addition, a portable, rental backup generator would be mobilized as needed during Project implementation to provide power to temporary remote locations that do not need a permanent or long-term power supply. The Final Groundwater Remedy Project also includes a connection panel and reserved space for a portable rental generator to be located behind the Remedy-Produced Water Conditioning.

Buildings and Structures

At the time the Groundwater FEIR was prepared, the level of detail and location of planned buildings and structures for major equipment and key supporting functions for the groundwater remedy were not yet developed. The Groundwater FEIR assumed a maximum footprint of about 110,000 square feet for buildings and structures. Through the collaborative design and comment process and with the elimination of river intake structure, the consolidation of some remedy components into existing structures (e.g., power supply), the shared use of existing buildings (e.g., TCS hazardous material storage building), the optimization of the limited space available for new remedy infrastructures inside TCS, and the consolidation of carbon substrate structures (i.e., the elimination of TW Bench carbon substrate structures), the Final Groundwater Remedy Project includes up to 20,000 square feet of planned buildings and structures, approximately 15,000 square feet of new structures at the proposed Construction Headquarters/Long-Term Remedy Support Area to be located near Moabi Regional Park, and up to 7,000 square feet for vaults (wells, electrical)/aprons around stickup wells, for a total of up to 42,000 square feet. This is a decrease of 57,500 square feet associated with buildings and structures analyzed in the Groundwater FEIR.

The buildings and structures would be located in four main areas, namely the Station, the TW Bench, the MW-20 Bench, and the northwest area of Moabi Regional Park. **Table 3-3** provides a summary of proposed remedy buildings/structures for major equipment and key supporting functions.

All of the planned buildings and structures would be constructed in previously disturbed areas that can be accessed by existing roads. The Station, MW-20 Bench, and TW Bench areas are located on previously disturbed areas next to existing graded roads, and have been used to support various field and Interim Measure activities since 2004. The northwest area of Moabi Regional Park is located on federal lands and on previously disturbed areas near the National Trails Highway, an existing paved road.

TABLE 3-3
REMEDY BUILDINGS AND STRUCTURES

Compressor Station	**TW Bench**	**MW-20 Bench**
• Existing Auxiliary Building • Share use of Hazardous Material Storage Building • Remedy-Produced Water Conditioning Plant and associated tanks and chemical storage (see Section 3.6.1.5.) • Equipment decontamination pad • Remedy freshwater storage tank	• Operations Building • Fence around the TW Bench • Existing equipment decontamination pad (reuse) • Security equipment (fencing, cameras, intrusion alarms, card readers, etc.) • Stormwater catch basins • Septic waste tank • Electrical equipment concrete pad	• Carbon Amendment Building and Carbon Storage Tank for NTH IRZ and IRL • Truck loading/unloading station • Existing storage tanks (reuse three large, heavy gauge steel “frac” tanks) • Security equipment (fencing, cameras, intrusion alarms, card readers, etc.)
Facilities within Moabi Regional Park	**TCS Evaporation Ponds**	
• Workshop/sample processing building • Parking shade structure • Covered rest area • Equipment decontamination pad • Utility pad • Office and training facilities, conference room, restrooms • Temporary office and contractor trailers within laydown areas. • Two buried septic tanks • One buried remedy-produced wastewater tank • Security fencing and equipment • Provisional noise barrier • Equipment storage area; portable contractor office trailers, tool storage containers • Truck waiting area • Soil Processing Area/Clean-Soil Storage Area • Informational Outreach Center	• New drip systems for ponds 3 and 4 • Pond observation cameras • New valves on discharge points • Utility building/Fenced area adjacent to the Utility building Concrete containment pad for water truck loading station	

SOURCE: CH2M Hill 2015a.

Most of the items listed above in Table 3-3 have been previously described, as indicated in the table. The following sections provide additional details for proposed buildings and structures from Table 3-3, including the Existing Auxiliary Building, the TW Bench, MW-20 Bench, and the Construction Headquarters/Temporary Construction Laydown Area/Long-Term Remedy Support Area.

Compressor Station

Existing Auxiliary Building

The new power generators required for the Final Groundwater Remedy Project would be housed in the existing Auxiliary Building at the Station, which currently houses air compressors, generators, and switch gear equipment (see Figure 3-5). Separate from this Project, the Station has decided to construct a new building for its air compressors, which resulted in the existing air compressor space in the auxiliary building being available to house the generators needed for the Project. This modification is a separate PG&E project as part of the operation of the Compressor Station, but it is considered in the cumulative analysis and presented here for completeness.

Hazardous Materials Storage Building

The Station has an existing Hazardous Materials Storage Building located along the western side of the Station (see Figure 3-5). This building is used for storage of hazardous waste. The Project would share the existing use of this building for storage of hazardous waste generated by the Project. PG&E does not plan to use the Hazardous Materials Storage Building for management of non-hazardous wastes generated by remediation activities.

TW Bench

The TW Bench area is currently used to support various field and IM-3 Facility activities, ongoing groundwater and surface water sampling activities, well drilling activities, equipment decontamination activities, soil sampling activities, temporary waste management activities, and various field surveys to collect baseline data. The TW Bench currently houses a field trailer, a decontamination pad, and several large, metal, cargo containers (conex boxes) for temporary storage. These facilities are regularly used by the groundwater and surface water sampling crew, PG&E staff, and field personnel/staff on-site for ad hoc field tasks. In addition to PG&E's use of the TW Bench area, Transwestern has been operating its metering station on the northernmost portion of the bench since 1991.

As shown in Figure 3-5, a new approximately 2,200-square-foot Operations Building would be located at the TW Bench to house certain supporting functions for long-term operation and maintenance of the Final Groundwater Remedy Project (programmable logic controllers, uninterruptible power supply, communications, Remedy SCADA system, Operator Interface Terminal systems, etc.). Space would be reserved in the Operations Building for a small drinking water system (approximately 2,000 gallons per day capacity) to provide drinking water for operators/crews and visitors. The existing decontamination pad would be reused. One 10,000-gallon underground septic waste tank would be installed. One electrical equipment concrete pad (approximately 240 square feet) would be installed to provide support for electrical equipment housings. The TW Bench would also include stormwater catch basins. The TW Bench would be secured with a fence and appropriate security measures.

MW-20 Bench

The MW-20 Bench area has been used to support various field and IM activities since 2004. Currently, a portion of the MW-20 Bench is used to house IM equipment and to support IM operations (e.g., extraction wells, an electrical room, three frac tanks, and a truck loading/unloading facility). There is fencing around the equipment area and nighttime lighting for health and safety and security purposes. The remaining portion of the MW-20 Bench is used for vehicle parking and equipment staging, and provides an alternative access route around the fenced facility.

As described in Section 3.6.1.1 and shown in Figure 3-5, the buildings and structures within the MW-20 Bench area include the planned Carbon Amendment Building and the Carbon Amendment Storage Tank, the reuse of the existing three 20,000-gallon frac tanks and 960-square-foot truck loading/unloading containment pad, and the installation of appropriate security measures (e.g., fence, cameras, intrusion alarms, and card readers).

Facilities near Moabi Regional Park

Construction Headquarters and Long-Term Remedy Support Area

The Construction Headquarters and Long-Term Remedy Support Area are new components that were not included or analyzed in the Groundwater FEIR; they are shown in **Figure 3-7a** and **Figure 3-7b**. They would be located within an area that was identified in the Groundwater FEIR as a potential location for one or more freshwater wells to be used in the remedy. The fenced facilities would be approximately 1.85 acres in size. The temporary construction laydown area would be approximately 1.05 acre in size. The construction laydown area would serve as the primary location for the mobilization and management of equipment, supplies, and site workers/contractors to and from the Project Area. The Construction Headquarters would function as PG&E's main area for construction oversight and support during construction. Following construction completion, a portion of this area (approximately 0.8 of the 1.85 acre) would function as an operation and maintenance support area for the lifetime of the groundwater remedy (referred to as the Long-Term Remedy Support Area). Key features of the Construction Headquarters and Long-Term Remedy Support Area include:

- Workshop/sample processing building with sample processing rooms, and restrooms – approximately 3,000 square feet of floor area, 23 feet tall.
- Parking shade structure – approximately 2,100 square feet, 10 to 12 feet tall.
- Covered rest area – 20 feet by 20 feet.
- Equipment decontamination pad – approximately 1,400 square feet.
- Utility pad (electrical generator/transformer, 15,000-gallon fire water tank, two 5,000-gallon potable water tanks) – approximately 1,000 square feet.
- PG&E office, consultants, and restroom trailers – approximately 6,000 square feet.
- Primary power would be supplied by City of Needles Electric Department via an underground feed from a utility pole to a transformer located on the utility pad (this remains an assumption until final installation from the City of Needles). Backup power would be provided via an on-site diesel generator. These facilities may be connected in the future to sewage and domestic water systems within Moabi Regional Park.
- Temporary office and contractor trailers within laydown areas.
- Two buried septic tanks – 10,000 gallons each and 8 feet diameter by 31 feet 6.5 inches long

each. The tanks are connected to the PG&E office trailer, men's and women's restrooms, and workshop building (restrooms and shop sink). An odor-neutralization system would be installed on the tank vent line to mitigate odors.

- One buried remedy-produced wastewater tank – 1,000 gallons.
- Security provisions – perimeter fencing with gates equipped with chains and locks, security cameras, and alarm system/yard lighting.
- Provisional noise barrier – 6 to 20 feet tall.

Temporary Construction Laydown Area

The temporary construction laydown area would be used by construction contractors over the duration of Final Groundwater Remedy Project construction. At least six lots would be provided in the temporary construction laydown area for the staging of contractor-provided trailers; each lot would include connections to the Construction Headquarters electric power supply and fire protection. In addition, fencing that meets PG&E's security standards (approximately 6 to 7 feet tall) would be installed to completely enclose the area.

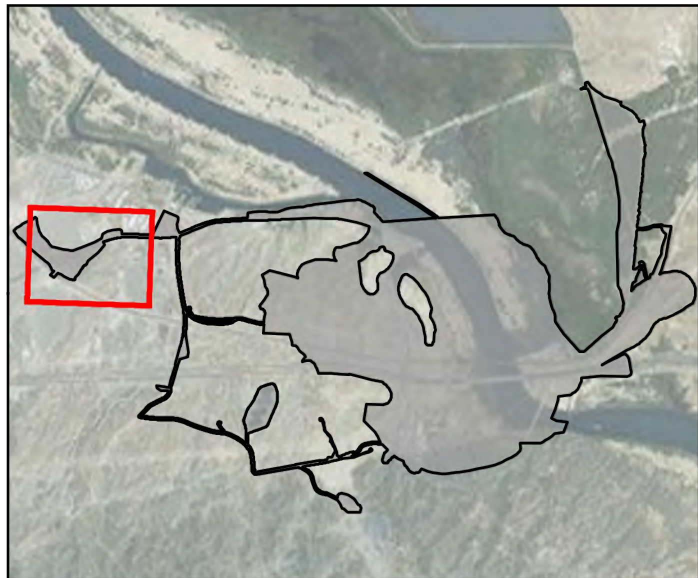
Other anticipated features would include temporary facilities (e.g., portable contractor office trailers, tool storage containers such as conex boxes), construction materials, and construction equipment that would be removed following construction completion.

The construction laydown area would serve as the primary location for contractor site offices and for the mobilization and management of equipment (drill rigs, excavators, backhoes, cranes, etc.), materials/supplies (pipes, valves, transformers, well materials, etc.), and site workers/contractors (inspectors, supervisors, superintendents, construction workers, etc.). Unaccompanied access to the temporary construction laydown area would be restricted to construction personnel who have completed required site health and safety training and are equipped with the required personal protective equipment.

Soil Processing Area/Clean-Soil Storage Area

Soils/materials displaced during construction activities would be brought for staging, processing, and potential reuse at the proposed 2.68-acre Soil Processing Area. Import material for use in construction may also be temporarily staged in this area. The estimated storage capacity is 11,700 cubic yards, the estimated volume to be generated during construction is 11,000 cubic yards for clean soil, and 4,000 cubic yards for soil above screening levels (but below hazardous waste levels). The up to 11,300 cubic yards of soil resulting from implementation of the Future Activity Allowance could be accommodated at the Soil Staging Area assuming soil is stockpiled in an efficient and deliberate manner. Soil could also be stored in the temporary construction laydown area, as needed. The Soil Processing Area layout includes:

- Separate staging/storage areas for construction-generated soil (pre-processing) and screened material (post-processing).
- An area where material can be processed (screened/crushed) for on-site use.
- A staging area for any material rejected during the screening process.



LEGEND

- Groundwater SEIR Project Area
- Provisional Noise Barrier
- Fenceline
- Future Potential Fire Water Connection
- Future Potential Sanitary Sewer Connection
- Future Potential Water Connection
- Potential Electrical/Telecommunication Connection
- Contractor Laydown Area
- Equipment Decontamination Labs, Maintenance Storage and Support Area (Long Term)
- Soil Processing Area

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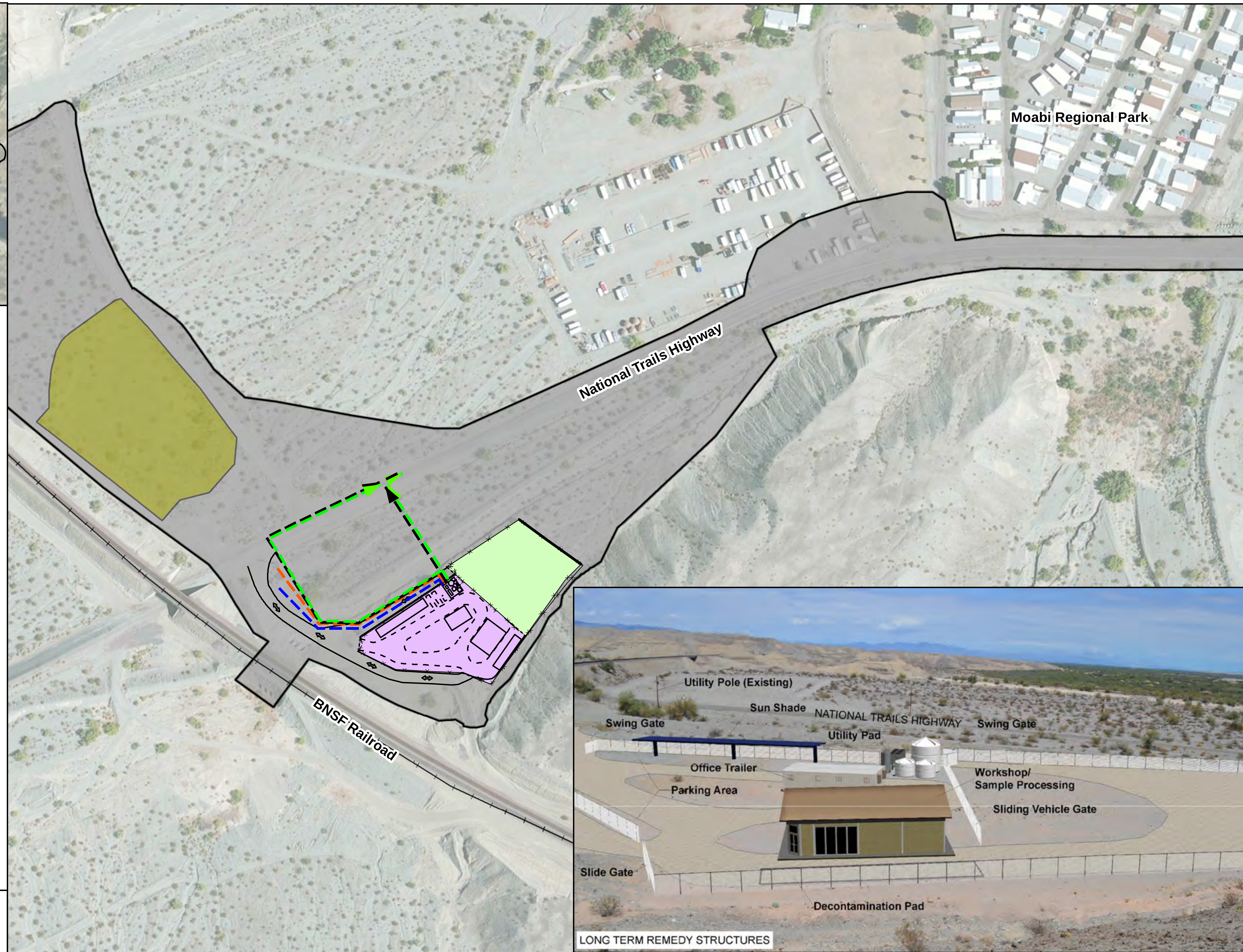

Final Groundwater Remediation Project SEIR

Map Creation Date: 11/11/2016 Sources: ESRI Aerial, PG&E 2015

General Remedy System Layout- Moabi Regional Park

Figure 3-7a

ESA North State Resources

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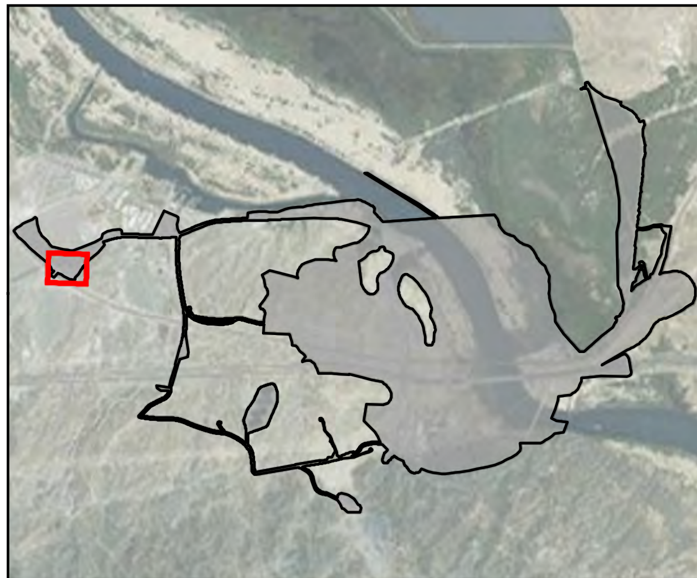

LEGEND

- Groundwater SEIR Project Area
- Provisional Noise Barrier
- Future Potential Fire Water Connection
- Future Potential Sanitary Sewer Connection
- Future Potential Water Connection
- Potential Electrical/Telecommunication Connection
- Fenceline
- Temporary Contractor Laydown Area (1.05 acres)
- Long Term Remedy Support Area (0.8 acres)

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Feet
N

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Final Groundwater Remediation Project SEIR
Map Creation Date: 11/11/2016 Sources: ESRI Aerial, PG&E 2015

Construction Headquarters and Long-Term Remedy Support Area

Figure 3-7b

ESA
North State Resources

- A staging area for imported material.
- A truck waiting area would be established just outside the entrance of the Soil Processing Area near the truck access road.

While these are anticipated to be the primary features of the Soil Processing Area, the final layout would be determined by the construction contractor, consistent with any applicable mitigation measures or conditions of approval. The Soil Processing Area may include a 20-foot by 20-foot shade structure to provide a covered rest area for on-site personnel. An elevated water tank would be employed to provide water for dust control. Water would be transported to the Soil Processing Area (e.g., filled from the main potable water tanks at the Construction Headquarters or other construction water source) to fill the elevated water tank. In addition, connection to the City of Needles electrical utility would be provided via an overhead feed from a nearby existing power pole to a new pole installed just outside the fenced yard.

Active equipment in the Soil Processing Area (e.g., soil screening unit, crushers, loaders, dump trucks/trailers) is expected to only be needed during Final Groundwater Remedy Project construction. At the onset of construction activities, the Soil Processing Area may be used as a temporary location for staging of construction equipment and office/construction trailers before they are moved to/located in the Construction Headquarters. This area may continue to be used as a location for storage of clean soils. Clean soils may also be used in this location as fill material, at the landowner's or land manager's request.

Informational Outreach Center

An Informational Outreach Center would be located at the entrance of Moabi Regional Park to provide residents and members of the public information about construction activities associated with the Project. The Informational Outreach Center would consist of a trailer of similar size to existing trailers in Moabi Regional Park. The Informational Outreach Center would be staffed with one person to provide information and would be available through the construction phase, and may remain open for inquiries during the initial operation phase depending on the community need.

TCS Evaporation Ponds

As previously noted, the existing TCS Evaporation Ponds may be used to dispose of some of the remedy-produced water. The water would be evaporated over time. The ponds are lined and designed to prevent leaks. Under some circumstances, the existing capacity of the ponds may be inadequate. The ponds would be upgraded with the following improvements:

- Existing ponds 3 and 4 would be equipped with new drip systems and agitators to increase the evaporation rate.
- Cameras would be installed to enable remote monitoring of the pond levels.
- New valves would be placed on top of the discharge points to remotely control filling.
- One one-story 17-foot by 25.3-foot (430 square feet) by 12-foot-tall masonry utility building would be constructed adjacent to the two southernmost ponds at the TCS Evaporation Ponds

to house the new natural-gas-fueled reciprocating internal-combustion-engine electrical power generator.

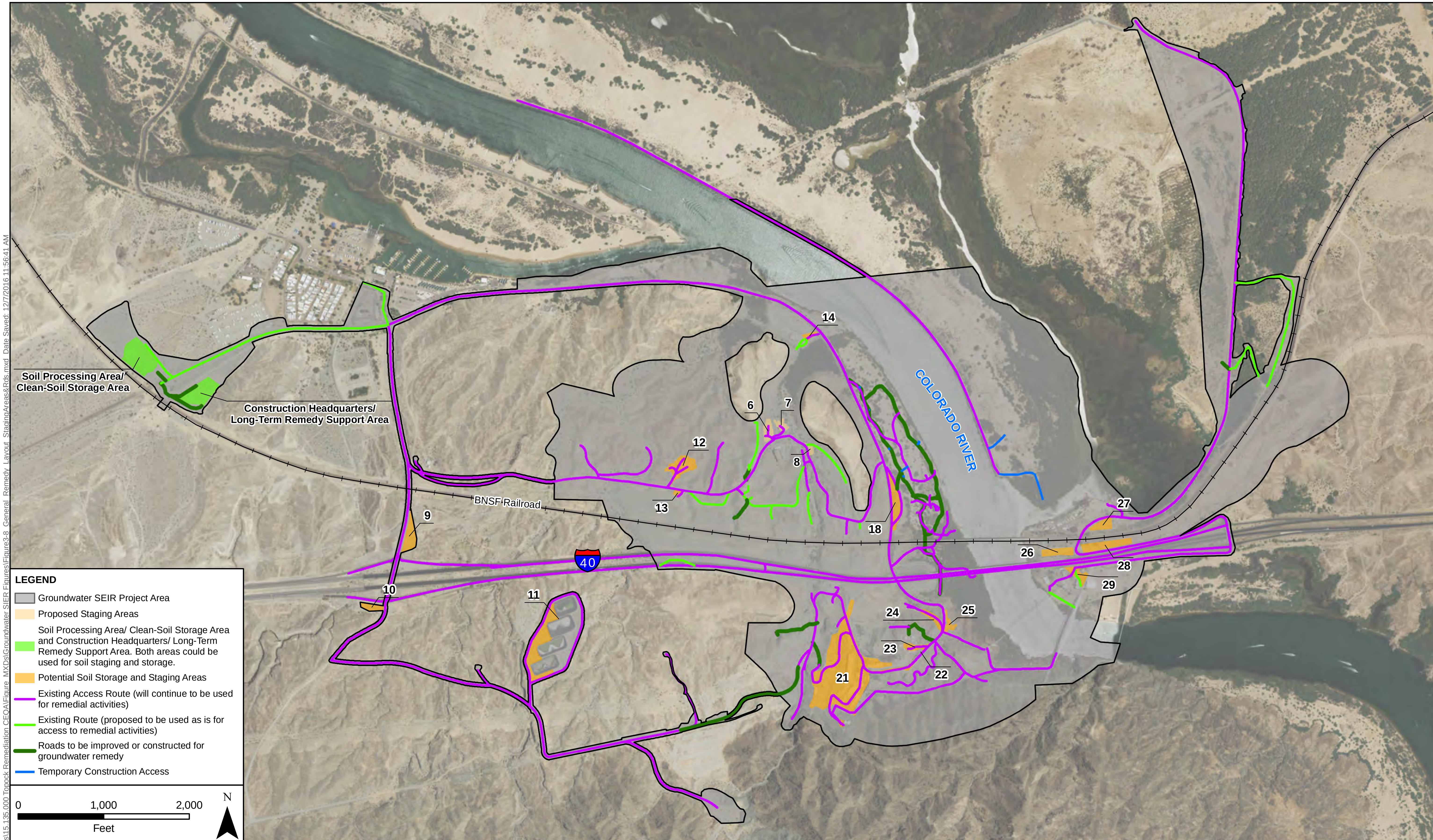
- One fenced area (approximately 500 square feet) next to the utility building would be constructed to house the thermoelectric generators.
- Containment area for truck loading at TCS Evaporation Ponds of about 800 square feet.
- Natural gas would be piped to the facility from the existing PG&E Line 300B to the utility building with a regulator and isolation valves.

With these improvements, the evaporation rate would be increased to accommodate the additional water.

Roadways

There would be two types of access roads that would be used as part of the Final Groundwater Remedy Project: temporary access roads used for construction and long-term access roads used to regularly operate and maintain the proposed Project. An existing road network consisting of maintained dirt roads and some paved roads for accessing the existing network of monitoring wells currently runs throughout the Project Area. This road network would be used where feasible for construction and operation of the Final Groundwater Remedy Project; however, additional roads would be required, as shown in **Figure 3-8**. A maximum of 8,150 linear feet (1.54 miles) of new roads would be needed throughout the Project Area, for both construction and long-term operation and maintenance of the Final Groundwater Remedy Project. An additional allowance of 25 percent additional roads (approximately 2,038 linear feet) is included in the SEIR evaluation as part of the Future Activity Allowance. In addition, 4,060 linear feet (0.76 miles) of improvements consisting of limited grading and drainage improvements would occur on existing roads east and west of Bat Cave Wash to Well FW-2 (approximately 2,000 feet) and access to the Construction Headquarters area (approximately 2,060 feet). The Project would result in a total of 12,210 linear feet of roadway additions or improvements. This is in comparison to the 6,000 linear feet of roadway improvements analyzed in the Groundwater FEIR.

Access roads would be graded to create a smooth surface and proper drainage. The construction of new roads and improvements of existing roads would result in the disturbance of approximately 11,000 cubic yards of soil. With an additional allowable increase of 25 percent, soil disturbance would be up to 13,750 cubic yards). This is an increase over the 4,600 cubic yards of soil disturbance associated with road construction analyzed in the Groundwater FEIR. The roads would be maintained throughout the operation and maintenance period of the Final Groundwater Remedy Project. Following determination that the remedial or monitoring structure is no longer needed, the road would be closed and restored to pre-Project conditions.



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Final Groundwater Remediation Project SEIR

Map Creation Date: 12/12/2016 Sources: ESRI Aerial, PG&E 2015

Staging Areas and Roadways

Figure 3-8

ESA

North State Resources

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As shown in Figure 3-8, the following improvements would be needed to construct and service the remedy infrastructure:

- Well IRL-4 – This well would be located at the bottom of a ravine, in the upland area just north of the BNSF tracks. A new, engineered road would be built to access and service this well, the nearby monitoring well, and associated conveyance piping. In addition, a portion of the ravine bottom would be partially filled in to create a sturdy, flat area with adequate work space for wells installation; well maintenance and sampling activities during remedy operations; and future decommissioning of these wells and associated conveyance piping. The new road would connect to the Southern California Gas Pipeline access road.
- Well IRL-2 – An existing road would be modified to service this well and associated conveyance piping and MW-I, located in the upland area west of the IM-3 Facility. Specifically, the connection from this road would be improved to connect to old Route 66.
- Floodplain Road, also referred to as the Ring Road (NTH IRZ and RB extraction wells) – A new gravel road would be built in the floodplain to construct and service the NTH IRZ and RB extraction wells, including future provisional wells and associated conveyance piping. This gravel road would form a loop around the floodplain and connect to MW-20 Bench and NTH. The length would be about 6,610 feet.
- TW Bench Area – The parking lot would be paved and a new gravel access road would be constructed north of the TW Bench to accommodate for shared use of the bench and to allow for access to and from Transwestern's equipment during the construction, operation, and maintenance of remedy facilities at the bench. The road would travel east of the TW Bench to allow for access to Transwestern's gas transmission equipment. The length would be about 490 feet.
- FW-2 Road – Improvements would be made to about 1,300 linear feet of existing roads located west of Bat Cave Wash to Well FW-2.
- Pipeline I Road – Improvements would be made to approximately 700 linear feet of existing road located east of Bat Cave Wash.
- MW-V Provisional Well – Approximately 500 feet of road access to this provisional well would be established from Bat Cave Wash to the well location. An existing abandoned 34-inch gas pipeline and berm would be removed to allow for the construction.
- Construction Headquarters Area and Soil Processing Area – About 2,060 linear feet of road improvements would be made for access to the Construction Headquarters area.

Access roads would be provided to allow regular operation and maintenance of remedy system components. In some locations, access roads and pipelines may share the same alignment, with the pipeline being installed adjacent to or underneath the access road.

For new access roads, routes would be graded and drainage systems would be established if necessary. In addition, grading near well vaults or aboveground structures may be necessary to enable maintenance vehicles to reach the well and perform necessary work. Roads would be built with materials sourced from the site based on balancing cut and fill and imported fill.

Fill Materials

A total of about 16,000 cubic yards of fill materials would be required for roads, trenches, and foundations (PG&E 2016). The fill material types and sources are listed below. The off-site sources of fill materials are assumed to be within 60 miles of the Station.

- Sand backfill: 6,000 cubic yards imported, 4,000 cubic yards on-site sources
- Gravel backfill: 11 cubic yards imported
- Aggregate base: 2,900 cubic yards imported
- Crushed rock: 7,000 tons (about 3,500 cubic yards) imported
- Embankment soil: 3,200 tons (about 2,462 cubic yards) on-site sources

With an additional 25 Percent Future Project Activity Allowance of 4,000 cubic yards, the total estimate for fill materials is 20,000 cubic yards.

3.6.1.10 Monitored Natural Attenuation

Because of the heterogeneity of the aquifer, it is anticipated that different portions of the aquifer will achieve the RAOs at different times, and that the shape and extent of the plume will change and diminish over the decades-long treatment period. The Final Groundwater Remedy Project includes monitored natural attenuation to address residual Cr(VI) that may remain in recalcitrant (difficult to treat) portions of the aquifer following the active treatment and flushing activities. Monitored natural attenuation uses naturally-occurring processes in the aquifer to continue to reduce the concentrations of Cr(VI) dissolved in groundwater to the less soluble Cr(III), which precipitates out of solution.

The decision to use monitored natural attenuation on specific areas of the plume would be made by DTSC and DOI during future evaluations, such as the 5-year reviews, and would be based on the types and options of active treatment system adjustments that could be made, the effectiveness of the treatment systems as of that date, and the location of proposed monitored natural attenuation areas relative to natural reductive zones in the aquifer. The effectiveness of monitored natural attenuation would be monitored using the monitoring network. The process would continue until the RAOs have been achieved.

3.6.1.11 Institutional Controls

Institutional controls are non-engineering mechanisms, such as legal or contractual restrictions on property use, which are used to help minimize the potential for human exposure to contamination and/or protect the integrity of a remedy. Institutional controls can be imposed by authorized agencies (such as DTSC). Institutional controls were a part of the description of the Project in the Groundwater FEIR and would be implemented in the Final Groundwater Remedy Project. They generally do not involve ground disturbing activities. The target timeframe for having the institutional controls in place is prior to remedy construction. It is anticipated that most of these controls would remain in place for the duration of the remedy and until the RAOs are achieved.

An RAO for the final groundwater remedy is to prevent ingestion of groundwater with Cr(VI) levels in excess of the regional background concentration of 32 μg/L as a potable water source. This RAO would be achieved by prohibiting the installation of potable water wells within the plume area until concentrations within the plume are below the cleanup goal, unless DTSC and DOI determine such prohibition is not necessary. Additionally, there are currently no known municipal or private wells in the chromium plume area. The Final Groundwater Remedy Project includes pumping and injecting groundwater to maintain hydraulic conditions so that the chromium plume moves through the treatment zone in the designed direction and at the designed rate. Pumping groundwater is a critical element of the remedy and thus needs to be protected whether it involves pumping from extraction wells in California or the freshwater supply well(s) in Arizona. Satisfactory performance of the remedy depends upon the control of groundwater flow directions and the gradients necessary to contain and remediate the chromium plume. The remedy also includes several physical elements (wells, pipelines, facilities, etc.) that would need to be protected to ensure that the RAOs can be met.

3.6.2 Description of Construction Activities

3.6.2.1 Overview of Construction Activities

The following provides a general description of the construction activities needed to implement the Final Groundwater Remedy Project. Where available, comparisons to the original assumptions used in the Groundwater FEIR are provided and additional new information based on the Final Remedy Design is also included.

Construction and treatment system start-up activities for the Final Groundwater Remedy Project would occur in two phases requiring a total of about 4.5 years, including construction closeout. The first phase would include the construction and start-up of the NTH IRZ and components needed to operate the NTH IRZ (about 2.5 years); the second phase would include the construction and start-up of the remaining groundwater remedy system (about 2 years). The construction closeout activities would occur during the second year of Phase 2 and would include generating as-built documents and other reports, surveying final elevations (e.g., well heads), soil stabilization of disturbed areas, demobilization of materials and equipment, and site inspections (e.g., biological monitors). Some limited construction closeout activities are expected to occur following Phase 1 construction and prior to the start of Phase 2, and task-specific demobilization of equipment, personnel, and materials as well as stabilization of disturbed areas will occur on an ongoing basis as field work is complete. The length of time required for construction is dependent on a number of factors, including the geologic conditions encountered during well installation, the time required for regulatory and landowner approvals, and the availability of construction labor and materials at the time of construction. In addition to this initial construction period, provisional wells and associated infrastructure, if needed, could be constructed during Phase 1, Phase 2, or the operation and maintenance period, depending on the response of the plume.

The proposed Project analyzed in this SEIR includes a Future Activity Allowance which could occur during the construction and/or operation and maintenance phase. During construction, activities associated with the Future Activity Allowance could include the 25 Percent Potential Allowance for Project components identified in the Final Remedy Design. Activities included in the Future Activity Allowance could include short-term immediate Project modifications made with concurrence from the parties in the field, and long-term modifications that are anticipated by PG&E far enough in advance such that a design or workplan for the feature (well, new segment of pipeline, etc.) would be possible, with appropriate review by stakeholders. All activities conducted under the Future Activity Allowance, as needed, will be tracked by PG&E and DTSC to maintain accurate levels of components installed under this allowance.

3.6.2.2 Construction Power and Lighting

Construction power would be supplied by portable generators whenever existing utility power is not readily available near the point of use. Approximately 6 portable generators would be operating simultaneously over an average work day, and 11 portable generators on a maximum-intensity work day. Types of portable generators that could be used include a 5,000 watt portable generator with hour meter or a 6,800 watt electric-start gas-powered portable generator. Types and models would be chosen directly by the construction contractor. With the exception of security lighting in the Construction Headquarters area, temporary lighting would be supplied by portable generators and lights, as needed and consistent with any applicable mitigation measures and conditions of approval. While night work is not planned as part of routine construction activities, it may be determined that limited circumstances require the continuation of work into the nighttime periods because it cannot be disrupted or suspended (for example, special conditions during drilling or concrete pouring) or work may require an early morning start to ensure completion within 1 day or because of heat constraints. For these special circumstances, nighttime construction lighting would be limited to active construction areas during nighttime or early-morning operations. To minimize lighting impacts, lighting would include shrouding or shielding for portable lights, the use of the lowest allowable height and fewest feasible numbers of lights consisting of downward-facing fixtures fitted with cutoff shields to reduce light diffusion. No permanent poles would be installed. However, lighting would also be required to comply with the minimum county, state, and federal security and safety standards.

3.6.2.3 Construction Traffic

Construction workers would be present on-site each day throughout the duration of construction. Heavy equipment would likely include drill rigs to install wells, trucks and excavators or backhoes to lay the pipeline network, and cranes to place control sheds and carbon substrate storage tanks. Trucks would be necessary for making deliveries and hauling waste from the site. For construction activities during a maximum work week, there would be 115 delivery truck trips to and from the work site and 560 worker vehicle trips to and from the work site per week. For functional testing, there would be 12 additional vehicles (4 technicians, 4 instrumentation specialists, and 4 engineers). Durations, staffing, and truck trips are summarized in Section 3.7.6, Task Durations and Staffing.

3.6.2.4 Soil Disturbance

Soil disturbance in the Project Area would occur with installation of extraction, injection, and monitoring wells; excavation of the new pipeline network; improvements to existing roads and construction of new roads; and construction of new buildings and supporting infrastructure. **Table 3-4** shows the total amounts of cubic yards of soil expected to be disturbed during construction. As shown in Table 3-4, the total amount of 45,200 cubic yards of soil would be disturbed. This would be more than three times the 13,400 cubic yards of soil disturbance analyzed in the Groundwater FEIR. With the additional 25 Percent Potential Allowance assumed for specific Project components identified in Section 3.6.1 as part of the Future Activity Allowance, the amount of soil disturbance would increase by approximately 11,300 cubic yards. The difference is primarily because the Groundwater FEIR underestimated the volumes for roadways, excluded drill cuttings, and did not include the Station, Moabi Regional Park, and Arizona soil disturbance areas associated with the freshwater supply sources because they were not reasonably foreseeable at that time.

The Final Remedy Design includes a contingency in the event that unanticipated soil contamination is discovered in utility trenches or at locations where wells are to be installed. Additional soil sampling and analysis would be conducted to identify the appropriate disposal of the soil. The soil would be separated and stockpiled at the Soil Processing Area pending receipt of the analytical results.

3.6.2.5 Water Usage

Drinking water to be used by personnel during construction would consist of bottled water purchased from off-site sources. Water for other uses during construction activities would be trucked/conveyed from the existing water system at the Station, or other water sources, to locations in the Project Area. Example uses for construction water include dust control, equipment decontamination, process water for well construction, development, and testing; hydrostatic testing of constructed pipelines; and other activities. As shown in **Table 3-5**, the maximum amount of water used during construction is estimated to be a total of about 72 acre-feet for all construction and IM-3 Facility decommissioning activities (not per year). With the Additional Activity Allowance, water use (primarily for construction-related uses of additional Project components) could, although unlikely, be up to 25 percent more, or approximately 18 acre-feet (for a total of 90 acre-feet). This is an increase over the 9.2 acre-feet of water use assumed in the Groundwater FEIR, and is due to the increase in overall disturbed areas, and an expanded assumption that active dust control would occur on all roads that handle construction traffic, including public roads. However, this volume of water is within PG&E’s allocation of 422 acre-feet per year and PG&E’s 300 acre-feet per year of excess capacity.

TABLE 3-4
SOIL DISTURBANCE IN THE PROJECT AREA

Location within the Project Area	Volume of Soil Disturbance (cubic yards) (*assumed in the Groundwater FEIR)*	Volume of Soil Disturbance[a] (cubic yards) (*revised Final Remedy Design estimates)*
Floodplain (includes MW-20 Bench and Ring Road)	3,400	11,000
Bat Cave Wash	1,400	500
Roadways (Excluding Ring Road)	4,600	11,000
Undisturbed areas	2,100	200
IRZ reagent storage tank	1,000	50
Well installation	900	5,600[b]
Topock Compressor Station	Not Included	4,530
Moabi Regional Park	Not Included	2,120
Arizona	Not Included	2,000
All future provisional well locations	Not Included	4,900[b]
Arizona - Pipeline B extension from HNWR-1A to Site B well	Not Included	2,600
Arizona - Wellhead improvements/civil work at Site B well	Not Included	200
TCS - Contingent Freshwater Pre-Injection Treatment System	Not Included	500
Total	**13,400**	**45,200**
Future Activity Allowance	**Not Included**	**11,300**
TOTAL SOIL DISTURBANCE		**56,500**

[a] Amount of soil excavation or drill cuttings
[b] Drill cuttings

SOURCE: Data provided by PG&E, February 17, 2015, February 26, 2016.

TABLE 3-5
MAXIMUM AMOUNT OF WATER USED DURING CONSTRUCTION

Types of Construction Water Uses[a]	Estimated maximum amount of water to be used during construction (acre-feet) — Remedy Construction: Phase 1	Remedy Construction: Phase 2	IM-3 Facility Decommissioning	Future Activity Allowance
Construction water for well installation, development, and testing[b]	3	2	0	1.2
Construction water for piping, utilities, vertical infrastructure, and access pathways[c]	35	29	2.1	16.5
Freshwater for functional testing	0.5	0.3	0	0.2
Freshwater for mitigation planting[d]	0.04	0.04	Minimal	0.02
Totals	**38.54**	**31.34**	**2.1**	**17.92**

NOTES:
[a] Water sources discussed in Sections 3.6.1.5 and 3.6.1.7.1 of this chapter
[b] 80 percent of this water would not be consumptive use because it will be re-injected into the aquifer during drilling. All injection testing water will be reused purge water during extraction testing.
[c] Most of this water would be used for dust control; a small amount would be used for soil compaction, equipment decontamination, and for hydrostatic testing of pipelines.
[d] Mitigation planting is to address potential plant impacts that cannot be avoided during remedy construction.

SOURCE: Data provided by PG&E, February 2015.

The sources of water for construction water supply in addition to the water trucked from the water tanks at the Station include:

- **Existing Station water supply system**. This supply would be accessed by a temporary storage and distribution system so interference with Station operations is minimized. The existing water supply pipe would be tapped and temporary aboveground pipes would convey water from the taps to temporary freshwater storage tanks staged in the vicinity of the turnout area outside east of the Station entry gate.
- **Existing freshwater supply well in Arizona (HNWR-1, HNWR-1A, Topock-2/-3, or Site B).** This supply would be accessed either at the wellhead (typically, to support construction in Arizona) or through Pipeline B once it is constructed. Water would be pumped from the well using either a temporary pump/power supply (generator) or using the remedy equipment and power supply once it is constructed. If present, existing pumps in the wells would be used. The power supply would be from the Mohave Electric Cooperative.
- **Treated water from the IM-3 Facility**. Treated water from IM-3 Facility would be accessed by the existing IM-3 Facility storage and distribution system, or using a temporary storage and supply system until the IM-3 Facility is turned off from service at the start of the remedy. This option would only be pursued following agency concurrence and DTSC approval of PG&E's evaluation of the potential total dissolved solids (TDS) impacts associated with the use of IM-3 Facility treated water for dust suppression during remedy construction control.
- **Existing water supply for Moabi Regional Park**. This water supply is included as a contingency and would only be accessed as determined necessary and as authorized by the

water supply operator. If implemented, a water supply station would be established in the Construction Headquarters area using a storage and distribution system.

- **Other commercially available supplies**. Construction water would be obtained, as necessary, from commercially available supplies including, but not limited to, Golden Shores Water Company and the City of Needles. Water would be transported to the site via truck.

Primary construction water supply tanks (typically 12,000-gallon overhead fill tanks) would be staged near the given water source. Typically, water trucks would be used to convey water from the water sources to the work areas to support field work and wet down vehicle traffic routes, as determined necessary to suppress dust; however, a temporary network of aboveground distribution pipes may be employed to convey water to the appropriate work areas, where feasible, to minimize the disturbance associated with water truck traffic. Secondary construction water tanks would be placed in the primary work zones or adjacent staging areas in California and Arizona to support construction in a given work area.

Consumptive water use during operations would consist of about 2.8 acre-feet per year (0.91 mg per year) of water to the TCS evaporation ponds, off-site disposal, and miscellaneous water use. Consumptive water use during decommissioning activities is anticipated to be similar to during construction activities.

3.6.2.6 Water Management

Construction and Start-Up

Wastewater would be generated during construction activities from well installation, development, testing, and sampling. In addition, other miscellaneous wastewater streams would be generated from equipment and vehicle decontamination, water from hydrotesting of conveyance piping, and rainfall that collects in secondary containment areas. The total volume of wastewater generated over the entire construction period is estimated to be approximately 25 MG. On-site reuse and disposal of wastewater generated during construction would be maximized. Water not managed on-site would be transported off-site to a permitted facility. On-site options are discussed in Section 3.6.3.3.

Management at IM-3 Facility and TCS Evaporation Ponds

The DOI's ARARs for the operation of IM-3 treatment and injection facilities authorize the disposal of groundwater generated during well installation, well development, and aquifer testing, and purged groundwater and water generated in rinsing field equipment during sampling events for the area-wide groundwater monitoring program at the IM-3 Facility. The lined TCS Evaporation Ponds receive cooling tower blowdown water and evaporate the water as part of normal Station operations. Solids are removed from the Ponds periodically and as needed. The Ponds are also operating under Waste Discharge Requirements issued by the California Regional Water Quality Control (RWQCB) Board. Discharge of remedy-produced water to the ponds would require coordinating capacity with the Station operations and authorization by the RWQCB.

On-Site Reuse

Water from hydrostatic testing of conveyance piping may be reused on-site for dust control, backfill moisture control, and other similar uses in accordance with the substantive requirements of the SWRCB Water Quality Order No. 2003-003-DWQ, Statewide General Waste Discharge Requirements for Discharges To Land With A Low Threat To Water Quality. The water generated from hydrostatic testing would be low volume discharges with minimal pollutant concentrations, and would not be reused in a manner that results in a discharge to waters of the United States or waters of the state. The volume and date of each reuse event would be documented.

Injection at Individual Wells During Well Testing

Following well installation and development, a well may be tested to evaluate its maximum injection flow rate. This hydraulic testing involves extracting water from the well, storing the water in portable tanks, then injecting the water back into the aquifer at the same or nearby well through a filter to remove particulate matter. Because chemical additives would not be used during these well testing activities, the water would be injected without additional characterization.

In addition, remedy-produced water would be generated during remedy start-up activities, such as backwashing of wells. This wastewater stream would be transported on-site via piping or trucking to the Remedy-Produced Water conditioning plant, conditioned by removing solids and adjusting the pH, and transported via piping to the IRZ wells for re-injection and/or discharge to TCS Evaporation Ponds. The conditioning plant is not designed for treatment of RCRA and non-RCRA hazardous waste. Only non-hazardous waste would be sent to the TCS Evaporation Ponds. The estimated total volume of remedy-produced water is approximately 7.6 MG per year. Water not managed on-site would be transported off-site to a permitted facility.

Operation & Maintenance

Different types of remedy-produced water (including spent solutions from CIP) require different management approaches. Multiple options are maintained to provide operational flexibility and reliability (see Section 6.1/Exhibit 6.1-2 [Waste Management Plan] of the O&M Plan [Volume 1 of the O&M Manual] for details). A major portion of the produced water would be conditioned in the remedy-produced water conditioning plant located inside of the Station. Certain waste streams generated by the remedy (e.g., first flush wastewater from well rehabilitation or purge water from certain monitoring wells) may exhibit hazardous levels of dissolved chromium and/or arsenic. Such streams would be appropriately managed and not sent to the TCS Evaporation Ponds.

3.6.2.7 Construction Staging

Site preparation and demarcation activities would be conducted for areas where construction-related activities occur and include the following types:

- **Primary Work Zones (also called Construction Areas) –** These zones are defined as the immediate area where actual construction would occur for a given component of remedy infrastructure. For example, the primary work zone for the construction of a well would consist of a defined area around the well location, while the zone for the construction of a pipeline would consist of an area on one or both sides along the length of the pipeline. To the extent feasible, primary work zones would be limited to previously disturbed areas (that is, minimizing use of undisturbed areas and those potentially exposed to differential compaction).

- **Staging Areas (also called Support Zones) –** Most of the staging areas would be located adjacent to or near primary work zones to support construction. Staging areas would be located in existing disturbed areas (that is, minimizing use of undisturbed areas and those potentially exposed to differential compaction).These areas would be used to minimize the size of the primary work zones by centrally placing temporary facilities (such as portable toilets and break areas) and for laydown of construction equipment, materials, supplies, and tools. Displaced soil, material (e.g., asphalt), and water generated in the primary work zones might also be temporarily staged in route to the designated storage or disposition area so that the size of the primary work zones can be minimized. Staging areas would also be used to coordinate transportation activities—for example, a staging area for the management of wastewater generated during well construction and development on the floodplain would be set up at the centrally located MW- 20 Bench. This central wastewater management area would include a series of portable frac tanks for temporary storage of wastewater, a truck haul station for hauling of wastewater, and pumping facilities to pump the wastewater to the IM-3 treatment plant, as appropriate, thereby limiting the need for these activities in the primary work zones on the flood plain.

  Tanks, bins, or tanker trucks would be used to contain excess water and drill cuttings (e.g., the fragments of rock and soil that are removed to create the borehole) in the primary work zone and at designated staging areas. Displaced soil, material (e.g., asphalt), and water generated in the primary work zones might also be temporarily staged in staging areas in route to the designated storage or disposition area so that the size of the primary work zones can be minimized.

- **Soil Processing/Clean-Soil Storage Area** – This area would be located near Moabi Regional Park, and is the primary area where soil and material displaced during construction activities would be brought for staging, processing, and potential reuse in the Project Area. In addition, this area would be used for storage of excess clean soil generated from construction of the remedy.

As shown in Figures 3-8, and **Table 3-6**, there are a total of 23 proposed staging areas. Some of the previously proposed staging areas are no longer being considered for use, hence the exclusion of certain staging area numbers in Table 3-6.

DTSC recognizes and acknowledges the importance of the Topock area to the Tribes as a significant cultural and historic area. Since 2013, DTSC has encouraged Tribal input on staging areas to be avoided during implementation of the Final Groundwater Remedy Project. The FMIT, Hualapai Indian Tribe, and Cocopah Indian Tribe submitted a table to DTSC indicating which staging areas should be avoided in the Final Groundwater Remedy Project. In the Final Remedy Design Directive letter dated October 19, 2015, DTSC details which staging areas were eliminated from use in the Final Groundwater Remedy Project. DTSC also detailed conditions PG&E must follow when using Staging Areas 6, 7, 12, 13, and 25, in order to minimize impacts on the areas and surrounding areas.

TABLE 3-6
PLANNED STAGING AREAS

Staging Areas ID	Location and Purpose	Approximate Size (in acres)
Moabi Regional Park Area		
#4	Construction Headquarters Area southeast of NTH and BNSF Railroad intersection	1.88
#5	Soil Processing and Staging Area northwest of NTH and BNSF Railroad intersection	2.56
Upland Area		
IM-3 System	Ongoing operation of IM-3 Facility until decommissioning, and for communication and coordination during remedy construction	0.98
#6 and #8	North and northeast of IM-3 Facility, respectively – Primary construction work zone and staging area for wells, vaults, piping, instrumentation; no long-term storage and lavatories are allowed in area 6.	0.73
#7	North of IM-3 Facility – Support zone for construction work zone and staging area for wells, vaults, piping, instrumentation; no long-term storage and lavatories in this area.	0.33
#12	West of IM-3 Facility – Primary construction work zone and staging area for laydown of construction equipment, materials, supplies, and tools, as well as temporary placement of displaced soils	1.45
#13	West of IM-3 Facility – Staging area for laydown of construction equipment, materials, supplies, and tools, as well as temporary placement of displaced soils; also to be used as critical vehicle turnaround area	0.12
MW-20 Bench and Vicinity		
#14	West of National Trails Highway and Colorado River – Primary work construction zone for Well MW-Z; staging area for construction of NTH IRZ	0.1
#18	MW-20 Bench Facility – Primary construction work zone for carbon amendment facilities; staging area for NTH IRZ and other remedy infrastructure; IM-3 Facility operation and maintenance activities until IM-3 Facility decommissioning	1.29
Near I-40 On-/Off-Ramp (California)		
#9	Park Moabi Road north of I-40 – Construction staging area	1.03
#10	Park Moabi Road south of I-40 – Subject to concurrence from Caltrans, construction staging area	0.45
TCS and Vicinity		
#11	TCS Evaporation Ponds – Primary construction work area for remedy infrastructure; staging will be limited to the western side of the fenced area	2.68
#20	North of Topock Compressor Station – Not currently proposed for use; if Provisional Well IRL-6 is needed, then this would be a primary construction work zone for the well, vault, piping, and controls	0.52
#21	Topock Compressor Station – Primary construction work zone and staging area	11.72
#22	East of Topock Compressor Station – Primary construction work zone for Pipeline F	0.74
#23	TW Bench east of Topock Compressor Station – Primary construction work zone for remedy infrastructure at the TW Bench; staging area for Pipeline F and other remedy infrastructure	0.41
#24	East of Topock Compressor Station and west of Colorado River – Primary construction work zone for remedy infrastructure in the topographic low area	0.54
#25	East of Topock Compressor Station and west of Colorado River – Flat area to be used for vehicles and water trucks to obtain water; limited materials and equipment staging; limited temporary parking; Route 66 sign will be cordoned off with protective barriers	0.34
Arizona		
#26 – #28	Remedy System area on Arizona Side, north of I-40 – Staging of equipment and materials	2.49
#29	Remedy System area on Arizona Side, south of I-40 – Staging of equipment and materials	0.65

SOURCE: CH2M Hill 2015a.

3.6.2.8 Construction of Wells

The following information describes the proposed approach to construction of new wells associated with the Final Groundwater Remedy Project, including extraction, injection, and monitoring wells. While the specific design and function of each well or well type would vary, the approach to construction for each would use similar methods, tools, and procedures. For many wells, the approach to finalizing the design and/or siting would depend on the information collected during location-specific well construction and/or information collected during the construction and testing of other nearby wells.

Well construction and testing would be conducted intermittently throughout the Project duration. Most wells would be installed during the construction period, but some wells, especially the provisional, may be installed during the operation and maintenance period. This duration is based on preliminary work sequencing assumptions and the assumption that a range of up to five drill rigs would be operating concurrently at any time over the given duration. In general, well-testing activities would be conducted following the completion of well construction and development in a given testing area.

The following describes the methods, tools, and general procedures that would be used to drill the boreholes that are needed for data collection (pilot boreholes) and well construction. The methods, tools, and general procedures are consistent with the analysis contained within the Groundwater FEIR. **Figure 3-9** shows a typical drill rig to be used for the Final Groundwater Remedy Project, which is the same as what was presented in Exhibit 3-10 of the Groundwater FEIR depicting a typical drill rig for the installation of a monitoring well.

- **Drill Rigs and Drilling Methods**. Drill rigs would be mounted on either a tracked vehicle or highway-rated truck/trailer. In general, the footprint of the drill rig would be a maximum of 10 feet wide by 50 feet long. The type of drill rig used would vary depending on the borehole depth and diameter, data collection requirements, and the subsurface conditions to be drilled through.
  - Rotosonic is the preferred method for drilling through unconsolidated materials above bedrock for 6- to 12-inch-diameter boreholes; this method has also been used at Topock for limited applications for drilling in the conglomerate and crystalline metadiorite bedrock. During the construction of the proposed Project well network, it is anticipated that the rotosonic method would be most useful when installing pilot boreholes for data collection or installing smaller-diameter wells (for example, monitoring wells with two or less nested, 2-inch-diameter well casings). The method typically does not require the addition of drilling additives but may require the addition of water for larger-diameter or deeper boreholes.
  - Rotary drilling with a casing advance (i.e., dual-rotary, dual-tube methods) is the preferred method for drilling through unconsolidated materials above bedrock for larger diameter boreholes when continuous core is not required. The method may require the addition of water or drilling additives may be required. Typical additives are discussed further in this section.

G:\Projects\15.135.000 Topock Remediation CEQA\Figure MXDs\Figure Updates 07252016\Figure3-9 Photo of New Wells and Construction.mxd

Final Groundwater Remediation Project SEIR
Map Creation Date: 7/26/2016 Source: ESA

Example of Equipment Used for Groundwater Remedy

Figure 3-9

ESA

  - Conventional rotary drilling (e.g., air rotary, mud rotary, tri-cone roller bit, percussion hammer) is used for drilling through both unconsolidated materials and bedrock. Drilling fluid is commonly used because the method does not use an outer drill casing to stabilize the borehole. It is anticipated that air rotary would be used to install the extraction wells at the east end of the East Ravine area. Mud rotary is not planned for use but may be used in the upland area if other drilling methods are unsuccessful or inefficient.
  - Wireline core drilling methods are preferred for drilling through bedrock when relatively undisturbed core samples are beneficial for well design. This method uses a dual-barreled or triple-barreled core barrel and diamond core drill bits. Typically, water with no additives is used for the drilling fluid, but sometimes a polymer additive is needed to remove cuttings from the borehole. It is anticipated that the wireline method would be used for drilling the deeper portion of MW-70BR-D in the East Ravine.
  - Bucket auger methods are used for large-diameter boreholes in unconsolidated materials when other methods are not capable or inefficient of drilling the borehole. This method is typically used to install large-diameter conductor casings to depths generally less than 100 feet. The method uses a bucket with a cutting edge to cut through materials and remove them by bringing the bucket to the surface. The method typically requires the use of a conductor casing and drilling fluids to keep the borehole open. It is anticipated that a bucket auger would only be used if large-diameter conductor casings become necessary to maintain borehole integrity.
  - Hollow-stem auger drilling methods are typically used to install smaller-diameter boreholes in finer-grained (minimal cobbles and boulders) unconsolidated materials to shallower depths (less than 100 to 150 feet). Drilling fluids are typically not needed unless required to manage borehole pressure (e.g., heaving sand conditions). Usually, this method is not used at Topock because of the rocky lithology and occasional heaving conditions. However, this method may be used for shallower wells near the southern end of the NTH IRZ where the unconsolidated materials are thin and the depth to groundwater is shallow.

- **Drilling fluids**. To assist in keeping boreholes open during drilling and well construction, air, water, and drilling additives may be added to boreholes. The primary fluids used would be air and/or water. However, drilling additives may be needed based on field conditions. The drilling additives would be commercially available products typically used in the water supply and drilling industry and would be compliant with National Science Foundation/American National Standards Institute Standard 60: *Drinking Water Treatment Chemicals – Health Effects*. Potential additives include foaming agents, bentonite-based products, and fluid control additives. In all cases, wells are developed following construction. The purpose of well development, in part, is to remove the drilling fluids, muds, and/or additives (to the extent practicable), which can interfere with the geochemical environment of the aquifer to be sampled and/or treated. The fluids would be placed in the bins or tanks described below for off-site disposal.
- **Primary Service Truck or Trailer**. A drill rig would be supported by a truck or trailer used to deliver and manage larger drilling tools like the drilling pipe or well casing. In some cases, this would be the same truck that delivers water to the drill rig. This vehicle is usually

positioned adjacent to the drill rig and often end-to-end. The dimension of this piece of equipment is typically similar to or smaller than the drill rig.

- **Secondary Support Equipment**. This smaller equipment would vary from rig to rig and is primarily dependent on the drilling method or given task. Examples of secondary support equipment that might be required include, but are not limited to, the following:
  - Auxiliary compressors, pumps, and generators
  - Material management equipment (backhoe or forklift)
  - Solids control unit for management of drill cuttings when drilling fluids are recirculated
  - General equipment trailer(s) to store smaller tools and materials
- **Bins and Tanks**. Drill cuttings and fluids generated during drilling would be temporarily stored in the primary work zone and/or staging area using tanks and bins. It is estimated that tanks would range in size from fixed-axle tanks that are approximately 9 feet wide by 50 feet long by 12 feet high to those that are smaller and mounted on a skid or trailer. The dimension of a typical bin (20-cubic-yard capacity) is approximately 25 feet long by 8 feet wide by 5 feet high; however, smaller bins might also be used. The amount of storage capacity required at each drilling site would vary significantly depending on variables such as the production rate of groundwater from the formation and the drilling method, but it is estimated that up to three tanks and three bins could be required to support the drilling of a borehole at a given time.
- **Crew Vehicles and Facilities**. Vehicles used by the crew to access the primary work zone and staging areas would range from standard highway vehicles to smaller off-highway vehicles. The exact number of vehicles would change depending on location and crew size at a given time but would typically be less than five. Temporary bathroom facilities would typically be in the primary work zone or staging areas unless the given area is within a jurisdictional area.

Throughout work, the crew would continuously assess what specific equipment is needed for a given task. Effort would be made to minimize the amount of equipment in the work zone. For example, if storage tanks were initially needed but are no longer required for a given task, then they could be removed. Similarly, if several drilling sites are located in the same general area, then a central tank staging area could be used to minimize the number of physical locations where the tanks are staged, thereby minimizing total footprint.

3.6.2.9 Construction of Fluid Conveyance, Utilities, Buildings, and Roadways

Fluid Conveyance/Electrical Power Supply and Distribution

Fluid conveyance piping and electrical conduit systems would connect together different components of the remedy system such as wells and buildings. The fluid conveyance pipelines and electrical/fiber optic lines would be predominantly located belowground in trenches. With the change of placing the Bat Cave Wash pipe crossings belowground, there is, overall, less aboveground conveyance piping than envisioned in the Groundwater FEIR. The design contains five typical configurations for these systems:

- Direct burial - Pipes, conduits, and/or wires are placed in an excavated trench so they are in direct contact with the ground, earthen backfill, and/or concrete encasement.
- Concrete trenches - Typically made of precast concrete, box-like concrete trenches are placed in an excavated trench and joined to make a continuous trench, and then the pipes, conduits, and/or wires are placed in the concrete trenches. Alternatively, concrete trenches may also be cast-in-place.
- Trenchless technologies - An underground hole is created to install a carrier pipe under the ground and then pipes, conduits, and/or wires pulled through the carrier pipe.
- Installed aboveground - In this instance pipes, conduits, and/or wires are installed close to or above the ground surface and are often attached to other structures for support.
- Installed on pipe bridges - Also an aboveground option, the pipes, conduits, and/or wires are installed high above the ground on bridges.

Conveyance piping and utility systems are often installed sequentially from one end of the pipe to the other. However, the number and location of work sites and crews for a given pipeline would vary over time based on site specific factors including equipment availability, market rates, employee skill sets, construction schedule, the size/structure/scope of the construction contract(s), and site conditions encountered in the field.

Buildings

The surface surrounding buildings would typically consist of a gravel layer during the remedy construction phase. Portions of the Construction Headquarters yard supporting long-term operation and maintenance use may be paved in the future.

The construction procedures for buildings are described in the C/RAWP (CH2M Hill 2015b). Buildings would be constructed as slab-on-grade structures. Concrete foundations would be built by excavating holes and trenches in the ground and using cast-in-place reinforced concrete footings. Construction equipment would be used to excavate soil, and the excavated soil would be loaded directly into haul vehicles and/or temporarily stockpiled near the excavations. Excavation in hard soil or rock may require special excavation techniques such as road mining, ripping, grinding, and/or hoe-ramming. Concrete would be delivered to the site and placed in the forms and around the reinforcing steel in one or more pours. Concrete pumping equipment may be used to place concrete in forms. Generally, the structural framing and outer skin of metal buildings would be prefabricated then assembled on-site. Masonry structures would be constructed on-site. Structural members would be welded and/or mechanically fastened together (bolted, screwed or riveted). Wall and roof skins would be attached next using mechanical fasteners or, in some case, welding the components. Electrical, plumbing, and HVAC systems would be installed concurrently as erection of the structure progresses. Equipment and conveyance piping for the remedy process systems would also be installed concurrently as the various areas are ready for the different components. Finishes, such as paint, hardware, electrical and plumbing fixtures, would be generally accomplished later in the process to avoid damages to the exposed components. Exterior visible finishes would be in conformance with the Groundwater EIR Mitigation Measures AES-1d and AES 2e, which require the color of the wells, pipelines, reagent storage tanks, control structures, and utilities consist of muted, earth-tone colors consistent with the surrounding natural color palette. Matte finishes shall be used to prevent reflectivity along with the view corridor. Integral color concrete should be used in place of standard gray concrete. Decommissioning of structures is discussed in Sections 3.8.2.1 and 3.8.2.2.

Temporary and Long-Term Access Routes and Roadways

Although existing access routes and roads would be used (and periodically maintained) to the maximum extent possible, two types of access roads would be installed as part of the remedy: temporary access roads used for construction, start-up activities, and eventual decommissioning activities; and long-term access roads used to regularly operate and maintain the groundwater remedy. Preferred existing and new access roads proposed to be used or installed as part of the Final Groundwater Remedy Project are shown in Figure 3-8. In addition to the access routes and roads shown in Figure 3-8, all existing access routes located on maintained roads into and out of the Project Area could occasionally be used during Project construction, operation and maintenance, and decommissioning (e.g., travel east and west of the site along the I-40 freeway, travel to/from local suppliers, travel through Needles to access well MW-54 on the peninsula, routes to private water supply wells, or customarily used routes for river water sampling activities). No Project-related improvements would be made to these roads.

Temporary Access Routes/Roads

Construction of temporary access roads would include the use/improvement of existing access routes and roads and/or the clearing, or regrading of the ground to provide an adequate driving surface. Large rocks would be removed from the road alignment and, if necessary, vegetation would be trimmed, cut, and/or cleared. If the existing subgrade base material is soft or loose, it may be reinforced, removed and replaced, or both. Geotextiles, geogrids, steel mats, plastic mats, sand grid, and/or soil stabilizers may be used to reinforce soil. If soil is removed and replaced, the excavated subgrade soil may be loaded directly into haul vehicles or stockpiled near the excavation for reuse. The replacement soil would generally be a coarse-grained material such as gravel, crushed rock, and/or aggregate base, built and maintained to carry the construction equipment expected on that route. In some cases, road surfacing is not needed, or it may incorporate coarse-grained soil and/or compacted native soil.

The use of temporary construction access routes would be discontinued after the necessary construction activity. After the temporary use, the access would be abandoned or restored. An example of this type of temporary access exists at the well MW-Y area where track mounted drill rig would access work areas across dredge sands during well installation, followed by installation of light duty plumbing and electrical conduit in trenches from the well head to the existing road. After construction is completed, the area and the access route would be restored as needed, and as directed through compliance with mitigation measures in this SEIR. Sampling would take place remotely from the existing road; therefore, eliminating the need for a long-term road to access the well head.

Long-Term Access Routes/Roads

Long-term access routes/roads would allow for regular operations and maintenance activities; in some locations, access roads and pipelines would share the same alignment. The proposed access routes/roads are described in Section 3.6.1.9.4. Select segments are described below.

For the unpaved access to Wells IRL-2 and IRL-4, the road ground surface would be cut to grade, compacted, and covered with a layer of gravelly soil called aggregate base (essentially a processed mixture of sand and gravel). Aggregate base would be acquired within 60 miles of the Project Area, with reuse of on-site sand backfill material and crushed rock as much as possible.

For the Floodplain Road, a new ring-shaped access and connecting spurs would be constructed in the floodplain to support construction and provide long-term access to the wells. The road may be constructed on granular stabilization rock depending on the stiffness of the existing subgrade soil. The structural layers in the road would consist of gravel, aggregate base, and geosynthetic layers such as geotextiles. The road materials would be placed and compacted in lifts or layers after preparing the subgrade.

For the TW Bench Area, the parking lot would be covered with asphalt concrete pavement. The ground surface would be cut to grade, compacted, and covered with a layer of gravelly soil called aggregate base. In addition, a new road would be installed to provide access to the existing TW Gas Metering Station yard from the north. The footprint of the new access would be cleared and graded, and the remaining subgrade would be compacted. The road would be surfaced with gravel or aggregate base.

For FW-2 access, improvements would be made to the road that leads into Bat Cave Wash to the west of the Station. The improvements would consist of installing new drainage structures, raising the road elevation, and providing a new road surface. This work would be accomplished with heavy construction equipment. New drainage structures, such as ditches, inlets, and pipes, would be installed by excavating below the ground surface and placing the structures in the excavation. The road would be raised by placing fill on the existing surface, cutting soil from higher portions of the road, and placing it on lower portions to create a more uniform surface. The fill would likely be borrowed from other excavations at the Project Area. The road surface would be created by spreading and compacting imported gravel on the surface.

For the Construction Headquarters, the existing access road south of the NTH would be used to cross the channelized ephemeral wash that originates from three culverts under the BNSF railroad tracks and runs southwest to northeast adjacent to the Headquarters area. The existing unpaved access route would be improved as described above and drainage will be engineered to divert flow through a concrete spillway. The existing unpaved access route north of the NTH will also be improved as described above.

Based on ongoing discussions with Caltrans, it may be necessary to relocate proposed wells at MW-U location and possibly even existing wells MW-40S and MW-40D out of the I-40 freeway median. If required, the wells would likely be moved due north of the freeway on Caltrans-leased land or BLM land. Access to the wells would require new road construction as described above and include construction from the bottom of an unnamed wash segment to the top of an isolated mesa located between the freeway and railroad.

3.6.2.10 Construction of Freshwater Pipeline on Arched Bridge

The installation of freshwater conveyance Pipeline B on the Arched Bridge over the Colorado River would require the use of customized roller-type pipe supports bolted to the bridge deck. A temporary elevated working platform would be installed to the existing deck beams to allow installation. The 12-inch-diameter pipe would be delivered to the Arizona side of the river, welded together to create segments of workable length, lifted onto the pipe supports and welded to the other pipe segments already on the bridge. The pipe could be hydrostatically tested in segments before mounting on the bridge, or the entire installed pipeline could be hydrostatically tested after mounting. None of the work activities would occur in the water (Colorado River).

3.6.3 Description of Operation and Maintenance of the Final Groundwater Remedy Project

Operation and maintenance of the entire Final Groundwater Remedy Project is forecast to begin in around January 2022 and would occur during the entire period in which cleanup activities would be ongoing and until the cleanup goals defined in the Objectives have been met (see Section 3.4). It is recognized that the NTH IRZ and those components required for operating the NTH IRZ would be started up and begin operation earlier (after Phase 1 Construction is complete), and as early as January 2019. The cleanup goal has been defined as the regional background level of 32 μg/L of Cr(VI). Depending on the performance of the Final Groundwater Remedy Project, the anticipated remedial timeframe is estimated to be about 30 years, followed by up to 10 years of long-term monitoring and concurrently up to 20 years of arsenic monitoring. If monitored natural attenuation is selected to continue remediation for portions of the plume, the long-term monitoring may be longer.

The groundwater remedy would comply with the O&M Manual in the Final Remedy Design (CH2M Hill 2015a). The O&M Manual includes of plans for operation and maintenance, sampling and monitoring, standard operating procedures, and management of contingencies associated with the Final Remedy Design. The manual consists of the following components:

- **O&M Plan** – Describes the main remedy system and its supporting systems, procedures for operation and maintenance (including start-up/shutdown), replacement schedule for equipment and system alarms, well and pipeline maintenance, waste management practices, road maintenance, stormwater pollution prevention, and hazardous material management.
- **Sampling & Monitoring Plan** – Presents goals and data quality objectives for sampling and monitoring of groundwater, surface water, and process water, details for various monitoring programs including remedy compliance monitoring, in-situ remediation performance monitoring, monitoring for other constituents of potential concern, monitoring of freshwater sources, process control monitoring for the remedy-produced water management system, and domestic/private well monitoring.
- **Contingency Plan** – Contingency planning and procedures to address potential operational problems and equipment failures.
- **Soil Management Plan** – Sampling protocols and analysis for soil and the plan for managing soils during operation and maintenance; sampling and analysis plan to document baseline soil conditions prior to remedy implementation, and plan to implement Best Management Practices to prevent or reduce stormwater pollution related to soil storage activities during remedy construction and operation and maintenance.

- **Project Health and Safety Plan –** Provides a framework for safe operation and maintenance of the groundwater remedy and includes procedures that would apply to PG&E employees and/or contractors who may operate and maintain the groundwater remedy.

As described in Section 3.6, the proposed Project analyzed in this SEIR includes a Future Activity Allowance, which could occur during the construction and/or operation and maintenance phase. During the operation and maintenance phase, activities associated with the Future Activity Allowance could include: (1) the 25 Percent Potential Allowance for all Project infrastructure; and (2) 10 additional monitoring well boreholes to be installed in Arizona as part of the monitoring program to assess monitor groundwater levels and chemical constituents as a result of freshwater pumping. Activities included in the Future Activity Allowance during operation and maintenance could include short-term immediate Project modifications made with concurrence from the parties in the field, and long-term modifications that are anticipated by PG&E far enough in advance such that a design for the feature (well, new segment of pipeline, etc.) would be possible, with appropriate review by stakeholders. Given the nature of activities involved with operation and maintenance, it is assume the majority of features to be installed under the Future Activity Allowance would be able to be conducted as long-term modifications. All activities conducted under the Future Activity Allowance, as needed, will be tracked by PG&E and DTSC to maintain accurate levels of components installed under this allowance.

3.6.3.1 Final Groundwater Remedy Operation and Maintenance

Normal Operations

Normal operations of the groundwater remedy would include groundwater extraction and recirculation, carbon substrate storage and deliveries; carbon substrate injections, and monitoring and control of the system. There would also be activities associated with freshwater supply, conveyance, and storage; remedy-produced water management; pre-injection water treatment (if required); power supply and distribution; and the Remedy SCADA system. All of these systems would require regularly scheduled maintenance to keep the systems functioning in an efficient and optimal manner.

In general, normal operation of the groundwater remedy associated with optimization of the groundwater extraction and recirculation systems would be accomplished through use of the Remedy SCADA system housed at the TW Bench. Carbon substrate would be delivered by tanker truck to the carbon storage tank at the MW-20 Bench. Operation personnel would be present during all chemical transfer activities and would verify the liquid level in each tank prior to beginning the filling operation to prevent overfilling. The tank would have secondary containment and be outfitted with level detectors and alarms to prevent overfilling.

Carbon substrate dosing and injection into the NTH IRZ, IRL, and TCS Recirculation Loop wells would also be primarily controlled by the Remedy SCADA system. Carbon substrate would be delivered to individual injection wells by a system of distribution lines and manifolds. The design incorporates the flexibility that would also allow for the injection of carbon substrate directly to selected wells through connections in the well vaults. Those individual well injections would be accomplished by pulling a portable tank to the well on a trailer or in a smaller vehicle carried by an operator during work hours. The anticipated footprint of these operations would be similar to that for sampling or maintenance of a well. All carbon substrate delivery valves and controls would be tested before start-up. There are system controls that are linked to the Remedy SCADA system including well packer pressure sensors and process control features that would allow operators to detect leaks or flow problems in the carbon substrate delivery system.

Regularly scheduled equipment operation and maintenance activities would include regular record keeping on important information from the Remedy SCADA system, such as tank levels and flow data. It would also include regular visual inspections of aboveground storage tanks for signs of damage, leaks, or excessive deformation of tank walls. Vent pipes and screens would be inspected and cleaned as needed. Carbon substrate pumps, well maintenance reagent pumps, and submersible well pumps would be regularly maintained according to manufacturer's recommendations and as established in the operation and maintenance manual and standard operating procedures (SOPs).

Monitoring flow rates through the Remedy SCADA system would help identify potentially faulty well pumps that may require removal from the individual wells for servicing. Planned actions, therefore, include maintenance of all equipment or replacement of faulty devices to keep the final groundwater remedy systems operating.

Regular planned activities for the freshwater supply, conveyance, and storage system would follow SOPs to guide the testing of the system start-up and shutdown procedures; well maintenance and cleaning and maintenance of the instrumentation and control equipment.

Maintenance activities for the Remedy-Produced Water Management system would follow SOPs for cartridge filter change-out; produced water storage tank cleaning and inspection; produced water conditioning system secondary containment inspection and operation; phase separator loading and removal; cleaning and maintenance of instrumentation and control equipment; and conveyance system and secondary containment inspection and maintenance.

Contingency Operations

The Final Remedy Design includes contingencies in the event that the groundwater remedy does not remove Cr(VI) as expected or the extraction system is not effective at preventing Cr(VI) or byproducts from migrating toward the Colorado River. The Operation and Maintenance Manual, Volume 3, Contingency Plan (Final Remedy Design, Appendix L; CH2M Hill, 2015a) itemizes potential causes and provides contingencies to address the possible causes. Potential causes and the contingencies to address the causes are summarized below.

- Insufficient volume of carbon substrate: Operational adjustments could include increasing the flow rate of the carbon substrate or changing to a different carbon substrate.
- Inadequate well spacing or Cr(VI) plume is larger than expected: Operational adjustments could include installing provisional wells in areas where treatment is underperforming.
- Recalcitrant (resistant to treatment) contaminant mass in immobile pore spaces: Operational adjustments could include installing provisional wells in areas where treatment is underperforming or changing to a different carbon substrate.

- Unexpected hydrogeologic conditions (e.g., preferential flow paths allowing groundwater to flow through treatment zone without treatment): Operational adjustments could include installing provisional wells in areas where groundwater flow is missing the treatment zone
- Limitations to injection and/or extraction: Operational adjustments could include installing provisional wells in areas where limitations are observed or redirecting water from the TCS Recirculation Loop to the NTH IRZ.
- Inadequate extraction: Operational adjustments could include adjusting pumping rates of wells or installing provisional wells in areas where extraction is underperforming.
- Excessive extraction: Excessive extraction could cause oxic water from the river to be pulled into the floodplain reducing the naturally-occurring reducing area near the river. This natural reducing zone would be used to treat residual levels of Cr(VI) after active remediation ends. Operational adjustments could include adjusting pumping rates of extraction wells along the riverbank to reduce excessive extraction.
- Insufficient treatment at the TCS Recirculation Loop: The remedy design at the TCS Recirculation Loop may be ineffective at driving the plume through the treatment zone. Operational adjustments could include injecting freshwater at the upgradient edge of the plume of the TCS Recirculation Loop. This would also require the installation of arsenic monitoring wells.

The Final Remedy Design includes contingencies in the event that the treatment methodology results in generating manganese, an in-situ byproduct, at concentrations above basin water quality objectives. Available methods for the treatment of manganese and iron are described Appendix J of the Final Remedy Design and include PG&E's preferred method of adsorptive or greensand filtration (CH2M Hill 2015a). The method would include two banks of eight filters consisting of filter with filter media in pressure-rated housings, submersible and process pumps, piping, valves, chemical storage tanks and metering pumps for sodium hypochlorite, polymer, and sodium bisulfite, a surge tank and a decant tank. The equipment would be mounted on a 2,500 square foot concrete foundation with a building or partially-sided roof (sunshade). The flow rate to the system is estimated at 150 to 500 gpm. The system could be located at TW bench or MW-20 Bench (after IM No.3 is decommissioned/removed), but not at the Station, the Remedy-Produced Water Conditioning Plant, or the FWPTS.

The Final Remedy Design includes contingencies in the event that the conveyance pipelines do not convey fluids as designed. The Operation and Maintenance Manual, Volume 3, Contingency Plan (Final Remedy Design, Appendix L; CH2M Hill, 2015a) itemizes potential causes and provides contingencies to address the possible causes. Potential causes and the contingencies to address the causes are summarized below.

- Leaks or breaks: The pipeline system has leak and pressure drop detection alarms that would automatically shut the system down. The secondary containment and well head boxes would limit the volume of fluids released before automatic system shutdown. Repairs would then be made, the system tested, and system operations restored.
- Fouling or clogging: The clean-in-place system (see Section 3.6.1.6) would minimize solids build-up and pipeline cleanouts would provide access to sections of pipelines that clog or

foul. The pressure detection alarms would identify pipeline sections with clogging or fouling and that portion of the system would be temporarily shut down and cleaned. If necessary, buried pipeline sections would be excavated and replaced.

- Release of pipeline maintenance chemicals to wells: The clean-in-place system is programmed to require wellhead valves to be closed prior to clean-in-place operations. In the event that the wellhead valve is not closed, clean-in-place maintenance chemicals would be discharged to the well. This would require rehabilitation of the well, similar to well development, where groundwater and the well maintenance chemicals would be pumped out of the well.

3.6.3.2 Long-Term Remedy Support Area

Operation and maintenance activities at the Long-Term Support Area would include on-site sample processing, and vehicle and equipment storage, decontamination, and maintenance. Routine and non-routine operation and maintenance activities would include inspection and preventative maintenance of the generator and solar panels; water delivery to the potable water tank; inspection and maintenance of the booster pump; removal and off-site disposal of sewage; decontamination of vehicles and equipment; management of rainwater collected in the secondary containment; inspection and maintenance of the sump pump; and off-site hauling of wastewater from the decontamination water storage tank. Water from this tank will be trucked to the appropriate location (e.g., the Remedy-Produced Water Conditioning Plant, TCS Evaporation Ponds, or off-site) for management. Soil could also be stored in the temporary construction laydown area, if needed, during implementation of the Future Activity Allowance, and if the soil stockpile area is at capacity.

3.6.3.3 Remedy-Produced Water Management

Normal Operations

As discussed in Section 3.6.1.5, well backwashing and rehabilitation, purge water from monitoring well sampling, equipment decontamination wastewater, and rainfall that collects in remedy facility secondary containment would result in remedy-produced water. The volume is estimated at about 7.6 MG per year. The wastewater chemistry of the injection and extraction wells would not be known initially until the water is pumped out of the wells and analyzed. Once the water chemistry is known, management of the wastewater would have the four options based on water quality summarized in **Table 3-7**.

The highest quality would be sent to the Remedy-Produced Water Conditioning System for processing and reuse by injection into IRZ wells or by blending with freshwater for use in TCS cooling towers. The volume of conditioned water available for reuse is estimated to range from 5.8 MG per year to the entire volume of 7.6 MG per year, depending on changes in the water quality over time. The volume is anticipated to increase over time as the Final Groundwater Remedy Project reduces contaminant concentrations.

TABLE 3-7
CRITERIA FOR REMEDY-PRODUCED WATER MANAGEMENT OPTIONS

Reuse/Disposal Option in Decreasing Order of Preference	Criteria	Comments
Reuse by injection into IRZ wells	Neutral pH (6.5 to 8.5) and non-hazardous	Adjust pH, if necessary
Reuse by blending with freshwater for use in TCS cooling towers	Neutral pH (6.5 to 8.5),non-hazardous, low TDS, low solids, and low concentrations of iron, silica, and manganese to prevent fouling	Limit to freshwater well backwash water
Discharge to TCS evaporation ponds	pH > 2.0 and non-hazardous	
Off-site disposal	No limitations	

SOURCE: CH2M Hill 2015a.

Reusing the water in the IRZ injection wells would assist in containment of the contaminant plume and in driving the contaminated water through the IRZ and promote treatment while reducing freshwater needs. This would also be consistent with the goal of near-zero consumptive use of water since the water would be returned to the basin. Reusing the water in the TCS cooling towers would serve as in-lieu groundwater recharge since the Station wouldn't have to import as much water for operational use in the cooling towers.

Contingency Operations

The remedy-produced treatment system has the flexibility to be altered to address unanticipated water quality conditions. Additional settling tanks and filters can be installed to handle excessive solids loads. Redundant tank educators can be installed to adjust high or low pH. Conditioning units can be added to remove scaling ions that can foul pipelines and wells (e.g., calcium, magnesium, iron). In addition, the system has automatic pressure and leak detectors that would automatically shut the system down to enable repairs of leaks or other system failures.

If the volume of treated remedy-produced water exceeds the capacity of the IRZ injection wells and the TCS cooling towers water demand rate or if the water is not accepted by PG&E TCS Operations for reuse in cooling towers, then the water would be routed to the TCS evaporation ponds. The volume is estimated to be up to 12 percent of the total 7.6 MG per year or about 0.9 MG per year.

If the TCS evaporation ponds do not have the capacity to accept the water or the water quality does not meet the pond acceptance criteria, then the backwash frequency could be temporarily decreased or the water could be disposed of at a permitted off-site facility (for purpose of the SEIR analysis, the off-site disposal facility is assumed to be Liquid Environmental Solutions in Phoenix). The TCS evaporation pond depths data measured over a 9-year period from 2005 to 2013 show only one year (2009) where the ponds approached their capacity (2-foot freeboard). Extrapolating this frequency of occurrence over the 30-year life of the Final Groundwater Remedy Project, the ponds could reach freeboard limits four times. Assuming a worst-case scenario each time the ponds reach freeboard, the entire approximately 0.9 MG of remedy-produced water generated for that entire year and intended for the TCS evaporation ponds would be transported to a permitted off-site facility (for purpose of the SEIR analysis, the off-site disposal facility is assumed to be Liquid Environmental Solutions in Phoenix). This equates to approximately 4 times 0.9 MG, or 3.6 MG. For a maximum case for the purpose of CEQA analysis, PG&E suggests using a volume that is 4 times 3.6 MG, or up to 15 MG to account for contingencies.

3.6.3.4 TCS Evaporation Ponds

Normal Operations

Operation and maintenance activities at the TCS Evaporation Ponds would include ongoing maintenance of the power system and remote sensing equipment. The electrical power generator at the TCS Evaporation Ponds would require routine maintenance of the radiator (monthly or post-100 hours of operation); checking of oil levels, drive belt condition, electrical connections, and emergency stop button (weekly of post-50 hours of operation); and a check of engine fluids, lines, hoses, cooling fan blades, exhaust components, and air intake (daily or after every 8 hours of operation).

The natural gas powered thermoelectric generators would receive an annual service check including performing a power check with maintenance as needed; replacing the fuel filter; draining the pressure regulator sediment bowl; checking the fuel orifice for clogging; cleaning the heat pipe fins, air intake screens, and cabinet interior; and checking all bolts and fasteners for tightness.

The natural gas regulators would require annual checks for regulators and monitoring of set points; inspection of regulators, monitors, valves, and fittings for leaks and other damage; checks of differential pressure across filter; manual operation of emergency valves; exercising of valves to ensure functionality; and inspection of one-quarter-inch Welker Sulfur Removal Filter. Inspection for atmospheric corrosion damage would occur every 3 years and internal inspection of the regulator and monitor would occur every 5 years.

The water recirculating pumps would be inspected monthly for hose connections, overall hose condition, power supply cable connections, overall cable condition, and pump influent and effluent to ensure there are no obstructions present hindering flow and to determine if the pump is making unusual sounds (e.g., unusual vibrations, squealing).

The actuator valves, liquid-level sensors, and control units used to transfer water to the ponds and control water levels would be visually checked monthly for the overall conditions, the condition of cable connections, power supply cable connections, cover seals, wire glands, and transmitter face. The cathodic protection for the buried steel natural gas pipeline would be inspected bi-monthly for the rectifier condition and annually for the pipe-to-soil potential.

Contingency Operations

The Final Remedy Design includes contingencies in the event that the TCS Evaporation Ponds is unable to accept water for disposal. The Operation and Maintenance Manual, Volume 3, Contingency Plan (Final Remedy Design, Appendix L; CH2M Hill, 2015a) itemizes potential causes and provides contingencies to address the possible causes. Potential causes and the contingencies to address the causes are summarized below.

- Insufficient pond capacity: The Station and/or remedial waste water production needs could be higher than anticipated, which could result in overflow at the ponds. Operational adjustments could include transferring water between the four ponds to utilize available capacity, storing water in portable tanks until capacity becomes available, reducing wastewater production at the Station, or trucking the water to an off-site disposal facility. In addition, drip systems could be added to Ponds 1 and/or 2.
- Insufficient evaporation rates: Pump failure, clogging of circulation pipelines, or pipeline perforations could reduce evaporation efficiency. Operational adjustments could include rehabilitation or replacement of pumps and/or pipelines. In addition, drip systems could be added to Ponds 1 and/or 2.

3.6.3.5 Well Maintenance

Routine Maintenance

Well performance would be monitored to assess the frequency and methods required for well maintenance. Well performance monitoring consists of establishment of a baseline during well installation, development, and system start-up. Once the system is online, well performance will be tracked by comparing the baseline data to long-term performance data.

Routine or preventative maintenance would be used to mitigate performance losses at injection and extraction wells and is generally conducted without intrusive modifications to the wellhead or well and do not require removing existing equipment from the well for access. Extraction wells would be maintained by surging and pumping to remove silt or mineral encrustation, while tightening the filter pack. Injection wells would be maintained by backwashing, which is conducted by stopping injection and pumping the well for a short period. Backwashing removes the solids which have accumulated in the well screen and gravel pack during injection. In the event that more aggressive routine maintenance is needed, the addition of Aqua Gard® would be used on both extraction and injection wells. The Aqua Gard method injects cryogenic liquid carbon dioxide into existing well access tubes. During the injection, plugging and fouling deposits are dislodged and detached from the filter pack and formation through rapid gas expansion during the liquid/gas phase change. Once the injection is complete, pumping, surging, and/or backwashing is employed to agitate and remove the material that was loosened during the injection. Some of the necessary equipment may include all or some of the following: a carbon dioxide injection trailer, carbon dioxide storage vessel, support truck, pump rig and/or crane (if a pump or pipe needs to be installed/removed), bag filters, and a support truck. Water produced from the routine well maintenance activities would be sent to the Remedy-Produced Water Conditioning System.

Monitoring wells would be inspected during the routine sampling or water-level gauging events to confirm that the condition of the well is acceptable. Well heads would be visually inspected to assess the well head integrity. Wells would be measured for total depth, turbidity, and pH to assess the well casing and screen integrity, and for the accumulation of sediment in the bottom of the well casing. If the monitoring well assessment indicates the need for maintenance, then the well would be redeveloped using methods for the extraction wells described above.

Non-Routine Maintenance

In the event that routine well maintenance does not restore well performance, non-routine invasive methods may be used, requiring removal of existing equipment from the well prior to conducting maintenance. Submersible pumps typically last 5 to 7 years. Given the decades-long life of the Project, submersible pumps are anticipated to require periodic repair or replacement. This would require the use of a truck- or trailer-mounted well maintenance rig with well pulling equipment. Drop-pipes may corrode over time and may require occasional replacement. This would require the use of a truck- or trailer-mounted well maintenance rig with pipe pulling equipment.

Well repair and well rehabilitation would require more extensive measures to restore well performance. Depending on the plugging or clogging mechanism, the recommended rehabilitation method may vary. Well rehabilitation programs must be tailored to the given well conditions and problems. Potential rehabilitation methods could include well conditioning using wire brushes; surging; air impact gun; bailing; the application of commercially available well rehabilitation chemicals that are typically inorganic or organic acids; or mechanical agitation and removal swabbing, jetting, surging, and pumping using a swab or surge block.

In severe cases, the well may require repair or replacement. Holes or gaps in the casing can be repaired using commercially available well patch materials. Wells can be relined with a new well casing inside the older casing, although this also means that the casing diameter would be smaller, reducing well performance. If the damage is too severe, the well may need to be reconstructed in place by removing the well casing and reconstructing the well with new materials in place. Alternately, the damaged well could be destroyed and a new well constructed at a new location, with approval of the regulatory agencies.

Well Maintenance Frequency

Operation and maintenance of the groundwater remedy would require between 10 and 12 full-time employees for routine operation and maintenance of the groundwater remedy throughout the life of the Project. **Table 3-8** provides a sample breakdown of employees by operation and maintenance activities; however, there may be fluctuations in employee assignments throughout the course of the remedy. Monitoring wells would be redeveloped on an as-needed basis.

TABLE 3-8
SAMPLE BREAKDOWN OF EMPLOYEES FOR OPERATION AND MAINTENANCE FACILITIES

Operation and Maintenance Activities	Sample Breakdown of Full-Time Equivalents (FTEs)	# of Weekly Vehicles On-Site (5 days/week)	Annual Deliveries/Pickups		Total Max Vehicle & Delivery Trips per Year[b]
			Chemical Deliveries, Supply Deliveries, Sample Pickups	Sludge/ Waste Haul	
Routine					
Routine O&M[a,b]	2.75 (average), 4.25 (worst case) *IRZ O&M[b] – 3–5/week (IRZ On), 0/week (IRZ Off)* *Other System O&M – 2 or 3/week*	10–40	IRZ O&M[2] – 9-228 (IRZ On), 4-92 (IRZ off) Other System O&M – 25–53 Water delivery to Park Moabi - 52	Other System O&M – 2–19 Sewage hauling from all septic tanks – 12	2,440
Well Maintenance[c]	3 (average), 10 (worst case)	9–32	7–24		1,660
Site Management	2	10	NA		520
Groundwater Monitoring[b]	3	12.5	52		702
Non-Routine					
Well Rehabilitation[c]	2 (average), 5 (worst case)	9–23	15–27		1,220
Other Non-Routine Well Repair/ Replacement[c]	1.5 (average), 3 (worst case)	1–1.75	1–2		93

NOTES:
FTEs = Full-Time Equivalents, account for PG&E employees and its contractors/subcontractors only. One vehicle trip is one round trip to/from site.

[a] Includes IRZ operation and maintenance, water conditioning plant operation and maintenance, freshwater supply well site operation and maintenance, Operation and maintenance of Moabi Regional Park facilities, etc. Excludes operation and maintenance of the enhancements at TCS Evaporation Ponds as those activities are Compressor Station work (PG&E estimated that an extra man-day per month [or 100 man-hours per year] would be required for operation and maintenance of the enhancements, a 7% increase over current work load). Worst case includes operation and maintenance of future provisional wells and contingent systems, and worst case carbon usage.
[b] In each 52-week year, there are 13 weeks of active IRZ operations (i.e., IRZ ON), and 39 weeks inactive IRZ operations (i.e., IRZ OFF). Groundwater monitoring occurs 52 weeks/yr for Years 1–3, 40 weeks/yr for Year 4-5, 32 weeks/yr for Year 6-10, 26 weeks/yr for Year 11-30, and 20 weeks/yr for Year 31+.
[c] Well maintenance type and frequency as defined in Exhibit 4.2-6 of the O&M Plan (Volume 1 of the O&M Manual).Assumes all planned and future provisional wells require routine well maintenance, non-routine well rehabilitation and repair/replacement.

SOURCE: Data provided by PG&E February 2016.

3.7 Schedule and Staffing

3.7.1 Overview

The anticipated schedule for implementation of the Project is described below. The major elements of the Project are (1) pre-construction, construction, and start-up, (2) operation and maintenance, and (3) decommissioning and restoration. Each of these phases would overlap, as indicated below. The schedule for each of these major elements is presented in the following pages and is based on what is currently reasonably foreseeable given what is known about the Project Area and work involved in the Project, but is subject to change. The schedule may be longer or shorter than described, however, depending on occurrences outside the control of DTSC or PG&E, including discoveries of biological or archeological resources that require work to be halted and rescheduled.

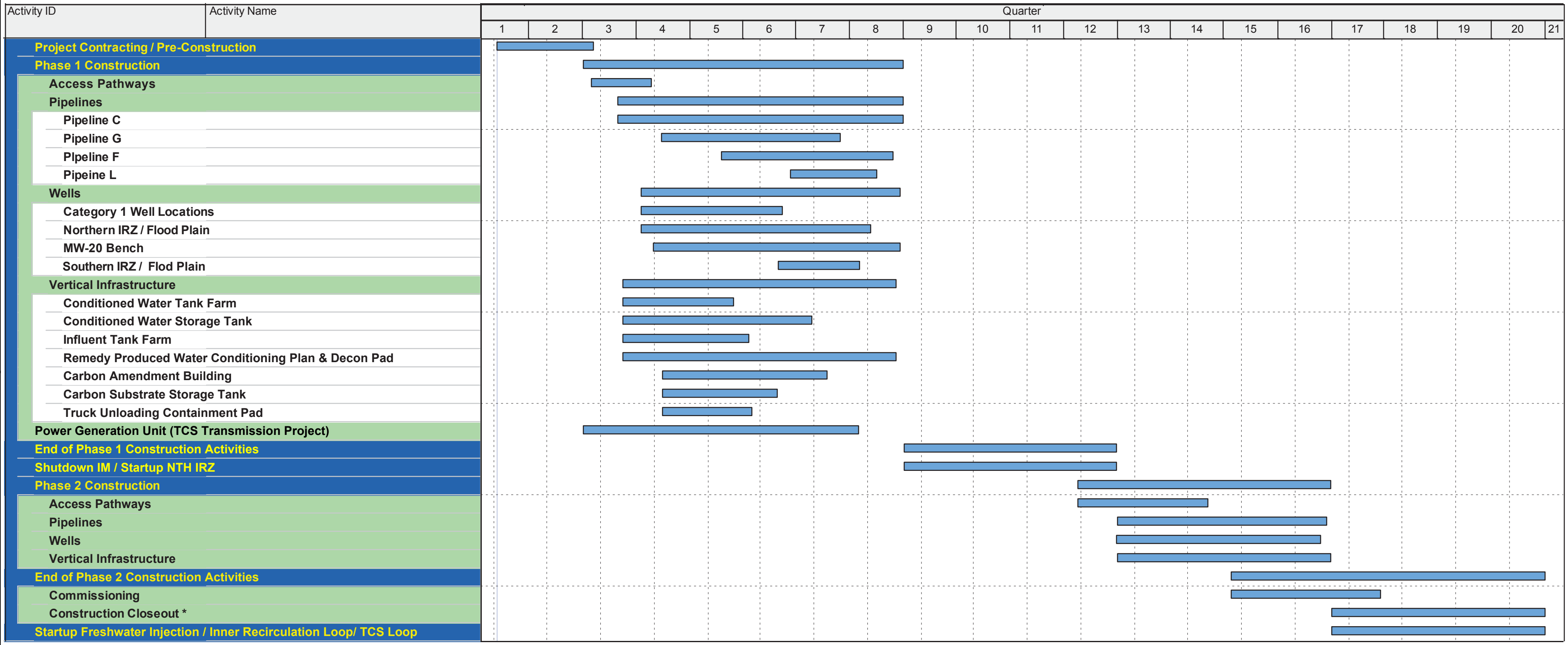
At this time and assuming the appropriate approvals are acquired, the pre-construction and construction activities are scheduled to begin in July 2017. The overall tasks are summarized in the sections that follow, along with **Table 3-9**, which summarizes the tasks durations, and **Figure 3-10** that shows Project phasing. The preliminary construction schedule presented below is based on estimated durations and sequencing typical for similar projects. The exact durations and sequencing may vary to provide the safest and most efficient operation that meets project requirements. The schedule is known as an early-start schedule because it shows the earliest possible start date for each activity; the actual schedule may vary. PG&E will develop a more detailed construction schedule with more solid start dates after the approval of the final design and selection of contractors.

TABLE 3-9
ESTIMATED PRECONSTRUCTION AND CONSTRUCTION SCHEDULE

Task	Estimated Duration
Preconstruction	4 months
• Mobilization[a]	4 months
• On-Site Stakeholder Kickoff Meeting	1 day
Construction and Start-Up Activities	60 months
• Phase 1 Construction[b]	19 months
• Shutdown of IM-3 Facility; Start-up of NTH IRZ	12 months
• Phase 2 Construction[c]	12 months
• Start-up of Freshwater Injection[d]	6 months
• Start-up of IRL and TCS Recirculation Loop	6 months
• Start-up Complete; Start Full Remedy Operations	0
Construction Closeout	12 months

NOTES:
[a] Mobilization includes construction of the Construction Headquarters, the Soil Processing Area, construction water connection, and demarcation/setup of staging areas.
[b] Phase 1 includes NTH IRZ, MW-20 Carbon Amendment Facility, carbon substrate storage, Remedy-Produced Water Conditioning Facility, power supply, Category 1 wells, and IRZ monitoring wells. Category 1 well installation will begin concurrently with Mobilization period.
[c] Phase 2 includes remaining systems (River Bank Extraction System, Freshwater Injection System, Inner Recirculation Loop, and TCS Recirculation Loop, and Category 2 and 3 wells)
[d] Contingent Freshwater Treatment System would require 11 weeks to construct if needed.

SOURCE: Adapted from Project schedule dated October 16, 2016 (an October 2016 Consultative Work Group handout), CH2M Hill 2016.



NOTE:
* Includes preparation and submittal of the Construction Completion Report

Final Groundwater Remediation Project SEIR
Creation Date: 7/26/2016 Source: PG&E 2015

Approximate Schedule Overlap From Construction / Remedial Action Work Plan

Figure 3-10

ESA
North State Resources

3.7.2 Pre-Construction, Construction, and Start-Up

The pre-construction, construction, and start-up of the Project are estimated to occur over an approximately 5-year period, following DTSC and DOI approval of the Final Remedy Design and C/RAWP. This includes time for contracting, mobilization, construction, start-up, IM-3 Facility shutdown, and construction closeout activities, among other activities, some of which are not entirely field construction activities in the strict sense. Currently, construction and start-up are proposed in two phases:

- The first phase is projected to include pre-construction activities and construction of the NTH IRZ and associated supporting infrastructure, installation of high priority wells (e.g., Category 1), and key mobilization and site preparation activities such as construction of the Construction Headquarters. Supporting infrastructure projected to be constructed during this phase includes access-roadways, pipelines, vertical infrastructure (e.g., carbon storage and amendment facility, remedy-produced water conditioning plant, power supply), and monitoring wells associated with the NTH IRZ system. Following construction and associated functional testing of the NTH IRZ and supporting systems, the Interim Measure is proposed to be turned off, and the NTH IRZ cutoff line would then be established. During start-up of the NTH IRZ, some limited construction closeout activities are expected. The estimated duration for the first phase of construction and start-up is approximately 2.5 years.
- The second phase is projected to include construction of the remaining systems (River Bank Extraction Wells, IRL, TCS Recirculation Loop, and freshwater injection), and associated supporting infrastructure, remaining monitoring wells (e.g., Categories 2 and 3), and associated pipelines, access roadways, controls, and electrical and mechanical systems. Depending on the progress of construction and the plume capture effectiveness of wells installed up to that time. The installation of the Riverbank Wells could be moved up into Phase 1 as a contingency. Following construction and associated functional testing, start-up of the remaining systems and construction closeout would occur. The proposed construction sequence is subject to change based on baseline data collected and analyzed and data collected and analyzed during first phase operation of the NTH IRZ. The estimated duration for the second phase of construction and start-up is approximately 12 months. Phase 2 may overlap the end of Phase 1 by a month or two, depending on the progress of construction.

The durations and sequencing that would be used for construction and system start-up depend on a number of uncertainties associated with construction scheduling, including specialized equipment availability; the size/structure/scope of the construction contract(s); constraints imposed by operations at the TCS; constraints imposed by landowners, leaseholders, and other adjacent property users; constraints in place to protect sensitive resources including but not limited to cultural and biological resources; and site conditions encountered in the field.

Start-up of the remedy involves those activities required to start the remedy system and fine-tune system operations based on performance monitoring. Start-up activities can generally begin once functional testing is complete and the permanent remedy power supply has been established. Start-up activities would generally occur concurrent with construction closeout activities for each phase.

3.7.3 Operation and Maintenance

Operation and maintenance would begin following start-up of the various remedy systems. Within approximately 1 to 3 years of the beginning of remedy start-up, which is when remedy components have been constructed, tested, and found to be operational. DTSC will evaluate and determine if the remedy is considered to be "Operating Properly and Successfully," meaning: (a) the remedy is operating as designed; (b) the information obtained from remedy operation indicates that the remedy is protective of human health and the environment; and (c) the remedy is likely to be able to achieve the cleanup levels or performance goals defined in the DTSC's Statement of Basis (DTSC 2010) and the DOI's Record of Decision for the groundwater remedy at the PG&E Topock Site (DOI 2010). Data collected during the operation and maintenance period would be used to update model projections of the anticipated active remediation duration. Currently, the anticipated duration is approximately 30 years of active remediation followed by up to approximately 10 years of long-term monitoring and up to approximately 20 years of arsenic monitoring, which would occur concurrently with the long-term monitoring for the first 10 years. This estimated timeframe does not account for additional time for monitoring that may be required if monitored natural attenuation is selected for portions of the plume and extends past the 10 years of long-term monitoring.

3.7.4 IM-3 Facility Decommissioning and Restoration

After receipt of approval for IM-3 Facility decommissioning by DTSC, with concurrence from the DOI, PG&E would decommission IM-3 Facility in accordance with an approved work plan. The estimated duration for the decommissioning and removal of IM-3 is approximately 1.5 years. After completion of IM-3 Facility decommissioning and removal, PG&E would submit a site-specific IM-3 Facility Restoration Plan, which would be reviewed by appropriate agencies and Tribes. The estimated duration for restoration is approximately 5 to 6 years.

3.7.5 Remedy Decommissioning and Restoration

Decommissioning of the groundwater remedy infrastructure would begin following the attainment of the cleanup objectives and/or the determination that the remedy facilities are no longer needed (estimated at 40 years). Once the completion criteria/performance standards for the groundwater remedy are met to the satisfaction of the agencies, PG&E would submit a plan to decommission the final groundwater remedy. Because of heterogeneity in the aquifer at the Topock site, it is expected that during the decades-long operation and maintenance period, there would be portions of the site that attain the completion criteria/performance standards at different times. During future evaluations, such as 5-year reviews, distinct geographical areas of the site may be identified where criteria/standards have been attained and/or where optimization of treatment would be necessary. If the agencies determine, based on data provided by PG&E, that monitored natural attenuation is appropriate to address residual chromium, the remedy facilities in those geographical areas may be altered or decommissioned in accordance with a decommissioning plan.

Currently, the steps and schedules for decommissioning and restoration are general and therefore analyzed in this SEIR to the extent such feature activities are foreseeable at this time. Decommissioning and restoration of remedy components is projected to occur decades in the future and would be affected by information and conditions that become available prior to and at the time of decommissioning and restoration. The steps and schedule for decommissioning and restoration may occur during multiple mobilizations and would be affected by the specific infrastructure to be decommissioned. Decommissioning and restoration activities are discussed in Section 3.8 below.

In general, restoration activities would not begin until after the completion of Phase 2 construction activities. However, some restoration activities would begin during Phase 1 (e.g., restoration of disturbed areas after well installation activities have been completed, revegetation to offset habitat loss that could not be avoided during construction) and the remaining restoration activities would not be completed until after the groundwater remedy has been completed and the groundwater remedy components have been removed.

3.7.6 Task Durations and Staffing

The phasing of the construction schedule is focused on transitioning from the IM-3 Facility system to the Final Groundwater Remedy Project as expeditiously as practical and consistent with the terms of the Settlement Agreement with FMIT. Table 3-9 summarizes the preconstruction and construction tasks and the forecasted durations associated with implementation of the Final Groundwater Remedy Project. The durations are best estimates and may vary depending on field conditions.

Mobilization would include moving personnel and equipment to the site, building the Construction Headquarters, setting up the soil-processing/clean-soil storage area, and establishing associated utilities and services for the Construction Headquarters. Site preparation would begin as mobilization progresses. It would include preparing temporary staging and work areas, including the construction water-filling station; installing temporary site controls (fencing, erosion control, etc.); conducting geophysical surveys to locate utilities; and demarcating sensitive areas. Site-specific sensitivity training and orientation would also occur during site preparation activities to inform construction workers about the biological, cultural, and historic resources in the area, consistent with mitigation measures and conditions of approval.

Site access roadway improvement would occur throughout the Project timeline as needed to provide access to primary work zones and staging areas. The construction durations for individual roadways are included in the duration for the associated construction element. For example, the time needed to construct a road leading to the primary work zone for a well or pipeline is included in the duration for that well or pipeline.

It is expected that Station construction projects not associated with the Final Groundwater Remedy Project may be active at the same general time as the remedy construction (for example, power generation). PG&E would coordinate with Station operations and sequence remedy construction to avoid conflict with the Station construction projects, as well as any delays to implementation of the groundwater remedy.

Construction of the structures on the MW-20 Bench would likely begin after completion of the portion of Pipeline C in the MW-20 Bench area. This would be done largely to avoid congestion on the MW-20 Bench. Construction of the structures on the TW Bench is part of Phase 2, and would likely begin over 2 years after the start of field construction activities to avoid congestion created by monitoring well installation. In addition, construction on the TW Bench would not start until a new road has been built to access the north side of the existing Transwestern gas pipeline metering yard.

Construction closeout activities would occur after completion of field construction activities. This group of activities includes producing record drawings and other as-built information, submitting and obtaining approval for construction completion report, soil stabilization, and demobilization.

Remedy start-up activities would be generally concurrent with construction closeout activities and the time durations may vary depending on the response of the aquifer to injection and extraction, and the shakeout response of equipment. Start-up activities include those activities required to start the remedy system and fine-tune remedy operations based on performance monitoring. These activities can generally start once commissioning activities are complete and the permanent remedy power supply has been established.

The construction, operation, maintenance, and decommissioning activities would require various trucks and vehicles to transport employees, equipment, and materials to and from the Project Area. The truck and vehicle counts, and durations are summarized in **Table 3-10**. As previously noted, the durations may vary depending on the rate of construction progress.

TABLE 3-10
SUMMARY OF NUMBERS OF ANTICIPATED WORKERS, TRUCKS, AND VEHICLES

Project Activities	Estimated Duration	Number of Trucks and Vehicles
Mobilization	4 months	During a maximum work week, there would be approximately 80 workers and 30 delivery truck trips to and from the work site.
Phase 1 Construction including Functional Testing[a]	19 months of construction, including functional testing	For construction activities, during a maximum work week, there would be approximately 168 workers, 115 delivery truck trips to and from the work site, and 560 worker vehicle trips to and from the work site per week.[b] For functional testing, there would be 12 additional vehicles (4 technicians, 4 instrumentation specialists, 4 engineers).
Start-up and operation and maintenance of NTH IRZ[b]	12 months for start-up 30 years for operation and maintenance	For operation and maintenance activities under worst case scenario (i.e., including future provisional wells and contingent systems), on a peak day there would be approximately 24 vehicles and 20 trucks. For start-up, on a peak day there would be approximately 2 or 3 additional vehicles (1 operator, 1 or 2 engineers).
Phase 2 Construction	12 months of construction, including functional testing	For construction activities, during a maximum work week, there would be approximately 181 workers, 105 delivery truck trips to and from the work site, and 603 worker vehicle trips to and from the work site per week.[b] For functional testing, there would be 12 additional vehicles (4 technicians, 4 instrumentation specialists, 4 engineers).
Start-up and operation and maintenance of remaining system	12 months for start-up 30 years for operation and maintenance	For operation and maintenance activities under worst case scenario (i.e., including future provisional wells and contingent systems), on a peak day there would be approximately 24 vehicles and 20 trucks. For start-up, on a peak day there would be approximately 2 or 3 additional vehicles (1 operator, 1 or 2 engineers).
Potential off-site wastewater disposal[c]	4 events	Assuming a 6,000-gallon truck hauling 15 million gallons would require 2,500 trucks resulting in 5,000 truck trips to and from the site.
Contingent Freshwater Treatment System	Up to 11 weeks	Construction crew vehicle trips would be 310; CM/monitors vehicle trips would be 130.
Decommissioning and Removal of IM-3 Facility	15 months	For IM-3 Facility decommissioning activities, during a maximum work week, there would be approximately 33 workers, 25 delivery truck trips to and from the work site and 117 worker vehicle trips to and from the work site per week.
Decommissioning and Removal of Remedy	12 months	For remedy decommissioning activities, during a maximum work week, there would be approximately 69 workers, 75 delivery truck trips to and from the work site and 240 worker vehicle trips to and from the work site.

NOTES:
[a] These Project phases are illustrated in the Final Remedy Design (CH2M Hill 2015a), Figure ES-2.
[b] Basis for vehicle trip counts:

Daily trips per vehicle: 1 morning, 1 lunch, 1 back from lunch, 1 p.m.	2	daily round trips per car
Assumed number of equipment/materials deliveries per day	1	daily round trips per site
IDW Management soil transfer trips per day	2	daily round trips per crew

[c] See Section 3.6.2.6 for discussion of potential need for this activity.

SOURCE: PG&E 2015.

3.7.7 Project Working Hours

Implementation of the Project would involve construction activities throughout the construction, operation and maintenance, and decommissioning phases. The primary working hours for field construction activities would be between 7:00 a.m. and 5:00 p.m., Monday through Friday. The term “field construction work” includes construction activities at the primary work zones and staging areas throughout the Project Area, but does not include preparatory or support activities at the Construction Headquarters, the Soil Processing Area, or within the Station, which could occur in the hours leading up to 7:00 a.m. and following 5:00 p.m. All work hours are subject to and are superseded by all immediate-effect health and safety related stand-downs (e.g., wind, lightning, fire, or excessive heat shutdowns or incident-related shutdowns). The following construction-associated work could occur outside of the default working hours:

- Activity at the Construction Headquarters, Soil Processing Area, and within the Station to allow for morning safety meetings, contractor equipment/materials preparation, equipment/materials deliveries, post-work day meetings, and office-based work construction office facilities at the Construction Headquarters or elsewhere.
- Biological, environmental, cultural, and archeological monitors could perform survey activities at field construction sites outside of the standard construction hours as needed to perform required survey tasks to allow construction to take place within allowable construction hours.
- Contractors may begin transferring workers, equipment, and materials to primary work zones and/or staging areas shortly before 7:00 a.m. to be able to begin work promptly at 7:00 a.m. In addition, in order to meet the 5:00 p.m. end-of-day requirement, contractors would likely begin daily work site cleanup and demobilization activities earlier, to ensure that they can be completely vacate the work sites by 5:00 p.m.
- Delivery of materials/equipment to site may be allowed to occur past the default end-of-day time of 5:00 p.m., on a case-by-case basis.

Workers have the ability to work using a “4-10” schedule. The “4-10” schedule would allow field construction work hours between 6:00 a.m. to 6:00 p.m., Monday through Thursday or Tuesday through Friday. This schedule is preferred by contractors when planned work requires significant daily equipment/materials setup and takedown time, and where there is sufficient daylight to allow extended daily work hours. Extending the work hours for a single day allows for additional productive work to take place. For example, pipeline installation work generally requires 2-3 hours of daily setup and takedown time, resulting in 5 to 6 hours of productive time under a standard 8-hour day. A “4-10” schedule allows for 7 to 8 productive hours per work day, and gives workers an extra day off to account for longer work days.

Given the climate in the Project Area, workers may elect to work during cooler parts of the day and minimize safety risks associated with working during peak daily temperatures. Requiring work to take place during peak temperature summer hours subjects workers to unnecessary health risks, imposes extensive worker monitoring, and reduces productivity. In addition, certain construction tasks themselves are difficult or impossible to complete in very high temperatures (e.g., concrete pours, controls equipment installation, working on exposed steel). Under seasonal modifications, work hours would be adjusted to begin earlier in the day. Work hours could be modified to 4:00 a.m. to 2:00 p.m. or 5:00 a.m. to 3:00 p.m. Monday through Friday under a 5-day working schedule, and 4:00 a.m. through 4:00 p.m. or 5:00 a.m. through 5:00 p.m. Monday through Thursday or Tuesday through Friday under a “4-10” working schedule. As described above, surveys and pre- and post-work activity could still occur outside of construction work hours. Temporary construction lighting may be required at the start of the day depending on the time of year this work is occurring.

Certain tasks may require work to extend outside of established working hours, and/or extend into weekend days (Saturday/Sunday). For example well drilling and testing are long-duration tasks that may need to continue to completion once begun, which would require extending work hours for these tasks and required supporting tasks (water management, soil management, biological/cultural/archeological monitoring) beyond the default construction hours. Concrete pours are also not done in very high temperatures, and have to be completed in a single continuous effort. These tasks would be identified during development of detailed contractor work schedules, and may also require temporary construction lighting.

3.8 Decommissioning and Restoration

3.8.1 IM-3 Facility

As stipulated in the Settlement Agreement (Superior Court of California 2013), not later than 30 days after the DTSC determines that the groundwater remedy is achieving plume control, the groundwater remedy is operating properly and successfully, and the DOI concurs with the decommissioning, DTSC shall issue a written approval to PG&E to decommission and remove the IM-3 Facility system. However, during the response to comment process for the 90% design (CH2M Hill 2014), DTSC stated that it may require some existing wells to be retained to avoid drilling additional wells. As stated in the 90% comment #1152, some of those wells (e.g., TW-series wells) may be used as part of the groundwater remedy and would be evaluated on a case-by-case basis before decommissioning at the direction of the DTSC. The IM-3 Facility system shall be turned off when the groundwater remedy equipment and facilities are in place, and ready to begin start-up. The remedy equipment and facilities may include some or all of the following: NTH IRZ wells, the monitoring wells, the pipelines, and/or other systems (e.g., controls, electrical) needed to operate these wells. Following notice from PG&E that the system is ready to be turned off, DTSC will advise PG&E whether it concurs that the IM-3 Facility system is ready to be turned off. Once DTSC has provided PG&E with such concurrence, PG&E will turn off the IM-3 Facility system. (Further details regarding this procedure are set forth in Exhibit A to the 2012 Settlement Agreement between DTSC and the FMIT).

The IM-3 Facility system components that would be removed, pending DTSC approval and with concurrence from DOI, consist of the following:

- There are three extraction wells in the MW-20 Bench area of the site (TW-2S, TW-2D, and TW-3D) and one extraction well in the floodplain (PE-1), as well as ancillary well equipment and vaults. There are two injection wells in the East Mesa area of the site (IW-2 and IW-3) and power supply infrastructure located at this site. Prior to decommissioning the wells, submersible pumps in the extraction wells, air-lift tubing in the injection wells, and pipes, valves, and instruments in both the extraction and injection well vaults would be removed. Conduit, electrical panels, and other features within a well vault would also be removed.

- Underground conveyance piping and vaults are located between the extraction wells and the treatment plant. After successful decontamination or cleaning, unneeded underground pipelines, conduits and well vaults for Wells PE-1, IW-2, and IW-3 would be removed and the locations restored to pre-project conditions.
- The entire IM-3 Facility, including equipment, pipelines, valves, instrumentation, utilities, and infrastructure underneath the sunshade, the sunshade, mobile warehouse units, trailer, treatment plant foundation and secondary containment areas, underground pipelines and utilities within the footprint of the treatment plant fence line, and security fence and gate would be removed.
- Underground and aboveground pipelines, and instrumentation conduit between treatment plant and injection well field would be removed in accordance with Agencies' direction unless otherwise agreed to and/or directed by the landowner.
- Support facilities are located on the MW-20 Bench and include Valve Vault #1, pumps, valves, pipelines, electrical, and instrumentation associated with the extraction wells, parking areas, security fence and gates, security system, lighting, and other ancillary equipment. Most of these components would be reused for the Final Groundwater Remedy Project.

Existing monitoring wells and their instrumentation that are currently used to monitor the IM-3 Facility performance would be reused as part of the monitoring network associated with the final groundwater remedy, and therefore would not be decommissioned. Decommissioning of existing wells and their instrumentation would be addressed as part of the decommissioning of the groundwater remedy.

The brine storage and loading facility (three tanks, the truck lane, and associated pumps and conveyance piping) also would be reused by the groundwater remedy in its existing location at the MW-20 Bench. No aboveground component of the existing IM-3 system located within the footprint of the existing IM-3 Facility building, or within the IM-3 Facility fence line, would be reused in its current location as part of the groundwater remedy. Approximately 500,000 kWh is anticipated to be used during decommissioning of the IM-3 Facility and associated site restoration, discussed in the following pages.

3.8.1.1 Site-Specific IM-3 Facility Restoration Plan

As discussed in the IM-3 Decommissioning Work Plan (Appendix F of the C/RAWP), PG&E would submit a Site-Specific IM-3 Restoration Plan for review and approval prior to implementation. The restoration plan would include a restoration design to meet the project objectives, an adaptive management approach that allows for evaluation of the effectiveness of the restoration through monitoring, long-term management of the site, and reporting.

PG&E would develop the Restoration Plan in consultation with the affected land owners and managers, including the FMIT, regulatory agencies (DTSC, BOR, and BLM), and Signatories and Invited Signatories to the Programmatic Agreement, and the Tribes. Some details of the more detailed Restoration Plan would be deferred until after the completion of the IM-3 Facility decommissioning, so that the Tribes and PG&E can further evaluate restoration approaches that would minimize further disturbance and earth movement. The completion of the removal of system facilities would better facilitate developing the restoration approaches.

3.8.2 Final Groundwater Remedy Facilities

As discussed in the Final Remedy Design, the decommissioning process would occur decades in the future and would be subject to change based on information and conditions that would become available prior to and at the time of remedy decommissioning. To account for this, once the RAOs for the groundwater remedy are met to the satisfaction of the agencies, PG&E would submit a Remedy Decommissioning Plan to DTSC and DOI for consideration and approval within 120 days of agency certification that the RAOs have been met. Consequently, the decommissioning steps described in the Final Remedy Design are general and conceptual. Most of the groundwater remedy facilities and components would be decommissioned and removed with certain exceptions discussed further in this section. After decommissioning and removal of the facilities, the areas would be restored using decompaction and grading techniques designed to decrease erosion and accelerate revegetation of native species (if requested by landowner). Decommissioning of groundwater treatment facilities at the Project Area could occur in separate phases, as described in the following subsections.

3.8.2.1 Decommissioning Plan

In compliance with the 2013 Consent Decree executed with the DOI, PG&E would submit a decommissioning plan within 120 days of the agencies' certification of completion of the remedial action and a determination that removal of such facilities is protective of human health and the environment. The decommissioning plan would describe procedures for the removal of the remedy facilities and associated infrastructure. The plan would also describe the post-remedy restoration of the site to the conditions existing prior to the implementation of the remedy construction, to the extent practicable. In addition, biological surveys would be conducted prior to decommissioning and during the breeding season, to inform the decommissioning planning process.

3.8.2.2 Wells

The decommissioning of wells would be in accordance with the CCR and the Standard Operating Procedure Well-SOP-01 in the O&M Manual, Volume 1, Appendix B, which complies with the standard well decommissioning procedures required by San Bernardino County and the California Water Resources Department (Bulletins 74-81 and 74-90), as well as Arizona regulations. The process would include either decommissioning the well in place (e.g., placing sealing material within the well casing) or removing the well (e.g., overdrilling). Typically, the top 5 feet of casing (including the concrete vault and any above-grade monument or concrete pad and protective bollards) would be removed. Surficial soil excavated from the hole would typically be placed back in the excavation as backfill; imported fill or other appropriate material would be added to the excavation to reach existing grade. As remedy decommissioning would occur decades from now, technological innovation and regulatory advancement could result in different processes for well decommissioning. It is anticipated that decommissioning activities will adapt and follow the lawful decommissioning standards in effect at the time of decommissioning.

Typical equipment that may be used for decommissioning wells includes drill rigs, support vehicles, backhoes, dump trucks, front loaders, cement trucks or trailers, and/or pump service trucks. The length of time required to decommission a well is anticipated to be between 1 day and 2 weeks per well depending on the procedure, location, condition, and design of the well. Some vegetation trimming and/or clearance may be necessary to accommodate equipment for the decommissioning activities. Investigation- derived waste materials that would be generated during well decommissioning may include incidental trash, the 5-foot-long sections of well casing that would be cut off the top of the well removed from the borehole, other well materials as described previously, soil and some amount of groundwater mixed with cement residue. Incidental trash typically includes excess cement, empty cement and sand bags, pallets, empty drink and food containers, plastic sheeting, and other disposables associated with construction work. Incidental trash would be placed in dumpsters or roll-off bins that would be hauled off-site periodically by truck to an appropriate disposal or recycling facility.

Conveyance piping and instruments in the well vaults would be decontaminated as appropriate and reused or disposed of as nonhazardous waste along with the additional incidental waste, or sold to a salvage company. Decontamination water or groundwater generated during the decommissioning operation would be managed as described in Section 3.8.2.7. The concrete vault would be either removed intact or broken into pieces for subsequent disposal. The amount of investigation-derived waste materials that may be generated per well range from 5 to 20 cubic yards of solid waste, and up to 2,000 gallons of water. The volume of soil/grout cuttings when overdrilling is needed for well decommissioning would depend on the length of the well.

3.8.2.3 Carbon Substrate Storage Facilities

Decommissioning the carbon substrate storage facilities would include removing the above-grade treatment facilities from the site. Removed materials would be reused, transported to an off-site disposal facility, or sold as scrap material. Equipment would be decontaminated as appropriate, such as by power washing. Decontamination wash water would be managed as described in Section 3.8.2.7. Regrading by placement of imported fill or other appropriate materials would typically be completed if foundation materials for the treatment facilities are removed during decommissioning.

3.8.2.4 Freshwater Flushing

While most facilities would be expected to be decommissioned following the completion of the remedial action, it is possible that water supply wells may not be decommissioned and that they could be transferred to another use after agencies and landowner concurrence.

3.8.2.5 Fluid Conveyance, Utilities, Buildings, and Roadways

Pipelines would be decontaminated as appropriate. Aboveground conveyance piping would be removed and either reused or disposed off-site as scrap material. It is DTSC's general direction to PG&E that all underground utilities and infrastructure should be removed to the extent practicable at the time of remedy decommissioning and the locations restored to pre-project conditions to the extent practical; however, it is possible that some infrastructure could be transferred to another use after agencies and landowner concurrence.

Decontamination wash water would be managed as described in Section 3.8.2.7. Electrical utilities would be disconnected from their service points and unused underground conduit would be removed and the locations restored to pre-project conditions to the extent practical. Underground electrical and conveyance piping conduit and vaults would be excavated, removed, and the locations restored to pre-project conditions or could be transferred to another use after agencies and landowner concurrence. Aboveground conduit would be removed with the conveyance piping. Electrical cable would be disposed of or sold for salvage value. Waste materials described above would be disposed of at a permitted off-site disposal facility (for the purpose of the SEIR analysis, a disposal facility located within approximately 200 miles of the site is used). As wells and other infrastructure are removed and it is determined that access roads are no longer necessary, roads would be decommissioned from further use. The efforts involved in decommissioning would be dependent on the type of road (could be paved with asphalt, covered in gravel, or left unpaved) and the location of road (such as in previously disturbed areas or areas that were in a more natural state prior to the Final Remedy Design). As discussed in Section 3.8.2.6, some components may be retained for other non-project uses. In such cases, some trenches may only be partially decommissioned.

Areas that are decommissioned from further use as roads would be restored back to pre-project conditions to the extent practical. After deconstruction and decommissioning of the facilities, the areas would be restored using decompaction and grading techniques designed to decrease erosion and accelerate revegetation of native species (if requested by landowner) or as directed.

Similarly, buildings would be decommissioned and decontaminated as appropriate. Buildings would be removed and the locations restored to pre-project conditions to the extent practical or could be transferred to another use after agencies and landowner concurrence. As previously noted, it is DTSC's general direction to PG&E that all infrastructure should be removed to the extent practicable at the time of remedy decommissioning and the locations restored to pre-project conditions to the extent practical.

3.8.2.6 Remedy Components to Remain

PG&E has proposed that the following components be left in place:

- Freshwater pipeline under I-40.
- Conveyance piping and conduits located in or under paved public roads.
- Subsurface infrastructure that property owners or land managers request not be removed providing the request is approved by the DTSC and DOI.
- Aboveground infrastructure that property owners or land managers request not be removed providing the request is approved by the DTSC and DOI.

PG&E will work with the agencies and landowners to incorporate their preference at the time of decommissioning for removal or abandonment in place. It is DTSC's general direction to PG&E

that all underground utilities and infrastructure should be removed to the extent practicable at the time of remedy decommissioning and the locations restored to pre-project conditions to the extent practical; however, it is possible that some infrastructures could be transferred to another use after agencies and landowner concurrence.

3.8.2.7 Water Management and Soil Disturbance

Decontamination water generated from decommissioning activities would be managed based on water quality of the decontamination water and in conformance with applicable regulations. Disposal options would include: (1) on-site by disposal at the TCS evaporation ponds, (2) on-site use of permitted transportable treatment units (see Section 3.6.1.5 for description), or (3) disposal at an off-site disposal facility.

In general, activities associated with removal of infrastructure are anticipated to occupy about the same footprint and lesser amount of soil disturbance. Because future soil disturbance would occur at the same location with similar or smaller footprint as that for construction, the amount of future soil disturbance would not be counted against the estimated volume of soil disturbance in Table 3-4.

3.9 Site Access

3.9.1 Access to Federal Lands

Remedial infrastructure is planned on federal lands, including lands administered by BOR (managed by BLM) and Havasu National Wildlife Refuge (managed by USFWS). The Record of Decision, Consent Decree, and DOI's approval of the Construction/Remedial Action Work Plan constitute permission to implement the groundwater remedy. No other permit applications or approvals for access to federal lands would be required before field implementation.

3.9.2 Access to Non-Federal Lands

Remedial infrastructure is planned on non-federal lands, including lands owned by BNSF Railway, Kinder Morgan, the FMIT, and private property owners in the Topock Marina area. In addition, infrastructure is planned on county roadways or their ROWs (San Bernardino County, California, and Mohave County, Arizona) as well as roadways/ROWs of state transportation agencies (Caltrans, ADOT). Where remedial infrastructure crosses or travels along utility easements, a consent to common use agreement or other notification process would be implemented, as appropriate.

Pursuant to CERCLA Section 121(e), activities conducted on-site are exempt from obtaining federal, state, or local permits or complying with other procedural requirements. However, PG&E is still required to comply with the substantive requirements of the identified location and action specific ARARs. The following is a list of approvals/permits/agreements that PG&E anticipates obtaining for the Project:

- Encroachment permits from ADOT and Caltrans for pipeline segment under I-40.

- Easement(s) from BNSF for pipeline segments and access roads under land owned by BNSF.
- License from San Bernardino and Mohave Counties for infrastructure in the county roadways and ROWs.
- Any necessary approvals from California and Arizona State Lands for the crossing of the Colorado River via the Arched Bridge.
- Consent to common-use agreements or other appropriate notification requirements with utility companies for remedial infrastructure on their lands or within their easements and ROWs.
- Access agreements with private property owners for remedial structures on their lands, where such agreements do not otherwise exist.
- Land Use Covenant for PG&E's Topock Compressor Station parcel to be executed with DTSC.

It should be noted that under the Settlement Agreement between PG&E and the FMIT, PG&E has access to the land owned by the FMIT to implement the groundwater remedy. More specifically, the 2009 Easement Agreement between the FMIT and PG&E covers access as well as activities such as operation and maintenance of facilities. The FMIT's preference to limit such activity to the extent practicable and to have as little remedial infrastructure placed on its property as possible is recognized; this preference has been, and would continue to be, considered during the development of the design, consistent with the provisions of the Easement Agreement and the 2006 Settlement Agreement. For example, in siting arsenic monitoring wells during the 90% design, PG&E relocated the freshwater injection Well FW-1 in order to use two installed monitoring well clusters and thereby avoided drilling additional new monitoring wells on the FMIT property.

3.10 Intended Uses of This SEIR

DTSC intends to use this SEIR for all further decisions and activities associated with implementing the Final Remedy Design, C/RAWP, decommissioning Work Plan, site-specific IM-3 Restoration Plan, and completion reports associated Final Groundwater Remedy, as evaluated in this SEIR. The Future Activity Allowance has been included in the Project Description and evaluation to further that objective, and to be sure that potentially foreseeable activities are included in the SEIR analysis. DTSC may also approve other related activities, such as existing well reconditioning or replacement work, groundwater investigation, characterization related activities, and activities determined by DTSC to be necessary to meet the completion criteria/performance standards for the Final Groundwater Remedy to the satisfaction of DTSC and DOI. If there is a future proposed activity in connection with the Final Groundwater Remedy, such as the installation of additional infrastructure beyond that specifically set forth in the Final Remedy Design, C/RAWP, and other associated Project documents, DTSC will evaluate whether that activity is within the applicable parameter set forth in this SEIR, including the Final Remedy Design, C/RAWP, and the Future Activity Allowance, and DTSC will also consider whether the location of the activity is within the Project Area. If the activity is found to be within the applicable parameter and within the Project Area (i.e., within the scope of this SEIR), that activity would likely be considered to have been covered by the evaluation in this SEIR and no further CEQA analysis would be conducted.

If, however, the activity is outside the applicable parameter of activity analyzed in the SEIR DTSC would consider whether the approval was a "discretionary approval of a project" under CEQA and, if so, would apply the provisions of Public Resources Code 21166 and the implementing CEQA Guidelines 15162 through 15163 in determining whether further CEQA would be required, and the scope and form of that further CEQA review.

The CEQA Guidelines identify the lead agency as the public agency with the principal responsibility for carrying out or approving a project (Section 15367). DTSC is the CEQA lead agency for the Final Groundwater Remedy Project because DTSC has the primary approval authority for the Project.

A number of other agencies in addition to DTSC will serve as responsible and trustee agencies, pursuant to CEQA Guidelines Section 15381 and Section 15386, respectively. This SEIR provides environmental information to these and other public agencies, which may be required to grant approvals or otherwise coordinate with DTSC, PG&E, or other agencies as part of Project implementation. For the purposes of CEQA, the term "responsible agency" includes all state and local public agencies other than the lead agency that have discretionary approval power over the project (14 CCR Section 15381). "Trustee agencies" are state agencies that have jurisdiction by law over natural resources affected by the project and held in trust for the people of the state of California. Future discretionary approvals may include issuance of a permit, if not otherwise exempt as explained below, or other required action. Responsible agencies may consider and use the analysis provided in this SEIR to satisfy their responsibilities under CEQA, as they deem appropriate. Federal agencies may review the SEIR and submit comments and/or use the information in this SEIR as part of their own approval processes.

As noted, CERCLA as implemented by DOI includes an exemption for removal or remedial actions conducted entirely on-site, and where such remedial action is selected and carried out in compliance with Section 121. Specifically, CERCLA Section 121(e)(1) provides that: "No Federal, State, or local permit shall be required for the portion of any removal or remedial action conducted entirely on-site, where such remedial action is selected and carried out in compliance with this section." (See 42 U.S.C. Section 9621 [e][1], also referred to as Section 121[e][1]). The Code of Federal Regulations provide that: "[t]he term on-site means the areal extent of contamination and all suitable areas in very close proximity to the contamination necessary for implementation of the response action." (40 CFR Sections 300 and 400[e][1]). Substantive requirements that would be required by a particular law, however, must still be attained after conferring with the applicable agency, consistent with the requirements of CERCLA. The general intent behind the provisions described in this section is that CERCLA actions should not be delayed by time-consuming and duplicative administrative requirements such as permitting, although remedial remedies should achieve the substantive standards of otherwise applicable laws.

The on-site portions of remedial actions taken under CERCLA authority administered by DOI must meet the substantive provisions of promulgated requirements that are ARARs, which were determined by DOI, BLM, USFWS, and Bureau of Reclamation (DOI 2009). ARARs must be attained by the remedial action pursuant to Section 121(d) of CERCLA, which assures protection of human health and the environment, and requires attainment of “legally applicable or relevant and appropriate standard(s), requirement(s), criteria, or limitation(s).” There are four basic criteria that define ARARs: (1) substantive rather than administrative, (2) applicable or relevant and appropriate, (3) promulgated state requirements which are more stringent than comparable federal standards, and (4) categorized as Chemical-specific, Location-specific, or Action-specific. ARARs were considered in the preparation of the Final CMS/FS, and are included as Appendix B to that document. Criteria, guidance, advisories, and proposed standards that are not legally binding are not ARARs, but may be considered and used as appropriate to ensure the protectiveness of the remedy. These are referred to as “To Be Considered” criteria (TBCs). DOI, as the lead agency for remedial actions taken under CERCLA authority, has established a list of ARARs and TBCs for the site, which is presented in the Final Corrective Measures Study/Feasibility for Solid Waste Management Unit 1 (SWMU 1)/Area of Concern 1 (AOC 1) and AOC 10 (Final CMS/FS) (CH2M Hill 2009), and included as Appendix CMS to the Groundwater FEIR.

In accordance with the Topock Remedial Design/Remedial Action Consent Decree (CD) between PG&E and the United States, on behalf of DOI, which was approved by the District court for the Central District of California in November 2013, the various response and corrective actions required to clean up groundwater contamination within the Project Area are exempt from obtaining permits pursuant to CERCLA Section 121(e)(1). If the exemption is found not to apply for any reason, a permit may be required. Because it is unclear what specific future actions may be requested by PG&E in the future, DTSC is unable to conclude with absolute certainty that the CERCLA exemption will be found to apply to all future actions that may arise. As discussed throughout this EIR, therefore, some of the following agencies may need to issue permits or approvals relating to the following activities if not otherwise deemed exempt under CERCLA.

This SEIR is intended to be used as the primary CEQA document for any permits or approvals from DTSC or other California public agencies which may be required for implementation of the remedial action as described in this SEIR, including investigatory, maintenance, repair, and infrastructure replacement activities.

3.10.1 Responsible and Trustee Agencies

Responsible and trustee agencies may include, but are not limited to, the following state, regional, and local agencies in California:

- The State of California Colorado River Basin RWQCB for Clean Water Act (CWA) may issue or modify waste discharge requirements pursuant to the Porter-Cologne Water Quality Control Act for the existing evaporation ponds at the Topock Compressor Station, relating to the disposal of water from the remedy construction and operation. Additionally, the Project may obtain coverage under the General Construction Activity Stormwater National Pollutant Discharge Elimination System (NPDES) permit (33 U.S. Code Section 1341). The NPDES General Construction Permit is issued by the SWRCB. In order to obtain coverage under this permit, a Notice of Intent and Storm Water Pollution Prevention Plan must be submitted to the RWQCB. The RWQCB may also use this EIR as the CEQA document for any other approvals that may be required for response and remediation activities as a responsible agency and pursuant to the CEQA Guidelines Section 15096.

- The California State Lands Commission (CSLC) may act as a responsible agency for issuance of ROWs or leases for Project activities that would occur on land owned or managed by the CSLC.
- In addition to its role in approving investigations on lands held by the state, the CSLC is a responsible agency regarding state-owned “sovereign” lands such as the beds of navigable waters.
- The California Department of Fish and Wildlife (CDFW) may be asked to issue permits pursuant to the California Endangered Species Act (California Fish and Game Code Section 2081 for listed species and may be asked to approve one or more streambed alteration agreements (California Fish and Game Code Section 1600 et seq.) for alteration of the bed or banks of surface waters. CDFW is also a trustee agency responsible for protecting fish and wildlife resources in the state.
- The California Department of Transportation (Caltrans) may be asked to issue ROW or leases for Project activities that would occur on land owned or managed by Caltrans.
- The Mojave Desert Air Quality Management District may be consulted regarding air quality and emissions and may be asked for certain permit approvals.
- The State Historic Preservation Officer may be asked for review of projects within the State of California for purposes of protecting historic and archeological resources pursuant to the Public Resources Code, Sections 5020 et seq. and Section 21083.2 et seq.
- The Metropolitan Water District of Southern California (MWD) may be asked for ROWs or leases related to construction and operation of any portion of the Project that would occur on MWD land.
- The San Bernardino County Division of Environmental Health may be asked to approve permits for well installation and potentially for on-site treatment of hexavalent chromium in groundwater and Health and Safety Plans and Soil Management Plans related to investigation and cleanup activities at the site.
- The San Bernardino County Fire Department may be asked to approve permits for tank installations associated with the investigation and cleanup of the Project Area.

3.10.2 Federal Agencies

The following federal agencies may review the draft SEIR and submit comments and/or use the information in this draft SEIR at their own discretion and in their own approval of any federal action not otherwise exempt as part of the remediation:

- The U.S. Environmental Protection Agency is the federal agency that enforces the federal RCRA (42 U.S. Code Section 6901 et seq.) and that is responsible for oversight related to the investigation and corrective action activities being conducted at the site by DTSC under their delegated authority to implement RCRA within California.

- On July 20, 2013, the U.S. Army Corps of Engineers (USACE) issued a letter that confirmed that a Section 404 permit pursuant to the CWA (33 U.S. Code Section 1344) for project-related discharges of dredged fill into waters of the United States is not required for the Topock remediation project because the site is exempt under CERCLA 121(e)(1). Additionally, USACE confirmed that it will not verify a jurisdictional delineation for this action because a permit is not required. A Wetland Delineation Report was completed on April 18, 2014. A protocol to identify procedures to be taken to ensure the Project's compliance with Section 404 is included in the Final Remedy Design (see Appendix A3 of the Final Remedy Design).
- The BOR has oversight authority for constructions, operations and maintenance of the Lower Colorado Water Supply Project, from which PG&E derives water rights.
- On July 7, 2014, the USFWS issued a letter to the BLM and provided concurrence with the findings presented in the Programmatic Biological Assessment (PBA) for the Final Groundwater Remedy (USFWS 2014), pursuant to Section 7 of the federal Endangered Species Act (ESA) (16 U.S. Code Section 1535[a][2]). The findings in the PBA state that the proposed activities associated with the Final Groundwater Remedy were not likely to adversely affect five species listed under the ESA and were not likely to jeopardize one species proposed for listing as threatened under the ESA and one candidate species for listing under the ESA. With this concurrence, the new PBA for the Final Remedy Design became effective as of July 7, 2014.
- The BLM, USFWS, and the BOR, as land managing agencies with authority over lands on which Project activities would occur, would also be responsible for compliance with Executive Order 13007. This order requires federal agencies, to the extent practicable and permitted by law, and not clearly inconsistent with essential agency functions, to accommodate access to and ceremonial use of Native American sacred sites by Native American religious practitioners and avoid adversely affecting the physical integrity of such sacred sites. Where appropriate, agencies shall maintain the confidentiality of sacred sites.

3.10.3 Arizona Agencies

The Final Groundwater Remedy Project may require ROWs, leases, or approvals from the Arizona State Land Department, Arizona Department of Transportation, Arizona Department of Water Resources, or Arizona Department of Environmental Quality for Project activities that would occur on lands under the department's jurisdiction. Coordination or approval from Mohave County or the Arizona Department of Water Resources may be required for construction of freshwater wells and any support facilities in Arizona.

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CHAPTER 4
Environmental Analysis

The focus of Chapter 4 of this subsequent environmental impact report (SEIR) is to evaluate impacts to the environment resulting from implementation of the proposed Pacific Gas and Electric Company (PG&E) Topock Compressor Station Final Groundwater Remediation Project (Project). Sections 4.1 through 4.9 discuss the existing environmental setting (or conditions), with an emphasis on any changed conditions since the Topock Compressor Station Groundwater Remediation Project Final EIR (Groundwater FEIR; DTSC 2011) that was certified on January 31, 2011 (SCH No. 2008051003). It identifies the applicable regulatory requirements and the approach (methodology) to identifying new impacts or impacts that have an increased severity from those previously identified in the Groundwater FEIR. It provides a detailed environmental impact evaluation to determine impacts, again focused on new significant impacts or impacts where there is an increase in severity. The SEIR then identifies where mitigation measures presented in the Groundwater FEIR are still applicable, where they are no longer applicable, where they are applicable with modifications (revisions), or where new mitigation measures are necessary, in order to reduce or avoid significant impacts. Appendix GWMM to this SEIR presents a comparison between the mitigation measures included in the Groundwater FEIR as reflected in the Mitigation Monitoring and Reporting Program approved by DTSC on January 31, 2011, and those presented in this SEIR for the Final Groundwater Remedy Project.

DTSC prepared a Modified Initial Study on the Groundwater Remedy Project, based on CEQA Guidelines Appendix G, which is included as Appendix IS to this SEIR. The Modified Initial Study identifies which of the Project's effects were adequately examined in the Groundwater FEIR and which topics warrant more detailed environmental analysis. This SEIR concentrates the environmental analysis on those topics identified in the Modified Initial Study with the potential to have either new significant effects or substantially more severe significant impacts than were previously identified in the Groundwater FEIR, or those areas for which substantially modified or new mitigation measures have been provided. Those areas are as follows:

- Aesthetics
- Air Quality/Greenhouse Gas
- Biological Resources
- Cultural Resources
- Hazardous Materials
- Hydrology and Water Quality
- Noise
- Utilities, Service Systems, and Energy
- Water Supply

Each section in this SEIR that addresses the resource areas listed above (Sections 4.1 through 4.9) includes the following components:

Introduction: This subsection describes the relationship of the analysis contained in the SEIR to the Groundwater FEIR, which was certified in 2011.

Summary of 2011 Groundwater FEIR Analysis: This subsection summarizes the environmental setting and impact analysis analyzed previously in the Groundwater FEIR, off of which this SEIR is tiered.

Existing Setting: This section describes the physical characteristics and setting with regard to the *Basis of Design Report/Final (100%) Design Submittal for the Final Groundwater Remedy, PG&E Topock Compressor Station, Needles, California, November* (Final Remedy Design; Appendix BOD to this SEIR), focusing on those areas where there have been changes made to the Project, changes in the circumstances surrounding the Project, or new information discovered since the Groundwater FEIR was certified (see Public Resources Code, Section 21166; CEQA Guidelines, Sections 15162 and 15168).

Regulatory Background: This subsection presents information on the laws, regulations, plans, and policies that relate to the issue area being discussed. Regulations originating from local, state, and federal levels are discussed as appropriate.

Environmental Impacts: This subsection evaluates the potential environmental impacts associated with the proposed Project as described in Chapter 3, "Project Description," compared to the impacts identified in the Groundwater FEIR per CEQA Guidelines Section 15162. All potential Project impacts are identified alphanumerically and sequentially throughout this section. For example, in the biological resources analysis, potential impacts are identified as IMPACT BIO-1, IMPACT BIO-2, etc. The impact statement provides a summary of the impact and either a statement of potential significance or of less than significance, which is followed by a discussion that compares the SEIR impact analysis to the Groundwater FEIR impact analysis, highlighting any relevant project additions or new or changing impact determinations. For potentially significant impacts, mitigation is introduced (e.g., Mitigation Measure BIO-1), which identifies whether mitigation measures haven been revised or added from those included in the Groundwater FEIR. Lastly, each section within Chapter 4 discusses the level of significance after implementation of those mitigation measures, and compares the significance conclusions to those reached in the Groundwater FEIR.

4.1 Aesthetics

4.1.1 Introduction

This section describes the reasonably foreseeable and potentially significant adverse environmental effects of the Pacific Gas and Electric Company (PG&E) Topock Compressor Station Final Groundwater Remediation Project (Final Groundwater Remedy Project, or proposed Project) as identified in the Project Description of this subsequent environmental impact report (SEIR) and related to visual and aesthetic resources in the Project Area. Specifically, this section considers the potentially significant adverse effects of the proposed Project during the construction, operation and maintenance, and decommissioning phases, as compared to those identified in the Topock Compressor Station Groundwater Remediation Project Final EIR (Groundwater FEIR; DTSC 2011), consistent with Public Resources Code Section 21166 and the California Environmental Quality Act (CEQA) Guidelines Sections 15162 and 15168, and including changes in impacts related to visual and aesthetic resources.

Visual or aesthetic resources are generally defined as both the natural and built features of the landscape that are seen and that contribute to the public's experience and appreciation of the environment. Visual or aesthetic resource impacts are generally defined in terms of a project's physical characteristics and potential visibility and the extent to which its presence would substantially degrade the existing visual character and quality of the environment.

4.1.2 Summary of 2011 Groundwater FEIR Aesthetics Analysis

The Aesthetics section of the Groundwater FEIR included a detailed discussion of the environmental setting and potential effects of the proposed remedy on visual and aesthetics resources. Although largely programmatic, the Groundwater FEIR provided a detailed analysis of the construction and operation of physical facilities anticipated at that time to be necessary to implement the groundwater remedy, including "before" and "after" visual simulations portraying potential project components. The Groundwater FEIR also included a project-level analysis of the conceptual technical methods selected for the final remedy. This SEIR incorporates the analysis in the Groundwater FEIR by reference and evaluates, on a project-specific level, the potential effects associated with construction and operation of the *Basis of Design Report/Final (100%) Design Submittal for the Final Groundwater Remedy, PG&E Topock Compressor Station, Needles, California, November* (Final Remedy Design; CH2M Hill 2015a) and the *Construction/Remedial Action Work Plan for the Final Groundwater Remedy* (C/RAWP; CH2M Hill 2015b) that were unknown at the time the analysis was conducted for the Groundwater FEIR. The Final Remedy Design is included in its entirety as Appendix BOD to this SEIR. Information included in the aesthetics analysis of the Groundwater FEIR is summarized on the following pages.

4.1.2.1 Setting Identified in 2011 Groundwater FEIR

Existing (2011) Visual Character

As summarized below, the Groundwater FEIR provided an assessment of existing visual character of the site within the context of the regional viewshed and the Project Area. Description of changes to these baseline visual conditions since 2011 is also included, where appropriate.

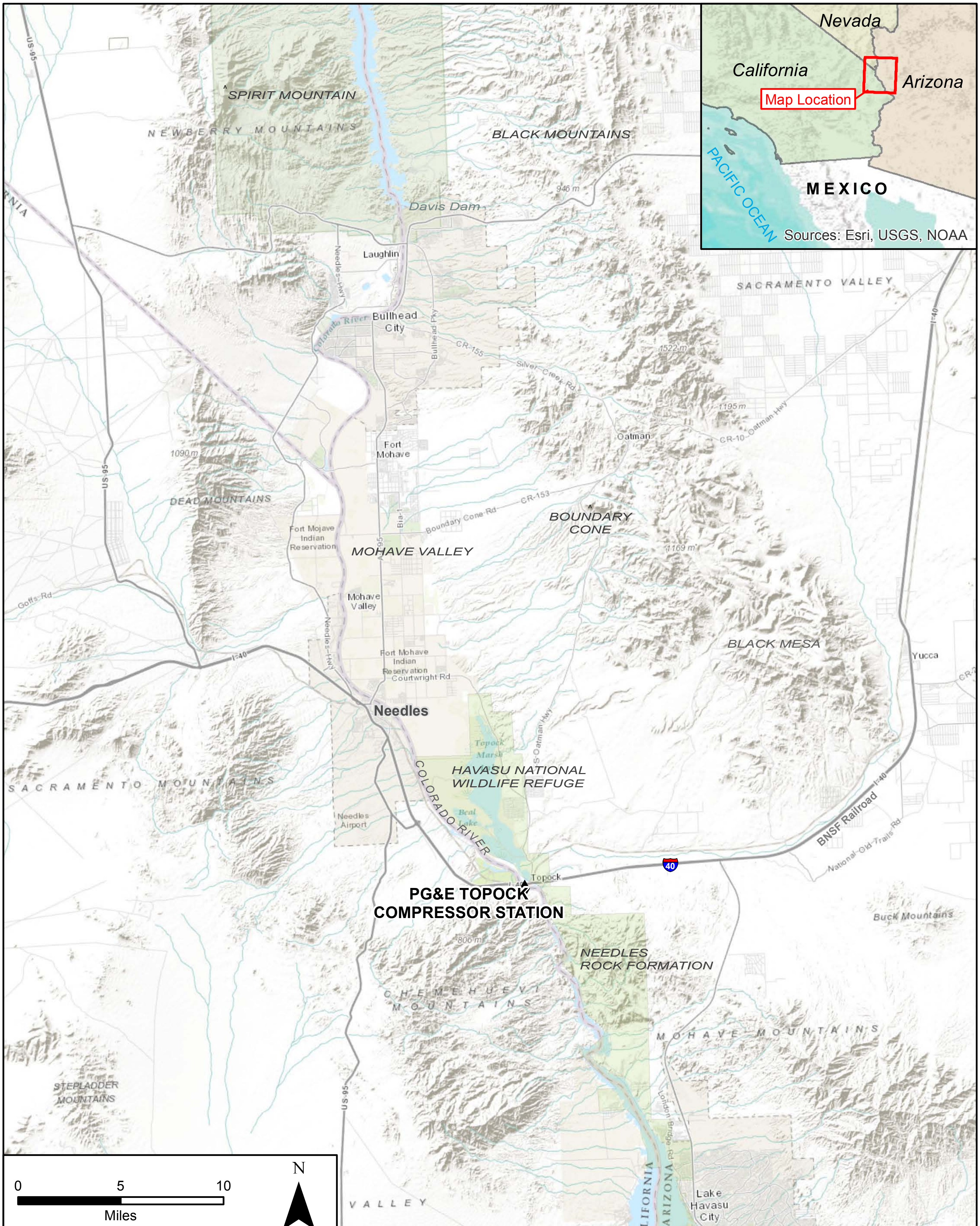
Regional Viewshed

The Groundwater FEIR described how the Project Area was situated within the basin-and-range geologic province that extends across southeastern California Nevada and portions of northern Arizona. The regional viewshed was characterized as a broad, sparsely vegetated desert landscape consisting of barren lakebeds and undulating alluvial terraces incised by numerous drainage ways that are framed by isolated mountainous outcrops and dramatic rock formations. The regional landscape was and still is primarily of undeveloped land, interrupted by discrete concentrations of residential, commercial, and agricultural development, primarily within the Mohave Valley, a broad alluvial plain bisected by the meandering channel of the Colorado River. The river corridor was described as a dominant visual resource and recreational travel way within the regional viewshed. The description of the regional viewshed in the Groundwater FEIR remains unchanged. **Figure 4.1-1** is an annotated topographic map showing the Project Area within the broader regional landscape context.

Project Area

The Groundwater FEIR described the general visual setting in the area surrounding the Project Area, which remains largely unchanged. Located at the southern end of the Mohave Valley where the Colorado River meets the Chemehuevi Mountains and veers east past the dramatic Needles rock formations, the visual character of the landscape within the Project Area and surrounding vicinity was portrayed in terms of the contrasts between natural and constructed elements: steep rocky slopes south of the PG&E Topock Compressor Station (Station) giving way to the meandering bank of the river and Topock Marsh, along with the Havasu National Wildlife Refuge (HNWR), to the north and east, with the western portion of the Project Area surrounded by largely undeveloped alluvial plateaus and shallow drainage washes. In addition to the Station, visible built features traversing the Project Area include Interstate 40 (I-40), the Burlington Northern Santa Fe (BNSF) Railway rail line, and natural gas transmission facilities, along with related infrastructure including steel bridges, pipelines, roadbeds, and engineered cut slopes. Developed land in the vicinity of the Project Area includes Moabi Regional Park, a mobile home development and recreation facility, both located immediately northwest of the Project Area.

The Topock Maze, a series of geoglyphs (defined as designs or motifs produced on the ground and typically formed by rocks or similarly durable landscape elements, such as gravel or earth), located on top of plateaus to the north and west of the Station, was described in the Groundwater FEIR primarily in terms of its visual and spatial elements, and was characterized as a dominant landscape feature providing a unique visual texture that constituted a memorable cultural landscape feature.



Topock Final Groundwater Remediation Project

Background Source: ESRI Topographic

Regional Landscape Context

Figure 4.1-1

ESA ENVIRONMENTAL VISION

121416

Since certification of the Groundwater FEIR, no substantial physical changes have occurred that affect the overall existing visual character within the regional viewshed and Project Area. Since 2011, however, additional Tribal perspectives regarding the Topock Maze and the Topock Cultural Area, which was subsequently determined by the Bureau of Land Management (BLM) to constitute a Traditional Cultural Property (TCP), have been provided. As discussed later in Section 4.1.3 of this SEIR, the Tribal perspectives provided are the basis for expansion of the Groundwater FEIR description of the regional viewshed and Project Area.

Existing (2011) Visual Quality

The Groundwater FEIR provided a description of visual quality experienced by viewers in the area. Because of the relatively predictable pattern created by the repetitious, undulating, and sparsely vegetated hills in this area, viewers located in, or looking toward, the western edge of the Project Area experience a low level of visual quality. Conversely, in views toward the east, visual quality is increased due to rock outcroppings along the steep north-facing slopes in combination with the open Colorado River valley, and the minimal amount of development north of the I-40 corridor.

Viewers located along the southern portion of the Project Area looking north toward Moabi Regional Park generally experience high-quality visual experience because views from this location are generally unobstructed, panoramic, and are defined by a variety of texture, scale, and landscape form. Viewers located on or along the Colorado River also typically enjoy a higher-quality visual experience because views from this location are complex in composition and include water and shoreline, characteristics which provide a unique visual experience and which are potentially more memorable than views at other locations around the Project Area.

No substantial physical changes have occurred since certification of the Groundwater FEIR that affect the overall existing visual quality experienced by viewers within the regional viewshed and Project Area.

Viewer Groups

Viewer groups identified in the Groundwater FEIR include residents of Moabi Regional Park; motorists on I-40 and adjacent roadways; recreational users on the Colorado River and adjacent waterways; hikers and campers accessing the surrounding open space; and pedestrian visitors to the Topock Maze. All of these viewer groups identified in 2011 are still applicable to the proposed Project. In addition, as outlined in Section 4.1.3.1, new information consisting of additional Tribal perspectives made available since the certification of the Groundwater FEIR in 2011 has resulted in an enhanced understanding of Native American cultural ties to the area, and the distinctive sensitivity of Tribal viewers.

Residential Viewers

Views available to residents of Moabi Regional Park included (and still include) expansive views of Mohave Valley and surrounding peaks, along with views toward recreation areas along the Colorado River to the north, whereas surrounding terrain constrained distant views to the south, west, and east. As a result of their fixed location and extended duration of views, viewer sensitivity of this group was judged to be generally moderate to high. However, views of the Project Area from Moabi Regional Park were characterized as largely obstructed by intervening topography, and it was discussed that elements in the immediate vicinity would be underground and thus would have little impact on residents. No noticeable change to the setting with respect to residential viewers as described in the Groundwater FEIR has occurred since 2011.

Vehicular Viewers

Travelers on I-40 (which traverses the Project Area, less than 1,000 feet north of the Station) represent the greatest number of motorists that would see activities in and around the Station. While described in the Groundwater FEIR as being largely obstructed by intervening topography, views afforded to motorists would have included fleeting close-range views of the Project Area, particularly at the Bat Cave Wash crossing. Motorists driving on local roads, in particular the National Trails Highway (historic State Route 66) north of the Station, were characterized as having somewhat more extended exposure to and awareness of developments associated with components analyzed in the Groundwater FEIR from high points in the topography and where they would pass close to the floodplain of the Colorado River. Overall viewer sensitivity of motorists was considered low to moderate given the limited extent and relatively short duration of views toward the Project Area. No substantial change to roadway infrastructure that would affect vehicular viewers has occurred since certification of the Groundwater FEIR.

Recreational Viewers

Recreational viewers were described in the Groundwater FEIR as a group composed primarily of boaters, campers, hikers, birders, and visitors to the HNWR and Moabi Regional Park, located adjacent to the Project Area. Boaters along the open waters of the Colorado River southeast of the Project Area were found to have, and currently still do have, largely unobstructed views of the Project Area, where it would be seen in conjunction with the scenic qualities of the river and its surroundings. Conversely, dense riverside vegetation and in some cases comparatively steep riverbank topography further east and north would generally constrain close range views of specific site elements. Hikers and campers accessing backcountry trails in the Chemehuevi Mountain south of the Project Area were and still are afforded long-duration, panoramic views of the Project Area and the surrounding region. Recreational viewer sensitivity was described as moderate to high given opportunities for extended views toward the Project Area. Recreational locations and activities in and around the Project Area have not changed since certification of the Groundwater FEIR.

Pedestrian Viewers

Primarily due to the proximity of the Topock Maze to the Project Area, pedestrians were characterized as a distinct viewer group in the Groundwater FEIR. This viewer group included Native Americans who regularly access cultural sites to engage in traditional cultural practices as well as interested non-Tribal visitors. As a result of intervening topography, views of the Station and ancillary facilities from the Topock Maze segments north of the Station were generally screened, although comparatively unobstructed views of the Station and auxiliary facilities were available to viewers who walked deeper into the Maze segment located generally west of the Station. Particularly in the case of the latter, viewer sensitivity was considered moderate to high due to close proximity and potentially long duration of views in some instances. No change in topography has occurred that would affect pedestrian views toward the proposed Project.

Description of Key Views

The Groundwater FEIR provided photographic documentation and text descriptions of 14 key views of the Project Area. The set of key views represents primary viewer groups that would be affected by the proposed Project. Locations of the viewpoints are illustrated in Exhibit 4.1-7, Key View Map, presented in the Groundwater FEIR. An overview of the key views is summarized in **Table 4.1-1**.

Except for three photographs taken in 2010, all of the key view photographs were taken in 2009, when fieldwork for the Groundwater FEIR was undertaken. The set of 14 photographs illustrate existing visual conditions at a particular moment in time, and portray representative roadway views of the Project Area and adjacent surroundings from I-40 and the National Trails Highway; pedestrian views of the IM-3 Facility, the Colorado River floodplain and BNSF Railway railroad bridge; as well as views toward the existing Station from various perspectives, including views from I-40, the Colorado River, and the Topock Maze. Overall viewer sensitivity within the Project Area has not changed since certification of the Groundwater FEIR. As noted above, the FEIR included in the Pedestrian viewer group Native Americans who regularly access cultural sites to engage in traditional cultural practices as well as interested non-Tribal visitors. Section 4.1.3.1 provides additional information on Tribal Groups as a distinct viewer group. It should be noted that the Project Area has been, and continues to be, characterized by a range of dynamic activities related to ongoing Station maintenance as well as implementation of interim measures (e.g., activities associated with operation of IM-3 Facility as well as ongoing operation of previously installed monitoring wells) that affects day to day visual conditions.

TABLE 4.1-1
SUMMARY OF GROUNDWATER FEIR KEY VIEWS OF THE PROJECT AREA

Key View	Viewer Group	View Description	View Sensitivity
1	Vehicular	View traveling east on I-40 toward the Station and Colorado River.	Low
2	Vehicular	View traveling east on I-40 toward compressor station at crossing of Bat Cave Wash. View is approximately 900 feet from the compressor station.	Moderate
3	Vehicular	View traveling west on I-40 toward the BNSF railroad bridge.	Low
4	Vehicular	View traveling south on historic National Trails Highway looking toward floodplain and railroad bridge. View is approximately 10 feet from the floodplain.	Moderate to high
5	Pedestrian	View southeast near Topock Maze toward the Colorado River, transportation bridges and the Needles rock formation.	High
6	Pedestrian	View looking south toward the IM-3 Facility and Station near Topock Maze. View is approximately 330 feet from the IM-3 Facility.	Moderate
7	Pedestrian	View looking north across Topock Maze. View is approximately 1,650 feet from the Station.	Moderate to high
8	Pedestrian	View looking east toward the Station at the Topock Maze.	Moderate
9	Pedestrian	View looking southeast toward Station near the Topock Maze. View is approximately 800 feet from the Station.	High
10	Recreational	View looking northeast toward Station, IM-3 Facility, and Colorado River. View is approximately 1,000 feet from the Station.	High
11	Recreational	View looking southwest toward floodplain, IM-3 Facility, and compressor station from Colorado River. View is approximately 300 feet from the floodplain.	High
12	Recreational	View looking west toward Station from Colorado River. View is approximately 1,800 feet from the Station.	Moderate
13	Recreational	View looking southwest toward existing arched utilities bridge from the Colorado River. View is approximately 150 feet from the abutment of the bridge.	Low
14	Recreational	View looking west toward Station from Colorado river. View is approximately 5,400 feet from the Station.	Low

Source: DTSC 2011.

This SEIR presents four new panoramic photographs from four of the key viewpoints (refer to **Figure 4.1-2**). These photographs, taken at eye level, have been included based on information and comments received from Native American Tribes since 2011 and are described in Section 4.1.3, “Existing Setting,” they document updated regional viewshed and Project Area characteristics.

To document current visual conditions in the Project Area for the SEIR, a set of updated photographs was taken in March 2016. The locations of these updated photographs, numbered 1 through 14 and shown in **Figure 4.1-3** and depicted in **Figure 4.1-4**, are generally comparable to those of the Groundwater FEIR photographs. One minor exception is Key Representative Photograph 7, in which the view orientation has shifted from northeast to northwest to include existing Topock Compressor Station Evaporation Ponds (TCS Evaporation Ponds) that are within the revised Project Area, as described in Chapter 3, “Project Description,” and as discussed in Section 4.1.3, “Existing Setting,” in this section.

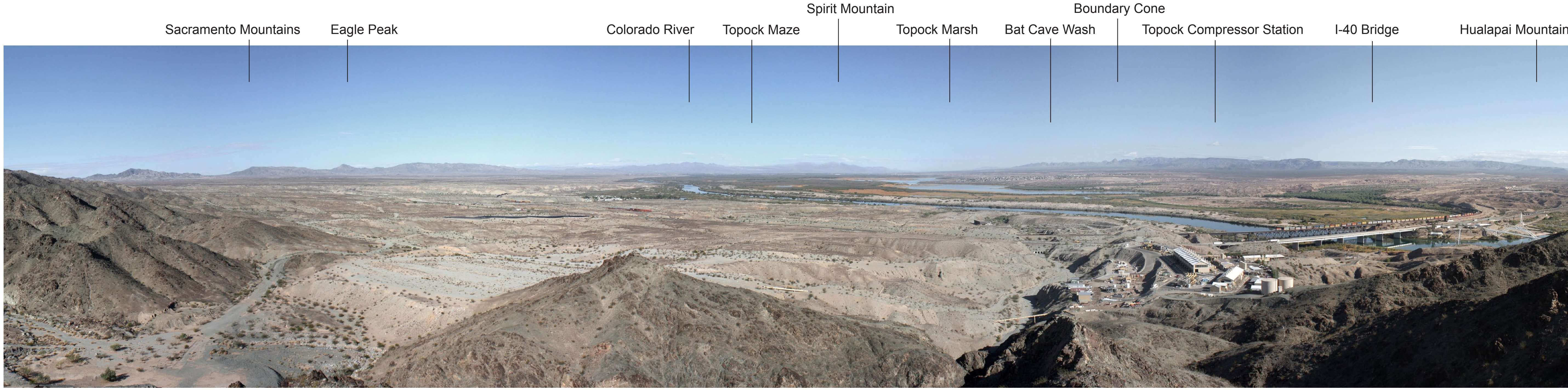
Comparison between the set of key view photographs presented in the Groundwater FEIR and the more recent photographs shows minor changes to Key Views 2, 9, and 10 with respect to auxiliary equipment and facilities surrounding the Station, whereas all other key views are essentially unchanged.

Seven new view locations are also included in this SEIR. Some of these additional photographs are included to document the Project setting in new Project Areas that, due to changes in the Project Area and associated infrastructure, were not previously addressed in the Groundwater FEIR. Locations of the seven new key view photographs are shown as Viewpoints A through G in Figure 4.1-3.

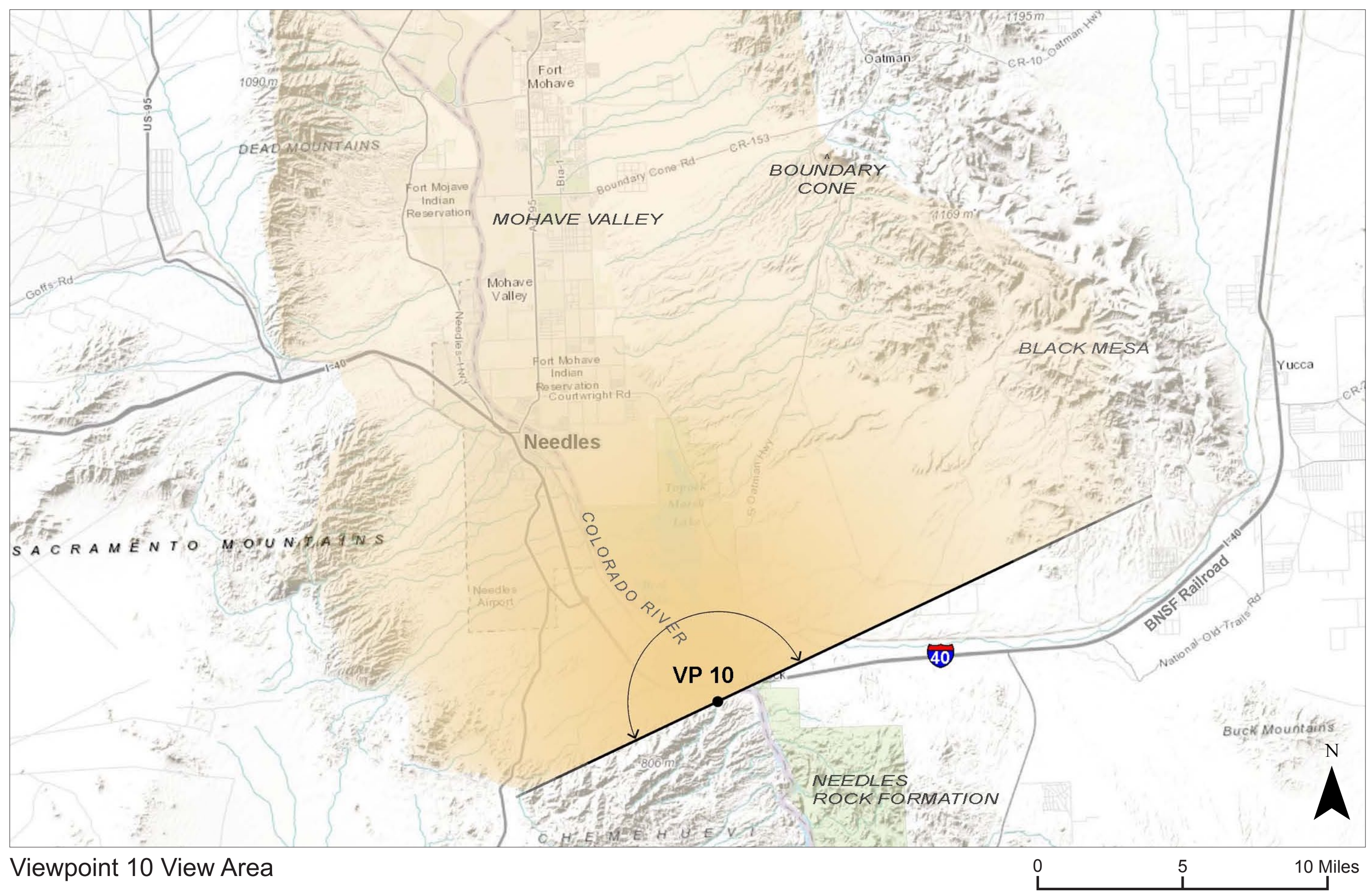
4.1.2.2 Impacts and Mitigation Measures Identified in the 2011 Groundwater FEIR

Impacts to aesthetic resources were addressed in the Groundwater FEIR, Volume II, Section 4.1. Following is a summary of the impact analysis and associated mitigation measures for aesthetics.

The Groundwater FEIR included a general description of conceptual groundwater remedy design elements that would consist of in situ treatment with freshwater flushing, and included remediation and monitoring wells, pipelines, freshwater intake locations, and associated infrastructure, such as aboveground storage facilities, electrical utilities, and roadways. The Groundwater FEIR considered the potentially significant adverse environmental impacts that would result to the extent such impacts were reasonably foreseeable given the level of detail known at the time. The visual analysis addressed each of the 14 key views and consideration was given to applicable policy documents to determine impacts on five scenic resources identified in or adjacent to the Project Area. These consisted of views from I-40, an eligible scenic highway, as identified in the California State Scenic Highway Program (represented in Key Views 1 and 2); views to the Needles rock formation, a scenic vista, in accordance with Goal OS 4 of the County General Plan (represented in Key View 4); views to the Topock Maze, a scenic vista, in accordance with Goal OS 4 of the County General Plan, represented in Key View 6; views to the Mohave Valley from Chemehuevi Mountain, in accordance with Goal OS 4 of the County General Plan, represented in Key View 9; and views from Colorado River, a scenic resources corridor, in accordance with Goal OS 5, Policy OS 5.2 of the County General Plan (represented in Key Views 10 and 11), refer to Groundwater FEIR p. 4.1-27.



Panoramic View from Key Viewpoint 10 at ridge on Chemehuevi Mountains



Viewpoint 10 View Area

Refer to Figure 4.1-3 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

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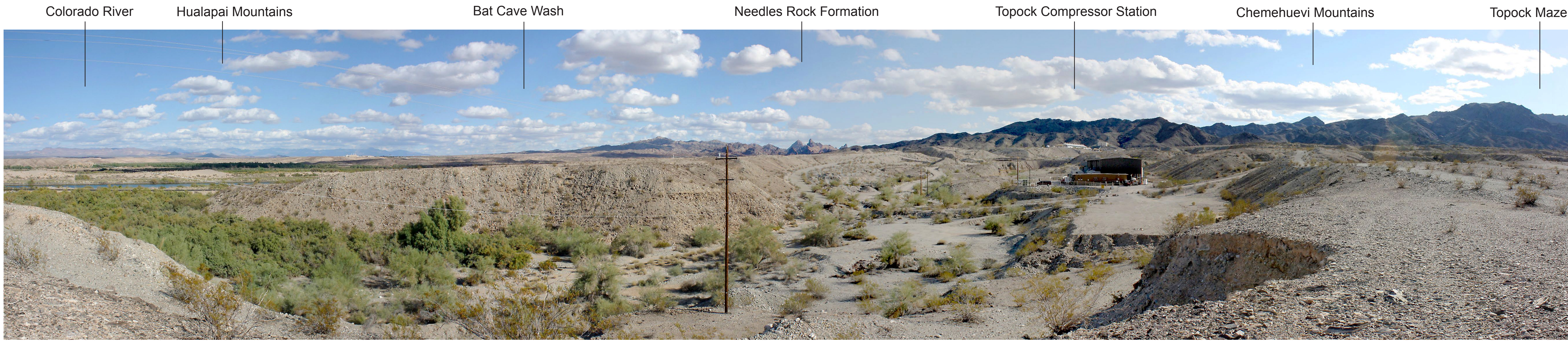
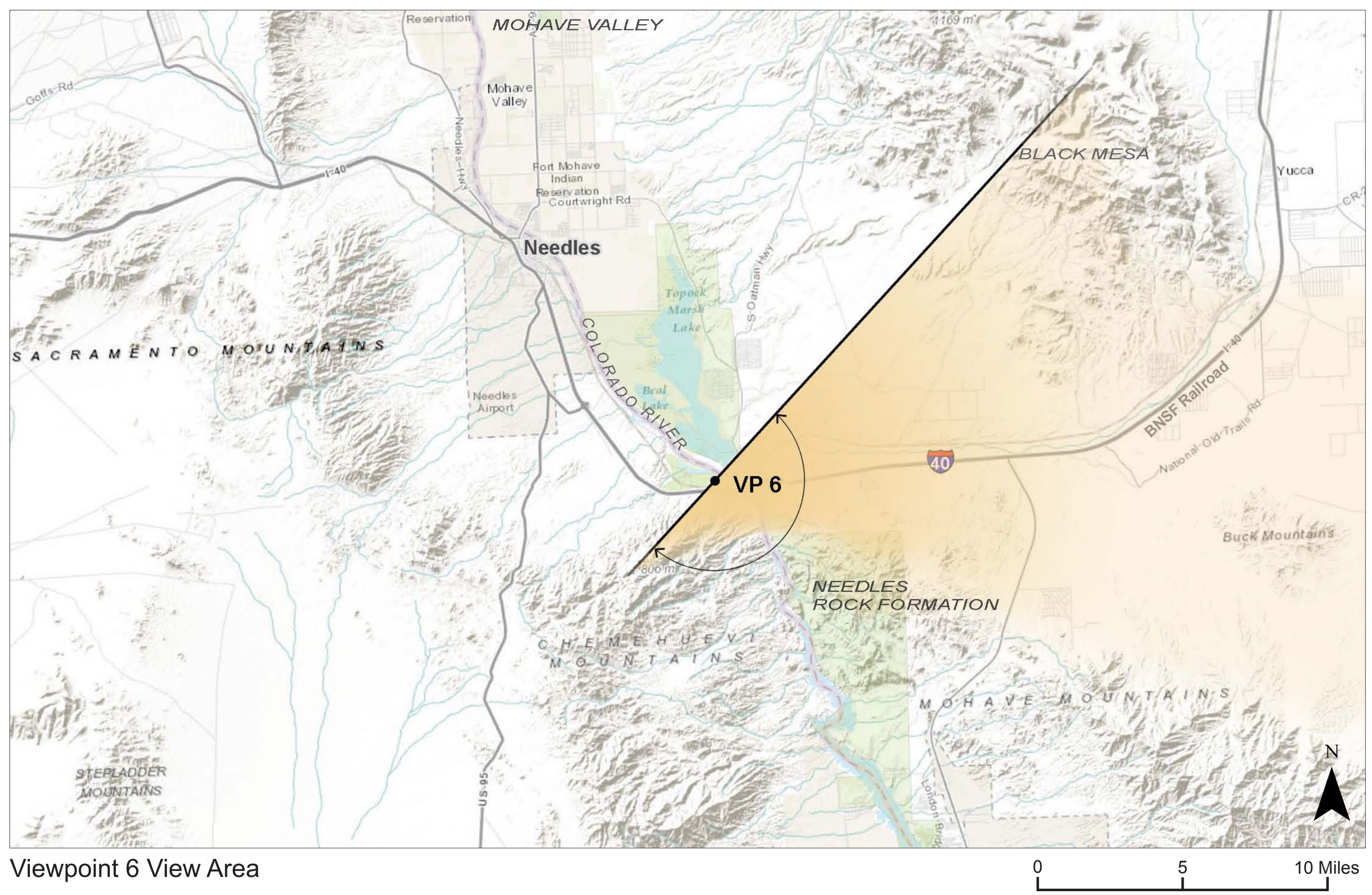
Topock Final Groundwater Remediation Project . 120112

Figure 4.1-2A
Panoramic Landscape Views - Viewpoint 10



Panoramic View from Key Viewpoint 6 looking southeast

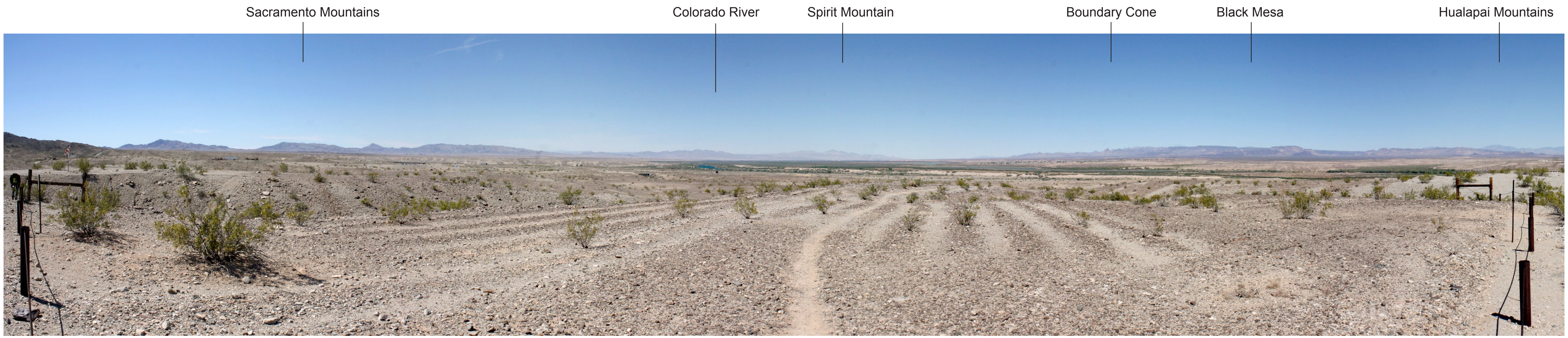


Viewpoint 6 View Area

Refer to Figure 4.1-3 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Figure 4.1-2B
Panoramic Landscape Views - Viewpoint 6



Panoramic View from Key Viewpoints 7 and 8 looking north

Panoramic View from Key Viewpoints 7 and 8 looking south

Refer to Figure 4.1-3 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Topock Final Groundwater Remediation Project . 120112

Figure 4.1-2C

Panoramic Landscape Views - Viewpoints 7 and 8

121416

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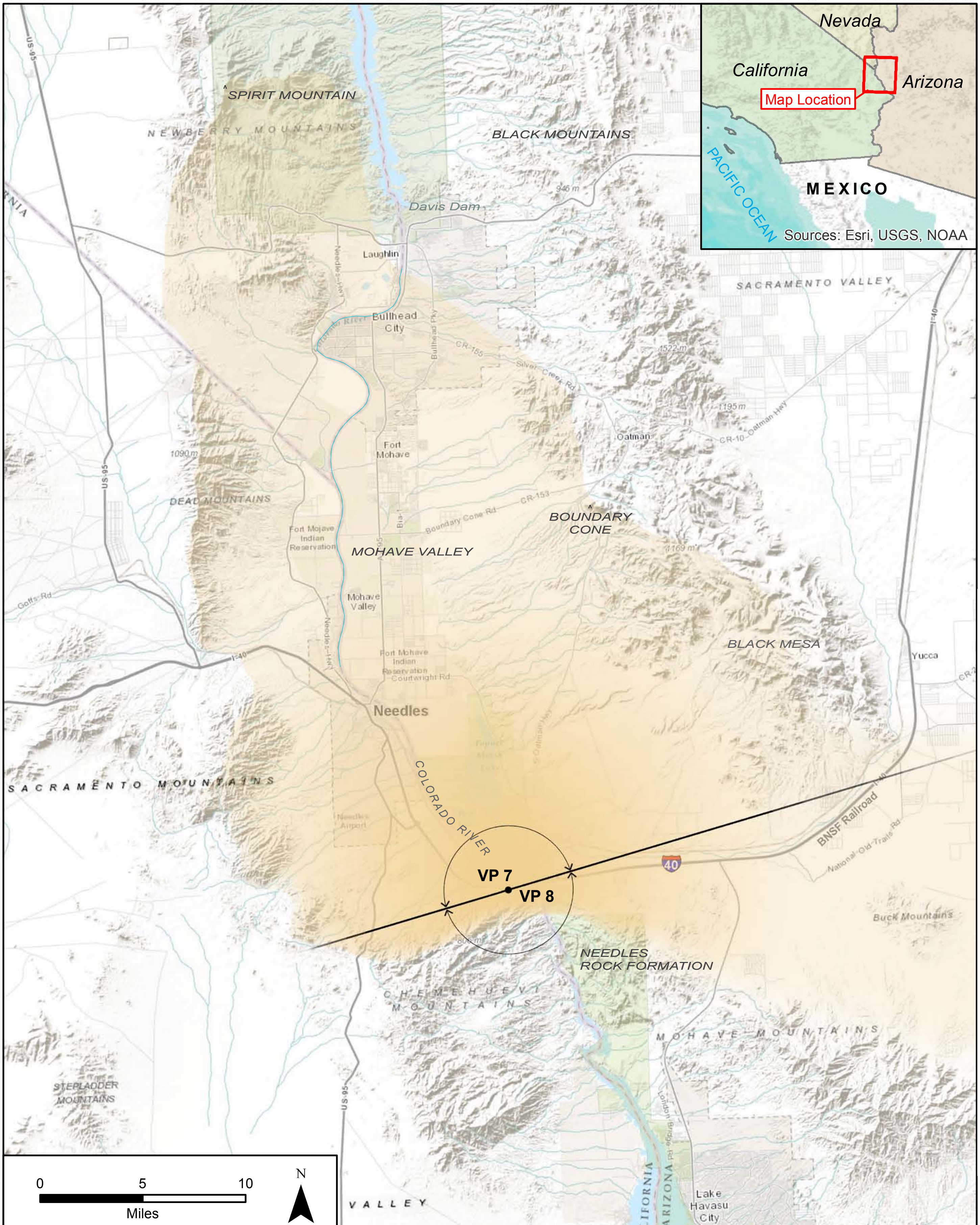

Topock Final Groundwater Remediation Project

Background Source: ESRI Topographic

Panoramic View Area - Viewpoints 7 and 8

Figure 4.1-2D

ESA ENVIRONMENTAL VISION

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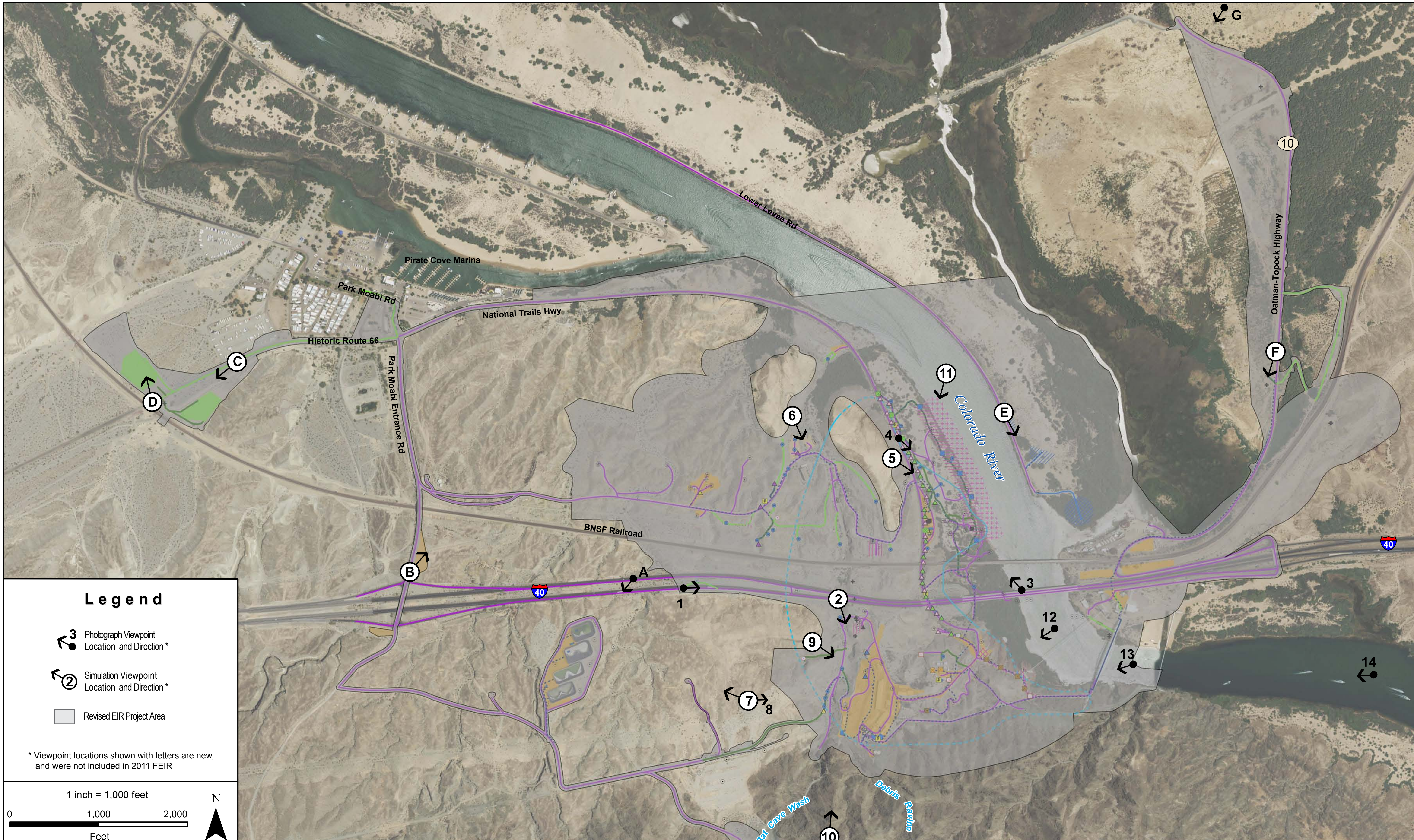

Topock Final Groundwater Remediation Project

Background Sources: ESRI Aerial, PG&E 2015

121416

Photograph Viewpoint Locations

Figure 4.1-3

ESA

ENVIRONMENTAL VISION

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1. Interstate 40 eastbound looking east toward Colorado River

2. Interstate 40 eastbound at Bat Cave Wash looking southeast toward Topock Compressor Station **

** Selected simulation view
Refer to Figure 4.1-3 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Topock Final Groundwater Remediation Project . 120112

Figure 4.1-4A

Updated Key Representative Photographs - Viewpoints 1 and 2

121516

3. Interstate 40 westbound at Colorado River looking northwest

4. National Trails Highway looking southeast toward the Needles rock formation

Refer to Figure 4.1-3 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Topock Final Groundwater Remediation Project . 120112

Figure 4.1-4B

Updated Key Representative Photographs - Viewpoints 3 and 4

121516

5. Looking southeast toward the Colorado River and the Needles rock formation **

6. Looking southeast toward Topock Compressor Station **

** Selected simulation view
Refer to Figure 4.1-3 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Topock Final Groundwater Remediation Project . 120112

Figure 4.1-4C

Updated Key Representative Photographs - Viewpoints 5 and 6

121516

7. Looking northwest toward TCS Evaporation Ponds **

8. Looking east toward Topock Compressor Station

** Selected simulation view
Refer to Figure 4.1-3 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Topock Final Groundwater Remediation Project . 120112

Figure 4.1-4D
Updated Key Representative Photographs - Viewpoints 7 and 8

121516

9. Looking southeast toward Topock Compressor Station **

10. Ridge on Chemehuevi Mountains looking north toward Colorado River and Topock Compressor Station **

** Selected simulation view
Refer to Figure 4.1-3 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Topock Final Groundwater Remediation Project . 120112

Figure 4.1-4E
Updated Key Representative Photographs - Viewpoints 9 and 10

121516

11. Colorado River looking southwest toward Topock Compressor Station **

12. Colorado River looking southwest toward Topock Compressor Station

** Selected simulation view
Refer to Figure 4.1-3 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Topock Final Groundwater Remediation Project . 120112

Figure 4.1-4F
Updated Key Representative Photographs - Viewpoints 11 and 12

121516

13. Colorado River near pipe bridge looking southwest toward Topock Compressor Station

14. Colorado River looking west toward Topock Compressor Station

Refer to Figure 4.1-3 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Topock Final Groundwater Remediation Project . 120112

Figure 4.1-4G

Updated Key Representative Photographs - Viewpoints 13 and 14

121516

A.* Interstate 40 westbound looking southwest toward the TCS Evaporation Ponds

B.* Park Moabi Entrance Road at Interstate 40 looking northeast toward the Colorado River **

** Selected simulation view
* New viewpoint, not included in 2011 FEIR
Refer to Figure 4.1-3 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Figure 4.1-4H
Updated Key Representative Photographs - Viewpoints A and B

C.* National Trails Highway looking southwest toward the proposed Construction Headquarters **

D.* National Trails Highway looking north toward the proposed Soil Processing Area **

** Selected simulation view
* New viewpoint, not included in 2011 FEIR
Refer to Figure 4.1-3 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Topock Final Groundwater Remediation Project . 120112

Figure 4.1-4I
Updated Key Representative Photographs - Viewpoints C and D

121516

E.* Levee Road in the Havasu National Wildlife Refuge looking south toward the Needles rock formation **

F.* Arizona Highway 10 looking southwest toward the Colorado River and freshwater wells site **

** Selected simulation view
* New viewpoint, not included in 2011 FEIR
Refer to Figure 4.1-3 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Topock Final Groundwater Remediation Project . 120112

Figure 4.1-4J
Updated Key Representative Photographs - Viewpoints E and F

121516

G.* Ridge near Arizona Highway 10 looking south toward Colorado River and Topock Compressor Station

* New viewpoint, not included in 2011 FEIR
Refer to Figure 4.1-3 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Figure 4.1-4K
Updated Key Representative Photographs - Viewpoint G

Temporary impacts of construction and decommissioning activities as well as long-term impacts resulting from operation and maintenance were analyzed in the Groundwater FEIR. **Table 4.1-2** presents an overview of the impact analysis results with respect to the 14 key views. The table indicates that elements analyzed in the Groundwater FEIR were not anticipated to be visible from four of the viewpoints. However, the Groundwater FEIR concluded that less than significant impacts would occur on eight of the views and impacts on two views would be potentially significant.

TABLE 4.1-2
SUMMARY OF GROUNDWATER FEIR KEY VIEW ANALYSIS

Key View	Viewer Group	Threshold of Significance	Scenic Resource Representation	Groundwater FEIR Project Visible?	Degree of Contrast (BLM)	Determination of Impact (CEQA)
1	Vehicular	2 & 4	Views from I-40; an eligible scenic highway	Yes	Weak	Less than significant
2	Vehicular	2 & 4	Views from I-40; an eligible scenic highway	Yes	Moderate	Less than significant
3	Vehicular	2	Views from I-40; an eligible scenic highway	Yes	Weak	Less than significant
4	Vehicular	1	Views to “Needles” rock; a scenic vista	Yes	Moderate	Less than significant
5	Pedestrian	1	Views near Topock Maze; a scenic vista	Yes	Strong	Potentially significant
6	Pedestrian	1 & 4	Views near Topock Maze; a scenic vista	Yes	Low	Less than significant
7	Pedestrian	N/A	Views near Topock Maze; a scenic vista	No	N/A	N/A
8	Pedestrian	N/A	None	No	N/A	N/A
9	Pedestrian	3	Views near Topock Maze; a scenic vista	Yes	Moderate	Less than significant
10	Recreational	1, 2, & 3	Views from Chemehuevi Mountain; a scenic vista	Yes	Weak	Less than significant
11	Recreational	2, 3, 4	Views from Colorado River; a scenic resources corridor	Yes	Strong	Potentially significant
12	Recreational	N/A	None	No	N/A	N/A
13	Recreational	2 & 3	Views from Colorado River; a scenic resources corridor	Yes	Moderate	Less than significant
14	Recreational	N/A	None	No	N/A	N/A

NOTE: Adapted from Table 4.1-3 Summary of Key View Analysis, *Topock Compressor Station Final Remedy FEIR*, 2011
SOURCE: DTSC 2011.

The FEIR identified three potentially significant impacts related to the operation and maintenance phase. Specifically, in a view experienced by Tribal visitors to Topock Maze—a culturally sensitive location overlooking the Colorado River floodplain that affords distant views of the Needles rock formation (Key View 5)—the introduction of components (including numerous wells, storage tanks, access roads and potentially a control building), and the need to remove floodplain vegetation, resulted in a strong level of visual contrast within a scenic vista (Impact AES-1). Similarly, the Groundwater FEIR analysis determined that, when seen from the perspective of boaters on the river (represented by Key View 11), the removal of vegetation resulting from the introduction of remedy components had the potential to significantly alter the visual character as well as views of the floodplain along a scenic resources corridor (Impacts AES-2 and AES-3).

The Groundwater FEIR included mitigation measures for aesthetic resources to reduce the level of impact. To help the facilities to be constructed and operated blend into their visual setting within the view corridors identified in Impacts AES-1 and AES-3, thereby reducing the overall contrast to a less than significant level, Mitigation Measures AES-1 and AES-3 were required to preserve existing mature plant specimens, restore disturbed vegetation, and implement surface treatment of built elements. Mitigation Measure AES-2 additionally called for preventing substantial vegetation removal within a minimum 20-foot setback from the river's edge in order to reduce the potentially significant impact of the facilities to be constructed and operated on views of the floodplain from the Colorado River.

4.1.3 Existing Setting

This section describes the aesthetics characteristics and setting with regard to the Final Groundwater Remedy Project to be conducted in the Project Area, focusing on those areas where there have been changes since the Groundwater FEIR.

4.1.3.1 Regional Viewshed

The Project Area lies within a larger area of traditional religious and cultural significance to several Native American Tribes inhabiting the region. As outlined in detail in Section 4.4 "Cultural Resources," five Native American Tribes, referred to as "Interested Tribes," actively participate in the Topock project. Each of the Interested Tribes has been, and continues to be, economically and culturally reliant on the Colorado River, and all are historically and spiritually rooted in the Colorado River region. The Project Area and vicinity is considered by Tribes to be part of a broader cultural landscape and, since 2011, has been determined by the BLM to constitute a TCP, as described in further detail in Section 4.4, "Cultural Resources," subsection 4.4.3.2. The Topock TCP continues to play a central role in the beliefs and practices of Native American Tribes with ties to the region that ascribe significance to many aspects of the cultural and natural environment, including the regional viewshed. Prominent landmarks that are culturally significant and integral to the Topock TCP are visible from many vantage points within the Mohave Valley and adjacent foothills. In addition to the Topock Maze complex near the Project Area, these features include the Needles pinnacles at the southern edge of the valley, Boundary Cone to the northeast, and Spirit Mountain situated approximately 35 miles away, which rises from the desert floor to over 5,000 feet to dominate the northwestern horizon. Descriptions of the visual setting from Tribal members with ties to the area indicate the viewshed is perceived as an interconnected and contiguous entity. Figure 4.1-1 is an annotated topographic map showing the Project Area within the broader regional landscape context. This figure illustrates the Project's location in relationship to a number of key landscape features seen in the surrounding area.

Figure 4.1-2A through Figure 4.1-2D present a set of panoramic photographs and panoramic view area maps from four key viewpoints in the Project Area. These photographs portray eye-level wide angle views of local and regional landscapes and features considered significant to Tribal groups. Annotations above each photograph indicate the locations of key visible natural and built landscape features. A panoramic view area for each photograph shows the regional map with the approximate area seen in each view lightly shaded in orange. Figure 4.1-2A includes the view from Key Viewpoint 10, on a ridgetop located along the Chemehuevi Mountains south of the Project. In this open view of the Mohave Valley, built features such as the existing Station and nearby transportation infrastructure are visible; however, the view is dominated by large-scale natural features such as the surrounding peaks, arroyos, and the Colorado River, which become defining elements in the visual character of the landscape. The view area map includes labels for many of these distant landscape features seen in the panoramic photograph. Figure 4.1-2B includes a panorama and view area map from Key Viewpoint 6 near the Topock Maze showing graded terrain and some built elements juxtaposed with open views of natural and cultural features, including the Bat Cave Wash and Needles rock formation seen from a slightly elevated vantage point. Figure 4.1-2C presents two panoramic views representing a 360-degree view of the Mohave Valley and surrounding peaks from Key Viewpoints 7 and 8 near the Topock Maze. The top image is a view to the north with the Sacramento Mountains, Colorado River, Spirit Mountain, Boundary Cone, and Black Mesa seen in the distance. The bottom photograph, a panorama looking south includes the closer Chemehuevi Mountains in the landscape backdrop. Figure 4.1-2D shows the panoramic view area of the 360-degree views from Key Viewpoints 7 and 8 near the Topock Maze.

4.1.3.2 Project Viewshed

The project viewshed is defined as the general area from which a project would be visible or could be seen. For purposes of describing a project's visual setting and assessing potential visual impacts, the viewshed, or "seen area," can be broken down into distance zones of foreground, middleground, and background. The foreground is defined as the zone within 0.25 mile to 0.5 mile from the viewer. The middleground can be defined as a zone that extends from the foreground up to 3 to 5 miles from the viewer, and the background extends from about 3 to 5 miles to infinity (Smardon et al. 1986/USDA 1995).

In desert areas such as in the vicinity of the proposed Project, landscape detail is typically most noticeable and objects generally appear most prominent when seen in the foreground. At middleground viewing distances, the texture of landscape features such as of rock outcropping surfaces and vegetation as well as built elements may be noticeable but are increasingly unrecognizable. In the background, visible detail is limited to landscape patterns or visual contrasts.

As described in detail in Chapter 3, "Project Description," and illustrated in Figure 4.1-3, the proposed Project includes the construction of a set of new extraction, injection, freshwater acquisition, and monitoring wells, and the construction of pipelines, utilities, buildings, and roadways in support of the Final Groundwater Remedy Project. Project elements that would potentially be seen within the Project viewshed would include new buildings, tanks, access roads, wells, data collection poles, and retaining walls. Additionally, many of the new facilities would be enclosed by 8-foot chain-link fencing. Some vegetation removal is also required for construction. Built elements would range in size from wells, which would be approximately 4 square feet flush with the ground surface, to new buildings, the tallest of which is approximately 40 feet tall. Given the scale and potential visibility of the proposed Project elements, this analysis is primarily focused on foreground viewing distances, although consideration is also given to the potential effects on middleground and background views.

4.1.3.3 Project Area

As a result of the evolution of the Final Remedy Design that has occurred since 2011 (see Chapter 3, “Project Description,” for more information) the Project Area no longer includes a broad area along the west bank of the Colorado River north of Pirate Cove Marina, and now includes new areas that were not addressed in the Groundwater FEIR visual analysis. These new areas are located west, northwest, and northeast of the Station and include the vicinity of the existing TCS Evaporation Ponds, an area along National Trails Highway/Historic Route 66 near the BNSF Railway crossing, and potential staging areas at the I-40 junction with Park Moabi Entrance Road, as well as locations within Arizona along the east bank of the Colorado River and along the Oatman-Topock Highway. Note that Figures 4.1-4A through 4.1-4G are a set of updated key view photos based on the original 14 photos included in the Groundwater FEIR, they were explained in Section 4.1.2.1. Figures 4.1-4H through 4.1-4K present a set of seven additional photographs that depict the existing visual conditions from viewpoints not included in the Groundwater FEIR. The locations of these new key views are shown in Figure 4.1-3, and the visual setting documented by these additional photographs (known as Key Views A through G) is described below and in the following pages.

Photograph A is a motorist’s view from westbound I-40 looking toward the existing TCS Evaporation Ponds situated south of the highway and approximately 3,000 feet west of the Station. The Chemehuevi Mountains are seen in the background. Although view duration would be short at typical highway travel speeds, viewer sensitivity is moderate because of the view orientation toward the scenic mountainous backdrop.

Photograph B shows a broad gravel turnout at the junction of the Park Moabi Entrance Road and I-40. This road serves as the primary approach to the Project Area as well as a primary point of access for residents of Moabi Regional Park mobile home park and for visitors to recreational facilities along the Colorado River, such as the Pirate Cove Resort, and to areas of Tribal importance along the nearby National Trails Highway, including portions of the Topock Maze. Because of slower vehicle speeds, motorists’ views here are typically longer in duration compared to views from I-40; viewer sensitivity is moderate given the open backdrop of the Colorado River and distant peaks.

Photograph C is a view looking southwest along the National Trails Highway toward the BNSF Railway overpass. The paved roadbed ends less than a mile beyond the overpass and serves as a point of access to backcountry trails in the Chemehuevi Mountains for recreational and Tribal visitors to the area. As in Photograph B, reduced vehicle speeds mean relatively longer duration views compared to the duration of views experienced by highway motorists, and in addition to the nearby Moabi Regional Park mobile-home park and visitor facilities, viewer sensitivity is considered high.

Photograph D shows the view looking north from the National Trails Highway adjacent to the BNSF Railway overpass shown in Photograph C. This view includes an expanse of flat gravel in the foreground with open views toward the Colorado River, southern Mohave Valley, and distant mountains. Because of the view orientation toward the landscape backdrop, viewer sensitivity on the part of recreational visitors using the National Trails Highway is moderate, and Tribal visitors could have a heightened sensitivity at this location because the distant view encompasses culturally important viewshed elements such as Boundary Cone.

Photographs E, F, and G represent views toward the Project Area from locations across the Colorado River in Arizona. Photograph E is a view looking south from Levee Road in the HNWR. This unpaved road lies on an embankment situated between the Colorado River channel (which is partially visible on the right) and the Topock Bay wetland (which is partially visible on the left), a seasonally inundated marsh that is popular for bird watching, boating, and other recreational activity. Set against a backdrop of the Chemehuevi Mountains and the Needles rock formation, this view includes the BNSF Railway bridge, the I-40 highway crossing, and (at a bend in the river beyond) a white painted gas pipeline bridge with its distinctive lattice towers. Viewer sensitivity is considered high because of the characteristics of the landscape backdrop, cultural sensitivity, and potential for comparatively long-duration views experienced by recreational and Tribal visitors in this area.

Photograph F documents a motorist's view looking southwest from the Topock-Oatman Highway (Arizona Highway 10/Historic Route 66) along the eastern perimeter of the Topock Bay. While the area traversed by this roadway was identified in the Groundwater FEIR Project Area as a potential Project freshwater source, no visual assessment of this location was undertaken in 2011. This state- and federal-designated historic roadway is traveled by recreational visitors as well as local motorists between I-40 and residential communities to the northeast, including Topock and Golden Shores. Disturbed alluvial terrain lining the roadway is visible in the immediate foreground and contrasts with the darker colored rocky relief of the Chemehuevi Mountains in the background. Two small light-colored structures surrounded by a fence are also seen in the foreground. Because of better road conditions compared to those experienced by motorists along the National Trails Highway and Park Moabi Entrance Road, view duration along this highway is relatively short, while viewer sensitivity is moderate given the scenic backdrop and historic designation.

Photograph G is a view looking southwest from a ridgeline overlooking the Colorado River floodplain near the northern edge of the Project Area. In 2013 Tribal representatives identified this as a key view location, when analysis was being conducted for the 2013 Addendum to the Groundwater FEIR, which expanded the Project Area and considered the potential environmental effects of alternative well locations for a freshwater source (DTSC 2013). The Station together with the BNSF Railway rail corridor and I-40 highway bridges are visible in the middle distance against the backdrop of the Chemehuevi Mountains and a portion of the Needles rock formation on the distant horizon. From this vantage point, the scale of the surrounding mountains and the broad view of the vegetated river floodplain in the foreground dwarf the built elements in the landscape. Viewer sensitivity is high from this location because of the scenic backdrop and cultural sensitivity.

4.1.3.4 Viewer Groups

Vehicular Viewers

Passenger train occupants traversing the Project Area along the BNSF Railway rail corridor were not included in the Groundwater FEIR's assessment of viewer groups in 2011. Amtrak trains that run between Los Angeles and Chicago include daily eastbound and westbound service. Current Amtrak schedules indicate these trains typically pass the Project between approximately midnight and 1:00 a.m. (Amtrak Southwest Chief revised 1/11/16 timetable). At these times, rail passengers could potentially experience brief nighttime views of the Project Area. Depending on the direction of travel, passengers would have fleeting views of interim remediation activity in Bat Cave Wash adjacent to the rail corridor as well as brief foreground views to the north along the Colorado River floodplain that could include existing light sources, such as security lighting associated with the Station and auxiliary facilities, in addition to night lighting around Moabi Regional Park and Pirate Cove Resort north and west of the Project Area.

Tribal Groups

Although reference to Native Americans was made in the Groundwater FEIR, they were not considered as a distinct viewer group, but rather included in discussions of pedestrian viewers to the Topock Maze. As noted in the Section 4.1.3.1 "Regional Viewshed" discussion earlier in this section, information received since the Groundwater FEIR was certified in 2011 has provided an enhanced understanding of the significant historic and cultural ties some Native American Tribes have with the region and specifically the Project Area, and whose use of the area includes ceremonial activities, education, and individual visits (Sullivan 2013). Potentially affected viewers include Tribal groups who engage in group activities several times during the year, for durations of an hour or more per occurrence. Educational activities typically occur relatively infrequently, lasting for several hours at a time. Individual visits of short to moderate duration occur on a regular but infrequent basis. Because many Tribal users are intimately familiar with the views and overall viewshed associated with the cultural landscape and would be sensitive to visual changes in the landscape, viewer sensitivity is considered high.

4.1.4 Regulatory Background

4.1.4.1 Federal

Bureau of Land Management

A portion of the Project Area lies on BLM land administered by the Lake Havasu Field Office and a portion lies on San Bernardino County leased property managed by the BLM and administered by the Needles Field Office.

The Federal Land Policy and Management Act of 1976 establishes a policy for the United States to manage public lands in a manner that will protect the quality of scenic values (43 U.S. Code 1701(a)(8)). To this end, the BLM has developed the Visual Resource Management (VRM) system to ensure that the scenic values of public lands are considered before allowing uses that may have negative visual impacts. Under this system, BLM-administered lands are inventoried, analyzed, and assigned visual ratings or management classes. Class designations are derived from an analysis of scenic quality (rated by land form, vegetation, water, color, influence of adjacent scenery, scarcity, and cultural modification), a determination of viewer sensitivity levels (sensitivity of people to changes in the landscape), and distance zones. Management classes describe the different degrees of modification allowed to the basic elements of the landscape (form, line, color, texture). Management classes and their goals are listed in **Table 4.1-3**. Management classes are identified in BLM Resource Management Plans.

TABLE 4.1-3
BLM MANAGEMENT CLASSES AND GOALS

Management Class	Goals
Class I	To preserve the existing character of the landscape. The level of change to the characteristic landscape should be very low and must not attract attention.
Class II	To retain the existing character of the landscape. The level of change to the characteristic landscape should be low.
Class III	To partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate.
Class IV	To provide for management activities that requires major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high.

SOURCE: U.S. Department of the Interior (DOI) 2007.

The *Lake Havasu Approved Resource Management Plan* (May 2007) identifies the visual resource management classes for areas around the proposed Project (BLM 2007). As a special designation, the Chemehuevi Mountain Wilderness, which lies approximately 0.4 miles south of the Project Area, has a Class I designation. The other BLM lands in the vicinity of the Project, including the Beale Sough Riparian and Cultural Area of Critical Environmental Concern, are primarily designated as Class III (DOI 2013 and DOI 2007). Class III guidelines allow for moderate change to landscape character. Management actions may attract attention but should not dominate the view of the casual observer (DOI 2007:118).

Fort Mojave Indian Reservation

The Fort Mojave Indian Tribe (FMIT) Reservation is located outside the Project Area along the Colorado River in an area covering nearly 42,000 acres in Arizona, California, and Nevada. The southernmost boundary of the FMIT Reservation is located approximately 1 mile north of the Station. The FMIT has a General Plan and maintains a planning department. The General Plan is focused on land use policy and does not specifically address visual quality or aesthetics (Fort Mojave Indian Tribe Planning Department 2013). Section 4.4, "Cultural Resources," includes additional information on cultural landscape and FMIT concerns regarding the proposed Project.

In addition, the FMIT owns land that is part of the Project Area north of I-40. The FMIT-owned land is located on land transferred under the 2006 Settlement Agreement between PG&E and the FMIT. Transfer of title of this property in the Project Area to the FMIT occurred in October 2009. The FMIT ownership of the property is subject to a blanket easement over the property to PG&E for remediation-related purposes. The Settlement Agreement precludes the FMIT from transferring title of the property into trust with the federal government for the life of the easement.

U.S. Fish and Wildlife Service

A portion of the Project Area lies in the HNWR. The Lower Colorado River National Wildlife Refuges Comprehensive Plan describes policies for this area. The plan includes a general description of the importance of managing long-term aesthetic resources but no specific policies that apply to the Project Area and surrounding area (USFWS 1994:158).

U.S. Department of Transportation, Federal Highway Administration

Route 66 is a National Scenic Byway and All-American Road in Arizona; however, it is not designated as such in California. The federal Scenic Byways Program prohibits billboards and has provisions to control other signage along designated scenic byways (U.S. Department of Transportation 2013).

4.1.4.2 State of California

California's Scenic Highway Program was created by the state legislature in 1963. Its purpose is to preserve and protect scenic highway corridors from change that would diminish the aesthetic value of lands adjacent to highways. The State Scenic Highway System includes highways that are either eligible for designation as scenic highways or have been designated as such. The status of a state scenic highway changes from "eligible" to "officially designated" when the local jurisdiction adopts a scenic corridor protection program, applies to the California Department of Transportation (Caltrans) for scenic highway approval, and receives the designation from Caltrans. A city or county may propose adding routes with outstanding scenic elements to the list of eligible highways; however, state legislation is required for designation.

The proposed Project would not be visible from State Route 38, the closest Designated State Scenic Highway, which is located in San Bernardino County more than 100 miles away. The Project Area is visible from locations along I-40, an Eligible State Scenic Highway.

4.1.4.3 State of Arizona

Arizona's state designated scenic roads include historic and scenic roads and parkways and federally designated scenic byways. Historic Route 66, known as Arizona State Highway 10 near the Project Area, is an Arizona state designated Historic Road (ADOT 2016). Guidelines under the state scenic roadway program include protection of roadside vegetation and the underground placement of pipelines and utilities where possible. A corridor management plan for Route 66 prepared for the scenic roadway program primarily discusses ways to preserve and promote the road's cultural and historic resources (ADOT 2005).

4.1.4.4 Local

County of San Bernardino (California) 2007 General Plan

The Open Space Element and the Conservation Element of the County of San Bernardino 2007 General Plan (County General Plan) contains provisions regarding preserving aesthetic resources, specifically scenic routes. Historic Route 66 and I-40, which both traverse the Project Area, are listed as county scenic routes. Relevant goals and policies include the following:

GOAL OS 4: The County will preserve and protect cultural resources throughout the County, including parks, areas of regional significance, and scenic, cultural and historic sites that contribute to a distinctive visual experience for visitors and quality of life for County residents.

GOAL OS 5: The County will maintain and enhance the visual character of scenic routes in the County.

- **Policy OS 5.2:** Define the scenic corridor on either side of the designated route, measured from the outside edge of the right-of-way, trail, or path. Development along scenic corridors would be required to demonstrate through visual analysis that proposed components are compatible with the scenic qualities present.

- **Policy OS 5.3:** The County desires to retain the scenic character of visually important roadways throughout the County. A "scenic route" is a roadway that has scenic vistas and other scenic and aesthetic qualities that over time have been found to add beauty to the County. Therefore, the County designates the following routes as scenic highways and applies all applicable policies to development on these routes:

    f. Historic Route 66 (National Trails Highway or Main Street) from Oro Grande northeast and east to the Arizona state line, excepting those areas with incorporated cities.

    g. Interstate 40 from Ludlow northeast to Needles.

The Project Area is located in the Desert Region of the County. The following provisions of the Conservation Element pertain to aesthetic resources in this region:

GOAL D/CO 1: Preserve the unique environmental features and natural resources of the Desert Region, including native wildlife, vegetation, water and scenic vistas.

- **Policy D/CO 1.2:** Require future land development practices to be compatible with the existing topography and scenic vistas, and protect the natural vegetation.

Mohave County (Arizona) General Plan

The Mohave County (Arizona) General Plan designates the Oatman-Topock Highway, located approximately 0.5 mile west of the Project Area, as a scenic route (Mohave County 2005:53). Policies applicable to scenic routes focus on preserving scenic vistas and enhancing aesthetic value of scenic routes.

4.1.5 Environmental Impacts

4.1.5.1 Thresholds of Significance

Based on the current (2016) CEQA Guidelines, Appendix G, a project may be deemed to have a significant effect on the environment with respect to aesthetics if it would:

- Have a substantial adverse effect on a scenic vista;
- Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway;
- Substantially degrade the existing visual character or quality of the site and its surroundings; or
- Create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area.

The criteria listed above have been applied for purposes of this aesthetics analysis; however, to maintain consistency with the evaluation conducted for the Groundwater FEIR aesthetics evaluation, the second criteria was expanded to include the following italicized modification: Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a *Scenic Resources Corridor* (includes a state scenic highway).

4.1.5.2 Approach to Analysis

This section presents a revised analysis per Public Resources Code Section 21166 and CEQA Guidelines Section 15162 governing conditions required for preparation of a SEIR, including substantial changes to the Project or circumstances under which the Project is taken that result in major revisions to the original Groundwater FEIR. Subsequent to certification of the Groundwater FEIR, the Final Remedy Design was prepared to include design details not available in 2011. This section outlines the approach to the potential visual and aesthetic resources impacts based on the Project-specific information now available, as well as the additional information obtained regarding the existing environmental setting (see Section 4.1.3 summarizing the additional information included in the Final Remedy Design).

Some of the mitigation measures in this section refer to various plans or other documents that have been prepared and included in the Final Remedy Design for the groundwater remedy or are part of the Project's federal requirements. Many of these plans and documents included in the

Final Remedy Design were prepared to implement mitigation measures previously adopted as part of DTSC's January 31, 2011 decision approving Alternative E as the groundwater remedy (DTSC 2011). Appendix GWMM to this SEIR presents a comparison between the mitigation measures included in the Groundwater FEIR as reflected in the Mitigation Monitoring and Reporting Program approved by DTSC on January 31, 2011, and those presented in this SEIR for the Final Groundwater Remedy Project.

All plans and documents included in the Final Remedy Design and references in this SEIR are appended to this SEIR as Appendix BOD. In addition, the documents are available online at the following link: http://dtsc-topock.com/documents/cleanup-implementation/groundwater/remedy-design/remedial-design-documents.

Visual Analysis Methodology

The following analysis is based on site observations; review of technical data, including Final Remedy Design maps and drawings provided by the California Department of Toxic Substances Control (DTSC); aerial and ground-level photographs of the Project Area; state and local planning documents; computer-generated visual simulations; and a review of the Groundwater FEIR Aesthetics section (Groundwater FEIR Section 4.1).

Similar to the Groundwater FEIR visual assessment, this visual analysis employs assessment methods based in part on accepted visual analysis techniques, including those adopted by federal agencies such as the BLM and the U.S. Department of Transportation (DOT) Federal Highway Administration (FHWA), as summarized by Smardon, et al. (1986). These methods were applied to assess changes in the visual effects associated with construction activity, operation and maintenance, and decommissioning phases of the Final Groundwater Remedy Project, as detailed in Chapter 3, "Project Description." Section 4.1.2.1 includes a set of 21 updated photographs that were taken in March 2016 to document current visual conditions in the Project Area. These photographs include the 14 key views analyzed in the Groundwater FEIR and seven additional views that document new locations not previously addressed in the Groundwater FEIR (due to new information available since 2011, including input received from Tribal members with ties to the area as well as Project changes associated with the Final Remedy Design).

To document the visual change that would occur, 13 computer-generated visual simulations were chosen to show the Final Groundwater Remedy Project from key sensitive viewpoints. Figure 4.1-3 shows the location of each simulation view. The simulations include seven view locations determined to be sensitive on the basis of the Groundwater FEIR visual assessment (Key Views 2, 5 through 7, and 9 through 11) as well as five new views documenting visual changes associated with new project elements not previously analyzed in 2011 (Key Views B, C, D, E, and F). In addition to nine simulation views which portray the operation and maintenance phase of the Project, three views show construction phase activity (Key Views 6, B, and D) and one of these also shows decommissioning (Key View 6). The simulations were produced using digital photography and computer-modeling and rendering techniques and are based on the Final Remedy Design documents, including the C/RAWP, as described in Chapter 3, "Project Description" of this SEIR.

Presented as pairs of before and after images, the visual simulations are included as **Figures 4.1-5A** through **4.1-16B**. Changes were assessed, in part, by evaluating the after views provided by the visual simulations and comparing them to the current visual environment. Potential impacts are assessed based on comparison with the visual effects identified in the Groundwater FEIR aesthetics analysis. Where the Project includes new components such as the Construction Headquarters/Long-Term Remedy Support Area, not previously assessed in the Groundwater FEIR, potential Project visibility and aesthetic effects were evaluated in terms of changes to current visual conditions. Section 4.1.5.3, “Impact Analysis,” contains discussion of the set of visual simulations, including comparison with visual simulations contained in the Groundwater FEIR, where applicable.

Existing View from Interstate 40 eastbound at Bat Cave Wash looking southeast (VP 2)

Refer to Figure 4.1-3 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Topock Final Groundwater Remediation Project . 120112

Figure 4.1-5A
Existing View from Viewpoint 2

121516

Visual Simulation of the proposed Project (VP 2)

Refer to Figure 4.1-3 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Topock Final Groundwater Remediation Project . 120112

Figure 4.1-5B

Visual Simulation of the Project from Viewpoint 2

121516

Existing View looking southeast toward the Needles rock formation (VP 5)

Refer to Figure 4.1-3 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Topock Final Groundwater Remediation Project . 120112

Figure 4.1-6A

Existing View from Viewpoint 5

121516

Visual Simulation of the proposed Project (VP 5)

Refer to Figure 4.1-3 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Topock Final Groundwater Remediation Project . 120112

Figure 4.1-6B

Visual Simulation of the Project from Viewpoint 5

121516

Existing View looking southeast (VP 6)

Refer to Figure 4.1-3 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Topock Final Groundwater Remediation Project . 120112

Figure 4.1-7A

Existing View from Viewpoint 6

121516

Visual Simulation of the proposed Project Construction (VP 6)

Refer to Figure 4.1-3 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Figure 4.1-7B

Visual Simulation of the Project from Viewpoint 6 - Construction

Visual Simulation of the proposed Project after Decommissioning of IM-3 (VP 6)

Refer to Figure 4.1-3 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Figure 4.1-7C

Visual Simulation of the Project from Viewpoint 6 - Decommissioning of IM-3

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Existing View looking northwest (VP 7)

Refer to Figure 4.1-3 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Topock Final Groundwater Remediation Project . 120112

Figure 4.1-8A
Existing View from Viewpoint 7

121516

Visual Simulation of the proposed Project (VP 7)

Refer to Figure 4.1-3 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Topock Final Groundwater Remediation Project . 120112

Figure 4.1-8B

Visual Simulation of the Project from Viewpoint 7

121516

Existing View looking southeast toward Topock Compressor Station (VP 9)

Refer to Figure 4.1-3 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Topock Final Groundwater Remediation Project . 120112

Figure 4.1-9A

Existing View from Viewpoint 9

121516

Visual Simulation of the proposed Project (VP 9)

Refer to Figure 4.1-3 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Figure 4.1-9B

Visual Simulation of the Project from Viewpoint 9

Existing View from Ridge on Chemehuevi Mountains looking north toward Topock Compressor Station and Colorado River (VP 10)

Refer to Figure 4.1-3 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Figure 4.1-10A
Existing View from Viewpoint 10

Visual Simulation of the proposed Project (VP 10)

Refer to Figure 4.1-3 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Topock Final Groundwater Remediation Project . 120112

Figure 4.1-10B

Visual Simulation of the Project from Viewpoint 10

121516

Existing View from Colorado River looking southwest (VP 11)

Refer to Figure 4.1-3 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Topock Final Groundwater Remediation Project . 120112

Figure 4.1-11A

Existing View from Viewpoint 11

121516

Visual Simulation of the proposed Project (VP 11)

Refer to Figure 4.1-3 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Topock Final Groundwater Remediation Project . 120112

Figure 4.1-11B

Visual Simulation of the Project from Viewpoint 11

121516

Existing View from Park Moabi Entrance Road at Interstate 40 looking northeast toward the Colorado River (VP B)

Refer to Figure 4.1-3 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Figure 4.1-12A
Existing View from Viewpoint B

Visual Simulation of the proposed Project construction (VP B)

Refer to Figure 4.1-3 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Topock Final Groundwater Remediation Project . 120112

Figure 4.1-12B

Visual Simulation of the Project from Viewpoint B

121516

Existing View from National Trails Highway looking southwest toward the Construction Headquarters (VP C)

Refer to Figure 4.1-3 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Topock Final Groundwater Remediation Project . 120112

Figure 4.1-13A

Existing View from Viewpoint C

121516

Visual Simulation of the proposed Project (VP C)

Refer to Figure 4.1-3 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Figure 4.1-13B
Visual Simulation of the Project from Viewpoint C

121516

Existing View from National Trails Highway looking north toward the Soil Processing Area (VP D)

Refer to Figure 4.1-3 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Topock Final Groundwater Remediation Project . 120112

Figure 4.1-14A

Existing View from Viewpoint D

121516

Visual Simulation of the proposed Project (VP D)

Refer to Figure 4.1-3 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Topock Final Groundwater Remediation Project . 120112

Figure 4.1-14B
Visual Simulation of the Project from Viewpoint D

121516

Existing View from Levee Road in the Havasu National Wildlife Refuge looking south toward the Needles rock formation (VP E)

Refer to Figure 4.1-3 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Topock Final Groundwater Remediation Project . 120112

Figure 4.1-15A

Existing View from Viewpoint E

121516

Visual Simulation of the proposed Project (VP E)

Refer to Figure 4.1-3 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Topock Final Groundwater Remediation Project . 120112

Figure 4.1-15B

Visual Simulation of the Project from Viewpoint E

121516

Existing View from Arizona Highway 10 looking southwest toward the Colorado River and freshwater wells site (VP F)

Refer to Figure 4.1-3 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Figure 4.1-16A
Existing View from Viewpoint F

Visual Simulation of the proposed Project (VP F)

Refer to Figure 4.1-3 for photograph viewpoint locations

SOURCE: ENVIRONMENTAL VISION

Figure 4.1-16B
Visual Simulation of the Project from Viewpoint F

121516

Construction Impact Methodology

Subsequent to certification of the Groundwater FEIR, additional details were developed in the Final Remedy Design regarding the number and location of wells, lengths of piping and roads, and footprints of treatment infrastructure that would be constructed to implement the Final Groundwater Remedy Project. In addition, the Final Groundwater Remedy Project includes a Future Activity Allowance for all Project infrastructure to be constructed (wells, pipelines, structures, etc.). Generally, the Future Activity Allowance includes two components: (1) an additional allowance for all Project infrastructure, established at up to 25 percent of the parameter set forth in the Final Remedy Design, and (2) up to 10 additional monitoring well boreholes to be installed in Arizona as part of the monitoring program. In terms of location, the Future Activity Allowance would include construction of pipelines and electrical power underground throughout the Project Area, boreholes potentially located in the floodplain area and generally in the vicinity of existing/planned boreholes, monitoring well boreholes in Arizona, and additional structures near existing/planned structures and facilities (like at the Station, Transwestern Bench, Construction Headquarters, etc.). This SEIR therefore also includes the anticipated effects associated with the Future Activity Allowance in the impacts analysis. **Table 4.1-4** includes a summary of wells, lengths of piping and roads, and footprints of treatment infrastructure above what was analyzed in the Groundwater FEIR. Each new or modified structural component that has the potential to impact aesthetic resources during construction is summarized in detail below.

TABLE 4.1-4
SUMMARY OF INFRASTRUCTURE

Component	Groundwater FEIR Estimate	Final Remedy Design	Future Activity Allowance	Total	Difference Between FEIR Limit and Total New SEIR Features [b]
Boreholes[a]	170	191	58	249	61
Disturbed Ground (cubic yards)	13,400	45,200	11,300	56,500	43,100
Fluid Conveyance Piping (linear feet, underground)	50,000	127,500 [c]	31,875	159,375	109,375
Electrical/Communications Conduits (linear feet, underground)	50,000	124,000 [c]	31,000	155,000	105,000
Buildings and Structures (square feet)	110,000	42,000	10,500	52,500	(57,500)
Roadway Improvements (linear feet)	6,000	8,150 linear feet (new) and 4,060 linear feet (improvements to existing)	2,038 linear feet (new) and 1,015 linear feet (improvements to existing)	10,188 (new) 5,075 (improvements to existing)	9,263

NOTE:
[a] Each borehole may contain multiple wells; inclusive of both remediation and monitoring wells.
[b] Difference equals Total SEIR Boreholes (249) minus Groundwater FEIR Limit boreholes (170) minus Installed Boreholes (18).
[c] 124,000 linear feet of piping and/or conduits in 43,200 linear feet of trenches.

SOURCE: CH2M Hill 2015a and 2015b.

As detailed in Chapter 3, “Project Description,” the proposed Project includes construction of new facilities near Moabi Regional Park, at the MW-20 Bench, the Transwestern Bench, the TCS Evaporation Ponds, and the Station that were not known at the time the aesthetics analysis was performed and subsequently certified in the Groundwater FEIR.

Most notably, from a visual perspective, the Final Remedy Design includes construction of a Construction Headquarters and the Soil Processing Area/Clean-Soil Storage Area, which were not included in the Groundwater FEIR analysis. These new facilities would be located near Moabi Regional Park, in an area that was identified in the Groundwater FEIR as a potential location for freshwater wells to be used in the remedy. The Soil Processing Area/Clean-Soil Storage Area includes staging areas for multiple phases of soil staging, as well as a truck waiting area and an approximately 12-foot-high shade structure and elevated water tank. The Construction Headquarters/Temporary Construction Laydown Area (approximately 1.85 acres in size) would function as PG&E’s main area for construction oversight and support during construction and as the primary location for the mobilization and management of equipment, supplies, and site workers/contractors to and from the Project Area. Construction activities would result in the presence of construction equipment this area. On a more long-term basis during Project construction, the presence of soils-handling equipment such as dump/haul trucks and front-end loaders would be evident in the immediate area, as well as on National Trails Highway.

An Informational Outreach Center would be located at the entrance of Moabi Regional Park to provide residents and members of the public information about construction activities associated with the Project. The Informational Outreach Center would be available through the construction phase, and may remain open for inquiries during the initial operation phase depending on the community need. It would consist of a trailer of similar size to existing trailers in Moabi Regional Park. Because the size, scale, and appearance of the Informational Outreach Center is comparable to existing trailers located in the immediate vicinity, the change would not be noticeable and no visual impact is expected to occur. Therefore, this analysis does not include further discussion of the Informational Outreach Center.

Freshwater supply for the Final Groundwater Remedy Project would be obtained from freshwater wells in Arizona (instead of a freshwater intake structure along the Colorado River as proposed in the Groundwater FEIR). Although well HNWR-1A was considered in the 2013 Addendum to the Groundwater FEIR and has since been installed, construction activities for supporting infrastructure would result in the presence of equipment such as backhoes, concrete trucks, and soil compactors.

The TCS Evaporation Ponds would be used in the Final Groundwater Remedy Project to dispose of some of the remedy-produced water generated by the proposed Project. The ponds would be upgraded to include a masonry utility building to house a new natural-gas-fueled generator, two 20-foot-tall antenna poles with camera and lights, and a containment area for truck loading. Construction activities at this location would result in the presence of construction vehicles such as fork lifts, backhoes, concrete trucks, and soil compactors.

Improvements at the Station include construction of infrastructure associated with the Topock Compressor Station Recirculation Loop (TCS Recirculation Loop), the Dissolved Metals Removal System, and a Remedy-Produced Water Conditioning Plant and associated tanks and chemical storage. The existing Auxiliary Building would be used for new power generators and the existing Hazardous Materials Storage Building for storage of hazardous materials. Improvements at the Transwestern Bench include construction of a 2,200-square-foot Operations Building, concrete pads, stormwater catch basins, and a fence surrounding the perimeter. Construction activities at the MW-20 Bench would include construction of the Carbon Amendment Building and the Carbon Amendment Storage Tank, the reuse of the existing three 20,000-gallon frac tanks and 960-square-foot truck loading/unloading containment pad, and the installation of appropriate security measures. Construction of these elements would result in the presence of construction vehicles such as fork lifts, backhoes, concrete trucks, and soil compactors at these locations. Construction of wells on the MW-20 bench and in other areas would result in the presence of equipment such as drill rigs and boom/crane trucks during the construction phase.

The Groundwater FEIR assumed subsurface trenches for piping at the northern and southern crossing under Bat Cave Wash; however, the majority of the piping proposed for the remedy was aboveground. The Groundwater FEIR assumed 50,000 linear feet of fluid conveyance and electrical power piping; as shown in Table 4.1-4, the proposed Project (including the Future Activity Allowance) would result in an increase of nearly 110,000 linear feet of underground conveyance piping and 70,000 linear feet of electrical power piping. The increased length of underground pipeline in the Final Groundwater Remedy Project would result in an increase of construction equipment for trench and backfill, such as excavator, backhoes, and dump/haul trucks, which would be evidenced in the construction visual setting.

Project modifications have resulted in an increase in the number of boreholes from 170 in the Groundwater FEIR to 191 in the Final Remedy Design. The Final Remedy Design includes a Future Activity Allowance, which provides for an additional 25 Percent Potential Future Activity Allowance of components included in the Final Remedy Design plus 10 additional monitoring boreholes, or 58 additional boreholes, amounting in a total of 249 potential boreholes. The increased number of boreholes from the Final Groundwater Remedy Project would result in an increase of construction equipment drilling, such as excavator, backhoes, and dump/haul trucks, which would be evidenced in the construction visual setting. Additional linear feet of access roads as shown in Figure 4.1-4 would result in an increased number of construction vehicles such as scrapers, bulldozers, and dump/haul trucks in the project area.

There are a total of 23 proposed staging areas to be used in the Final Groundwater Remedy Project. Some of the previously proposed staging areas are no longer being considered for use. In addition, the previously proposed Staging Area 15 would now be used for mitigation planting. DTSC has detailed conditions PG&E must follow when using Staging Areas 6, 7, 12, 13, and 25, in order to minimize impacts on the areas and surrounding areas. See Table 3-6 in Chapter 3, “Project Description,” for a list of staging areas.

Project modifications have resulted in an increase in soil disturbance from 13,400 cubic yards in the Groundwater FEIR to 45,200 cubic yards in the Final Remedy Design, which is more than three times that amount analyzed in the Groundwater FEIR. In addition, accounting for the Future Activity Allowance, the total amount of soil disturbance analyzed in this SEIR is 56,500 cubic yards (see Table 3-4 in Chapter 3, "Project Description"), or four times the amount analyzed in the Groundwater FEIR. This results primarily from additional roadways and facility footprints (described earlier), and the fact that remedy pipelines are to be constructed underground (versus aboveground, which was assumed in the Groundwater FEIR).

With the exception of security lighting in the Construction Headquarters area, temporary lighting would be supplied by portable generators and lights, as needed and consistent with any applicable mitigation measures and conditions of approval. While night work is not planned as part of routine construction activities, it may be determined that limited circumstances require the continuation of work into the nighttime periods because it cannot be disrupted or suspended (for example, during drilling of some wells or special conditions during concrete pouring) or work may require an early morning start to ensure completion within 1 day or because of heat constraints. For these special circumstances, as specified in C/RAWP Section 4.6.4, "Lighting," nighttime construction lighting would be limited to active construction areas during nighttime or early-morning operation. To minimize lighting impacts, lighting would include shrouding or shielding for portable lights, the use of the lowest allowable height, and fewest feasible numbers of lights consisting of downward-facing fixtures fitted with cutoff shields to reduce light diffusion.

The Final Remedy Design incorporates design details and plans to comply with Mitigation Measures AES-1, AES-2, and AES-3 of the Groundwater FEIR to preserve existing mature plant specimens, restore disturbed vegetation as well as to maintain a minimum 20-foot setback from the Colorado River, and implement specific surface treatment of built elements. These specific materials and plans are included in the supporting documents briefly described below and on the following page.

The *Aesthetics and Visual Resources Protection and Revegetation Plan* (C/RAWP Appendix N) addresses mitigation for impacts to mature plants and riparian vegetation along the Colorado River identified in the FEIR for Key Views 5 and 11 (Mitigation Measures AES-1, AES-2, and AES-3). To meet the mitigation requirements, the plan contains a mature plant survey and specifies protection measures for vegetation on the sandy terrace west of the Colorado River. Mature trees along the river would be left intact to provide a visual barrier between the Project wells and the river. If mature vegetation is removed, it would be replaced with native plant material as specified in the plan replacement planting procedures. The plan includes maintenance and monitoring procedures for 5 years following planting, as required by the mitigation measures. In addition to the requirements specified in the mitigation measures, the plan includes success criteria, and adaptive management for a minimum of 5 years following mitigation planting. Photo monitoring protocols to document preconstruction, post-construction, and plant regeneration conditions related to the mitigation planting are also specified.

The *Habitat Restoration Plan for Riparian Vegetation and Other Sensitive Habitats* (C/RAWP Appendix O) is implemented to preserve and protect sensitive habitats in the Project Area as required by FEIR Mitigation Measure BIO-1. This plan applies to the overall Project Area as opposed to the area seen in Key Views 5 and 11, which is covered by the *Aesthetics and Visual Resources Protection and Revegetation Plan* discussed previously. Because the plan includes mapping of sensitive vegetation for avoidance, and procedures for vegetation salvage, revegetation, and monitoring, it also addresses requirements of FEIR Mitigation Measures AES-1, AES-2, and AES-3.

The *Assessment of Proposed Mitigation Planting Areas for Final Groundwater Remedy Impacts, Topock Compressor Station* (C/RAWP Appendix V) is a supplement to the Project restoration and revegetation plans that provides information and detailed mapping of the proposed mitigation planting areas. Some of this mitigation planting will apply to Mitigation Measures AES-1, AES-2, and AES-3, and in other areas it will help reduce the level of potential visual impacts.

The Final Remedy Design documents provide design details that comply with the surface treatment requirements of Mitigation Measures AES-1d and AES-2e for muted, earth-tone colors, matte surface finishes, and integral color concrete. The Final Remedy Design Appendix C - Design Criteria includes these surface treatment specifications in Sections C.3.1-Concrete, C.5.1-Piping, and C.8-Architectural. Further specifications on painting are included in Appendix E - *Volume 1 Specifications, Painting and Coating, Section 3.01.D.*

In addition, Final Remedy Design Figure 2.4-6 Ordinary High Water Mark and 20-Foot Setback along the Riverbank (Mitigation Measure AES-2A) delineates the Project's 20-foot setback from the Colorado River. As outlined above, when taken together the proposed Project includes salient details designed to address requirements of Mitigation Measures AES-1, AES-2, and AES-3.

The analysis assumes that construction activities would be conducted in compliance with all applicable regulations and work plans, including those noted above. All other construction-related impacts of the proposed Project are unchanged from what is presented in the Groundwater FEIR.

Operation and Maintenance Impact Methodology

Normal operation of the groundwater remedy would include groundwater extraction and recirculation, carbon substrate storage and deliveries, carbon substrate injections, and monitoring and control of the system. There would also be activities associated with freshwater supply, conveyance, and storage; remedy-produced water management; pre-injection water treatment (if required); power supply and distribution; and the Remedy Supervisory Control and Data Acquisition system. All of these systems would require regularly scheduled maintenance to keep the systems functioning in an efficient and optimal manner.

Routine or preventative maintenance would be used to mitigate performance losses at injection and extraction wells and is generally conducted without intrusive modifications to the wellhead or well; this maintenance does not require removing existing equipment from the well for access. Non-routine well maintenance may involve removal of existing well equipment, and in some instances wells may need to be replaced, which is accounted for in the operation and maintenance phase of the proposed Project (see Chapter 3, “Project Description,” Section 3.6.3.5) and would follow similar methods used to construct wells and other associated infrastructure.

After construction and use of the Construction Headquarters during the construction phase, the area would become the Long-Term Remedy Support Area, which would function as PG&E’s support area for the lifetime of the groundwater remedy. It would include a 25-foot-tall workshop as well as an 11-foot-tall sunshade structure and an office trailer, and would be enclosed by an 8 foot chain-link fence. Solar panels will installed on rooftops at the Long-Term Remedy Support Area and five small solar panels would be installed for monitoring at remote well locations in Arizona. Operation and maintenance activities at the Long-Term Remedy Support Area would include on-site sample processing, and vehicle and equipment storage, decontamination, and maintenance. Routine and non-routine operation and maintenance activities would include inspection and preventative maintenance of the generator and solar panels; water delivery to the potable water tank; inspection and maintenance of the booster pump; removal and off-site disposal of sewage; decontamination of vehicles and equipment; management of rainwater collected in the secondary containment; inspection and maintenance of the sump pump; and off-site hauling of wastewater from the decontamination water storage tank.

Operation and maintenance activities at the TCS Evaporation Ponds would include ongoing maintenance of the power system and remote sensing equipment. As described in Section 3.6 of the Project Description, the Final Groundwater Remedy Project includes a Future Activity Allowance for all Project infrastructure, which could occur during the construction or operation and maintenance phase. In terms of location, the Future Activity Allowance could include construction additional pipelines and electrical power underground throughout the Project Area, and would primarily be situated in proximity to existing infrastructure. For example, additional boreholes could be located in the floodplain and in the vicinity of existing/planned boreholes, and additional buildings/structures would likely be situated near other existing/planned structures and facilities (at the Station, Transwestern Bench, and Long-Term Remedy Support Area, etc.).

Operation and maintenance activities for the proposed Project would occur during the entire period in which cleanup activities would be ongoing and until the cleanup goals and objectives of the Final Groundwater Remedy Project have been met. Depending on the performance of the Final Remedy Design, the anticipated remedial timeframe is estimated to be about 30 years, followed by up to 10 years of long-term monitoring and concurrently up to 20 years of arsenic monitoring. The following impact analysis considers whether operation and maintenance of the Final Groundwater Remedy Project, in conjunction with the Future Activity Allowance, would result in new or substantially more severe significant adverse impacts related to aesthetics compared to those identified in the Groundwater FEIR certified in 2011.

Decommissioning Impact Methodology

The steps and schedule for decommissioning and restoration may occur during multiple mobilizations and would be affected by the specific infrastructure to be decommissioned. Decommissioning activities would occur within the same footprints of locations where remedy infrastructure was previously installed. Decommissioning and restoration of remedy components are largely projected to occur decades in the future and would be affected by information and conditions that become available prior to and at the time of decommissioning and restoration. However, some restoration activities would begin during Phase 1 Construction (restoration of disturbed areas after well installation activities have been completed, revegetation to offset habitat loss that could not be avoided during construction, etc.).

Decommissioning of the proposed Project would generally be beneficial to visual resources in the long-term as developed features would be removed and areas impacted would be restored to a pre-project condition. However, decommissioning activities (e.g., removal and capping of wellheads, restoration of roadways, and removal of pipelines) would be similar to construction impacts in their visual effects and are considered concurrently as in the Groundwater FEIR assessment of visual impacts.

4.1.5.3 Impact Analysis

Table 4.1-5 in this SEIR includes a summary of visual effects associated with the proposed Project elements. As indicated in this table, the proposed Project with mitigation would result in a less than significant visual impact. This represents no change in the case of all but two of the impacts analyzed in the Groundwater FEIR. By incorporating requirements stipulated in Mitigation Measures AES-1 through AES-3 from the Groundwater FEIR, as detailed in the Final Remedy Design pertaining to protection of existing vegetation, revegetation of cleared areas and surface treatment of aboveground project structures, the potentially significant impacts of the Project on aesthetic resources identified at Key Views 5 and 11 in 2011 would be less than significant.

TABLE 4.1-5
SUMMARY OF SEIR KEY VIEW ANALYSIS

Key Viewpoint	View Location and Description *(View Sensitivity)*	Visible project elements compared with Groundwater FEIR	Visual effect compared with Groundwater FEIR *(Impact Significance)*
Key Views Analyzed in 2011 Groundwater FEIR and SEIR			
1	Motorist view traveling east on I-40 toward the Station and Colorado River showing a monitoring well in highway median. *(Low sensitivity)*	No change.	No change. *Less than Significant Impact*
2*	Motorist view traveling east on I-40 toward Station at crossing of Bat Cave Wash. *(Moderate sensitivity)*	Groundwater FEIR evaluated an aboveground pipeline through Bat Cave Wash that is now to be constructed underground in the Final Remedy Design; no new reductant storage facility in foreground; new buildings and infrastructure visible south of Station. (Refer to Visual Simulation Figure 4.1-5B)	Incremental change with improvement in view from I-40. *Less than Significant Impact*
3	Motorist view traveling west on I-40 toward the BNSF railroad bridge *(Low sensitivity)*	Minor changes in new structures visible at the Monitoring Well-20 Bench (MW-20 Bench) north of bridge.	Minor incremental change. *Less than Significant Impact*
4	Motorist view traveling south on historic National Trails Highway looking toward floodplain and railroad bridge. *(Moderate to high sensitivity)*	Minor changes in wells and access roadway within the floodplain. Less permanent vegetation removal. New revegetation areas.	Minor incremental change. *Less than Significant Impact*
5*	**Tribal/Pedestrian view looking southeast toward the Colorado River and the "Needles" rock formation.** *(High sensitivity)*	**Minor changes in wells and access roadway within the floodplain. Less permanent vegetation removal. New revegetation areas. (Refer to Visual Simulation Figure 4.1-6B)**	**Incremental change with improvement in view from Viewpoint 5.** ***Less than Significant Impact with implementation of MM AES-1***
6*	Tribal/Pedestrian view looking southeast. *(Moderate sensitivity)*	Project elements no longer seen at the IM-3 Facility area. Changes to buildings and infrastructure at Station in background. (Refer to Visual Simulation Figure 4.1-7C)	Incremental change with improvement in view. *Less than Significant Impact*
7*	Tribal/Pedestrian view looking north toward TCS Evaporation Ponds. *(Moderate to high sensitivity)*	Upper portion of new remedy building and infrastructure visible adjacent to TCS Evaporation Ponds. (Refer to Visual Simulation Figure 4.1-8B)	Minor incremental change. *Less than Significant Impact*
8	Tribal/Pedestrian view looking east toward Station. *(Moderate sensitivity)*	No visible changes.	No change. *Less than Significant Impact*
9*	Tribal/Pedestrian view looking southeast toward Station. *(High sensitivity)*	Changes to new buildings and infrastructure at Station. Originally proposed aboveground pipeline now to be constructed underground. (Refer to Visual Simulation Figure 4.1-9B)	Incremental change with improvement in view. *Less than Significant Impact*

Key Viewpoint	View Location and Description *(View Sensitivity)*	Visible project elements compared with Groundwater FEIR	Visual effect compared with Groundwater FEIR *(Impact Significance)*
10*	Recreational and Tribal view from Chemehuevi mountains looking northeast toward Station and Colorado River. *(High sensitivity)*	New buildings and infrastructure located closer to Station in a previously disturbed area. Pipeline in Bat Cave Wash no longer visible. (Refer to Visual Simulation Figure 4.1-10B)	Incremental change with improvement in view from Chemehuevi Mountains. *Less than Significant Impact*
11*	**Recreationalist view looking southwest toward floodplain and Station from Colorado River.** *(High sensitivity)*	**Less permanent vegetation removal. Revegetation of areas cleared during construction. New wells and floodplain ring road less visible. (Refer to Visual Simulation Figure 4.1-11B)**	**Incremental change with improvement in view from Colorado River.** ***Less than Significant Impact with implementation of MM AES-1 and AES-2***
12	Recreationalist view looking west toward Station from Colorado River. View is approximately 1,800 feet from the Station. *(Moderate sensitivity)*	New structures at Transwestern Bench (TW Bench) and Station potentially visible but largely hidden by topography	Minor incremental change. *Less than Significant Impact*
13	Recreationalist view looking southwest toward existing arched utilities bridge from the Colorado River. *(Low sensitivity)*	Originally proposed freshwater intake on the Colorado River at the existing pipeline bridge, which is no longer included as part of the Final Remedy Design. A new freshwater pipeline would be installed on the existing pipeline bridge.	Incremental change with improvement in view from Colorado River *Less than Significant Impact*
14	Recreationalist view looking west toward Station from Colorado river. *(Low sensitivity)*	Originally proposed freshwater intake on the Colorado River at the existing pipeline bridge, which is no longer included as part of the Final Remedy Design. A new freshwater pipeline would be installed on the existing pipeline bridge.	Incremental change with improvement in view from Colorado River. *Less than Significant Impact*
New Key Views not included in Groundwater FEIR			
Key Viewpoint	**View Location and Description**	**Visible project elements**	**Visual effect** ***including impact significance***
A	Motorist view traveling west on I-40 toward the TCS Evaporation Ponds. *(Moderate sensitivity)*	New antenna poles with camera and light at ponds.	Fleeting partial view of Project elements, barely noticeable from I-40. *Less than Significant Impact*
B*	Park Moabi Entrance Road at I-40 looking northeast toward the Colorado River. *(Moderate sensitivity)*	No long-term project elements at this location.	No visual effect during Operation and Maintenance phase. *Less than Significant Impact*
C*	Motorist view traveling west on historic National Trails Highway looking toward the Construction Headquarters location. *(High sensitivity)*	New buildings and infrastructure at Construction Headquarters site adjacent to BNSF railroad embankment. (Refer to Visual Simulation Figure 4.1-13B)	Foreground vegetation provides partial screening and visibility of Project structures reduced due to use of matte, earth-tone color consistent with the natural colors of surrounding landscape. *Less than Significant Impact with implementation of MM AES-1*
D*	Motorist view traveling east on historic National Trails Highway looking toward Soil Processing Area site. *(Moderate to high sensitivity)*	Potential long-term clean-soil storage area. (Refer to Visual Simulation Figure 4.1-14B)	Potential visual contrast would be minor and facility would not obstruct distant views of Mohave Valley and surrounding peaks. Existing roadside vegetation would partially screen view toward site from Moabi Regional Park. *Less than Significant Impact*

Key Viewpoint	View Location and Description *(View Sensitivity)*	Visible project elements compared with Groundwater FEIR	Visual effect compared with Groundwater FEIR *(Impact Significance)*
E*	Recreational and Tribal view looking south from Levee Road in the Havasu National Wildlife Refuge. *(High sensitivity)*	New monitoring wells and data collection monitoring equipment with solar panel adjacent to unpaved, lightly traveled roadway. (Refer to Visual Simulation Figure 4.1-15B)	Small-scale project elements could be seen against backdrop that includes large-scale built structures. Matte, earth-tone color of project elements, consistent with the natural colors of surrounding landscape, would reduce visual contrast. *Less than Significant Impact*
F*	Motorist view traveling south on Arizona Highway 10 looking southwest toward the existing HNWR-1A freshwater well site. *(Moderate sensitivity)*	New structures, fencing, and power pole with overhead conductors**.** (Refer to Visual Simulation Figure 4.1-16B)	New project elements seen alongside existing freshwater well, and in close proximity to existing utility poles and overhead conductors. Matte, earth- tone color of project elements, consistent with the natural colors of surrounding landscape, would reduce visual contrast. *Less than Significant Impact*
G	Tribal and recreational view from ridge near Arizona Highway 10 looking south toward Colorado River and Station. *(High sensitivity)*	New structures and HNWR-1A well in distance**.**	HNWR-1A site partially visible in the distance; the HNWR-1A well is surrounded by areas of disturbed vegetation which has the potential to obstruct view of the facility in the future. *Less than Significant Impact* *(no change from 2013 Addendum to the Groundwater FEIR)*

NOTE: Because the Groundwater FEIR concluded there could be potentially significant impacts at Key Viewpoints 5 and 11, these discussions are shown in **bold** above).

* Simulation View

IMPACT AES-1 **Substantial Adverse Effects on Scenic Vistas.** The proposed Project could introduce additional wells, roads, pipelines, and other associated infrastructure, including the Future Activity Allowance, which could have a substantial adverse effect on a scenic vista. This impact would be **potentially significant**, as previously identified in the Groundwater FEIR.

Construction

As detailed in Chapter 3, “Project Description,” of this SEIR, the proposed Project includes concepts and details that were unknown when the Groundwater FEIR was certified, regarding construction of pipelines and wells, buildings, storage facilities, staging areas and roadways that could be seen from scenic vistas identified in the Groundwater FEIR. In particular, aboveground conveyance piping has generally been replaced with underground piping, which results in removal of most of the aboveground piping that was envisioned in the Groundwater FEIR. This results in a reduction in some visible Project components. Refinements in Project design include additional wells within the Colorado River floodplain visible from Key Viewpoint 5 and in the IM-3 Facility area seen from Key Viewpoint 6, in addition to structures associated with Remedy Produced Water Conditioning Plan and other new structures located at the Station that would be seen from Key View 9, all of which are views from a location of Tribal sensitivity. Construction of facilities in new locations include monitoring and power generating equipment at the TCS

Evaporation Ponds partially visible from Key Viewpoint 7 and the HNWR Freshwater well site, distant views of which are potentially available from Key Viewpoint G north of the Topock Marsh in Arizona.

Although the construction of wells and other project infrastructure could be noticeable from some of these view locations, particularly Key Viewpoints 5, 6, 9, and B, which afford foreground views of Project locations, these activities would be temporary and of limited duration in any given area because of their dynamic nature (see Figure 4.1-4 for key viewpoints). The Project also provides for a Future Activity Allowance, which, during construction phase, could involve additional construction of new wells, roads, pipelines, and other associated infrastructure. While the exact locations are currently unknown, construction activity would likely take place in close proximity to existing/planned features and would employ the same equipment, work standards, and temporary visible effect as the known facilities. The key viewpoints identified and discussed in this SEIR represent the general range of views to and from a scenic vista, and any additional construction phase activity associated with infrastructure developed as part of the Future Activity Allowance (i.e., 58 additional boreholes) would not result in different impacts than with the known infrastructure.

Figure 4.1-7 is an existing (before) view and visual simulation (after), from Key Viewpoint 6 looking southeast toward the existing IM-3 Facility and the Chemehuevi Mountains beyond. A comparison of the existing view and simulation indicates that proposed construction activity related to well construction, along with material displacement and equipment storage would occur on previously graded pads located in proximity to the IM-3 Facility (Figures 4.1-7 A and B). The comparison also shows previously established access roads which are visible in the existing view, would continue to serve as access for the proposed Project staging and construction areas seen in the simulation view (Figure 4.1-7 A and B). As demonstrated by these simulations, temporary construction activity that would be visible within the foreground would not have a noticeable effect on the middleground and distant landscape views. All construction-related impacts on a scenic vista would be less than significant, and no mitigation measures would be required.

Operation & Maintenance

The Groundwater FEIR assessment of potential long-term Project operation and maintenance impacts on scenic vistas concluded that because the Project would not be seen from four key viewpoints evaluated, there would not be any impact at Key Viewpoints 7, 8, 12, and 14, which were identified as scenic vistas, (refer to Section 4.1.2.2, Table 4.1-2). Since certification of the Groundwater FEIR, some of the proposed Project elements have changed, as seen from a number of locations identified as scenic vistas in 2011, and are found in the SEIR analysis to have less than significant impacts (Key Viewpoints 6, 9, 10, and G shown in Figure 4.1-3 and summarized in Table 4.1-5). As noted in Section 4.1.3, the orientation of viewpoint 7 has been modified from that which was assessed in 2011, to encompass Project elements in a location not previously analyzed (monitoring and power generating equipment adjacent to existing TCS Evaporation Ponds).

The Groundwater FEIR concluded that a potentially significant impact would result due to visible structures near Key Viewpoint 5, with the introduction of Project elements along the Colorado River floodplain, and required Mitigation Measure AES-1 to reduce this potentially significant impact. To address requirements stipulated in this mitigation measure of the Groundwater FEIR, the Final Remedy Design contains detailed treatments and procedures, including guidelines for the protection of existing mature vegetation and surface treatment of aboveground structures contained in the *Aesthetics and Visual Resources Protection and Revegetation Plan* (C/RAWP Appendix N), and other plans referenced above in Section 4.1.5.3, which has been incorporated into Mitigation Measure AES-1 for this SEIR. Implementation of these guidelines in the Final Remedy Design as stated in Mitigation Measure AES-1 below would reduce the potential for visual contrast that could result in an adverse visual effect on this scenic vista.

Figures 4.1-6A and B show an existing view and simulation from Key Viewpoint 5. A comparison of the two images demonstrates that the effect would be an incremental change to the level of visual contrast and the overall visual character of the floodplain, with respect to the view toward the Colorado River and the Needles rock formations. When compared with the existing view, the Figure 4.1-6B visual simulation shows a new access road and several new wells in the floodplain, adjacent to the National Trails Highway. The simulation also demonstrates that mature stands of vegetation along the floodplain would remain largely intact, and shows the restoration of previously open areas with native vegetation near the water's edge. Well vault covers and other project structures have a muted matte surface, in accordance with FEIR Mitigation Measure AES-1d, which has been included the Final Remedy Design (Appendix C – Design Criteria), and blend in with the natural colors of surrounding landscape, and therefore effectively would minimize visual contrast associated with introduction of Project components when seen from this scenic vista. As a result, impacts would be less than significant and no mitigation would be required.

Key View 5, in addition to Key Viewpoints 6, 7, 9, 10, and G, are all considered culturally sensitive, based on Tribal input. Project elements seen from Key Viewpoint 5, including well vaults and new access roadway visible from this viewpoint, are limited to foreground locations within the floodplain, and would not alter existing views of the Colorado River and more distant views of the Needles rock formations, which have been identified as culturally important landscape features. Impacts would be less than significant and no mitigation measures would be required.

Figure 4.1-8 represents a view experienced by Tribal and pedestrian visitors at Key Viewpoint 7. As shown in the Figure 4.1-8B visual simulation, visible Project elements, including portions of monitoring and power generating equipment, would barely be evident among the existing alluvial deposits that characterize the foreground landscape setting. A comparison of the Figure 4.1-8 existing view and simulation shows that the proposed Project would not block views toward the distant Sacramento Mountains seen in the Figure 4.1-8B simulation view. The broader landscape context for this scenic vista can be seen in the Figure 4.1-2C photographs showing panoramic views and the Figure 4.1-2D panoramic view area map. Because of the lack of visible Project components in the foreground, impacts would be less than significant and no mitigation measures would be required.

Figure 4.1-9 from Key Viewpoint 9, represents a view from a location of Tribal sensitivity, is a component of the broader panoramic viewshed depicted in Figure 4.1-2C, approximately 950 feet northeast of Key Viewpoint 7, that looks toward Bat Cave Wash and the Station facilities beyond against a backdrop of the Chemehuevi Mountains. When seen from this location, the introduction of Project elements would represent incremental change to the existing visual setting. Similar to the determination made in the Groundwater FEIR, the Figure 4.1-9B simulation depicting Final Remedy Design elements demonstrates that the proposed Project would result in an incremental improvement to the view from a location of Tribal sensitivity. The simulation also shows that the application of a matte, earth-tone surface treatment, in accordance with FEIR Mitigation Measure AES-1d, which is specified in the Final Remedy Design (Final Remedy Design Appendix C – Design Criteria), would blend in with the natural colors of surrounding landscape, and therefore effectively would minimize visual contrast associated with introduction of Project components when seen from this scenic vista. As a result, impacts would be less than significant and no mitigation would be required.

Key Viewpoint 10 from the Chemehuevi Mountains affords an elevated view of the Mohave Valley from the same viewpoint as the panoramic view depicted in Figure 4.1-2A, which shows important local and regional features, which are defining elements in the visual character of the landscape and include surrounding peaks, arroyos and the Colorado River. Within this context, the introduction of Project elements, located on terrain within the confines of the existing Station would be barely noticeable. Similarly, the photograph from Key Viewpoint G, on a ridge near Arizona Highway 10 shows an expansive landscape view overlooking the Colorado River floodplain with the Needles rock formation and a portion of the Chemehuevi Mountains dominating the horizon (Figure 4.1-K). The HNWR freshwater well sites adjacent to Topock Marsh would be discernible; however they would not be particularly noticeable due to surrounding topography and vegetation. Project features as seen from this key viewpoint would result in a less than significant impact, and no mitigation measures would be required.

The Project also provides for a Future Activity Allowance, which, during the operation and maintenance phase, could involve additional construction of new wells, roads, pipelines, and other associated infrastructure. While the exact locations are currently unknown, infrastructure would likely be located in close proximity to existing/planned features. Any future infrastructure would be situated within the Project Area. The key viewpoints identified in this SEIR represent the general range of views to and from a scenic vista, and any additional infrastructure developed as part of the Future Activity Allowance (i.e., 58 additional boreholes) would be required to comply with Mitigation Measure AES-1, which provides guidelines for the protection of existing mature vegetation, revegetation of areas disturbed during construction, and specific surface treatment such as materials color and finish. Implementation of Mitigation Measure AES-1 would reduce the potential for visual contrast that could result in an adverse visual effect on these identified scenic vistas associated with infrastructure included in the Future Activity Allowance.

Decommissioning

The decommissioning activities themselves would be similar to construction in terms of equipment and activity, and therefore the visual impacts to a scenic view during the decommissioning phase would be less than significant. Additionally, as noted above in Decommissioning Impact Methodology, and demonstrated in the Figure 4.1-7C visual simulation showing the existing IM-3 Facility following decommissioning of the facility (discussed in more detail in Impact AES-3 below), decommissioning of the Project would generally be beneficial in the long-term, because developed visible infrastructure would be removed and areas impacted would be restored to a pre-project condition. As a result, the temporary impact of decommissioning activities on scenic vistas in the Project Area would be less than significant, and no mitigation would be required.

Comparison of Impact AES-1 Impacts (Revised) to Groundwater FEIR Impact Analysis

The 2011 Groundwater FEIR determined that the temporary presence of construction equipment and personnel, grading operations and materials stockpiles, while visible from scenic vistas (represented by Key Viewpoints 5, 6, 7, 9, and 10), would have limited effect on the existing landscape due to their dynamic nature and comparatively short duration in any given location and therefore would be less than significant. As outlined in Chapter 3, “Project Description,” the methods, equipment, and general procedures contained in the Final Remedy Design are consistent with the analysis contained within the Groundwater FEIR. Therefore these temporary impacts associated with the Project would be less than significant. The Groundwater FEIR determined that, once constructed, views looking toward the Colorado River, floodplain, and “Needles” rock formation, could be adversely affected through removal of floodplain vegetation, introduction of remedy infrastructure, grading operations, and overall alteration of the foreground elements of a scenic vista. The Groundwater FEIR determined the Project would result in a potentially significant visual impact, and the FEIR includes Mitigation Measure AES-1. To comply with FEIR Mitigation Measure AES-1 the Final Remedy Design includes the *Aesthetics and Visual Resources Protection and Revegetation Plan* (C/RAWP Appendix N) which provides guidelines for the protection of existing mature vegetation, revegetation of areas disturbed during construction, and surface treatment of aboveground structures. Adjustments for the Project design were also made based on the Mature Plants Survey (Final Remedy Design Figure 2.4-8). As a result, impacts would be less than significant and no mitigation would be required.

The Future Activity Allowance could introduce new wells, roads, pipelines, and other associated infrastructure at locations currently unknown and could potentially impact a scenic vista in the Project Area. With implementation of **Mitigation Measure AES-1**, which provides guidelines for the protection of existing mature vegetation, revegetation of areas disturbed during construction, and surface treatment of aboveground structures, impacts to scenic vistas resulting from the Future Activity Allowance would be reduced to a less than significant level. According to the Groundwater FEIR for the same potentially significant impact, compliance with this mitigation measure would reduce the overall change to the visual character of the view corridor along the Colorado River to a less than significant level. By implementing this mitigation measure, the impact determination in this SEIR is the same as the conclusions in the Groundwater

FEIR. Therefore, given the effective incorporation of mitigation requirements, the Project would not result in any new significant impacts or substantially more severe impacts on a scenic vista than previously identified in the Groundwater FEIR.

Mitigation Measures

Mitigation Measure AES-1: Substantial Adverse Effects on Scenic Vistas (Groundwater FEIR Measure with Revisions). The proposed Project, including the Future Activity Allowance, shall be designed and implemented to adhere to the design criteria presented below:

a. Existing mature plant specimens (i.e., medium- to large-sized trees, large or prominent shrubs, and tall predominately herbaceous) shall be protected in place during construction, operation, and decommissioning phases consistent with CUL-1a-5. The identification of plant specimens that are determined to be mature and retained shall occur as part of the design phase and mapped/identified by a qualified plant ecologist or biologist and integrated into the final design and project implementation consistent with CUL-1a-5.

b. Revegetation of disturbed areas within the riparian vegetation along the Colorado River shall occur concurrently with construction operations. Plans and specifications for revegetation shall be developed by a qualified plant ecologist or biologist before any riparian vegetation is disturbed and shall be implemented consistent with CUL-1a-5. The revegetation plan shall include specification of maintenance and monitoring requirements, which shall be implemented for a period of 5 years after project construction or after the vegetation has successfully established, as determined by a qualified plant ecologist or biologist.

c. Plant material shall be consistent with surrounding native vegetation.

d. The color of the wells, pipelines, reagent storage tanks, control structures, and utilities shall consist of muted, earth-tone colors that are consistent with the surrounding natural color palette. Matte finishes shall be used to prevent reflectivity. Integral color concrete should be used in place of standard gray concrete.

e. The final revegetation plans and specifications shall be reviewed and approved by an architect, landscape architect, or allied design professional licensed in the State of California to ensure that the aesthetic mitigation design objectives and criteria are being met. Planting associated with biological mitigation may contribute to, but may not fully satisfy, visual mitigation.

f. The requirements of the *Aesthetics and Visual Resources Protection and Revegetation Plan* (C/RAWP Appendix N) shall be implemented throughout the construction, operation and maintenance, and decommissioning phases of the Project, including but not limited to replacement planting procedures (see Section 4.3), maintenance and adaptive management (see Section 5.2), and photo-monitoring (see Section 5.3). These measures apply to new Project components added as part of the Future Activity Allowance, should they be visible from Key View 5 or any of the other key views identified in the SEIR.

Timing:	Implementation of the revegetation plan shall occur during project construction and operation and maintenance. Maintenance and monitoring requirements shall be implemented after Project construction for a period of 5 years, or after the vegetation has successfully established, as determined by a qualified plant ecologist or biologist.
Responsibility:	PG&E would be responsible for the implementation of these measures. DTSC would be responsible for ensuring compliance.
Significance after Mitigation:	Implementation of these mitigation measures would reduce the potentially adverse effect on a scenic vista associated with the Future Activity Allowance. Although the proposed Project would still be visible, incorporating a facilities design that is aesthetically sensitive and preserving the vegetation would blend the proposed project into their visual setting within the floodplain and would reduce the overall contrast of the proposed Project to a **less than significant** level.

IMPACT AES-2 **Substantial Damage to Scenic Resources within a Scenic Corridor.** The proposed Project could introduce new features in the Colorado River floodplain, at the TCS Evaporation Ponds, and near the existing HNWR-1A well site in Arizona that could adversely impact scenic resources within a scenic corridor. Because of the strong degree of contrast that is possible as a result of Project effects in these areas, this impact would be **potentially significant**, as previously identified in the Groundwater FEIR.

Construction

As detailed in Chapter 3, "Project Description," of this SEIR, the proposed Project includes new facilities at the TCS Evaporation Ponds and at the freshwater source wells located in Arizona, both which would be visible from scenic corridors, which were not known at the time the Groundwater FEIR aesthetics analysis was performed. These project locations are seen in Key View A from I-40, an eligible California state scenic highway, and Key View F from Arizona Highway 10 (a designated Arizona Historic Highway), respectively. Visual effects of construction activity include the temporary presence of equipment, materials and work crews in the Project Area. While the construction of wells and other Project infrastructure could be visually noticeable, they would be of limited duration in any given area because of their dynamic nature and would be visible in short-duration roadway views. These activities would not introduce a substantial change to the existing visual setting, and therefore the impact would be less than significant and no mitigation measures would be required.

The Project also provides for a Future Activity Allowance, which, during construction phase, could involve additional construction of new wells, roads, pipelines, and other associated infrastructure. While the exact locations are currently unknown, construction activity would likely take place in close proximity to existing/planned features and would employ the same equipment, work standards, and temporary visible effect as the known facilities. The key viewpoints identified and discussed in this SEIR represent the general range of effects on scenic resources within a scenic corridor, and any additional construction associated with infrastructure developed as part of the Future Activity Allowance (i.e., 58 additional boreholes) would not result in different impacts than with the known infrastructure.

Construction activities associated with the Future Activity Allowance may introduce new wells, roads, pipelines, and other associated infrastructure along the Colorado River floodplain, at the TCS Evaporation Ponds, and near the existing HNWR-1A well site in Arizona, all of which could be visible from a scenic corridor. However, as with the construction of known facilities identified in the Final Remedy Design, construction activities would be of limited duration and dynamic in nature, and would not have a significant impact on scenic resources within a scenic corridor.

Operation & Maintenance

The Groundwater FEIR assessment of potential long-term project operation and maintenance impacts on scenic resources concluded that because the Project would not create a high level of visual contrast in views from I-40, an eligible California state scenic highway, there would not be any impact at Key Viewpoints 1, 2, and 3 (refer to Section 4.1.2.2, Table 4.1-2), which represented views from a scenic corridor. As noted earlier, Key Viewpoints A and F, shown on Figure 4.1-3 were not evaluated in the Groundwater FEIR. The following discussion includes evaluation of these views and results are summarized in Table 4.1-5.

The Groundwater FEIR determined that long-term views from the Colorado River, a scenic resources corridor (represented by Key View 11) would be adversely affected by the Project through removal of floodplain vegetation, grading operations, and overall alteration of a scenic view corridor as a result of the introduction of wells and related infrastructure along the Colorado River floodplain. The Final Remedy Design incorporates design details and plans called for under Mitigation Measure AES-2 to preserve existing mature plant specimens, and restore disturbed vegetation as well as to maintain a minimum 20-foot setback from the Colorado River and implement specific surface treatment of built elements. The *Aesthetics and Visual Resources Protection and Revegetation Plan* (C/RAWP Appendix N), and other plans referenced in Section 4.1.5.2, stipulate measures with respect to protection and restoration of vegetation and surface treatment of aboveground structures along the Colorado River floodplain. For example, as specified in Mitigation Measure FEIR AES-2a and shown in Final Remedy Design Figure 2.4-6, the Project is setback a minimum of 20 feet from the ordinary high water mark of the river in order to prevent substantial vegetation removal along the river bank and flood plain for installation of Project components.

Figure 4.1-11 shows an existing view and visual simulation looking southwest toward the Project from Key Viewpoint 11 on the Colorado River. A comparison of these before and after views indicates that when seen in this key view from the river, the retention of river bank vegetation would substantially screen views of floodplain project elements, including a new access roadway and numerous new wells. Limited areas of vegetation removal and portions of the roadway are visible to the right, along with areas of revegetation that over time would provide additional screening of Project elements. The simulation further indicates that by implementing the setback of 20 feet, as specified in FEIR Mitigation Measure AES-2a and included in the Final Remedy Design (Final Remedy Design Figure 2.4-6), and substantially preserving the existing vegetation along the riverbank and floodplain as detailed in the *Aesthetics and Visual Resources Protection and Revegetation Plan* (C/RAWP Appendix N), the proposed Project would preserve existing character and quality of the landscape setting. The Figure 4.1-11B visual simulation also demonstrates that because the level of visual contrast would be relatively weak, the project would blend with surrounding landscape when seen from this key view from the river. Therefore, the Project effectively incorporates treatments called for under the Groundwater FEIR Mitigation Measure AES-2 and, as a result, the impact would be less than significant.

Certain Project components would be seen in views from I-40, an eligible California state scenic highway, and Arizona Highway 10 (a designated Arizona Historic Highway). Photograph A is a current key view from westbound I-40, looking toward the TCS Evaporation Ponds located west of the Station (Figure 4.1-4H). This view shows areas where new Project components, including pump infrastructure, power and communication equipment and a small building along the southwestern perimeter of the TCS Evaporation Ponds, would be located. As seen from this highway viewpoint, these Project elements would generally be blocked by intervening topography. The two 20-foot-tall communication antenna poles with camera and light would be visible over 1,000 feet away; however, motorists traveling at typical highway speeds would have only fleeting views toward the TCS Evaporation Ponds and therefore the impact of these additional project components on scenic resources from this eligible State Scenic Highway would be less than significant and no mitigation would be required.

Figure 4.1-16A shows the existing roadway view from Key Viewpoint F on Arizona Highway 10 (Historic Route 66) looking southeast toward the existing HNWR-1A freshwater well site, with more distant views of the BNSF Railway corridor, bridge structures, and a portion of the Station framed by the Chemehuevi Mountains in the background. The existing freshwater well facility, with light-colored enclosures that stand out against the surrounding darker vegetation, can be seen in the existing view. The Figure 4.1-16B visual simulation shows the proposed HNWR-1A freshwater well infrastructure that includes a new concrete well pad, sand collection system, and 12-foot-tall electrical enclosure, along with a new surrounding chain-link fence. Also shown in the simulation is a new wood utility pole and overhead conductors, which would provide electric power to the facility. While the pole would introduce a new vertical element to a view dominated by the horizontal outline of the railway and mountainous backdrop, it is similar in height and form to nearby existing poles seen along both sides of the roadway, which at typical highway speeds would be perceived by motorists for a short duration. Because the matte, earth-tone color of the new components is consistent with that of the surrounding topography and vegetation, as specified in the Final Remedy Design (Appendix E) which satisfies Groundwater FEIR Mitigation Measure AES-2e, the overall contrast of the new well components is incrementally reduced when compared to the existing facility, and the resulting impact on the surrounding quality and character of the landscape would therefore be less than significant and no mitigation would be required.

The Project also provides for a Future Activity Allowance, which, during the operation and maintenance phase, could involve additional construction of new wells, roads, pipelines, and other associated infrastructure along the Colorado River floodplain or at areas visible from I-40 and Highway 10, the three primary designated scenic corridors in the Project Area. While the exact locations are currently unknown, infrastructure would likely be located in close proximity to existing/planned features. For example, additional boreholes could be located in the floodplain and in the vicinity of existing/planned boreholes, and additional buildings/structures would likely be situated near other existing/planned structures and facilities (at the Station, Transwestern Bench, and Long-Term Remedy Support Area, etc.). The key viewpoints identified in this SEIR represent the general range of potential adverse impact to scenic resources within a scenic corridor, and any additional infrastructure developed as part of the Future Activity Allowance (i.e., 58 additional boreholes) would be required to comply with mitigation measure AES-2, to preserve existing mature plant specimens, and restore disturbed vegetation as well as to maintain a minimum 20-foot setback from the Colorado River and implement specific surface treatment of built elements to blend in with the surrounding landscape. Implementation of Mitigation Measure AES-2 would reduce the potential overall visual contrast of the proposed Project infrastructure included in the Future Activity Allowance to a less than significant level.

Decommissioning

The decommissioning activities themselves would be similar to construction in terms of equipment and activity, and therefore the visual impacts from the scenic corridors during the decommissioning phase would be less than significant. As noted above in Decommissioning Impact Methodology, and demonstrated in the Figure 4.1-7C visual simulation showing the existing IM-3 Facility following decommissioning of the facility (discussed in more detail in Impact AES-3), decommissioning of the Project would generally be beneficial in the long-term, because developed visible infrastructure visible from scenic corridors would be removed and areas impacted would be restored to a pre-project condition. As a result, the temporary impact of construction and decommissioning activities on scenic vistas in the Project Area would be less than significant, and no mitigation would be required.

Comparison of Impact AES-2 (Revised) to Groundwater FEIR Impact Analysis

Construction and decommissioning-related visual impacts resulting from the temporary presence of equipment, materials, and work crews on views from the Colorado River, a scenic resources corridor, as well as on views from I-40, an eligible California state scenic highway, were found to be less than significant in the Groundwater FEIR, as were potential impacts from Arizona Highway 10 (historic Route 66) that were addressed in the 2013 Addendum to the Groundwater FEIR. These impacts would not differ with the Final Remedy Design, as discussed above, and no mitigation measures would be required in this SEIR.

The Groundwater FEIR determined that views from the Colorado River, a scenic resources corridor (represented by Key View 11) would be adversely affected by the Project through removal of floodplain vegetation, grading operations, and overall alteration of a scenic view corridor as a result of the introduction of wells and related infrastructure along the Colorado River floodplain. Substantial removal of existing vegetation along the river bank could significantly alter the character of existing views, including visible vehicular traffic along the National Trails Highway not previously seen from the river (refer to the Key Viewpoint 5 in the Groundwater FEIR, Section 4.1, "Aesthetics"). The Final Remedy Design (C/RAWP Appendix N and Final Remedy Design Figure 2.4-6) incorporates design details and plans called for under Mitigation Measure AES-2 to preserve existing mature plant specimens, and to restore disturbed vegetation, as well as to maintain a minimum 20-foot setback from the Colorado River and to implement specific surface treatment of built elements. As a result of these changes in the Project, the level of vegetation clearing seen from the river is greatly reduced. A comparison between the SEIR visual simulation and the Groundwater FEIR visual simulation shows that the strong degree of visual contrast seen in this SEIR's key viewpoint would be substantially reduced from what was presented in the Groundwater FEIR.

In its assessment of views from I-40, an eligible California state scenic highway, the Groundwater FEIR concluded that impacts would be less than significant. As noted above there would be no substantial change in the impacts on views from I-40. As discussed above, views of the Project from Key Viewpoint F: Arizona Highway 10, a designated Arizona Historic Highway, would not be adversely affected. The matte, earth-tone color of the new components is consistent with that of the surrounding topography and vegetation, as included in the Final Remedy Design (Final Remedy Design, Appendix E) which satisfies Groundwater FEIR Mitigation Measure AES-2e. The minor incremental visual change associated with the Project would not result in any new significant impacts or substantially more severe impacts than previously identified in the Groundwater FEIR.

The Future Activity Allowance, which may introduce new wells, roads, pipelines, and other associated infrastructure visible from scenic corridors, was not anticipated at the time the Groundwater FEIR was certified. Any infrastructure introduced as part of the Future Activity Allowance at these locations could potentially affect scenic resources within a scenic corridor in the Project Area; however, with implementation of **Mitigation Measure AES-2**, which includes measures to preserve existing mature plant specimens, restore disturbed vegetation, maintain a minimum 20-foot setback from the Colorado River, and to implement specific surface treatment of built elements, impacts to scenic resources within a scenic corridor resulting from the Future Activity Allowance would be reduced to a less than significant level.

Mitigation Measures

Mitigation Measure AES-2: Substantial Damage to Scenic Resources within a Scenic Corridor (Groundwater FEIR Measure with Revisions). The proposed Project shall be designed and implemented to adhere to the design criteria presented below:

a. A minimum setback requirement of 20 feet from the water (ordinary high water mark or OHWM) shall be enforced, except with regard to any required river intake facilities, to prevent substantial vegetation removal along the river bank.

b. Existing mature plant specimens (i.e. medium- to large-sized trees, large or prominent shrubs, and tall predominately herbaceous plants) shall be protected in place during construction, operation, and decommissioning phases. The identification of plant specimens that are determined to be mature and retained shall occur as part of the design phase and mapped/identified by a qualified plant ecologist or biologist and integrated into the final design and project implementation consistent with CUL1a-5.

c. Revegetation of disturbed areas within the riparian vegetation along the Colorado River shall occur concurrently with construction operations. Plans and specifications for revegetation shall be developed by a qualified plant ecologist or biologist before any riparian vegetation is disturbed. The revegetation plan shall include specification of maintenance and monitoring requirements, which shall be implemented for a period of 5 years after project construction or after the vegetation has successfully established, as determined by a qualified plant ecologist or biologist.

d. Plant material shall be consistent with surrounding native vegetation.

e. The color of the wells, pipelines, reagent storage tanks, control structures, and utilities shall consist of muted, earth-tone colors that are consistent with the surrounding natural color palette. Matte finishes shall be used to prevent reflectivity. Integral color concrete should be used in place of standard gray concrete.

f. The final revegetation plans and specifications shall be reviewed and approved by an architect, landscape architect, or allied design professional licensed in the State of California to ensure that the aesthetic mitigation design objectives and criteria are being met. Planting associated with biological mitigation may contribute to, but may not fully satisfy, visual mitigation.

g. The requirements of the *Aesthetics and Visual Resources Protection and Revegetation Plan* (C/RAWP Appendix N) shall be implemented throughout the construction, operation and maintenance, and decommissioning phases of the Project, including but not limited to replacement planting procedures (see Section 4.3), maintenance and adaptive management (see Section 5.2), and photo-monitoring (see Section 5.3). These measures apply to new Project components added as part of the Future Activity Allowance, should they be visible from Key View 11 or any of the other key views identified in the SEIR.

Timing:	Implementation of the revegetation plan shall occur during project construction and operation and maintenance. Maintenance and monitoring requirements shall be implemented after Project construction for a period of 5 years, or after the vegetation has successfully established, as determined by a qualified plant ecologist or biologist.
Responsibility:	PG&E would be responsible for the implementation of these measures. DTSC would be responsible for ensuring compliance.
Significance after Mitigation:	Implementation of these mitigation measures would reduce the overall change to the visual character of the view corridor along

the Colorado River associated with the Future Activity Allowance. Although the proposed Project would still be visible, incorporating a facilities design that is aesthetically sensitive and preserving the vegetation would blend the proposed project into their visual setting within the floodplain and would reduce the overall visual contrast of the proposed Project to a **less than significant** level.

IMPACT AES-3 **Substantial Degradation of Existing Visual Character or Quality.** The proposed Project could introduce additional wells, roads, pipelines, and other associated infrastructure, including the Future Activity Allowance, which could substantially degrade existing visual character or quality. This impact would be **potentially significant**, as previously identified in the Groundwater FEIR.

Construction

As noted in Chapter 3, "Project Description," of this SEIR the methods, equipment, and general procedures contained in the Final Remedy Design with respect to construction are consistent with the analysis contained within the Groundwater FEIR. Compared to the Groundwater FEIR analysis, some of the previously proposed staging areas are no longer being considered for use. In addition, aboveground conveyance piping has generally been replaced with underground piping. The proposed Project also includes construction of a new Construction Headquarters building near Moabi Regional Park in addition to approximately 2,100 additional feet of access roadways would be built beyond those envisioned in the Groundwater FEIR. While the additional road construction, along with construction of ancillary project facilities at the Station and in areas within Arizona not specifically evaluated in the Groundwater FEIR would result in an increase in the volume of soil displacement and overall construction activity. The construction of new buildings and the establishment of additional staging areas would, for the most part, occur in previously disturbed areas and in many locations existing roadways would be used for access.

Pairs of existing views and visual simulations show effects of staging and construction activity on visual character and quality, as seen from three key viewpoints. Figures 4.1-7 A and B present an existing (before) view and visual simulation (after), from Key Viewpoint 6 looking southeast toward the existing IM-3 Facility and the Chemehuevi Mountains beyond. This viewing area is generally considered culturally sensitive based on Tribal input regarding the important use by Native American Tribal members. A panoramic existing view from this viewpoint is shown in Figure 4.1-2B. A comparison of the existing view and simulation indicates that proposed construction activity related to installation of new wells and other Project infrastructure, together with material displacement and equipment storage would occur on previously graded pads located in proximity to the IM-3 Facility (Figures 4.1-7 A and B). The comparison also shows previously established access roads which are visible in the existing view, would continue to serve as access for the proposed Project staging and construction areas seen in the simulation view (Figure 4.1-7 A and B). The temporary construction activity would be visible within the foreground; however views of the middleground and distant landscape would be largely be unaffected by construction phase activity. As a result, the impact on visual character would be less than significant and no mitigation measures would be required.

Similarly, the Figure 4.1-12 Viewpoint B existing and simulation views from the Park Moabi Entrance Road/I-40 junction toward the Mohave Valley, indicates that staging of construction equipment that would occur on an existing gravel roadside turnout where existing storage tanks and utility poles currently occupy a disturbed portion of the site. Views from this location include the BNSF Railway corridor, visible a short distance beyond the turnout, and more distant views of the Colorado River and peaks surrounding the Mohave Valley. This temporary staging area, as well as the one discussed below (Key View D), is considered a culturally sensitive location, given the historical and spiritual ties that the Native American Tribes have to these distant regional landscape features. However, the visual simulation shows that views of these landmark features are largely unchanged with the introduction of equipment storage containers and vehicles during the temporary construction phase. As a result, the impact on visual character would be less than significant and no mitigation measures would be required.

Figure 4.1-13 (Viewpoint C) represents a motorist’s view traveling west on the National Trails Highway toward the projected Construction Headquarters. This facility would be built during construction and would function as PG&E’s main area for construction oversight and support during construction. The existing view shows the earthen embankment of the BNSF Railway overpass against a backdrop of the Chemehuevi Mountains. The Figure 4.1-13B simulation depicts proposed buildings and ancillary infrastructure, including a fence and storage tank adjacent to the embankment. The facility would be visible by some nearby residents of the Moabi Regional Park mobile home complex as well as recreational visitors accessing backcountry trails beyond the overpass. Views toward the mountainous backdrop are not impaired as a result of the comparatively low profile of the facility in relation to the railway embankment. Given its matte, earth-tone color, as specified in Mitigation Measure AES-1d and incorporated into the Project, visual contrast of facility components is minimized. As a result, visual contrast would be further reduced and therefore a potentially significant impact on this key view would be less than significant.

Figure 4.1-14 is an existing view and visual simulation from Key Viewpoint D: National Trails Highway looking toward the proposed Soil Processing Area/Clean-Soil Storage Area, to be located adjacent to the road and immediately north of National Trails Highway. Located on the site of a former gravel quarry, soils and other materials displaced during construction activities would be brought to this location for temporary staging, and processing, along with temporary staging of import material for use in construction. As indicated in Chapter 3, “Project Description” of this SEIR, this area may continue to be used as a location for storage of clean soils, which may potentially be used as fill material. This roadway view includes eroded alluvial terraces typical of the terrain in the western portion of the Project Area as well as more distant views of the mountains surrounding the Mohave Valley to the northwest. The Figure 4.1-14B visual simulation shows a chain-link perimeter fence surrounding a temporary stockpile of material, along with machinery and other temporary infrastructure. Because of its comparatively low profile due to its location in a topographic depression, the stockpile would not be a visually prominent feature in relation to the surrounding landscape and distant mountains. In addition, visual contrast is further reduced through the use of subdued, earth tone color on the perimeter fence and ancillary infrastructure, which is specified and incorporated into the Final Remedy Design (Appendix E), as called for in Mitigation Measure AES-1. In light of the minor incremental visual change described above, the impact on visual character would be less than significant and no additional mitigation measures would be required.

Figure 4.1-7C is a visual simulation showing the IM-3 Facility decommissioning as seen in Key View 6. This simulation shows the existing IM-3 Facility location with all visible infrastructure associated with the facility removed and the site partially restored to resemble the surrounding desert terrain. Other remaining active Project infrastructure, including new monitoring and remediation wells, is visible in the immediate foreground, while a portion of the new structures installed at the Station is visible in the distance against a backdrop of the Chemehuevi Mountains. A comparison of the existing view with this visual simulation demonstrates that the change would represent an incremental visual improvement to the landscape setting. Therefore the impact on visual character would be less than significant and no mitigation measures would be required.

The Project also provides for a Future Activity Allowance, which would involve additional construction activity of new wells, roads, pipelines, and other associated infrastructure at locations currently unknown. While the exact locations of additional infrastructure is not currently known, any future construction activities would be situated within the Project Area and would employ the same equipment, work standards, and temporary visible effect as the known facilities. The key viewpoints identified and discussed in this SEIR represent the general range construction phase effects on visual character and quality, and any additional construction associated with infrastructure developed as part of the Future Activity Allowance (i.e., 58 additional boreholes) would not result in different impacts than with the known infrastructure.

Operation & Maintenance

Since certification of the Groundwater FEIR in 2011, a number of additional Project elements have been introduced in locations not considered in the Groundwater FEIR. These include a Long-Term Remedy Support Area and a Soil Processing Area/Clean-Soil Storage Area near Moabi Regional Park and new elements at the TCS Evaporation Ponds. In addition, new monitoring wells and a freshwater well facility would be located on the Arizona side of the Colorado River. Key viewpoints depicting these new areas include Key Views C, E, and F, as shown in Figure 4.1-3 and summarized in Table 4.1-5. Specificity regarding location of infrastructure at the Station has also been identified in the Final Remedy Design and is portrayed in Key Views 9 and 10.

The Groundwater FEIR assessment of potential long-term project operation and maintenance impacts on visual quality concluded that because the Project would not be visible from four key viewpoints evaluated, there would not be any impact at Key Viewpoints 7, 8, 12, and 14 (refer to Section 4.1.2.2, Table 4.1-2). However, the Groundwater FEIR also concluded that Mitigation Measure AES-3 was required to reduce a potentially significant impact on visual quality resulting from strong visual contrast at Key Viewpoint 11. The Final Remedy Design incorporates design details and plans to comply with FEIR Mitigation Measures AES-1, 2, and 3 of the Groundwater FEIR to preserve existing mature plant specimens, restore disturbed vegetation as well as to maintain a minimum 20-foot setback from the Colorado River and implement specific surface treatment of built elements. The Final Remedy Design includes a 20-foot setback from the Colorado River (Final Remedy Design Figure 2.4-6) and the *Aesthetics and Visual Resources Protection and Revegetation Plan* (C/RAWP Appendix N) addresses mitigation for impacts to mature plants and riparian vegetation along the Colorado River identified in the FEIR for Key Views 5 and 11 Implementation of these Project design details the Final Remedy Design would reduce the potential for visual contrast that could degrade existing visual character and quality.

Figure 4.1-11 shows an existing view and visual simulation looking southwest toward the Project from Key Viewpoint 11 on the Colorado River. A comparison of these before and after views indicates that when seen in this key view from the river, the retention of river bank vegetation would substantially screen views of floodplain project elements, including a new access roadway and numerous new wells. Limited areas of vegetation removal and portions of the roadway are visible to the right, along with areas of revegetation that over time would provide additional screening of project elements. The simulation further indicates that by implementing the setback of 20 feet, as specified in the Groundwater FEIR Mitigation Measure AES-2a, which has been incorporated into the Final Remedy Design (Final Remedy Design Figure 2.4-6), and substantially preserving the existing vegetation along the riverbank and floodplain as detailed in the *Aesthetics and Visual Resources Protection and Revegetation Plan* (C/RAWP Appendix N), the proposed Project would preserve existing character and quality of the landscape setting. The Figure 4.1-11B visual simulation also demonstrates that because the level of visual contrast would be relatively weak, the project would blend with surrounding landscape when seen from this key view from the river. Therefore, the Project effectively incorporates treatments called for under the Groundwater FEIR Mitigation Measure AES-2 and, as a result, the impact would be less than significant and no additional mitigation measures would be required.

Figure 4.1-8 shows an existing view and visual simulation from Key Viewpoint 7. A wide panorama of the existing view from Key Viewpoint 7 is also shown in Figure 4.1-2C and view area map Figure 4.1-2D. This key view across the Mohave Valley is considered culturally sensitive based on Tribal input regarding important use of this location by Native American Tribal members. The Figure 4.1-8B visual simulation shows the roof of a small generator enclosure building and two 20-foot-tall antenna poles with cameras at the TCS Evaporation Ponds would be barely visible in this view. The simulation also shows that the Project would not block views of distant mountains. A comparison of the existing view and visual simulation illustrates a minor incremental change on existing visual character and quality, and would represent a less than significant impact with no mitigation measures required.

Figure 4.1-13 (Viewpoint C) represents a motorist’s view traveling west on the National Trails Highway toward the projected Long-Term Remedy Support Area. The existing view shows the earthen embankment of the BNSF Railway overpass against a backdrop of the Chemehuevi Mountains. The Figure 4.1-13B simulation depicts proposed buildings and ancillary infrastructure, including a fence and storage tank adjacent to the embankment. The facility would be visible by some nearby residents of the Moabi Regional Park mobile home complex as well as recreational visitors accessing backcountry trails beyond the overpass. Views toward the mountainous backdrop are not impaired as a result of the comparatively low profile of the facility in relation to the railway embankment. Given its matte, earth-tone color, as specified in Groundwater FEIR Mitigation Measure AES-1d and incorporated into the Project, visual contrast of facility components is minimized. Moreover, because mature vegetation has been protected as required by Groundwater FEIR Mitigation Measure AES-1a, the facility would be partially screened and thus would more effectively blend in with the visual setting. As a result, visual contrast would be further reduced and therefore a potentially significant impact on this key view would be less than significant and no mitigation measures would be required.

Figure 4.1-15 (Viewpoint E) is a key view from Levee Road in HNWR seen by recreationalists and others accessing the Colorado River from the Arizona side and surrounding marshland, looking toward a scenic backdrop of the Chemehuevi Mountains and Needles rock formation (Figure 4.1-4J). Noticeable foreground elements include the BNSF Railway Bridge, and portions of the I-40 highway crossing the Colorado River, seen on the right. The Figure 4.1-15B conceptual simulation depicts the potential location of Project elements, including monitoring wells and data monitoring equipment, with pole mounted solar collectors (photovoltaic panels) placed alongside the lightly traveled gravel roadway. However, the narrow profile of these elements, and the use of non-reflective, earth-tone color would result in minor visual contrast within the landscape setting, particularly when seen against nearby large-scale built structures, and would represent a less than significant impact on visual character and quality of the surrounding landscape. No mitigation measures would be required.

Figure 4.1-16 is roadway view from Key Viewpoint F: Arizona Highway 10 (Historic Route 66) looking southeast toward the existing HNWR-1A freshwater well site, with more distant views of the BNSF Railway corridor, bridge structures and a portion of the Station. The dark rocks of the Chemehuevi Mountains frame the background. Alluvial deposits from the nearby Topock Marsh and an existing freshwater well facility, whose light-colored buildings stand out against the surrounding darker vegetation, can be seen in the existing view. The visual simulation shows the proposed HNWR-1A freshwater well infrastructure that includes pump housing, new well head and piping, along with a new surrounding chain-link fence. Also shown in the simulation is a new wood utility pole and overhead conductors, which would provide electric power to the facility. While the pole would introduce a new vertical element to a view dominated by the horizontal outline of the railway and mountainous backdrop, it is similar in height and form to nearby existing poles seen along both sides of the roadway, which at typical highway speeds would be perceived by motorists for a short duration. Because the matte, earth-tone color of the new Project components is consistent with that of the surrounding topography and vegetation, as included in the Final Remedy Design details (Appendix E) which satisfies Mitigation Measures AES-1 and AES-3 from the Groundwater FEIR, the overall contrast of the new components is incrementally reduced when compared to the existing facility, and the resulting impact on the surrounding quality and character of the landscape would therefore be less than significant with no mitigation measures required.

As noted in Section 4.1.3, an elevated ridge viewpoint located near Arizona Highway 10 was identified as culturally sensitive during discussions with Tribal representatives in 2013 (refer to Figures 4.1-3 and 4.1-4K, Photograph G). Taken from this elevated location, Photograph G shows an expansive landscape view to the southwest, overlooking the Colorado River floodplain, near the northern edge of the Project Area. With respect to the proposed Project, new components at the HNWR-1A freshwater well site would be partially discernible in the distance almost 1 mile away. In addition, the HNWR-1A well site is surrounded by areas of temporarily disturbed vegetation which has the potential to obstruct views of the facility in the future. The contingent freshwater Site B well is located closer to this viewpoint; however, given intervening terrain and vegetation this site would not be visible. This minor incremental visual change would not result in an impact on the surrounding quality and character of the landscape and would be therefore less than significant and no mitigation measures would be required.

The Project also provides for a Future Activity Allowance, which, during the operation and maintenance phase, could involve additional construction of new wells, roads, pipelines, and other associated infrastructure. While the exact locations are currently unknown, infrastructure would likely be located in close proximity to existing/planned features. Any future infrastructure would be situated within the Project Area. The key viewpoints identified and discussed in this SEIR represent the general range of effects on visual character and quality, and any additional infrastructure developed as part of the Future Activity Allowance (i.e., 58 additional boreholes) would be required to comply with Mitigation Measures AES-1 and AES-2, which provide guidelines to preserve existing mature plant specimens and restore disturbed vegetation, as well as to maintain a minimum 20-foot setback from the Colorado River and implement specific surface treatment of built elements to blend in with the surrounding landscape. Implementation of Mitigation Measure AES-1 and AES-2 would reduce the potential for visual contrast that could result in an adverse visual effect on visual character and quality associated with infrastructure included in the Future Activity Allowance.

Decommissioning

The decommissioning activities themselves would be similar to construction in terms of equipment and activity, and therefore the visual impacts from the scenic corridors during the decommissioning phase would be less than significant. As noted earlier in Decommissioning Impact Methodology, and demonstrated in the Figure 4.1-7C visual simulation showing the existing IM-3 Facility following decommissioning of the facility (discussed in more detail below), decommissioning of the Project would generally be beneficial in the long-term, because developed visible infrastructure visible from scenic corridors would be removed and areas impacted would be restored to a pre-project condition. As a result, the temporary impact of construction and decommissioning activities as it relates to visual character and quality in the Project Area would be less than significant, and no mitigation would be required.

Comparison of Impact AES-3 Impacts (Revised) to Groundwater FEIR Impact Analysis

Construction and decommissioning-related visual impacts resulting from the temporary presence of equipment, materials, and work crews on existing visual character or quality of the landscape setting were found to be less than significant in the Groundwater FEIR assessment, and no mitigation measures were required. The Groundwater FEIR found that implementation of the Project would result in a strong degree of visual contrast along the Colorado River from Key Viewpoint 11, and FEIR Mitigation Measure AES-3 was required (implementing the provisions of Mitigation Measure AES-1) to reduce impacts to a less than significant level. As demonstrated by the three before and after simulation views discussed above, the visual effects associated with proposed additional construction-related activities would not result in noticeably different visual effects compared to the assessment of construction activities described in the 2011 Groundwater FEIR. Further, Mitigation Measure AES-1 has been incorporated into the Final Remedy Design and is therefore completed for the Project activities described therein. Therefore the impact would remain less than significant; however no mitigation is required for this SEIR since the measure has been implemented as part of the Final Remedy Design. The Groundwater FEIR determined that views from the Colorado River would be adversely affected by the Project through removal of floodplain vegetation, grading operations, and overall alteration of a scenic view corridor as a result of the introduction of wells and related infrastructure along the Colorado River floodplain. The Final Remedy Design incorporates design details and plans called for under Mitigation Measure AES-3 (implementing the provisions of Mitigation Measure AES-1) to preserve existing mature plant specimens, and to restore disturbed vegetation, as well as to maintain a minimum 20-foot setback from the Colorado River and to implement specific surface treatment of built elements. As a result of these measures which have been incorporated into the design of the Project, the level of vegetation clearing seen from the river would be greatly reduced. A comparison with the SEIR visual simulation shows that the strong degree of visual contrast seen in this key viewpoint in the Groundwater FEIR would be substantially reduced. Further, Mitigation Measure AES-1 has been incorporated into the Final Remedy Design and is therefore completed for the Project activities described therein. Therefore, the impact would remain less than significant; however no mitigation is required for this SEIR since the measure has been implemented as part of the Final Remedy Design.

Operation and maintenance of the Project also provides for a Future Activity Allowance, which could involve additional construction of new wells, roads, pipelines, and other associated infrastructure at locations currently unknown, and was not envisioned at the time the Groundwater FEIR was certified. The extent of these potential additional impacts cannot be quantified as exact locations of additional infrastructure is not currently known. These activities could potentially impact existing visual character or quality in the Project Area. With implementation of Mitigation Measures AES-1 and AES-2 which provide guidelines for the protection of existing mature vegetation, revegetation of areas disturbed during construction, a minimum 20-foot Project setback from the Colorado River, and specific surface treatment of built elements, impacts to existing visual character or quality resulting from the Future Activity Allowance would be reduced to a less than significant level.

Substantial Light and Glare. The proposed Project would not create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area. This impact would be **less than significant,** as previously identified in the Groundwater FEIR.

Construction & Decommissioning

While night work is not planned as part of routine construction activities, it may be determined that limited circumstances require the continuation of work into the nighttime periods because it cannot be disrupted or suspended (for example, special conditions during drilling or concrete pouring) or work may require an early morning start to ensure completion within 1 day or because of heat constraints. For these special circumstances, as specified in the Final Remedy Design (C/RAWP Section 4.6.4 Lighting and Final Remedy Design Appendix C.6.7), nighttime construction lighting would be limited to active construction areas during nighttime or early-morning operations. To minimize lighting impacts, lighting would include shrouding or shielding for portable lights, the use of the lowest allowable height and smallest number feasible to maintain adequate night lighting for safety, and shielding and orientation of lights such that off-site visibility of light sources, glare and light from construction activities are minimized to the extent feasible. These lighting parameters apply to the project including any lighting associated with the Future Activity Allowance. Views of lighting and nighttime construction activity would be generally be of short duration as primary views would be from passing motorists, and would not include features that would create glare. Once construction and operation and maintenance are complete, new lighting at the Construction Headquarters/Long-Term Remedy Support Area would be removed.

Given these Project characteristics, the Project's short-term, temporary activities would not create a new source of substantial light or glare that would affect daytime or nighttime views in the area. As a result, impacts would be less than significant and no mitigation measures would be required.

Operation & Maintenance

Modifications to the Project since certification of the Groundwater FEIR include the addition of new security lighting at the Long-Term Remedy Support Area, and lighting standards and protocols specified in the Final Remedy Design (C/RAWP Section 4.6.4 Lighting and Final Remedy Design Appendix C.6.7) that comply with Mitigation Measure CUL-1a-7 from the Groundwater FEIR as well as Mohave and San Bernardino County lighting requirements. New lighting will consist of downward facing fixtures fitted with cutoff shields to reduce light diffusion. These lighting parameters apply to the project including any lighting associated with the Future Activity Allowance. Views toward the Long-Term Remedy Support Area site from the nearby Moabi Regional Park mobile home complex are generally screened by intervening vegetation. In addition, new lighting at the Long-Term Remedy Support Area will be a minor incremental change to the existing light sources in the area around Moabi Regional Park. As a result, impacts would be less than significant.

As detailed in the Final Remedy Design, solar panels will installed on rooftops at the Long-Term Remedy Support Area and five small solar panels would be installed for monitoring at remote well locations in Arizona. In general, solar panels would produce less glare than window glass and, given the upward orientation of the panels, the potential glare effects would generally be minimal, thus impacts would be less than significant.

Comparison of Impacts (Revised) to Groundwater FEIR Impact Analysis

The Groundwater FEIR concluded that impacts associated with light and glare would be considered less than significant, and no mitigation measures were required. As noted, there would be no significant light or glare impacts associated with the Final Groundwater Remedy Project. Therefore, the Project would not result in any new significant impacts or substantially more severe impacts than previously identified in the Groundwater SEIR and no mitigation measures would be required.

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4.2 Air Quality and Greenhouse Gas Emissions

4.2.1 Introduction

This section describes the reasonably foreseeable and potentially significant adverse environmental effects of the Pacific Gas and Electric Company (PG&E) Topock Compressor Station Final Groundwater Remediation Project (Final Groundwater Remedy Project, or proposed Project) as identified in the Project Description of this subsequent environmental impact report (SEIR) and related to air quality and climate change/greenhouse gas emission (GHG) conditions in the Project Area. Specifically, this section considers the potentially significant adverse effects of the proposed Project during the construction, operation and maintenance, and decommissioning phases, as compared to those identified in the Topock Compressor Station Groundwater Remediation Project Final EIR (Groundwater FEIR; DTSC 2011), consistent with Public Resources Code Section 21166 and the California Environmental Quality Act (CEQA) Guidelines Sections 15162 and 15168, and including changes in impacts related to the emission of regional criteria pollutants and local impact to sensitive receptors.

The impact evaluation in the air quality and GHG section of the Modified Initial Study (see Appendix IS) explains why the proposed Project would not result in new significant impacts or substantially increase the severity of impacts related to compliance with applicable air quality plans and emission of odors.

4.2.2 Summary of 2011 Groundwater FEIR Air Quality and Greenhouse Gas Emission Analysis

The Air Quality section of the Groundwater FEIR included a detailed discussion of the environmental setting and potential effects of the proposed Project on air quality and GHG conditions. Although largely programmatic, the Groundwater FEIR provided an analysis of the construction and operation of physical facilities anticipated at that time to be necessary to implement the proposed Project. The Groundwater FEIR also included a project-level analysis of the conceptual technical methods selected for the final remedy. This SEIR incorporates the analysis in the Groundwater FEIR by reference and evaluates, on a Project-specific level, the potential effects associated with construction and operation of the *Basis of Design Report/Final (100%) Design Submittal for the Final Groundwater Remedy, PG&E Topock Compressor Station, Needles, California, November* (Final Remedy Design; CH2M Hill 2015a) and the *Construction/Remedial Action Work Plan for the Final Groundwater Remedy* (C/RAWP; CH2M Hill 2015b) that were unknown at the time the analysis was conducted for the Groundwater FEIR. The Final Remedy Design is included in its entirety as Appendix BOD to this SEIR. Information included in the air quality and GHG analysis of the Groundwater FEIR is summarized below and in the following pages.

4.2.2.1 Setting Identified in the 2011 Groundwater FEIR

The following summarizes the setting relative to air quality and climate change described in the Groundwater FEIR.

Topography, Climate, and Meteorology

The Project Area was (as of certification of the Groundwater FEIR), and still is, within the Mojave Desert Air Basin (MDAB). The MDAB comprises the eastern portion of Kern County, the northeastern portion of Los Angeles County, the eastern portion of Riverside County, and all of San Bernardino County.

The Groundwater FEIR described the ambient concentrations of air pollutants as determined by the amount of emissions released by sources and the atmosphere's ability to transport and dilute such emissions. Natural factors that affect transport and dilution include terrain, wind, atmospheric stability, and sunlight. Therefore, existing air quality conditions in the area are determined by such natural factors as topography, meteorology, and climate, in addition to the amount of emissions released by existing air pollutant sources. This general setting description has not changed since the certification of the Groundwater FEIR.

The Groundwater FEIR stated that the Mojave Desert Air Quality Management District (MDAQMD) is the agency with jurisdiction over the majority of the MDAB. The MDAB was, and currently still is, an assemblage of mountain ranges interspersed with long, broad valleys that often contain dry lakes. Winds in the Project Area generally varied; however, prevailing winds in the MDAB were out of the west and southwest as a result of the local topography. The MDAB was, and currently still is, separated from the Southern California coastal and Central California valley regions by mountains whose passes form the main channels for these westward-moving air masses.

Pacific subtropical high cell influenced the MDAB in the summer, which encouraged daytime solar heating. Most of the moisture in the desert region was described in the Groundwater FEIR as being from unstable air masses coming from the south. The MDAB averaged between 3 and 7 inches of precipitation per year (from 16 to 30 days with at least 0.01 inch of precipitation) and at least 3 months had maximum average temperatures over 100.4°F.

This general climate information has remained consistent since certification of the Groundwater FEIR; however, additional relevant information for the proposed Project is provided in Section 4.2.3 of this SEIR.

Criteria Air Pollutants

The Groundwater FEIR described the indicators of ambient air quality conditions based on concentrations of the following criteria pollutants: ozone, carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), respirable particulate matter with an aerodynamic resistance diameter of 10 micrometers or less (PM_{10}), fine particulate matter with an aerodynamic resistance diameter of 2.5 micrometers or less ($PM_{2.5}$), and lead.

Source types, health effects, and future trends associated with each air pollutant have not changed since certification of the Groundwater SEIR. Please refer to the Groundwater FEIR, pages 4.2-2 through 4.2-4, for a detailed description of criteria pollutants.

Emissions Inventory

The Groundwater FEIR quantified the emissions of criteria air pollutants and precursors within San Bernardino County for various source categories, based on the project information that was available at the time. Mobile sources were the largest contributor of reactive organic gas (ROG), CO, and oxides of nitrogen (NO_X), accounting for approximately 63 percent, 88 percent, and 73 percent, respectively, of the total emissions. Stationary sources of emissions account for approximately 76 percent of oxides of sulfur (SO_X), while areawide sources account for approximately 73 percent and 44 percent of the County's PM_{10} and $PM_{2.5}$ emissions, respectively. The emission summaries have been updated since certification of the Groundwater FEIR as described in detail in Section 4.2.3.2 of this SEIR.

Monitoring Station Data and Attainment Area Designations

Although criteria air pollutant and precursor concentrations are measured at several monitoring stations in the MDAB, the closest monitoring station is run by the Arizona Department of Environmental Quality (ADEQ). The closest MDAQMD monitoring station is located in Twentynine Palms, which is over 100 miles to the southwest of the Project Area. Measurements recorded at the closest ADEQ monitoring station in Bullhead City, Arizona, located approximately 35 miles north of the Project Area, are considered representative of the Project Area. The Groundwater FEIR (see Table 4.2-2) summarized the air quality data from Bullhead City, Arizona, for 2004 through 2006 for PM_{10}. Local data for ozone, CO, and $PM_{2.5}$ are not monitored close enough to the Project Area to serve as relevant background information. Ambient air quality data is typically updated annually, and the most recent information regarding ambient air quality data is presented in Section 4.2.2.3 of this SEIR.

The California Air Resources Board (CARB) and U.S. Environmental Protection Agency (USEPA) use monitoring data to designate areas according to attainment status for criteria air pollutants published by the agencies. The purpose of these designations is to identify areas with air quality problems and thereby initiate planning efforts for improvement. The three basic designation categories are "nonattainment," "attainment," and "unclassified." The "unclassified" designation is used in areas that cannot be classified on the basis of available information as meeting or not meeting the standards. In addition, the California designations include a subcategory of the nonattainment designation, called "nonattainment-transitional." The nonattainment-transitional designation is given to nonattainment areas that are progressing and nearing attainment. Attainment designations were provided in the Groundwater FEIR in Table 4.2-4 and have changed since that time. Updated information regarding attainment status can be found in Table 4.2-5 of this SEIR.

On-Site Emissions

As discussed in the Groundwater FEIR, the Project Area is occupied in part by the PG&E Topock Compressor Station (Station) and Interim Measure 3 Groundwater Extraction and Treatment Facility (IM-3 Facility). Pollutant emissions at the site were based on the number of active employees and a project specific traffic study. The Urban Emissions model (URBEMIS 2007), Version 9.2.4, was used to estimate the existing operational emissions (i.e., area- and mobile-source) associated with the current site use. As shown in Table 4.2-3 (page 4.2-6 of the FEIR) the existing on-site operations resulted in criteria pollutant emissions of 1.0, 0.5, 2.3, 0.3, and 0.1 tons per year for ROG, NO_X, CO, PM_{10}, and $PM_{2.5}$ respectively.

While the modeling programs available for use have changed, the nature of the existing on-site operations has not. Therefore, while emissions may be slightly lower if calculated using California Emissions Estimator Model (CalEEMod), the on-site emission sources would not change. Emissions are anticipated to be lower using CalEEMod because the vehicle fleets have become more efficient over time. The extent of the increase in vehicle efficiency was not accounted for in URBEMIS but is in CalEEMod. Therefore, the emissions presented in the Groundwater FEIR represent the most conservative emissions, and the existing on-site emissions estimates are not updated in this SEIR.

Toxic Air Contaminants

The Groundwater FEIR stated that the concentrations of toxic air contaminants (TACs) are used as indicators of ambient-air-quality conditions. A TAC is defined as an air pollutant that may cause or contribute to an increase in mortality or in serious illness, or that may pose a hazard to human health. TACs are usually present in minute quantities in the ambient air; however, their high toxicity or health risk may pose a threat to public health even at low concentrations. According to the *California Almanac of Emissions and Air Quality*, most of the estimated health risk from TACs can be attributed to relatively few compounds, the most important being particulate matter from diesel-fueled engines (i.e., diesel particulate matter (DPM)). DPM poses the greatest health risk among TACs. CARB estimated the DPM health risk in California in 2000–2010 to be 300 excess cancer cases per million people. The Groundwater FEIR indicated that the health risk of DPM in California was reduced by 17 percent since 2000 and the total estimated tons per year emitted of DPM statewide has been reduced 51 percent since 1990. In that time levels of all TACs except para-dichlorobenzene, acetaldehyde, and formaldehyde have declined. This general setting description has remained consistent since the certification of the Groundwater FEIR; however, more recent data is available and therefore the information is updated in Section 4.2.3.4 of this SEIR.

Sources of Toxic Air Contaminants

The Groundwater FEIR explained that the closest stationary sources of TACs to the Project Area included the existing Station, Southern California Gas Company locations (approximately 12–15 miles to the northwest), and the Needles Desert Community Hospital (approximately 12 miles northwest), according to CARB's Community Health Air Pollution Information System. Vehicles on Interstate 40 and U.S. Highway 95 and other roads in the vicinity were sources of DPM and other TACs associated with vehicle exhaust. A rented generator (Isuzu Model 6WG1X) was used in the Project Area at the IM-3 Facility for backup electricity and was permitted as California portable equipment through the MDAQMD. The generator was used in 2009 for approximately 119 hours. This general setting description has not changed since the publication of the Groundwater FEIR; however, additional permitted TAC sources are in use at the Station and are described in Section 4.2.3.4 of this SEIR.

Naturally Occurring Asbestos

The Groundwater FEIR stated that naturally occurring asbestos was found in at least 44 of California's 58 counties as of 2011. Asbestos is the name for a group of naturally occurring silicate minerals. According to the *General Location Guide for Ultramafic Rocks in California—Areas More Likely to Contain Naturally Occurring Asbestos* as cited in the Groundwater FEIR, the Project Area and off-site program elements are not located in areas that are more likely to contain naturally occurring asbestos. This setting description has not changed since the certification of the Groundwater FEIR.

Greenhouse Gas Emissions

The Groundwater FEIR explained that certain gases in the Earth's atmosphere, classified as GHGs, play a critical role in determining the Earth's surface temperature. Prominent GHGs that contributed and continue to contribute to the greenhouse effect are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and fluorinated compounds. Human-caused emissions of these GHGs in excess of natural ambient concentrations were and continue to be responsible for intensifying the greenhouse effect and have led to a trend of unnatural warming of the Earth's climate, known as global climate change or global warming. It is extremely unlikely that global climate change over the past 50 years can be explained without the contribution from human activities. Emissions of GHGs contributing to global climate change are attributable in large part to human activities associated with the industrial/manufacturing, utility, transportation, residential, and agricultural sectors. In California, the transportation sector is the largest emitter of GHGs, followed by electricity generation. Emissions of CO_2 are byproducts of fossil fuel combustion. CH_4, a highly potent GHG, results from off-gassing (the release of chemicals from nonmetallic substances under ambient or greater pressure conditions) largely associated with agricultural practices and landfills. CO_2 sinks, or reservoirs, include vegetation and the ocean, which absorb CO_2 through photosynthesis and dissolution, respectively, two of the most common processes of CO_2 sequestration. More information about GHGs can be found in Section 4.2.1.7 of the Groundwater FEIR.

The Groundwater FEIR described that MDAQMD has been proactive in reducing GHG emissions. As of 2011, within the MDAQMD jurisdiction GHG emissions were reduced 35 percent since the baseline year of 2004. Updated information related to GHG emissions is included in Section 4.2.3.5 of this SEIR.

Odors

The Project Area was described in the Groundwater FEIR as being in an area that has little human development, other than the Station and related facilities. No known odor sources are in the immediate vicinity of the Project Area, except for existing Station operations such as exhaust gases and odorants (mercaptan). If meteorological conditions were right, potential sources of odor in the Project vicinity could include fumes from Interstate 40 and odors from the community of Topock (e.g., food, sewer treatment, natural gas odorant). This setting description has not changed since the publication of the Groundwater FEIR.

4.2.2.2 Impacts and Mitigation Measures Identified in the 2011 Groundwater FEIR

Impacts to air quality and GHG emissions were addressed in the Groundwater FEIR, Volume II, Section 4.2. Following is a summary of the analysis and associated mitigation measures for air quality and GHG emissions.

Effects on Short-Term Construction-Related Emissions of Criteria Air Pollutants and Precursors

The Groundwater FEIR indicated that although construction-related emissions would be short-term or temporary in duration, they have the potential to cause a significant air quality impact. Land-disturbing activities included wells, roads, pipelines, utility installation, and other associated infrastructure. Construction was anticipated to take place over 3 years.

Based on the analysis, maximum emissions of ROG, NO_X, and $PM_{2.5}$ were found to result in 10.5, 79.5, and 48.7 lb/day respectively and were below the regulatory thresholds of 137 lb/day (ROG and NO_X), and 82 lb/day ($PM_{2.5}$). Prior to mitigation, maximum PM_{10} emissions were 218.1 lb/day, which was well above the 82 lb/day MDAQMD threshold. The Groundwater FEIR included Mitigation Measure AIR-1, which identified fugitive dust control measures to reduce PM emissions during construction. These measures include: periodic watering; covering loaded haul vehicles; stabilizing graded site surfaces when construction is completed; cleaning up vehicle track-out or spills on public paved roadways; and limit earth-moving activities under high-wind conditions. Implementation of Mitigation Measure AIR-1 was found to reduce fugitive dust emissions by 75 percent and thus reduced PM_{10} emissions to below regulatory thresholds.[1] Therefore, after mitigation construction emissions of criteria air pollutants was found to be less than significant.

Effects on Long-Term Operations-Related (Regional) Emissions of Criteria Air Pollutants and Precursors

The Groundwater FEIR evaluated emissions associated with operation and maintenance, decommissioning activities, and mobile sources, and concluded the impact would be less than significant. Based on the analysis, maximum emissions of ROG, NO_X, PM_{10} and $PM_{2.5}$ would have resulted in 0.8, 9.37, 0.27, and 0.25 tons/year, respectively, and would be below the regulatory thresholds of 25 tons/year (ROG and NO_X), and 15 tons/year (PM_{10} & $PM_{2.5}$).

Operation of the Project required permits from the MDAQMD under Regulation 203 (Permit to Operate) and 1300 (New Source Review). Stationary sources requiring permits would have included, but would not have been limited to, pumps and generators. The permitting process required equipment to implement emissions controls, including approved Best Available Control Technologies (BACTs) such that these sources would not have resulted in a significant impact.

The Groundwater FEIR determined that the proposed Project would not violate or contribute substantially to an existing or projected air quality violation, expose sensitive receptors to

[1] The Groundwater FEIR does not provide a numerical evaluation for the post mitigation emissions levels of PM_{10}.

substantial pollutant concentrations, or conflict with air quality planning efforts. As a result, this impact was found to be less than significant. No mitigation was required in the Groundwater FEIR.

Effects on Long-Term-Operations-Related (Local) CO Emissions

As discussed in the Groundwater FEIR, CO concentrations are a direct function of motor vehicle activities. CO hotspots occur in areas of where mobile-source emissions are higher, such as urban areas. Specifically, they are found to occur at intersections that operate at a level of service (LOS) of E or worse during peak hours. The Groundwater FEIR found that Project generated traffic would not result in signalized intersections operating at a LOS of E or F under cumulative conditions and therefore would not result in a CO hotspot.

Long-term operation of the proposed Project was found not to result in the generation of local CO emissions that violate or contribute substantially to an existing or projected air quality violation, expose sensitive receptors to substantial pollutant concentrations, or conflict with air quality planning efforts. As a result, this impact was found to be less than significant. No mitigation was required in the Groundwater FEIR.

Effects on Short-Term-Construction-Related and Long-Term-Operations-Related Emissions of TACs

As discussed in the Groundwater FEIR, construction and operation of the proposed Project had the potential to result in the emissions of TACs that would result in adverse health impacts for sensitive receptors. The Groundwater FEIR indicated that construction would have lasted approximately 3 years, which was substantially less than the 70-year exposure period used for determining health risk. Additionally, the nearest sensitive receptor was located over 1,000 feet from anticipated Project activities. PM emissions disperse to negligible levels within 500 feet of the source; therefore, health risks from construction activities for the closest sensitive receptors were found to be less than significant.

Operational activities were found to include sources of TACs such as pumps and generators. These sources would have been permitted by the MDAQMD. During the permitting process, potential risk would have been analyzed and emission-reduction measures implemented as necessary to reduce risk below the applicable significance levels. If the risk was not able to be reduced to below the significance levels, the permit would be denied and the source could not be operated. Therefore, construction- and operational-related emissions were found to not expose sensitive receptors to substantial concentrations of TACs, and this impact was found to be less than significant. No mitigation was required in the Groundwater FEIR.

Groundwater FEIR Effects on Short-Term Construction Activities or Long-Term Operations That Create Objectionable Odors

As indicated in the Groundwater FEIR, construction and operation of the proposed Project was found to not introduce new odor sources close to existing or planned sensitive receptors. Additionally, while construction emissions were found to result in odors from equipment exhaust, like PM emissions, odors were found to dissipate to negligible levels beyond 500 feet. The nearest sensitive receptors were located greater than 1,000 feet from anticipated Project activities and thus were found to not be exposed to substantial odor concentrations from construction activities.

Therefore, short-term construction activities and long-term operations were found to not create objectionable odors. As a result, this impact was less than significant. No mitigation was required in the Groundwater FEIR.

Groundwater FEIR Effects on Long-Term Operations-Related (Regional) Emissions of Greenhouse Gases

The Groundwater FEIR indicated that GHG emissions associated with construction, operation and maintenance, decommissioning activities, and mobile sources had the potential to exceed applicable thresholds of significance.

The analysis demonstrated that total emissions under the proposed Project would have resulted in 1,793 metric tons of carbon dioxide equivalent per year ($MTCO_2e$/year) for operation and 2,618 $MTCO_2e$/year for construction. When construction emissions were averaged over the construction time frame, total annual emissions were 2,394 $MTCO_2e$/year for the first years of Project operation and 1,739 $MTCO_2e$/year for the remaining Project lifetime. This is well below the 25,000 $MTCO_2e$/year threshold established for under Assembly Bill (AB) 32 as necessary for achieving the AB 32 goals. Therefore, the construction and operation of the Groundwater FEIR was found to not result in GHG emissions that would exceed the applicable thresholds of significance nor would the Groundwater FEIR conflict with applicable plans, policies, or regulations adopted for the purposes of reducing GHG emissions. Therefore, the Groundwater FEIR concluded that impacts would be less than significant and no mitigation was required.

4.2.3 Existing Setting

This section describes the physical air quality and GHG characteristics and setting with regard to the Final Groundwater Remedy Project to be conducted in the Project Area, focusing on those areas where there have been changes since the Groundwater FEIR.

4.2.3.1 Topography, Climate, and Meteorology

The temperature in the Project Area averages 73.2 ^{o}F with an average maximum temperature of 86.40 ^{o}F and an average minimum temperature of 59.74 ^{o}F. Average annual precipitation is 4.72 inches with an average of 13 days receiving more than 0.1 inch of rain in a year (USA.com 2016).

4.2.3.2 Emissions Inventory

Table 4.2-1 summarizes the emissions of criteria air pollutants and precursors within San Bernardino County for various pollutant source categories in 2015. Mobile sources are the largest contributor of ROG, CO, and NO_X, accounting for approximately 57 percent, 84 percent, and 65 percent, respectively, of the total emissions for San Bernardino County. Stationary sources of emissions account for approximately 76 percent of oxides of sulfur (SO_X), while areawide sources account for approximately 72 percent and 45 percent of the County's PM_{10} and $PM_{2.5}$ emissions, respectively.

TABLE 4.2-1
SUMMARY OF 2015 ESTIMATED EMISSIONS INVENTORY FOR CRITERIA AIR POLLUTANTS AND PRECURSORS
(San Bernardino County)

	Estimated Annual Average Emissions (tons per Day)					
Source Type/Category	**ROG**	**CO**	**NO_X**	**SO_X**	**PM_{10}**	**$PM_{2.5}$**
Stationary Sources						
Fuel Combustion	1.2	9.7	26.4	2.1	6.2	4.9
Waste Disposal	5.2	0.1	0.1	0.1	0.3	0.1
Cleaning and Surface Coating	8.1	0	0.1	0	0.3	0.3
Petroleum Production and Marketing	6.3	0	0	0	0	0
Industrial Processes	5.2	12.3	42.2	2.9	30.6	16.7
Subtotal (Stationary Sources)	**26.0**	**22.1**	**68.8**	**5.1**	**37.4**	**21.9**
Areawide Sources						
Solvent Evaporation	19.1	-	-	-	0	0
Miscellaneous Processes	7.4	58	4.3	0.3	122.6	23.7
Subtotal (Areawide Sources)	**26.6**	**58**	**4.3**	**0.3**	**122.6**	**23.7**
Mobile Sources						
On-Road Motor Vehicles	23.3	223.1	80.2	0.4	5.4	4
Other Mobile Sources	46.2	202.1	53.3	0.9	4.1	3.5
Subtotal (Mobile Sources)	**69.5**	**425.2**	**133.5**	**1.3**	**9.5**	**7.5**
Total for San Bernardino County	**122.0**	**505.3**	**206.6**	**6.8**	**169.5**	**53.1**

NOTES:
ROG = reactive organic gases; CO = carbon monoxide; NO_X = oxides of nitrogen; SO_X = oxides of sulfur; PM_{10} = respirable particulate matter; $PM_{2.5}$ = fine particulate matter

SOURCE: CARB 2016a.

4.2.3.3 Monitoring Station Data and Attainment Area Designations

As discussed in the Groundwater FEIR, the closest monitoring station is run by the ADEQ. Measurements recorded at the closest ADEQ monitoring station in Bullhead City, Arizona, approximately 35 miles north of the Project Area, are provided in **Table 4.2-2** for PM_{10} for 2012 through 2014 (the three most current years) and are considered representative of the Project Area. Local data for ozone, CO, and $PM_{2.5}$ are not monitored close enough to the Project Area to serve as relevant background information and therefore are not provided.

TABLE 4.2-2
SUMMARY OF ANNUAL AMBIENT AIR QUALITY DATA (2012–2014), BULLHEAD CITY, ARIZONA

	2012	2013	2014
Respirable Particulate Matter (PM_{10})			
Maximum concentration (µg/m^3)	185	208	108
Number of days national standard exceeded	1	1	0

NOTES: Local data for ozone, CO, and $PM_{2.5}$ was not available for the Project Area at the time of this writing. 2014 was the most current data available at the time of the report.

µg/m^3 = micrograms per cubic meter

SOURCE: ADEQ 2015.

4.2.3.4 Toxic Air Contaminants

According to the most recent information provided by CARB, it is estimated that emissions of DPM in 2035 will be less than half of those in 2010 further reducing the cancer and non-cancer risks statewide. Efforts to reduce DPM, such as cleaner-burning diesel fuel, engine retrofits with DPM filters, new technologies to reduce DPM emissions, and use of alternative fuels, are being explored to aid in the reduction of DPM in the air. Since 1990, DPM levels have decreased by 68 percent. It is still estimated that 70 percent of total known cancer risk is related to DPM and statewide cancer risk is estimated to be at 520 cases per million. Estimated non-cancer risks include cardiopulmonary death at 1,400 cases, cardiovascular hospitalization at 100 cases, respiratory hospitalization at 120 cases, and respiratory emergency room visits at 600 cases. A large fraction of DPM exposure occurs during travel on roadways. CARB estimates that 30 to 55 percent of daily exposure occurs during the time people spend in their vehicles (CARB 2016b).

Since the certification of the Groundwater FEIR, additional sources of TAC emissions have come into use in the Project Area. The Station has seven permitted sources and the IM-3 Facility has one current permit (as reported in the Groundwater FEIR), as identified in **Table 4.2-3**.

TABLE 4.2-3
PERMITTED TAC SOURCES

Operator (Facility #)	Permit #	Description
PG&E (2998)	E009727	Permit to Operate: Diesel IC Engine Emergency Generator
PG&E (39)	N002572	Permit to Operate: aboveground storage takes for the dispensing of gasoline or diesel fuel. Total 5,000 gallon capacity
	T002944	Permit to Operate: 3,500-gallon waste oil holding tank
	T003303	Permit to Operate: 7,250-gallon waste oil storage
	B002660	Permit to Operate: Diesel ICE Engine, Generator
	B000313	Permit to Operate: IC Engine, Natural Gas Compressor
	B003302	Permit to Operate: Four Natural Gas Fueled IC Engines
	E009590	Permit to Operate: Diesel IC, Engine Emergency Fire Pump

SOURCE: MDAQMD 2016.

The Groundwater FEIR indicated that all sensitive receptors were more than 1,000 feet from the proposed Project activities. Given the known location of proposed components and the updated Project Area, the following have been identified as sensitive land uses in and around the Project Area for the Final Groundwater Remedy Project that could be influenced by the activities of the Project:

1) Single-family residences between Park Moabi Road and National Trails Highway in California, located approximately 1,100 feet to the northeast of the proposed Construction Headquarters/Long-Term Remedy Support Area and Soil Processing/ Clean-Soil Storage Area, but less than 100 feet from the National Trails Highway that would be the main pathway to and from these areas and the on-site construction sites
2) Topock 66 Spa & Resort's adjacent residences located approximately 225 feet to the northwest of the Staging Area 27 in Arizona. The Topock 66 Spa & Resort is approximately 180 feet from the proposed freshwater pipeline located along the Oatman-Topock Highway
3) Residences on the south side of I-40 in Arizona, approximately 800 feet to the southwest of Topock 66 Spa & Resort, and approximately 220 feet from Staging Area 26

The distances identified above represent the distances to the closest known activity area for the Final Groundwater Remedy Project. The Project does include a Future Activity Allowance, which could result in the placement of a borehole or other feature closer than the identified distances, and it is assumed that these would occur within the limits of the defined Project Area. Locating well drilling or other construction activities closer to sensitive receptors than the distances stated above could result in increased risk levels associated with TAC emissions.

4.2.3.5 Existing Air Quality – Greenhouse Gas Emissions

California produced 459.3 gross million metric tons of carbon dioxide equivalent ($MMTCO_2e$) in 2013. This is an increase from levels between 2009 and 2011 (458.44, 453.06, and 450.94 $MMTCO_2e$, respectively) but a decrease from levels between 2000 and 2008, when emissions ranged from a low of 466.32 in 2000 to a high of 492.86 in 2004. Additionally, emissions in 2013 were reduced from the 460.8 $MMTCO_2e$ emitted in 2012. Combustion of fossil fuel in the transportation sector was the single largest source of California's GHG emissions in 2013, accounting for 37 percent of total GHG emissions in the state. This sector was followed by the industrial sector (23 percent) and the electric power sector (including both in-state and out-of-state sources) (20 percent). Agriculture, residential activities, commercial and unspecified sources make up the remaining emissions at 8 percent, 7 percent, 5 percent, and <1 percent, respectively (CARB 2015a).

Arizona produced 92.3 $MMTCO_2e$ in 2000 (the most recent data available), representing 1.2 percent of the total GHG emissions in the United States at that time. This is an increase of 51 percent from 1990 levels. Arizona has established two goals for reducing GHG emissions: (1) reducing emissions to 2000 levels by 2020 and (2) reducing emissions to 50 percent below 2000 levels by 2040. In addition, Arizona has a renewable power goal of 15 percent by 2025. Of the 2000 emissions, energy was the largest source of emissions at 49 percent, followed by transportation at 39 percent, industry and agriculture each at 5 percent, and waste at 2 percent (USEPA 2016).

USEPA's Greenhouse Gas Reporting Program requires facilities that emit above 25,000 $MTCO_2e$ to report their emissions. Roughly 50 percent of total emissions in the United States are reported by the facilities subject to the Greenhouse Gas Reporting Program. In 2014, the total GHG emissions reported under the GHGRP for the Mainland United States was 3,204 $MMTCO_2e$, with California facilities reporting emissions of 117 $MMTCO_2e$, and Arizona facilities reported emissions of approximately 61.5 $MMTCO_2e$ (USEPA 2015a).

4.2.4 Regulatory Background

4.2.4.1 Criteria Air Pollutants

Federal Plans, Policies, Regulations, and Laws

USEPA has been charged with implementing national air quality programs. USEPA's air quality mandates are drawn primarily from the federal Clean Air Act (CAA), which was enacted in 1970. The most recent major amendments made by Congress were in 1990.

The CAA required the USEPA to establish national ambient air quality standards (NAAQS). As shown in **Table 4.2-4**, the USEPA has established NAAQS for ozone, CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and lead. Table 4.2-2 lists the NAAQS and as provides a brief discussion of the related health effects and principal sources for each criteria air pollutant. **Table 4.2-5** presents current attainment statuses for the Project Area portion of the MDAB.

The CAA also required each state to prepare an air quality control plan referred to as a State Implementation Plan (SIP). The Federal Clean Air Act Amendments of 1990 added requirements for states with nonattainment areas to revise their SIPs to incorporate additional control measures to reduce air pollution. The SIPs are modified periodically to reflect the latest emissions inventories, planning documents, and rules and regulations of the air basins, as reported by their jurisdictional agencies. USEPA must review all SIPs to determine whether they conform to the mandates of the CAA and its amendments, and to determine whether implementing them will achieve air quality goals. If USEPA determines that a SIP is inadequate, a federal implementation plan that imposes additional control measures may be prepared for the nonattainment area. Failure to submit an approvable SIP or to implement the plan within the mandated time frame may cause sanctions to be applied to transportation funding and stationary air pollution sources in the air basin.

State of California

The CARB is responsible for coordination and oversight of state and local air pollution control programs in California and for implementing the California Clean Air Act (CCAA). The CCAA, which was adopted in 1988, required CARB to establish California ambient air quality standards (CAAQS) (Table 4.2-3). CARB has established CAAQS for sulfates, hydrogen sulfide, vinyl chloride, visibility-reducing particulate matter, and the above-mentioned criteria air pollutants. In most cases the CAAQS are more stringent than the NAAQS. Differences in the standards are generally explained by the health effects studies considered during the standard-setting process and the interpretation of the studies. In addition, the CAAQS incorporate a margin of safety to protect sensitive individuals.

The CCAA requires that all local air districts in the state endeavor to achieve and maintain the CAAQS by the earliest practical date. The act specifies that local air districts should focus particular attention on reducing the emissions from transportation and areawide emission sources, and provides districts with the authority to regulate indirect sources. Among CARB’s other responsibilities are overseeing local air districts’ compliance with California and federal laws, approving local air quality plans, submitting SIPs to USEPA, monitoring air quality, determining and updating area designations and maps, and setting emissions standards for new mobile sources, consumer products, small utility engines, off-road vehicles, and fuels.

State of Arizona

Air quality in the state of Arizona is regulated by ADEQ’s Air Quality Division. The ADEQ Air Quality Division has not adopted specific state-level standards and instead enforces USEPA standards. At this time Mohave County is not currently in a nonattainment or maintenance area for any federal pollutant and does not have any additional state or federal regulatory requirements beyond those required at the federal level.

TABLE 4.2-4
STATE AND NATIONAL CRITERIA AIR POLLUTANT STANDARDS, EFFECTS, AND SOURCES

Pollutant	Averaging Time	State Standard	National Standard	Pollutant Health and Atmospheric Effects	Major Pollutant Sources
Ozone	1 hour	0.09 ppm	---	High concentrations can directly affect lungs, causing irritation. Long-term exposure may cause damage to lung tissue.	Formed when ROG and NO_X react in the presence of sunlight. Major sources include on-road motor vehicles, solvent evaporation, and commercial/industrial mobile equipment.
	8 hours	0.07 ppm	0.070 ppm		
Carbon Monoxide	1 hour	20 ppm	35 ppm	Classified as a chemical asphyxiant, CO interferes with the transfer of fresh oxygen to the blood and deprives sensitive tissues of oxygen.	Internal combustion engines, primarily gasoline-powered motor vehicles.
	8 hours	9.0 ppm	9 ppm		
Nitrogen Dioxide	1 hour	0.18 ppm	100 ppb	Irritating to eyes and respiratory tract. Colors atmosphere reddish-brown.	Motor vehicles, petroleum-refining operations, industrial sources, aircraft, ships, and railroads.
	Annual Avg.	0.030 ppm	0.053 ppm		
Sulfur Dioxide	1 hour	0.25 ppm	75 ppb	Irritates upper respiratory tract; injurious to lung tissue. Can yellow the leaves of plants, destructive to marble, iron, and steel. Limits visibility and reduces sunlight.	Fuel combustion, chemical plants, sulfur recovery plants, and metal processing.
	3 hours	---	0.5 ppm		
	24 hours	0.04 ppm	0.14 ppm		
	Annual Avg.	---	0.03 ppm		
Respirable Particulate Matter (PM10)	24 hours	50 ug/m^3	150 ug/m^3	May irritate eyes and respiratory tract, decreases lung capacity, may cause cancer and increased mortality. Produces haze and limits visibility.	Dust and fume-producing industrial and agricultural operations, combustion, atmospheric photochemical reactions, and natural activities (e.g., wind-raised dust and ocean sprays).
	Annual Avg.	20 ug/m^3	---		
Fine Particulate Matter (PM2.5)	24 hours	---	35 ug/m^3	Increases respiratory disease, lung damage, cancer, and premature death. Reduces visibility and results in surface soiling.	Fuel combustion in motor vehicles, equipment, and industrial sources; residential and agricultural burning. Also, formed from photochemical reactions of other pollutants, including NO_X, sulfur oxides, and organics.
	Annual Avg.	12 ug/m^3	12 ug/m^3		
Lead	Monthly Ave.	1.5 ug/m^3	---	Disturbs gastrointestinal system and causes anemia, kidney disease, and neuromuscular and neurological dysfunction.	Present source: lead smelters, battery manufacturing & recycling facilities. Past source: combustion of leaded gasoline.
	Quarterly	---	1.5 ug/m^3		
Hydrogen Sulfide	1 hour	0.03 ppm	No National Standard	Nuisance odor (rotten egg smell), headache and breathing difficulties (higher concentrations).	Geothermal power plants, petroleum production and refining.
Sulfates	24 hours	25 ug/m^3	No National Standard	Breathing difficulties, aggravates asthma, reduces visibility.	Produced by the reaction in the air of SO_2.
Visibility-Reducing Particles	8 hours	Extinction of 0.23/km; visibility of 10 miles or more	No National Standard	Reduces visibility, reduces airport safety, lowers real estate value, and discourages tourism.	See $PM_{2.5}$.

NOTES:
ppm = parts per million; ug/m^3 = micrograms per cubic meter.
The USEPA lowered the federal primary $PM_{2.5}$ annual standard from 15 ug/m^3 to 12 ug/m^3 on December 14, 2012.

SOURCE: CARB 2015b.

TABLE 4.2-5
MDAB ATTAINMENT STATUS

	Designation/Classification	
Pollutant	**Federal Standards**	**State Standards**
Ozone – 1 hour	No Federal Standard	Nonattainment - Transitional
Ozone – 8 hours	Unclassified/Attainment	Nonattainment - Transitional
PM_{10}	Nonattainment/Moderate	Nonattainment
$PM_{2.5}$	Unclassified/Attainment	Unclassified
CO	Unclassified/Attainment	Attainment
Nitrogen Dioxide	Unclassified/Attainment	Attainment
Sulfur Dioxide	Unclassified	Attainment
Lead	Unclassified/Attainment	Attainment
Hydrogen Sulfide	No Federal Standard	Unclassified
Sulfates	No Federal Standard	Attainment
Visibility-Reducing Particles	No Federal Standard	Unclassified

SOURCE: CARB 2013a; USEPA 2015b.

Mojave Desert Air Quality Management District

MDAQMD attains and maintains air quality conditions for the desert portion of San Bernardino County and the far eastern end of Riverside County through a comprehensive program of planning, regulation, enforcement, technical innovation, and promotion of the understanding of air quality issues. The clean-air strategy of MDAQMD includes preparing plans and programs for the attainment of ambient air quality standards, adopting and enforcing the rules and regulations concerning sources of air pollution, and issuing permits for stationary sources of air pollution. MDAQMD also inspects stationary sources of air pollution, responds to citizen complaints, monitors ambient air quality and meteorological conditions, and implements programs and regulations required by the CAA as amended, and CCAA. Air quality plans applicable to the proposed Project are discussed below and summarized in **Table 4.2-6**.

MDAQMD submitted the *1991 Air Quality Attainment Plan* (AQAP) in compliance with the requirements set forth in the CCAA, which specifically addressed the nonattainment status for ozone and, to a lesser extent, CO and PM_{10}.

TABLE 4.2-6
SUMMARY OF MOJAVE DESERT AIR QUALITY MANAGEMENT DISTRICT AIR QUALITY PLANS

Pollutant	Plan Title	Date	Status
Ozone	*2004 Ozone Attainment Plan* (State and Federal)	April 26, 2004	Adopted by MDAQMD and CARB on April 26, 2004
	Federal 8-Hour Ozone Attainment Plan (Western Mojave Desert Nonattainment Area)	June 9, 2008	Adopted by MDAQMD and CARB on June 9, 2008
Nitrogen dioxide (NO_2) and volatile organic compounds (VOC)	*1991 Air Quality Attainment Plan*	August 26, 1991	Adopted by MDAQMD and CARB on August 26, 1991
	Reasonable Further Progress Rate-of-Progress Plan	October 26, 1994	Adopted by MDAQMD and CARB on October 26, 1994
	Post 1996 Attainment Demonstration and Reasonable Further Progress Plan	October 26, 1994	Adopted by MDAQMD and CARB on October 26, 1994
	Triennial Revision to the 1991 Air Quality Attainment Plan	January 22, 1996	Adopted by MDAQMD and CARB on January 22, 1996
Respirable and fine particulate matter (PM_{10} and $PM_{2.5}$)	*Mojave Desert Planning Area Federal Particulate Matter Attainment Plan*	July 25, 1995	Adopted by MDAQMD and CARB on July 25, 1995

NOTES:
CARB = California Air Resources Board; MDAQMD = Mojave Desert Air Quality Management District.

SOURCE: MDAQMD 2016.

The CCAA also requires a triennial assessment of the extent of air quality improvements and emission reductions achieved through the use of control measures. As part of the assessment, the attainment plan must be reviewed and, if necessary, revised to correct for deficiencies in progress and to incorporate new data or projections. The requirement of the CCAA for a first triennial progress report and revision of the 1991 AQAP was fulfilled with the preparation and adoption of the triennial *Revision to the 1991 Air Quality Attainment Plan* in 1996.

Portions of San Bernardino County not including the Project Area are part of a Federal Ozone Air Quality Maintenance Area. As a nonattainment area, the region is also required to submit rate-of-progress milestone evaluations in accordance with the CAA, as amended. Milestone reports were prepared for 1994 and 1996, and most recently in 2008 for the 8-hour ozone standard. These milestone reports include compliance demonstrations that the requirements have been met for the MDAQMD. The AQAPs and reports present comprehensive strategies to reduce emissions of ROG, NO_X, and PM_{10} from stationary, area, mobile, and indirect sources. Such strategies include adopting rules and regulations, enhancing CEQA participation, implementing a new and modified indirect-source review program, adopting local air quality plans, and implementing control measures for stationary, mobile, and indirect sources.

The following MDAQMD rules and regulations also pertain to the proposed Project:

Rule 201–202: Permits to Construct. A person shall not build, erect, install, alter or replace any equipment, the use of which may cause the issuance of air contaminants or the use of which may eliminate, reduce or control the issuance of air contaminants without first obtaining written authorization for such construction from the Air Pollution Control Officer (APCO). A permit to construct shall remain in effect until the permit to operate the equipment for which the application was filed is granted or denied, or the application is canceled.

Rule 203: Permit to Operate. A person shall not operate or use any equipment, the use of which may cause the issuance of air contaminants or the use of which may reduce or control the issuance of air contaminants, without first obtaining a written permit from the APCO or except as provided in Rule 202. The equipment shall not be operated contrary to the conditions specified in the permit to operate.

Rule 403: Fugitive Dust. The developer or contractor is required to control dust emissions from earthmoving activities or any other construction activity to prevent airborne dust from leaving the Project Area.

Rule 404: Particulate Matter—Concentration. A person shall not discharge into the atmosphere from any source, particulate matter except liquid sulfur compounds, in excess of the concentration at standard conditions included in the rule.

Rule 407: Liquid and Gaseous Air Contaminants. A person shall not discharge into the atmosphere from any source CO exceeding 2,000 ppm measured on a dry basis, averaged over a minimum of 15 consecutive minutes. The provisions of this subsection shall not apply to emissions from internal combustion engines.

Rule 462: Organic Liquid Loading. The purpose of this rule is to limit the emissions of VOC and TACs (such as benzene) from Organic Liquid Loading (any organic liquid, including gasoline), and in conjunction with Rules 461 and 463, limit the emissions from the storage, transfer, and dispensing of organic liquids.

Rule 463: Storage of Organic Liquids. The purpose of this rule is to limit the emissions of VOCs and TACs (such as benzene) during the Storage of Organic Liquids, and in conjunction with Rules 461 and 462, limit the emissions from the storage, transfer, and dispensing of organic liquids, including bulk facilities, retail service stations, and others, the transport of fuels between these facilities and the transfer of fuel into motor vehicle tanks.

Rule 475: Electric Power Generating Equipment. The purpose of this rule is to limit emissions of NO_X and PM from nonmobile Electric Power Generating Equipment.

Rule 1300: New Source Review. Set forth the requirements for the preconstruction review of all new or modified Facilities.

County of San Bernardino 2007 General Plan

The adopted *County of San Bernardino 2007 General Plan* includes the following applicable goals, objectives, and policies from the Conservation Element (San Bernardino County 2007):

GOAL CO 4: The County will ensure good air quality for its residents, businesses, and visitors to reduce impacts on human health and the economy.

Policy CO 4.1: Because developments can add to the wind hazard (due to increased dust, the removal of wind breaks, and other factors), the County will require either as mitigation measures in the appropriate environmental analysis required by the County for the development proposal or as conditions of approval if no environmental document is required, that developments in areas identified as susceptible to wind hazards to address site-specific analysis of:

a. Grading restrictions and/or controls on the basis of soil types, topography or season.

b. Landscaping methods, plant varieties, and scheduling to maximize successful revegetation.

c. Dust-control measures during grading.

Policy CO 4.2: Coordinate air quality improvement technologies with the South Coast Air Quality Management District and the MDAQMD to improve air quality through reductions in pollutants from the region.

Policy CO 4.5: Reduce emissions through reduced energy consumption.

Program 1: Implement programs to phase in energy conservation improvements through the annual budget process.

Policy CO 4.12: Provide incentives to promote siting or use of clean air technologies (e.g., fuel cell technologies, renewable energy sources, UV coatings, and hydrogen fuel).

Mohave County, Arizona General Plan

The adopted *Mohave County, Arizona General Plan* includes the following applicable goals, objectives, and policies from the Natural Resources Element (Mohave County 2015):

GOAL 1: To increase County efforts to maintain or improve existing air quality.

Policy 1.3: The County should encourage the siting of new industries that do not require a “major source” pollution permit from ADEQ. Major source polluters shall provide the Best Available Demonstrated Control Technology.

GOAL 2: To establish construction and development standards that maintain or improve existing air quality.

Policy 2.1: The County should adopt standards for dust management at construction sites.

Policy 2.2: The County should adopt urban and suburban road construction and surfacing standards that will, to the maximum feasible extent, minimize traffic related dust generation.

Policy 2.4: The County shall require submittal and approval of environmental assessments for major projects with the potential for significant air pollutant discharges, including but not limited to manufacturing or other industrial developments. New proposals will be evaluated with the Arizona Ambient Air Quality Guidelines (for hazardous air pollutants) or better.

4.2.4.2 Toxic Air Contaminants

Air quality regulations also address TACs (or, federally, hazardous air pollutants (HAPs). In general, for those TACs that may cause cancer, there is no concentration that does not present some risk. In other words, there is no threshold level below which adverse health impacts may not be expected to occur. The USEPA and CARB regulate HAPs and TACs, respectively, through statutes and regulations that generally require the use of control technologies to limit emissions. These statutes and regulations, in conjunction with additional rules set forth by MDAQMD, establish the regulatory framework for TACs.

Federal Hazardous Air Pollutant Programs

The USEPA has programs for identifying and regulating HAPs. Title III of the CAA directed USEPA to promulgate national emissions standards for HAPs (NESHAP). The NESHAP for major sources of HAPs may differ from those for area sources. Major sources are defined as stationary sources with potential to emit more than 10 tons per year of any HAP or more than 25 tons per year of any combination of HAPs; all other sources are considered area sources.

The CAA called on USEPA to issue emissions standards in two phases. In the first phase (1992–2000), USEPA developed technology-based emissions standards designed to reduce emissions as much as feasible. These standards are generally referred to as requiring maximum available control technology. For area sources, the standards may be different, based on generally available control technology. In the second phase (2001–2008), USEPA was required to issue health risk–based emissions standards where deemed necessary to address risks remaining after implementation of the technology-based NESHAP standards.

The CAA also required USEPA to issue vehicle or fuel standards containing reasonable requirements that control toxic emissions of, at a minimum, benzene and formaldehyde. Performance criteria were established to limit mobile-source emissions of benzene, formaldehyde, and 1,3-butadiene. In addition, Section 219 of the CAA required the use of reformulated gasoline in selected areas with the most severe ozone nonattainment conditions to further reduce mobile-source emissions.

State of California

TACs in California are regulated primarily through the Tanner Air Toxics Act AB 1807 (Chapter 1047, Statutes of 1983) and the Air Toxics Hot Spots Information and Assessment Act (AB 2588 [Chapter 1252, Statutes of 1987]). AB 1807 sets forth a formal procedure for CARB to designate substances as TACs. Research, public participation, and scientific peer review must occur before

CARB can designate a substance as a TAC. To date, CARB has identified more than 21 TACs and adopted USEPA's list of HAPs as TACs. Most recently, particulate matter emissions from DPM was added to the CARB's list of TACs.

Once a TAC is identified, CARB then adopts an airborne toxics control measure for sources that emit that particular TAC. If there is a safe threshold for a substance at which there is no toxic effect, the control measure must reduce exposure below that threshold. If there is no safe threshold, the measure must incorporate BACT to minimize emissions; for example, the airborne toxics control measure limits truck idling to 5 minutes (Title 13, Section 2485 of the California Code of Regulations [CCR]).

The Air Toxics Hot Spots Information and Assessment Act requires that existing facilities that emit toxic substances above a specified level prepare an inventory of toxic emissions, prepare a risk assessment if emissions are significant, notify the public of significant risk levels, and prepare and implement risk reduction measures.

CARB has adopted control measures for DPM and more stringent emissions standards for various on-road mobile sources of emissions, including transit buses and off-road diesel equipment (e.g., tractors, generators). Recent and future milestones include the low-sulfur diesel fuel requirement and tighter emissions standards for heavy-duty diesel trucks (2007) and off-road diesel equipment (2011) nationwide. Over time, replacing older vehicles will result in a vehicle fleet that produces substantially lower levels of TACs than under current conditions. Mobile-source emissions of TACs (e.g., benzene, 1,3-butadiene, DPM) have been reduced significantly over the last decade and will be reduced further in California through a progression of regulatory measures (e.g., Low Emission Vehicle/Clean Fuels and Phase II reformulated gasoline regulations) and control technologies. With implementation of CARB's Risk Reduction Plan, DPM concentrations were expected to be reduced by 75 percent by 2010 and are projected to be reduced by 85 percent in 2020 from the estimated year-2000 level. Adopted regulations are also expected to continue to reduce formaldehyde emissions from cars and light-duty trucks. As emissions are reduced, it is expected that risks associated with exposure to the emissions will also be reduced.

In addition, the *Air Quality and Land Use Handbook: A Community Health Perspective* (handbook) provides guidance on land use compatibility with sources of TACs (CARB 2005). The handbook is not a law or adopted policy but offers advisory recommendations for the siting of sensitive receptors near uses associated with TACs, such as freeways and high-traffic roads, commercial distribution centers, rail yards, ports, refineries, dry cleaners, gasoline stations, and industrial facilities, to help keep children and other sensitive populations out of harm's way.

State of Arizona

On January 1, 2007, a new Arizona State HAP Program became effective. As required by Arizona Revised Statutes (A.R.S.) Section 49-426.06, the program requires certain new and modified sources of HAP emissions to install control technology in order to reduce the risk those emissions pose to human health. Sources subject to the program that are able to demonstrate through a risk management analysis (RMA) that their emissions will not adversely affect human health are eligible for an exemption from the control technology requirement.

Mojave Desert Air Quality Management District

At the local level, air pollution control or management districts may adopt and enforce CARB control measures. Under MDAQMD Rule 1300 (New Source Review) and Rule 1200 (Federal Operating Permit), all sources that possess the potential to emit TACs must obtain permits from MDAQMD. Permits may be granted to these operations if they are constructed and operated in accordance with applicable regulations, including new-source review standards and air toxics control measures. MDAQMD limits emissions and public exposure to TACs through a number of programs. MDAQMD prioritizes TAC-emitting stationary sources based on the quantity and toxicity of the TAC emissions and the proximity of the facilities to sensitive receptors.

Arizona Department of Environmental Quality

The ADEQ was created under the Environmental Quality Act of 1986 and directs all of Arizona's environmental protection programs. The ADEQ is composed of four departments, water quality, waste, administration and air quality. The Air Quality Division of ADEQ is responsible for ambient air monitoring, issuing permits, and developing air quality plans and rules, specifically the SIP.

Odors

MDAQMD's Rule 402 (Nuisance) addresses odor exposure at the Project Area. MDAQMD recommends that odor impacts be addressed in a qualitative manner. Such an analysis shall determine if the proposed Project results in excessive nuisance odors, as defined under the CCR, Health and Safety Code Section 41700, air quality public nuisance.

4.2.4.3 Greenhouse Gas Emissions

Federal Plans, Policies, Regulations, and Laws

The principal air quality regulatory mechanism at the federal level is the CAA and in particular, the 1990 amendments to the CAA and NAAQS that it establishes. The federal CAA does not specifically regulate GHG emissions; however, the U.S. Supreme Court has determined that GHGs are pollutants that can be regulated under the federal CAA. There are currently no federal regulations that set ambient air quality standards for GHGs.

Fuel-Efficiency Standard

The federal government sets emission standards for construction equipment. The first federal standards (Tier 1) were adopted in 1994 for all off-road engines over 50 horse power and to be phased in by 2000. In 1998, a new standard was adopted that introduced Tier 1 for all equipment below 50 horse power and introduced the Tier 2 and Tier 3 standards. Phase in for Tier 2 and Tier 3 standards for all equipment was to be phased in by 2008. Tier 4 efficiency requirements for newly manufactured vehicles are contained in 40 Code of Federal Regulations Parts 1039, 1065, and 1068 (originally adopted in 69 Federal Register 38958 [June 29, 2004], and were most recently updated in 2014 [79 Federal Register 46356]). Emissions requirements for new off-road Tier 4 vehicles were completely phased in by the end of 2015.

Corporate Average Fuel Economy (CAFE) Standards

New federal rules have been adopted that set national GHG emissions standards and will significantly increase the fuel economy of all new passenger cars and light trucks sold in the United States. The National Highway Traffic Safety Administration has established fuel economy standards that strengthen each year reaching an estimated 34.1 miles per gallon for the combined industry-wide fleet for model year 2016. (See 75 Federal Register 25324 et seq. [May, 7, 2010].) It is, however, legally infeasible for individual municipalities to adopt more stringent fuel efficiency standards. The CAA (42 United States Code [U.S. Code] Section 7543[a]) states that: "No state or any political subdivision therefore shall adopt or attempt to enforce any standard relating to the control of emissions from new motor vehicles or new motor vehicle engines subject to this part."

Energy Independence and Security Act of 2007

The federal government passed the Energy Independence and Security Act of 2007, which sets energy efficiency standards for lighting (light bulbs) and appliances. The proposed Project would be required to install photosensors and install energy efficient lighting fixtures consistent with the requirements of the 42 U.S. Code Section 17001 et seq.

California Plans, Policies, Regulations, and Laws

Executive Order S-1-07

Executive Order S-1-07, which was signed by Governor Schwarzenegger in 2007, proclaims that the transportation sector is the main source of GHG emissions in California. It establishes a goal to reduce the carbon intensity of transportation fuels sold in California by at least 10 percent by 2020. As a result of this order, CARB approved a proposed regulation to implement the Low Carbon Fuel Standard on April 23, 2009, that would reduce GHG emissions from the transportation sector in California by about 16 MMT by 2020. The Low Carbon Fuel Standard is designed to reduce California's dependence on petroleum, create a lasting market for clean transportation technology, and stimulate the production and use of alternative, low-carbon fuels in California. The Low Carbon Fuel Standard is designed to provide a durable framework that uses market mechanisms to spur the steady introduction of lower carbon fuels. The framework establishes performance standards that fuel producers and importers must meet each year (since 2011).

Executive Order S-3-05 & 4-29-2015

In 2005, in recognition of California's vulnerability to the effects of climate change, Governor Schwarzenegger established Executive Order S-3-05, which set forth a series of target dates by which statewide emissions of GHGs would be progressively reduced, as follows:

- By 2010, reduce GHG emissions to 2000 levels
- By 2020, reduce GHG emissions to 1990 levels
- By 2050, reduce GHG emissions to 80 percent below 1990 levels

In 2015, Governor Brown issued Executive Order 4-29-2015 to establish a GHG reduction target of 40 percent below 1990 levels by 2030. These orders are only applicable to "state agencies with jurisdiction over sources of greenhouse gas emissions" (Order 4-29-2015 Section 2). Furthermore, there is currently no implementation strategy for these Executive Orders (i.e., a plan, similar to the AB 32 Scoping Plan, which apportions GHG reductions by economic sector/activity/region).

The emphasis of the Executive Orders is the continuing reduction in GHG emissions over time in order to limit the effects of climate change. A project is considered consistent with the provisions of the Executive Order if it meets the general intent in reducing emissions in order to facilitate the achievement of State adopted goals and does not impede attainment of those goals. As discussed in several cases, a given project need not be in perfect conformity with each and every planning policy or goals to be consistent. A project would be consistent, if it will further the objectives and not obstruct their attainment.[2]

Assembly Bill 32 – California Global Warming Solutions Act

In response to the 2006 Executive Order, the California Legislature adopted AB 32, the Global Warming Solutions Act of 2006, which requires CARB to establish a statewide GHG emissions cap for 2020 based on 1990 emission levels. AB 32 required CARB to adopt and enforce programs and regulations that identify and require selected sectors or categories of emitters of GHGs to report and verify their statewide GHG emissions. In December 2007 CARB adopted 427 $MMTCO_2e$ as the statewide GHG emissions limit equivalent to the statewide levels for 1990. This is approximately 28 percent below forecasted 2020 "business-as-usual" (BAU) emissions of 596 $MMTCO_2e$, and about 10 percent below average annual GHG emissions during the period of 2002 through 2004 (CARB 2008).[3,4]

CARB published the *Expanded List of Early Action Measures To Reduce Greenhouse Gas Emissions In California Recommended For Board Consideration* in September 2007 (CARB 2007). CARB adopted nine Early Action Measures for implementation, including Ship Electrification at Ports, Reduction of High Global-Warming-Potential Gases in Consumer Products, Heavy-Duty Vehicle Greenhouse Gas Emission Reduction (Aerodynamic Efficiency), Reduction of Perfluorocarbons from Semiconductor Manufacturing, Improved Landfill Gas Capture, Reduction of Hydrofluorocarbon-134a from Do-It-Yourself Motor Vehicle Servicing, Sulfur Hexafluoride Reductions from the Non-Electric Sector, a Tire Inflation Program, and a Low Carbon Fuel Standard.

By January 1, 2011, CARB was required to adopt rules and regulations (which were to become operative January 1, 2012), to achieve the maximum technologically feasible and cost-effective

2 *Sierra Club v. County of Napa* (2004) 121 Cal.App.4th 1490; *San Francisco Tomorrow et al. v. City and County of San Francisco* (2015) 229 Cal.App.4th 498; *San Franciscans Upholding the Downtown Specific Plan v. City & County of San Francisco* (2002) 102 Cal.App.4th 656; *Sequoyah Hills Homeowners Assn. V. City of Oakland* (1993) 23 Cal.App.4th 704, 719.

3 The Scoping Plan document states approximately 30 percent from BAU analysis (CARB 2008 pg. 12). When calculated the percent reduction between the 1990 goal of 427 $MMTCO_2e$ by 2020 and the 2020 BAU of 596 $MMTCO_2e$ equals 28.36 [(596–427)/596).

4 Updates to these values are discussed under the Climate Change Scoping Plan in Section 3.6.3.2.4.

GHG emission reductions. AB 32 permitted the use of market-based compliance mechanisms to achieve those reductions. AB 32 also required CARB to monitor compliance with and enforce any rule, regulation, order, emission limitation, emissions reduction measure, or market-based compliance mechanism that it had adopted.

As of January 1, 2012, the GHG emissions limits and reduction measures adopted in 2011 by CARB became enforceable. In designing emission reduction measures, CARB must aim to minimize costs, maximize benefits, improve and modernize California’s energy infrastructure, maintain electric system reliability, maximize additional environmental and economic co-benefits for California, and complement the state’s efforts to improve air quality.

Climate Change Scoping Plan

In December 2008, CARB approved the AB 32 Climate Change Scoping Plan (Scoping Plan) outlining the state’s strategy to achieve the 2020 GHG emissions limit (CARB 2008). This Scoping Plan, developed by CARB in coordination with the Climate Action Team, proposes a comprehensive set of actions designed to reduce overall GHG emissions in California, improve the environment, reduce dependence on oil, diversify California’s energy sources, save energy, create new jobs, and enhance public health. However, recognizing that there are various technological, environmental, and economic factors for different types of emission sources/sectors, Section II of the Scoping Plan sets different reduction targets depending upon the nature of the activity. This concept is graphically displayed in Figure 3 of the 2008 Scoping Plan. In setting these goals, CARB was specifically tasked with selecting a goal based upon technological and economic feasibility (see Health & Safety Code Section 38561). In addition to the approximately 28 percent reduction from the BAU scenario by 2020, the 2008 Scoping Plan set a local government target of 15 percent below 2008 levels by 2020.[5]

As required by AB 32, the Climate Change Scoping Plan must be updated at least every 5 years to evaluate the mix of AB 32 policies to ensure that California is on track to meet the targets set out in the legislation. In October 2013, a draft Update to the initial Scoping Plan was developed by CARB in collaboration with the Climate AT. The draft Update builds upon the Scoping Plan with new strategies and expanded measures, and identifies opportunities to leverage existing and new funds to drive GHG emission reductions through strategic planning and targeted program investments. The draft Update to the Scoping Plan was presented to CARB’s Board for discussion at its February 20, 2014, meeting. Subsequently, the first update to the AB 32 Scoping Plan was approved on May 22, 2014, by CARB.

As part of the proposed update to the Scoping Plan, the emissions reductions required to meet the 2020 statewide GHG emissions limit were further adjusted. The primary reason for adjusting the 2020 statewide emissions limit was based on the fact that the original Scoping Plan relied on the Intergovernmental Panel on Climate Change (IPCC) 1996 Second Assessment Report to assign the global warming potentials (GWPs) of GHGs. Recently, in accordance the United Nations Framework Convention on Climate Change, international climate agencies have agreed to begin

5 Today’s levels as discussed in the Scoping Plan refer to the years used for the average emissions and estimates for projected 2020 BAU emissions, which were for the years 2002 through 2004.

using the scientifically updated GWP values in the IPCC's Fourth Assessment Report (AR4) that was released in 2007. Because CARB has begun to transition to the use of the AR4 100-year GWPs in its climate change programs, CARB recalculated the Scoping Plan's 1990 GHG emissions level with the AR4 GWPs. As the recalculation resulted in 431 $MMTCO_2e$, the 2020 GHG emissions limit established in response to AB 32 is now slightly higher than the 427 $MMTCO_2e$ in the initial Scoping Plan. Considering that the proposed update also adjusted the 2020 BAU forecast of GHG emissions to 509 $MMTCO_2e$, a 15 percent reduction below the estimated BAU levels was determined to be necessary to return to 1990 levels by 2020 (CARB 2014).

As recently described by the California Governor in the 2015 Executive Order "California is on track to meet or exceed the current target of reducing greenhouse gas emissions to 1990 levels by 2020, as established in the California Global Warming Solutions Act of 2006 (AB 32)" (Brown 2015).

Senate Bill 97

Senate Bill (SB) 97, enacted in August 2007, required the Office of Planning and Research (OPR) to develop guidelines for the mitigation of GHG emissions, or the effects related to releases of GHG emissions. On April 13, 2009, the OPR submitted proposed amendments to the Natural Resources Agency in accordance with SB 97 regarding analysis and mitigation of GHG emissions. As directed by SB 97, the Natural Resources Agency adopted Amendments to the CEQA Guidelines for GHG emissions on December 30, 2009. On February 16, 2010, the Office of Administrative Law approved the Amendments, and filed them with the Secretary of State for inclusion in the California Code of Regulations. The Amendments became effective on March 18, 2010.

Senate Bill 375

SB 375, which establishes mechanisms for the development of regional targets for reducing passenger vehicle GHG emissions, was adopted by the state on September 30, 2008. On September 23, 2010, CARB adopted the vehicular GHG emissions reduction targets that had been developed in consultation with the metropolitan planning organizations (MPOs); the targets require a seven to eight percent reduction by 2020 and between 13 to 16 percent reduction by 2035 for each MPO. SB 375 recognizes the importance of achieving significant GHG reductions by working with cities and counties to change land use patterns and improve transportation alternatives. Through the SB 375 process, MPOs, such as the Southern California Association of Governments (SCAG) will work with local jurisdictions in the development of sustainable communities strategies (SCS) designed to integrate development patterns and the transportation network in a way that reduces GHG emissions while meeting housing needs and other regional planning objectives. SCAG's reduction target for per capita vehicular emissions is eight percent by 2020 and 13 percent by 2035 (CARB 2010).

In April 2012, the SCAG adopted the 2012–2035 RTP/SCS. SCAG's RTP/SCS includes a commitment to reduce emissions from transportation sources by promoting compact and infill development in order to comply with SB 375 (SCAG 2012). Two goals of the SCS that are applicable to the Proposed Project include:

1. "Promote the development of better places to live and work through measures that encourage more compact development, varied housing options, bike and pedestrian improvements, and efficient transportation infrastructure."
2. "Create more compact neighborhoods and plac[e] everyday destinations closer to homes and closer to one another."

California Green Building Standard Code

In January 2010, the State of California adopted the 2010 CALGreen Code, which became effective in January 2011. Building off of the initial 2008 California Green Building Code, the 2010 CALGreen Code represents a more stringent building code that requires, at a minimum, that new buildings and renovations in California meet certain sustainability and ecological standards. The 2010 CALGreen Code has mandatory Green Building provisions for all new residential buildings that are three stories or fewer (including hotels and motels) and all new nonresidential buildings of any size that are not additions to existing buildings.

In early 2013 the California Building Standards Commission adopted the 2013 California Building Standards Code that also included the latest 2013 CALGreen Code, which became effective on January 1, 2014. The mandatory provisions of the Code are anticipated to reduce GHG emissions by three MMT by 2020, reduce water use by 20 percent or more, and divert 50 percent of construction waste from landfills. Additionally, the California Building Code includes a requirement for a 20 percent reduction in indoor potable water usage. The 2013 California Energy Code (Title 24, Part 6), which is also part of the CALGreen Code (Title 24, Part 11, Chapter 5.2), became effective on July 1, 2014.

California Renewable Portfolio Standard

Established in 2002 under SB 1078, and accelerated by SB 107 [2006] and SB 2 [2011], California's RPS obligates investor-owned utilities, energy service providers and community choice aggregators to procure 33 percent of their electricity from renewable energy sources by 2020. The California Public Utilities Commission (CPUC) and the California Energy Commission (CEC) are jointly responsible for implementing the program.

Arizona Plans, Policies, Regulations, and Laws

Arizona Climate Change Initiatives

On September 8, 2006, Arizona Governor Napolitano signed Executive Order 2006-13, which established a statewide goal to reduce Arizona's future GHG emissions to the 2000 emissions level by the year 2020, and to 50 percent below the 2000 level by 2040. The executive order also created the Climate Change Executive Committee under the direction of the ADEQ to begin implementing action plan recommendations.

In addition to these two key actions, Executive Order 2006-13 also issued the following directives:

- ADEQ is to develop a GHG emissions reporting mechanism and establish a multi-state registry.
- ADEQ and the Arizona Department of Transportation (ADOT) are to adopt the Clean Car Program in Arizona.
- ADEQ and the Arizona Department of Weights and Measures are to develop standards for biodiesel and ethanol sold in Arizona.
- ADOT is to implement a pilot program for hybrids in High Occupancy Vehicle (HOV) lanes.
- The Arizona Department of Administration (ADOA) is to convert the state vehicle fleet to low-GHG-emissions vehicles.

Local Plans, Policies, Regulations, and Laws

San Bernardino County

San Bernardino County has adopted a series of policies designed to achieve a balance between development and environmental stewardship called Green County San Bernardino. Two of the policies include use of renewable energy and resource conservation. The San Bernardino policies are written to achieve, and if possible exceed, the measures proposed in AB 32 (San Bernardino County 2011).

4.2.5 Environmental Impacts

4.2.5.1 Thresholds of Significance

Based on Appendix G of the CEQA Guidelines implementation of the proposed Project would have a significant impact on air quality and climate change if it would:

- 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 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;
- Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment; or
- Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs.

Based on the MDAQMD Guidance (MDAQMD 2011) the proposed Project would have a significant impact on air quality and climate change if it exceeds the thresholds in **Table 4.2-7**. A project that exceeds these thresholds is required to incorporate mitigation to reduce impacts to a less than significant level. If this is not possible, then all feasible mitigation must be incorporated.

TABLE 4.2-7
MDAQMD SIGNIFICANT EMISSIONS THRESHOLDS

Pollutant	Annual Threshold (tons/year)	Daily Threshold (lb/day)
VOC or ROG	25	137
NO_x	25	137
CO	100	548
SOx	25	137
PM_{10}	15	82
$PM_{2.5}$	15	82
CO_2e (GHGs)	100,000 (90,719 MT)	548,000

SOURCE: MDAQMD 2011.

In using the thresholds of significance identified in Table 4.2-7,[6] the Project is being compared to California's regulations. No violation of Arizona air quality regulations would occur because California regulations currently are stricter for all pollutants than those of Arizona, which are consistent with federal standards.

The complete list of CEQA significance criteria used in the air quality and GHG emissions analysis is included in the Modified Initial Study (see Appendix IS), which also explains why the proposed Project would not result in new significant impacts or substantially increase the severity of impacts previously identified in the Groundwater FEIR (see Pub. Resources Code, Section 21166; CEQA Guidelines, Section 15162) on air quality with respect to air quality plans and objectionable odors, and on GHG with respect to GHG plans. As a result, those impacts will not be addressed further in this SEIR and are summarized below and on the following page.

Air Quality Plans

The Groundwater FEIR determined that the Project would not conflict with the implementation of local air quality plans if it complies with all applicable MDAQMD rules and regulations, including control measures, and is consistent with the growth forecasts in the applicable plans (or is directly included in the applicable plan). The Groundwater FEIR found that the Project would comply with all applicable district rules and regulations, specifically the rules outlined in the regulatory section above. This condition has not changed since certification of the Groundwater FEIR. Additionally, the proposed Project has incorporated specific actions to support Rule 403 into the Project. The Project would not result in new significant impacts or substantially increase the severity of impacts previously identified in the Groundwater FEIR on air quality with respect to compliance with applicable air quality plans. Therefore, this issue is not evaluated further in this SEIR.

6 While the 100,000 ton (90,719 MT) CO_2e MDAQMD annual threshold is not as conservative as the Federal reporting limit of 25,000 $MTCO_2e$ annually or the SCAQMD's 10,000 $MTCO_2e$ annual threshold, the Project would still be below both of these thresholds.

Objectionable Odors

The Groundwater FEIR determined that the Project would not add any additional sources or types of odors and therefore would not result in odor emissions. This condition has not changed since certification of the Groundwater FEIR. No known odor sources are in the immediate vicinity of the Project Area, except for existing Station operations such as exhaust gases and odorants. The Project would not result in new significant impacts or substantially increase the severity of impacts previously identified in the Groundwater FEIR on air quality with respect to objectionable odors. Therefore, this issue is not evaluated further in this SEIR.

Greenhouse Gas Emissions Plans

The Groundwater FEIR determined the Project would not conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions. The Groundwater FEIR found that the Project would comply with all applicable district rules and regulations, specifically the rules outlined earlier in the regulatory section. This condition has not changed since certification of the Groundwater FEIR. Additionally, the proposed Project has incorporated specific actions to support Rule 403 into the Project. The Project would not result in new significant impacts or substantially increase the severity of impacts previously identified in the Groundwater FEIR on GHG with respect to compliance with applicable GHG plans. Therefore, this issue is not evaluated further in this SEIR.

4.2.5.2 Approach to Analysis

Subsequent to certification of the Groundwater FEIR, the Final Remedy Design was prepared and completed reflecting an iterative design, comment, and response process that included modifications of the size of the Project Area, as well as of refinements to specific quantity and location of Project components. This section presents an updated analysis of the proposed Project with respect to air quality and climate change impacts based on revised setting information included in Section 4.2.3 as well as the additional information and details included in the Final Remedy Design documents, as outlined in Chapter 3, “Project Description.”

As detailed in Chapter 3 of this SEIR, the proposed Project includes the construction of wells, remediation facilities, new and upgraded roadways, and other non-well-related infrastructure and facilities at the MW-20 Bench, Moabi Regional Park, the Transwestern Bench as well as the Station and TCS Evaporation Ponds. It also established updated information regarding construction duration and phase overlaps. This Project-level specificity has been identified subsequent to the certification of the Groundwater FEIR in 2011.

Some of the mitigation measures in this section refer to various plans or other documents that have been prepared and included in the Final Remedy Design for the groundwater remedy or are part of the Project’s federal requirements. Many of these plans and documents included in the Final Remedy Design were prepared to implement mitigation measures previously adopted as part of DTSC’s January 31, 2011 decision approving Alternative E as the groundwater remedy (DTSC 2011). Specifically, the Final Remedy Design incorporates design details and plans called for under Mitigation Measure AQ-1 to reduce fugitive dust emissions in the Project Area. Project details and plans that address Mitigation Measure AQ-1 are contained in the Final Remedy Design Table 6.1-1.These specific plans include:

- Section 4.4.2, Air and Meteorological Monitoring, requires monitoring weather conditions to identify potential dust generation conditions and the dust migration pathways. This section describes the required monitoring equipment including anemometer, thermometer, hygrometer, and a rain gauge. This is a qualitative measure as it will avoid dust generation through timing of activities based on the severity of wind and weather. Therefore the amount of dust that may be avoided cannot be quantified and is not part of the project calculations.
- Section 4.6.2.1, Dust Control, describes the required measures to control fugitive dust and comply with the 2011 Groundwater FEIR Mitigation Measures AIR-1. The measures describes periodic watering for dust control, covering trucks and stockpiles, slope stabilization measures, cleaning of public roads with Project-related track-out, and minimizing work during high wind conditions. Mitigation Measure AIR-1 from the Groundwater FEIR is based on consistency with MDAQMD Rule 403 for reducing fugitive dust. Because this mitigation measure is consistent with a regulatory requirement that must be followed, the reductions afforded by this mitigation measure are considered part of the unmitigated emissions assumptions for the analysis. Therefore, even though Mitigation Measure AIR-1 is incorporated, the reductions afforded by this measure will not reduce emissions beyond what would occur if the measure was not implemented.
- Appendix D, Construction Health and Safety Plan, provides procedures that would be applied during construction activities. This plan provides chemical exposure limitations that dictate the level of personal protection to be used, measures to monitor air quality, and measures to control the generation of dust. This is a qualitative measure as it will avoid dust generation through timing of activities based on the severity of wind and weather. Therefore the amount of dust that may be avoided cannot be quantified. Potentially reduction measures identical to those identified in Section 4.6.2.1 could be incorporated into the Construction Health and Safety Plan and those reductions would be addressed as described above. Risk minimization and air monitoring also do not directly reduce emissions levels and therefore are not quantitatively accounted for in the analysis.
- Appendix M, Best Management Practices, includes Section 2.4, Wind Erosion Control BMPs. The measures describe dust control using water, while not causing erosion, and minimizing work during high wind conditions. If necessary, soil binders are described to stabilize soil. This BMP addresses how dust control measures would be implemented so as not to cause erosion as well as discussing the minimization of work during high wind conditions. As discussed above, the quantity of dust that may be avoided directly as a result of this measure cannot be quantified.

Appendix GWMM to this SEIR presents a comparison between the mitigation measures included in the Groundwater FEIR as reflected in the Mitigation Monitoring and Reporting Program approved by DTSC on January 31, 2011, and those presented in this SEIR for the Final Groundwater Remedy Project.

All plans and documents included in the Final Remedy Design and references in this SEIR are appended to this SEIR as Appendix BOD. In addition, the documents are available online at the following link: http://dtsc-topock.com/documents/cleanup-implementation/groundwater/remedy-design/remedial-design-documents.

To evaluate the potential impacts of the Project on air quality and climate change, this analysis draws on detailed information regarding the Project description provided in Chapter 3 of this SEIR which describes the treatments and measures proposed during project construction, operation and maintenance, and decommissioning. In addition, the impacts of the Project are compared with impacts identified in the Groundwater FEIR.

Impact Methodology

Similar to the Groundwater FEIR air quality and climate change assessment, this analysis employs standard methodology from the MDAQMD to determine significance for each of the impact areas, as detailed below.

It should be noted that Final Groundwater Remedy Project includes a Future Activity Allowance for all Project infrastructure to be constructed (wells, pipelines, structures, etc.). Generally, the Future Activity Allowance includes two components: (1) an additional allowance for all Project infrastructure, established at up to 25 percent of the parameter set forth in the Final Remedy Design, and (2) up to 10 additional monitoring well boreholes to be installed in Arizona as part of the monitoring program. In terms of location, the Future Activity Allowance would include construction of pipelines and electrical power underground throughout the Project Area, boreholes potentially located in the floodplain area and generally in the vicinity of existing/planned boreholes, and additional structures near existing/planned structures and facilities (like at the Station, Transwestern Bench, and Construction Headquarters, etc.). This SEIR therefore also includes, in the impacts analysis, the anticipated effects associated with the Future Activity Allowance.

Criteria Pollutants

This EIR section focuses on the nature and magnitude of the change in the air quality environment due to implementation of the proposed Project. Air pollutant emissions associated with the proposed Project would result from the construction, operation, and decommissioning of the remediation systems in the Project Area. Emissions sources include the operation of construction equipment, the operation of motor vehicles both on and off-site, worker commutes, the operation of pumps, and paving activities. The emissions generated by these activities and other secondary sources have been estimated and compared to the applicable thresholds of significance recommended by MDAQMD.

Construction

Short-term construction-generated emissions of criteria air pollutants and ozone precursors associated with the proposed Project were modeled using the California Emissions Estimator Model (CalEEMod), Version 2013.2.2, as recommended by MDAQMD. CalEEMod was used to determine whether short-term construction-related emissions of criteria air pollutants associated with the proposed Project would exceed MDAQMD's applicable regional thresholds and whether mitigation would be required. Modeling was based on Project-specific data provided by PG&E, where available. Where Project-specific information was not available, reasonable assumptions based on other similar projects and default model settings were used to estimate criteria air pollutant and ozone precursor emissions. Modeling input and output files are provided in Appendix AQ of this SEIR.

Construction activities for the Final Groundwater Remedy Project are summarized here and would occur in two phases requiring a total of approximately 5 years, including construction closeout. The first phase would include the construction of the National Trails Highway (NTH) in situ reactive zone (IRZ) and components needed to operate the NTH IRZ (about 2.5 years); the second phase would include the construction of the remaining groundwater remedy system (about 2 years). Decommissioning of the existing IM-3 Facility would likely occur during the construction phase. Additionally, there is a Future Activity Allowance for the Project, some of which could occur during initial construction activities. This allowance is included as part of the modeled scenario to ensure that a conservative analysis is presented. The following construction schedule was used for modeling purposes[7]:

- Preconstruction/mobilization (beginning 1/1/2017)
- Phase 1 construction (beginning 5/1/2017)
- Phase 2 construction (beginning 12/1/2018)
- Decommissioning of IM-3 (beginning 12/1/2019)

Based on the information provided by PG&E, the Project's construction schedule could involve phase overlaps, including an overlap of the construction in Phase 2 and Decommissioning of the IM-3 Facility with the operation of Phase 1. This overlap is used as the maximum scenario in the analysis. A detailed equipment list for each of the above phases was provided by PG&E. The provided equipment list represents the maximum amount of equipment that would be operated on-site on any given day including both the construction of the proposed Project as well as the potential development of wells and infrastructure associated with the Future Activity Allowance. Equipment that could be used in any or all of the phases includes: water trucks, backhoes, concrete pumps, cranes, bulldozers, drill rigs and associated equipment, excavators, forklifts, loaders, manlifts, crushing equipment, compactors, and scrapers. Soil import for construction activities is estimated at 23,800 cubic yards (estimated 2,975 haul trips). Up to 160 worker trips and 23 vendor/haul trucks are anticipated to occur daily, depending on the phase. The analysis also considered fugitive dust requirements associated with Project-related construction activities, including off-road vehicle traffic, loading/unloading activities, and activities at the Soil Staging and Processing Area. Construction emissions are based on a worst-case daily construction scenario.

[7] This is the schedule was assumed at the issuance of the Notice of Preparation (NOP) for this SEIR. Even if the construction schedule shifts out several months, it is not anticipated to change the results of the analysis, as the overall phases and overlap would not change.

Operation and Maintenance

Long-term (i.e., operational) regional emissions of criteria air pollutants and precursors associated with the proposed Project, including mobile- and area-source emissions, were also quantified using the CalEEMod computer model. Area-source emissions, which are widely distributed and made of many small emissions sources (e.g., consumer products), were modeled according to the size of buildings proposed. Mass mobile-source emissions were modeled based on the daily vehicle trips that would result from the proposed Project. Project trip generation rates were obtained from the Project's traffic study (Lin Consulting, Inc. 2016; Appendix TRA to this SEIR). The operation of on-site wells was included through both generator and on-site electrical usage. Additionally, the maintenance activities that could occur during the operational and maintenance phase includes up to 15 (maximum 10 routine and 5 non-routine) well rehabilitations a year. Therefore, as a worst-case analysis of operational/maintenance activities, it was assumed equipment to rehabilitate and/or rebuild one well at a time would be active on-site year-round. In addition, there is the potential for the Future Activity Allowance to occur during the operation and maintenance phase. This would result in construction-related equipment to be active on-site in addition to the typical operation and maintenance equipment. Therefore, as a worst-case emissions scenario it was assumed that equipment to drill one additional well per day and develop the associated infrastructure (road, pipeline, and trench connections) would be active on-site for 250 days per year (assumes 5 days per week construction activities). The resulting long-term operational emissions that would be generated by the Project were then compared with the applicable MDAQMD thresholds for determination of significance. Mitigation measures included in the Groundwater FEIR were considered for their appropriateness and applicability. Modeling input and output files are provided in Appendix AQ of this SEIR.

Operational emissions assumed daily worker trips of 58, delivery trips of 40, and workers for start-up of 6. Additionally, operational activities included the maintenance of wells and assumed the usage of the following equipment: crane, drill rig and associated equipment, forklifts, and manlifts. Operational emissions were based on a worst-case daily emissions scenario, as described above. Equipment associated with the construction of the Future Activity Allowance includes: crane, drill rig and associated equipment, forklifts, manlifts, back hoe, excavator, compactor, concrete truck and pump, water truck, and dump truck. Additionally, the Future Activity Allowance assumes 33 daily workers, one daily vendor delivery and one daily haul delivery.

Decommissioning

Decommissioning of the IM-3 phase is included as part of the construction analysis, as it would likely overlap. Decommissioning of the components of the remedy after the completion of remediation, estimated to be 30 years into the future is addressed qualitatively. The exact timing and equipment to be used, which could be highly improved in terms of air quality emissions this far into the future, is unknown at this time.

CO Hotspots

Qualitative screening procedures and guidelines contained in the Transportation Project-Level Carbon Monoxide Protocol (the Protocol) are used to determine whether a project poses the potential for a CO hotspot (UCD ITS 1997). According to the Protocol, and for the purposes of this analysis, intersections where LOS is worsened from D or better to an LOS of E or F with the incorporation of mitigation, and would increase average daily traffic (ADT) by 5 percent or more, would require refined analysis to determine if the project specific emissions exceed the regulatory thresholds of 20 parts per million (ppm) for a one-hour average or 9 ppm for an eight-hour average. Where impacts do not meet these criteria, intersections are considered to be less than significant and no additional analysis is required.

TAC Emissions

DPM was identified as a TAC by ARB in 1998. The potential cancer risk from the inhalation of DPM outweighs the potential for all other health impacts. At this time, MDAQMD has not adopted a methodology for analyzing such impacts and does not recommended the completion of health risk assessments for construction-related emissions of TACs.

A qualitative analysis of TAC emissions from construction activities is included in the analysis. This is because the dose to which receptors are exposed is the primary factor used to determine health risk (i.e., potential exposure to HAP emission levels that exceed applicable standards). Dose is a function of the concentration of a substance or substances in the environment and the duration of exposure to the substance. Dose is positively correlated with time, meaning that a longer exposure period would result in a higher exposure level for the maximally exposed individual. Thus, the risks estimated for a maximally exposed individual are higher if a fixed exposure occurs over a longer period of time. According to the Office of Environmental Health Hazard Assessment (OEHHA) guidance manual, health risk assessments, which determine the exposure of sensitive receptors to HAP emissions, should be based on a 30-year or 70-year exposure period, which is much longer than the project's 5 year construction schedule (OEHHA 2015).

A qualitative analysis of TAC emissions from operational activities is also included since the proposed Project could include stationary sources of TACs, such as pumps and generators. These types of stationary sources would be subject to MDAQMD's rules, regulations, and permitting; and Maximum Achievable Control Technology (MACT) and the Best Available Control Technology for Toxics (T-BACT) requirements. Thus, during the permitting process MDAQMD would analyze such sources (e.g., health risk assessment) based on their potential to emit TACs. If it is determined that the sources would emit TACs in excess of MDAQMD's applicable significance threshold, MACT or T-BACT (e.g., diesel particulate filters) would be implemented in order to reduce emissions. If the implementation of MACT or T-BACT would not reduce the risk below the MDAQMD's threshold, the MDAQMD would deny the operating permit.

GHG Emissions

Construction, operational, and decommissioning activities are considered together in the GHG analysis as GHG emissions are considered a cumulative pollutant. Construction and operational emissions for the proposed Project were estimated using the most recent version of the CalEEMod Version 2013.2.2, as recommended by the MDAQMD. Modeling was based on Project-specific data provided by the PG&E, where available. Where Project-specific information was not available default model settings or reasonable assumptions based on other similar projects were used to estimate GHG emissions. Modeling assumptions, calculations, input and output files are provided in Appendix AQ.

Modeling assumptions for construction and decommissioning are identical to that for criteria pollutants listed above. For operational emissions, the assumptions provided for criteria pollutants are supplemented with electrical usage (7,820,000 kWh annual consumption, which includes delivery of the freshwater supply from Arizona and general operation of the remedy), solar offset of 15,200 kWh annually, water usage (drinking water is assumed would be brought in), the wastewater and solid waste generation was based on the default CalEEMod settings for the Project. Additionally, the modeling accounted for the use of natural gas equipment including generators. Natural gas consumption for the Project is anticipated to total 3,209,100 thousand British thermal units per year.

CalEEMod estimates the emissions of CO_2, CH_4, and N_2O as well as the resulting total CO_2e emissions associated with construction-related GHG sources such as off-road construction equipment, material delivery/haul trucks, worker vehicles, water consumption, electrical and natural gas consumption, and solid waste generation. As CalEEMod currently uses the IPCC's 1996 Second Assessment Report to assign the GWPs for CH_4 and N_2O, these emissions from the CalEEMod outputs were taken and converted to CO_2e emissions outside of CalEEMod using the updated GWPs from IPCC's AR4. The use of GWPs from IPCC's AR4 is recommended in CARB's latest First Update to the Scoping Plan. The GHG analysis incorporates similar assumptions as the air quality analysis for Project consistency.

Because GHG emissions are a cumulative pollutant (i.e., there is not one Project or source that could by itself impact climate change), construction and operational emissions are combined and compared to the threshold to determine significance. Because the threshold is based on annual emissions, construction emissions are summed for all years of construction and then divided by a 30-year project lifetime to provide amortized construction emissions.[8] These amortized construction emissions are then added to the operational emissions and compared to the MDAQMD threshold.

8 The Final Groundwater Remedy Project is anticipated to have 30 years of active remediation followed by 10 years of long-term monitoring and up to 20 years of arsenic monitoring. As a conservative estimate of annual GHG emissions, construction emissions were amortized over the active remediation phase as monitoring beyond that phase is approximate.

4.2.5.3 Impact Analysis

IMPACT AIR-1 **Short-term Construction-Related Emissions of Criteria Pollutants and Precursors.** The proposed Project could violate the MDAQMD air quality standards for NO_X during construction activities. This would result in **potentially significant impacts**, which is a new identified impact from the Groundwater FEIR. The proposed Project would not violate MDAQMD air quality standards for PM_{10} during construction activities. Impacts related to construction emissions of PM_{10} would be **less than significant**, which is reduced from the Groundwater FEIR. Impacts related to all other criteria pollutants would be **less than significant**, as previously identified in the Groundwater FEIR.

Construction

Construction activities associated with the proposed Project would generate pollutant emissions from the following construction activities: (1) drilling, grading, and excavation; (2) construction workers traveling to and from Project site; (3) delivery and hauling of construction supplies to, and debris from, the Project Area; (4) soil stockpiling and processing for reuse on-site; (5) fuel combustion by on-site construction equipment; and (6) paving. These construction activities would temporarily create emissions of dust, fumes, equipment exhaust, and other air contaminants. The amount of emissions generated on a daily and annual basis would vary, depending on the intensity and types of construction activities occurring simultaneously.

Construction emissions are considered short term and temporary, but have the potential to represent a significant impact with respect to air quality. Particulate matter (i.e., PM_{10} and $PM_{2.5}$) are among the pollutants of greatest localized concern with respect to construction activities. Particulate emissions from construction activities can lead to adverse health effects and nuisance concerns, such as reduced visibility and soiling of exposed surfaces. Particulate emissions can result from a variety of construction activities, including excavation, grading, demolition, transporting/storing/processing soils to be reused on-site, vehicle travel on paved and unpaved surfaces, and vehicle and equipment exhaust. Construction emissions of PM can vary greatly depending on the level of activity, the specific operations taking place, the number and types of equipment operated, local soil conditions, weather conditions, and the amount of earth disturbance.

Emissions of ozone precursors ROG and NO_X are primarily generated from mobile sources and vary as a function of vehicle trips per day associated with hauling, delivery of construction materials, vendor trips, and worker commute trips, and the types and number of heavy-duty, off-road equipment used and the intensity and frequency of their operation

It is mandatory for all construction projects under the MDAQMD’s jurisdiction to comply with Rule 403 for controlling fugitive dust. Incorporating Rule 403 into the proposed Project would reduce regional PM_{10} and $PM_{2.5}$ emissions from construction activities. Additionally, the Final Remedy Design incorporates design details and plans called for under Mitigation Measure AQ-1 from the Groundwater FEIR to reduce fugitive dust emissions (which further enforced compliance with MDAQMD's Rule 403). Compliance with Rule 403 and the Final Remedy Design plans were accounted for in the construction emissions modeling as discussed previously in this section.

Table 4.2-8 summarizes the modeled peak daily emissions of criteria air pollutants and ozone precursors associated with the proposed Project's worst-case construction scenario. The worst-case construction scenario assumes that all the equipment that could potentially be in use is in use. Therefore, while this represents a peak day usage, this does not necessarily represent a typical daily occurrence and therefore emissions on a typical day are anticipated to be less. The provided construction details identify the maximum equipment anticipated to be on site at one time during the particular construction phase, therefore construction of any portion of the Future Activity Allowance[9] would not increase daily activities or emissions as identified in the analysis. For the Project's construction, PG&E provided the full inventory of the equipment that would be used during the peak day for each of the construction phases (e.g., preconstruction/mobilization; Phase 1, Phase 2, and decommissioning of the IM-3 Facility). Based on the information provided, the Project's construction schedule is assumed to involve phase overlaps, including an overlap of the construction in Phase 2 and Decommissioning of the IM-3 Facility with the operation of Phase 1.

As shown in Table 4.2-8, the maximum daily construction emissions generated by the proposed Project's worst-case construction scenario[10] would be less than the MDAQMD's daily significance threshold for all criteria pollutants (including PM), with the exception of NO_X. Therefore, the Project would result in a potentially significant air quality impact related to NO_X.[11] For the analysis a maximum scenario is presented that assumes that activities associated with the operation of Phase 1, construction of Phase 2, and decommissioning of the IM-3 Facility are all occurring at the same time.

Mitigation Measure AIR-1 from the Groundwater FEIR is further enforcement of MDAQMD's Rule 403 to reduce PM emissions from fugitive dust. Because the Project is required to follow Rule 403 and this measure simply enforces compliance with the rule, the emissions reductions for PM that would be achieved by this measure are already accounted for in Table 4.2-8 above.

9 The Future Activity Allowance would include the development of up to 58 additional wells and associated infrastructure that may be necessary to completely remediate or monitor the remediation process.

10 The worst-case construction scenario includes the Future Activity Allowance.

11 Note that while the Future Activity Allowance is included, this represents a worst-case daily analysis and even if the Future Activity Allowance were removed, the on-site equipment would not change and unmitigated emissions would still exceed the daily threshold for NO_x.

TABLE 4.2-8
PEAK DAILY UNMITIGATED CONSTRUCTION EMISSIONS

	Lb/day					
Phase	**ROG**	**NO_x**	**CO**	**SO_x**	**PM_{10}**	**$PM_{2.5}$**
Preconstruction	7.34	71.86	77.42	0.19	26.24	6.39
Phase 1 Construction	15.21	**159.57**	119.48	0.24	25.99	10.73
Phase 2 Construction	10.63	107.28	92.19	0.21	23.89	7.10
Decommissioning	3.99	38.42	35.07	0.07	5.57	2.28
MDAQMD Threshold	***137***	***137***	***548***	***137***	***82***	***82***
Significant?	No	**Yes**	No	No	No	No
Maximum Scenario						
Phase 2 Construction	10.63	107.28	92.19	0.21	23.89	7.10
Decommissioning	3.99	38.42	35.07	0.07	5.57	2.28
Phase 1 Operation	1.28	10.97	12.49	0.03	2.58	0.78
Total Max Scenario	11.66	**156.68**	139.75	0.32	32.03	10.16
MDAQMD Threshold	***137***	***137***	***548***	***137***	***82***	***82***
Significant?	No	**Yes**	No	No	No	No

NOTES: The analysis incorporates reductions achieved from compliance with MDAQMD's rule 403, which is a mandatory requirement of the Project.

SOURCE: ESA 2016 Modeling (See Appendix AQ).

Table 4.2-9 shows the NO_X emissions with the incorporation of **Mitigation Measure AIR-1a**. With the incorporation of Mitigation Measure AIR-1a, NO_X emissions are reduced to below regulatory conditions for both the worst-case scenario and during Phase 1. It is understood that this is a peak day construction equipment fleet and therefore this would be an occasional occurrence rather than the normal, on peak days. With the use of Tier 4 equipment as required by Mitigation Measure AIR-1a, the proposed Project would result in less than significant NO_X emissions during Phase 1 construction and during the maximum scenario overlap of Phase 2 construction, decommissioning of the IM-3 Facility, and Phase 1 operation (each of these individually would be below the daily regulatory thresholds without mitigation). Construction phase emissions would have a less than significant impact related to regional air quality (specifically NO_X) after the implementation of Mitigation Measure AIR-1a.

TABLE 4.2-9
MITIGATED PEAK DAILY CONSTRUCTION EMISSIONS

Phase	NO_x (lb/day)
Preconstruction	50.11
Phase 1 Construction	**91.15**
Phase 2 Construction	72.02
Decommissioning of IM-3 Facility	21.90
MDAQMD Threshold	***137***
Significant?	**No**
Maximum Scenario	
Phase 2 Construction	72.02
Decommissioning of IM-3 Facility	21.90
Phase 1 Operation	10.97
Total Max Scenario	**127.47**
MDAQMD Threshold	***137***
Significant?	**No**

SOURCE: ESA 2016 Modeling (See Appendix AQ).

Decommissioning

Decommissioning activities would result in construction type activities similar to those identified during Project construction. It is anticipated that the intensity of the equipment used on-site would be less than that identified for peak daily emissions. Additionally, given the likely improvements in technology over the next 30 years, it is anticipated that the equipment fleets would be cleaner than are available today. Given these considerations, there is the potential that emissions estimated for the construction scenario above would be conservative with respect to decommissioning. However, as the exact timing and nature of decommissioning is not known, and emissions from the construction of the proposed Project would be less than significant for criteria pollutant emissions after mitigation, it is assumed that decommissioning activities would also result in less than significant impacts with the implementation of Mitigation Measure AIR-1a. As discussed previously under construction, implementation of Mitigation Measure AIR-1 from the Groundwater FEIR was assumed in the unmitigated scenario as it is simply enforcing MDAQMD Rule 403 which would be required with or without Mitigation Measure AIR-1.

Thus, the proposed Project would result in a less than significant impact for decommissioning-related activities with implementation of mitigation consistent with the Groundwater FEIR.

Comparison of Short-Term Construction-Related Emissions of Criteria Pollutants to Groundwater FEIR Impact Analysis

The Groundwater FEIR found the PM_{10} emissions would exceed regulatory thresholds but that with the incorporation of Mitigation Measure AIR-1 emissions of PM_{10} would be reduced to less than significant. Because Mitigation Measure AIR-1 simply results in a further enforcement of MDAQMD Rule 403, and the proposed Project would be required to comply with Rule 403 even if Mitigation Measure AIR-1 was not specified in the Groundwater FEIR, the reductions associated with this compliance were accounted for in the unmitigated emissions. Therefore, even after implementation of Mitigation Measure AIR-1, the proposed Project would remain less than significant for PM_{10} emissions.

The proposed Project includes a different level of daily construction activity than the Groundwater FEIR. Additionally, the Groundwater FEIR did not identify potential overlaps in construction phasing. Regardless, the increased amount of equipment anticipated to be operated on a daily basis with implementation of Mitigation Measure AIR1a the proposed Project would not result in criteria pollutant emissions that exceed regulatory environments. This is true even when several of the phases are anticipated to occur at the same time. The proposed Project would result in a less than significant impact for construction-related impacts of NO_X with the implementation of mitigation.

Mitigation Measures

Mitigation Measure AIR-1: Short-Term Construction-Related Emissions of Criteria Air Pollutants (Groundwater FEIR Measure). PG&E shall implement the fugitive dust control measures below for any construction and/or demolition activities:

- Use periodic watering for short-term stabilization of disturbed surface area to minimize visible fugitive dust emissions during dust episodes. Use of a water truck to maintain moist disturbed surfaces and actively spread water during visible dusting episodes shall be considered sufficient;
- Cover loaded haul vehicles while operating on publicly maintained paved surfaces;
- Stabilize (using soil binders or establish vegetative cover) graded site surfaces upon completion of grading when subsequent development is delayed or expected to be delayed more than 30 days, except when such delay is caused by precipitation that dampens the disturbed surface sufficiently to eliminate visible fugitive dust emissions;
- Cleanup project-related track out or spills on publicly maintained paved surfaces within twenty-four hours; and
- Curtail nonessential earth-moving activity under high wind conditions (greater than 25 miles per hour) or develop a plan to control dust during high wind conditions. For purposes of this rule, a reduction in earth-moving activity when visible dusting occurs from moist and dry surfaces due to wind erosion shall be considered sufficient to maintain compliance.

Timing:	During all construction, operation and maintenance, and demolition activities in the project area.
Responsibility:	PG&E shall be responsible for the implementation of these measures. DTSC shall be responsible for ensuring compliance.
Significance after Mitigation:	The above-identified measures would be anticipated to reduce fugitive dust (PM_{10}) emissions by a minimum of 75 percent. Thus, post mitigation, PM_{10} emissions would be substantially

reduced to below MDAQMD's threshold of 82 lb/day. The significance of compliance with required fugitive dust controls after mitigation remains **less than significant** for PM_{10}.

Mitigation Measure AIR-1a: Short-Term Construction-Related Emissions of Criteria Air Pollutants and Precursors (New Measure). PG&E's construction contractor shall ensure that all off-road equipment with a horsepower greater than 50 horsepower have USEPA certified Tier 4 interim engines or engines that are certified to meet or exceed the NO_X emission ratings for USEPA Tier 4 engines. This measure excludes specialty construction equipment where Tier 4 interim engines cannot currently be obtained within the industry, or older equipment cannot be retrofitted to meet Tier 4 emissions standards. During construction and decommissioning, the construction contractor shall maintain a list of all operating equipment in use on the Project site. The construction equipment list shall state the makes, models, and numbers of construction equipment on-site. For specialty equipment where Tier 4 interim engines are not available, documentation supporting this conclusion shall be included in the equipment files. Once Tier 4 equipment is available for a piece of specialty equipment, it shall be incorporated into the construction fleet, replacing the existing non-Tier 4 piece of equipment. Equipment shall be properly serviced and maintained in accordance with the manufacturer's recommendations. Construction contractors shall also ensure that all nonessential idling of construction equipment is restricted to five minutes or less in compliance with California Air Resources Board's Rule 2449.

Timing:	At a minimum during Phase 1 and Phase 2 construction activities and during Decommissioning of IM-3 Facility when the decommissioning phase overlaps with Phase 2 construction.
Responsibility:	PG&E shall be responsible for the implementation of these measures. DTSC shall be responsible for ensuring compliance.
Significance after Mitigation:	The above-identified measures would be anticipated to reduce NO_X emissions. Post mitigation NO_X emissions would be substantially reduced, however not to below MDAQMD's threshold of 137 lb/day. Even after the implementation of mitigation the project would be **less than significant** with respect to NO_X emissions.

Long-term Operations-Related (Regional) Emissions of Criteria Pollutants and Precursors. The proposed Project would not violate the MDAQMD air quality standards for any criteria pollutant during operational activities. This would result in a **less than significant impact**, as previously identified in the Groundwater FEIR.

Typical operations and maintenance activities associated with the Project would include groundwater extraction and recirculation, carbon substrate storage and deliveries; carbon substrate injections, and monitoring and control of the system. There would also be activities associated with freshwater supply, conveyance, and storage; remedy-produced water management; pre-injection water treatment (if required); power supply and distribution; and the

Remedy Supervisory Control and Data Acquisition system. All of these systems would require regularly scheduled maintenance to keep the systems functioning in an efficient and optimal manner. Operation could involve the construction of new wells, roads, and related infrastructure through the Future Activity Allowance. Activities that would result in air quality emissions include commuter vehicles, delivery vehicles, the typical operation of the remediation system (including the Future Activity Allowance), as well as the equipment required for maintenance of the wells and other on-site facilities.

Table 4.2-10 shows the operational emissions anticipated from the implementation of the proposed Project, including implementation of the Future Activity Allowance in the operational phase. As shown, all criteria pollutant emissions are anticipated to be below the regulatory requirements and therefore would result in less than significant impacts. No mitigation is required.

TABLE 4.2-10
OPERATIONAL EMISSIONS (MAXIMUM SCENARIO)

	Tons/year					
Phase	**ROG**	**NO_x**	**CO**	**SO_x**	**PM_{10}**	**$PM_{2.5}$**
Phase 1 Construction	0.52	4.46	5.12	0.01	0.38	0.28
Phase 2 Construction	0.18	0.77	2.61	0.01	0.22	0.13
Future Activity Allowance	0.57	5.74	4.76	0.01	1.56	0.38
Total Emissions	1.28	10.97	12.49	0.03	2.15	0.78
MDAQMD Threshold	25	25	100	25	15	15
Significant?	No	No	No	No	No	No

SOURCE: ESA 2016 Modeling (See Appendix AQ).

Comparison of Long-Term Operations-Related (Regional) Emissions of Criteria Pollutants and Precursors to Groundwater FEIR Impact Analysis

Due to the different nature of remediation in the proposed Project as was identified in the Final Groundwater FEIR, the amount and type of operational activities would differ, resulting in different levels of criteria pollutant emissions. Regardless, the proposed Project results in a less than significant impact for operational-related impacts, which is consistent with the findings in the Final Groundwater EIR.

> **Long-Term (Regional) Emissions of Greenhouse Gases.** The proposed Project would not generate greenhouse gas emissions that would have a significant impact on the environment, nor would it conflict with applicable plans, policies, or regulations adopted for the purposes of reducing GHG emissions. These impacts would be **less than significant**, as previously identified in the Groundwater FEIR.

GHG emissions are a cumulative impact by nature. As such GHG emissions analysis takes into account both construction as well as operational emissions. In order to provide an annual emissions estimate over the lifetime of the Project, construction emissions are combined for the whole Project and then amortized over the project lifetime, which as discussed in the methodology section, is estimated at 30 years.

Construction-related GHG emissions for the proposed Project were estimated using the same assumptions that were applied to the Project's air quality analysis. Total estimated construction-related GHG emissions for the proposed Project are shown in **Table 4.2-11**. As shown, the proposed Project's total estimated GHG emissions during construction would be approximately 10,285 $MTCO_2e$. This would equal to approximately 343 $MTCO_2e$ per year after amortization over 30 years. Decommissioning of the IM-3 Facility site is included in the annual emissions during 2020 and is anticipated to take a year. Decommissioning of the Final Groundwater Remedy Project is estimated to take a year and would be similar or less intensive than the construction phases. Therefore, as a worst-case scenario, the greatest construction year GHG emissions were assumed to occur during the 12 months of decommissioning activities. These were incorporated into the construction estimates and amortized over the life of the Project.

TABLE 4.2-11
CONSTRUCTION GHG EMISSIONS

Year	CO
2017	2,513
2018	2,341
2019	2,107
2020	811
Decommissioning (Remedy)	2,513
Total	**10,285**
Annual Construction[a]	342.83

[a] Amortized over 30 years

SOURCE: ESA 2016 Modeling (See Appendix AQ).

Direct and indirect sources of GHG emissions associated with the proposed Project would primarily result from electricity and natural gas consumption and solid waste generation. GHG emissions from electricity consumed at the Project Area would be generated off-site by fuel combustion at the electricity provider. In addition mobile source emissions from motor vehicle trips generated by employees and vendors would occur from operational activities. The estimated operational GHG emissions resulting from Project implementation are shown in **Table 4.2-12**. Additionally, the Project's amortized construction-related GHG emissions from Table 4.2-11 are added to the operational emissions estimate in order to determine the Project's total annual GHG emissions. As shown, the total operational emissions would result in net emission increase of 5,979.34 $MTCO_2e$ per year, which would not exceed the MDAQMD's threshold of 90,719

$MTCO_2e$ per year threshold. Therefore, GHG emissions resulting from Project implementation is considered to be less than significant, and no mitigation is required

TABLE 4.2-12
OPERATIONAL GHG EMISSIONS

Year	CO
Phase 1	2,301.83
Phase 2	1,772.58
Future Activity Allowance	1,562.10
Sub Total	4,074.41
Amortized Construction[a]	342.83
Total	**5,979.34**
Threshold	90,719
Significant?	No

[a] Amortized over 30 years

SOURCE: ESA 2016 Modeling

Consistency with CARB Scoping Plan

The CARB Scoping Plan was designed to reduce GHG emissions from new land use projects. The proposed Project is a remediation project intended to clean up contaminated groundwater. The proposed Project is incorporating solar-generated electricity to offset some of the on-site electrical uses and therefore, although the proposed Project is not a project type intended under the CARB Scoping Plan, it would further the intent of the Plan in that it would use renewable energy to offset electrical usage.

Consistency with SB 375

The key goal of the SCS is to achieve GHG emission reduction targets through integrated land use and transportation strategies. The focus of these reductions is on transportation and land use strategies that influence vehicle travel. The proposed Project is not a land use project type anticipated under SB 375, however the Project is set up to minimize on-site transportation by having employees meet at a staging area and then commute together to the on-site work locations. This would minimize the emissions of GHGs from vehicle miles traveled (VMT). Therefore, while not a project type anticipated by SB 375, the proposed Project would reduce GHG emissions from VMT consistent with the goals of SB 375.

Consistency with Green County San Bernardino

San Bernardino County has adopted a series of policies designed to achieve a balance between development and environmental stewardship called Green County San Bernardino. Two of the policies include use of renewable energy and resource conservation. The San Bernardino policies are written to achieve, and if possible exceed, the measures proposed in AB 32 (San Bernardino County 2011). The proposed Project would include the use of renewable energy (solar) to offset some of the Projects electrical use. This would be consistent with the Green County Plan.

The proposed Project would result in a less than significant impact as it is compliant with local plans and policies intended to reduce GHG emissions.

Comparison of Compliance with Plans, Policies, or Regulations for the Reduction of GHGs to Groundwater FEIR Impact Analysis

The Groundwater FEIR determined that GHG emissions would result in a less than significant impact. Subsequent to the Groundwater FEIR's publication, the MDAQMD identified a different significance threshold which was applied to the analysis for the proposed Project. Even with the implementation of the more restrictive threshold, the proposed Project emissions result in less than significant impacts consistent with the Groundwater FEIR.

The Groundwater FEIR also discussed the project's ability to comply with plans, policies, and regulations for the reduction of GHG emissions. The Groundwater FEIR determined that it would not conflict and therefore impacts would be less than significant. While there are additional plans, policies, and regulations that govern the proposed Project than were relevant at the time of the Groundwater FEIR, the proposed Project would be consistent with these and therefore would result in a less than significant impact consistent with the Final Groundwater EIR.

IMPACT AIR-2 **Result in a Cumulatively Considerable Net Increase.** The proposed Project could result in a cumulatively considerable net increase in criteria pollutant emissions with respect to NOx emissions during construction activities. This would result in **potentially significant impacts**, which is a new identified impact from the Groundwater FEIR. The proposed project would not result in a cumulative considerable net increase in any other criteria pollutant emissions. Impacts related to all other criteria pollutants for construction and for operational activities would be **less than significant**, as previously identified in the Groundwater FEIR.

The MDAB is in nonattainment status for ozone, PM_{10} and $PM_{2.5}$ from past development as well as pollutant transport from other basins. All new projects (including the proposed Project) are required to comply with MDAQMD measures to reduce potential new construction emissions of these pollutants. The MDAQMD has established daily significance thresholds for criteria pollutants and ozone precursors designed to reduce the impacts of development on the air quality of the region. To this end, the Project-related thresholds have been established to ensure that if they are not exceeded, then there is no potential for the Project to result in regional emissions above the state or federal thresholds, or significant increases in daily/annual emissions where existing conditions already exceed the thresholds. Since these state and federal thresholds are cumulative in nature, and the MDAQMD thresholds were developed to ensure/enable compliance with these state and federal thresholds, then project compliance with MDAQMD thresholds would ensure a project does not have the potential to result in a cumulative impact.

Operational emissions are shown to have less than significant impacts with respect to all criteria pollutants. Therefore, operational emissions would not be cumulatively considerable. Impacts from construction emissions and decommissioning were found to have less than significant impacts for NO_X emissions after the implementation of Mitigation Measure AIR-1a, Short-Term Construction-Related Emissions of Criteria Air Pollutants and Precursors, and less than significant emission for the remaining criteria pollutants (ROG, CO, SOx, PM_{10} and PM_{25}) without mitigation. Because NO_X emissions would be reduced to below regulatory thresholds, the impacts would be less than significant and therefore the proposed Project would not have a cumulatively considerable impact with respect to construction or operational activities.

As identified in the Long-Term Operations Related to (Local) CO Emissions and Short-Term Construction-Related and Long-Term Operational-Related Emissions of TACs discussions below, the proposed Project would not result in significant impacts with respect to exposing sensitive receptors to substantial pollutant concentrations. Therefore, the proposed Project would also be less than significant for cumulative impacts related to sensitive receptors.

Comparison of Cumulatively Considerable Net Increase to Groundwater FEIR Impact Analysis

The Groundwater FEIR concluded that the activities would not result in a cumulatively considerable net increase because emissions from operational activities did not exceed regulatory thresholds and emissions from construction/decommissioning activities were able to be reduced to below regulatory thresholds with the incorporation of mitigation. The analysis above for the proposed Project, as with the Groundwater FEIR, concludes that emissions from operation are less than significant. With the incorporation of mitigation measure AIR-1a (additional mitigation beyond what is required in the Groundwater FEIR) the emissions from the proposed Project would be reduced to less than significant levels for all construction and decommissioning-related criteria pollutants. Because impacts would be reduced to less than significant, the proposed Project would result in a less than cumulatively considerable net increase with respect to criteria pollutants.

> **Long-Term Operations Related to (Local) CO Emissions.** The proposed Project would not expose sensitive receptors to substantial pollutant concentrations. This impact would be **less than significant**, as previously identified in the Groundwater FEIR.

CO Hotspots

Two local intersections were analyzed as part of the traffic study that was prepared for the proposed Project (Lin Consulting, Inc. 2016; Appendix TRA). The traffic impact analysis compared the projected LOS at each study intersection. The existing and existing-plus-project LOS for each of the study intersections are anticipated to operate at an LOS of A with and without project traffic. Therefore, neither of these intersections would be anticipated to result in a CO hotspot. Impacts would be less than significant as related to CO Hotspots and no mitigation is required

Comparison of Exposure of Sensitive Receptors to Substantial CO Concentrations to Groundwater FEIR Impact Analysis

CO impacts were addressed in the Groundwater FEIR and concluded to be less than significant. While vehicle traffic under the proposed Project may result in greater traffic then identified in the Groundwater FEIR, the analysis shows that the LOS for the studied intersections would not be reduced below A. Therefore, consistent with the Groundwater FEIR, the proposed Project results in a less than significant impact for CO-related impacts.

> **Short-Term Construction-Related and Long-Term Operational-Related Emissions of TACs.** The proposed Project would not expose sensitive receptors to substantial TAC pollutant concentrations. This impact would be **less than significant**, for construction activities as well as operational activities (as previously identified in the Groundwater FEIR).

A TAC is defined as an air pollutant that may cause or contribute to an increase in mortality or in serious illness, or that may pose a hazard to human health. TACs are usually present in minute quantities in the ambient air; however, their high toxicity or health risk may pose a threat to public health even at low concentrations.

According to The California Almanac of Emissions and Air Quality (CARB 2013b), the majority of the estimated health risk from TACs can be attributed to relatively few compounds, the most important being particulate matter from diesel-fueled engines (diesel particulate matter). Diesel particulate matter differs from other TACs in that it is not a single substance, but rather a complex mixture of hundreds of substances. Although diesel particulate matter is emitted by diesel-fueled internal combustion engines, the composition of the emissions varies depending on engine type, operating conditions, fuel composition, lubricating oil, and whether an emission control system is present. Health impacts related to PM emissions, including DPM which is a subset of PM_{10}, are included in Table 4.2-4.

The Project construction period of approximately 5 years would be much less than the 30- or 70-year period used for risk determination, and the majority of equipment and activities would be located at distances greater than 1,000 feet from the sensitive receptors as recommended by MDAQMD. Some pipeline activity would be conducted within 1,000 feet of the nearest sensitive receptors, including construction of the proposed freshwater pipeline at the Oatman-Topock Highway, some staging areas, and potentially some activities associated with the Future Activity Allowance. While these activities would occur within the recommended 1,000-foot buffer, these activities would be temporary (lasting only days to months) and, in the case of staging areas, intermittent throughout the day. Because the construction activities are spread out over approximately 755 acres, no one receptor would be closer than 1,000 feet to all, or even a majority, of the activities. Based on the area and the nature of the activities, only one or two individual activities would occur closer than 1,000 feet to any receptor. This minimizes exposure time of these residents to TACs. Because the use of off-road heavy-duty diesel equipment would be temporary, the emissions of diesel diminish rapidly with distance, and the majority of construction activities would occur at distances greater than 1,000 feet from existing sensitive receptors, construction-related emissions would not expose sensitive receptors to substantial concentrations of TACs and therefore would be less than significant.

The proposed Project could include stationary sources of TACs, such as pumps and generators. These types of stationary sources would be subject to MDAQMD's rules and regulations, including Regulations 201-202 (Permits to Construct System), 203 (Permit to Operate), 475 (Electric Power Generating Equipment), and 1300 (New Source Review); and MACT and T-BACT requirements. Thus, during the permitting process MDAQMD would analyze such sources (e.g., health risk assessment) based on their potential to emit TACs. If it is determined that the sources would emit TACs in excess of MDAQMD's applicable significance threshold, MACT or T-BACT (e.g., diesel particulate filters) would be implemented in order to reduce emissions. If the implementation of MACT or T-BACT would not reduce the risk below the MDAQMD's threshold, the MDAQMD would deny the operating permit. Thus, operational-related emissions would not expose sensitive receptors to substantial concentrations of TACs and this impact would be less than significant. No mitigation would be required.

Comparison of Exposure of Sensitive Receptors to Substantial TAC Concentrations to Groundwater FEIR Impact Analysis

The Groundwater FEIR concluded that construction activities would result in no impacts with respect to TAC emissions. However, because there are emissions of TACs during construction activities, there are no provided regulatory thresholds for construction activities, and some of the receptors are closer to activities in the proposed Project than were identified in the Groundwater FEIR, the proposed Project identifies these impacts as less than significant.

Consistent with the Groundwater FEIR, the proposed Project would include TAC emissions sources that require permitting under MDAQMD rules and regulations. As discussed previously, the permitting process would ensure that all operating TAC sources would result in risk levels that are below regulatory requirements. Therefore, as with the Groundwater FEIR, the proposed Project is less than significant with respect to TAC impacts.

4.3 Biological Resources

4.3.1 Introduction

This section describes the reasonably foreseeable and potentially significant adverse environmental effects of the Pacific Gas and Electric Company (PG&E) Topock Compressor Station Final Groundwater Remediation Project (Final Groundwater Remedy Project or proposed Project) as identified in the Project Description of this subsequent environmental impact report (SEIR) and related to biological resource conditions in the Project Area. Specifically, this chapter considers the potentially significant adverse effects of the proposed Project during the construction, operation and maintenance, and decommissioning phases, as compared to those identified in the Topock Compressor Station Groundwater Remediation Project Final EIR (Groundwater FEIR; DTSC 2011), consistent with Public Resources Code Section 21166 and CEQA Guidelines Sections 15162 and 15168, and including changes in impacts related to wetlands and jurisdictional waters, special-status species, and wildlife nursery sites.

4.3.2 Summary of 2011 Groundwater FEIR Biological Resources Analysis

The Biological Resources section of the Groundwater FEIR included a detailed discussion of the environmental setting and potential effects of the proposed remedy on biological resources. Although largely programmatic, the Groundwater FEIR provided a detailed analysis of the construction and operation of physical facilities anticipated at that time to be necessary to implement the groundwater remedy. The Groundwater FEIR also included a project-level analysis of the conceptual technical methods selected for the final remedy. This SEIR incorporates the analysis in the Groundwater FEIR by reference and evaluates, on a project specific level, the potential effects associated with construction and operation of the *Basis of Design Report/Final (100%) Design Submittal for the Final Groundwater Remedy, PG&E Topock Compressor Station, Needles, California, November* (Final Remedy Design; CH2M Hill 2015a) and the *Construction/Remedial Action Work Plan for the Final Groundwater Remedy* (C/RAWP; CH2M Hill 2015b) that were unknown at the time the analysis was conducted for the Groundwater FEIR. The Final Remedy Design is included in its entirety as Appendix BOD to this SEIR. Information included in the biological resources analysis of the Groundwater FEIR is summarized below and in the following pages.

4.3.2.1 Setting Identified in the 2011 Groundwater FEIR

Project Setting

In general, the Project Area is located within both the Mojave and Colorado Deserts. These deserts are separated by the Colorado River; portions of the Project Area east of the Colorado River (in Arizona) are located within the Colorado Desert while portions of the Project Area west of the Colorado River are located within the Mojave Desert. The terrain and habitat in the Project Area generally includes relatively flat sparsely vegetated desert, unvegetated desert pavement, numerous shallow to deep ephemeral washes, and gently rolling hills. The elevation within the Project Area ranges from roughly 400 to 600 feet above mean sea level (msl). The base of the

Chemehuevi Mountains is located at the southeastern edge of the Project Area and the Colorado River bisects the eastern portion of the Project Area. Slopes encountered west of the Colorado River reflect a series of ancient river terraces.

Though mostly undeveloped, existing facilities occur throughout the area including the PG&E Topock Compressor Station (Station), the Interim Measure 3 Groundwater Extraction and Treatment Facility (IM-3 Facility), paved and unpaved access roads, four evaporation ponds, a rock quarry, two water tanks, historic U.S. Highway ("Route") 66, numerous groundwater wells, and six natural gas pipelines that run partially above and partially below ground. Interstate 40 (I-40) and the Burlington Northern Santa Fe (BNSF) Railway bisect the Project Area in an east-west direction. Moabi Regional Park, Pirate Cove Resort, and Topock Marina were within the Project Area identified in the Groundwater FEIR.

The biological setting for the Project Area for this SEIR is generally similar to the setting summarized above and provided in the Groundwater FEIR; however, the boundaries of the Project Area have been updated. Project Area updates include primarily removal of areas north of the Colorado River Park Moabi channel, expansion west of Moabi Regional Park for the proposed Soil Processing/Clean-Soil Storage Area and Construction Headquarters, and expansion east of the Colorado River in Arizona and within the Havasu National Wildlife Refuge (HNWR) (see Figure 2-1 for changes to the Project Area since the Groundwater FEIR). The Project setting for added Project Area in Arizona is described in Section 4.3.3 of this SEIR.

Biological Resources

Biological resources known to occur, or having the potential to occur, in the Project Area were evaluated in the Groundwater FEIR based on a number of biological surveys previously conducted for the Project Area, primarily by PG&E, CH2M Hill, and Garcia and Associates (GANDA). As outlined in the Groundwater FEIR, the following reports and surveys informed the previous evaluation of biological resources:

- Final Biological Resources Investigations for Interim Measures No. 3: Topock Compressor Station Expanded Groundwater Extraction and Treatment System (CH2M Hill 2004a)
- Biological Resources Survey Report for the Area of Potential Effect (APE) Topock Compressor Station Expanded Groundwater Extraction and Treatment System (CH2M Hill 2005)
- Final Programmatic Biological Assessment for Pacific Gas and Electric Topock Compressor Station Remedial and Investigative Actions (CH2M Hill 2007)
- Southwestern Willow Flycatcher Presence/Absence Surveys for the PG&E Compressor Station Expanded Groundwater Extraction and Treatment System (GANDA 2008a, 2009a)
- Desert Tortoise Presence/Absence Surveys for the PG&E Compressor Station Expanded Groundwater Extraction and Treatment System (GANDA 2008b, 2009b)
- Species list for the HNWR (USFWS 2007)
- Biological Reconnaissance Survey in Additional Minor Portions of Project Area Outside of the Expanded Area of Potential Effects (CH2M Hill 2010)

The following subsections provide a summary of biological resources previously evaluated in the Groundwater FEIR. Each subsection notes whether current conditions applicable to this SEIR have changed since certification of the Groundwater FEIR. Revised information for each biological resource is provided in Section 4.3.3 of this SEIR, as necessary. Additional reports and documentation regarding updated general and focused surveys reviewed for this SEIR are listed in Section 4.3.3.

Vegetation and Habitat

Terrestrial habitats documented in the Groundwater FEIR were found to be typical of Mojave Desert uplands and included creosote bush scrub, saltbush scrub, mesquite, palo verde, mesquite/palo verde, salt cedar/mesquite, arrowweed, and salt cedar. Aquatic habitats associated with the Colorado River included freshwater marsh and emergent wetlands. The dominant habitat was determined to be creosote bush scrub, which was sparsely vegetated with widely distributed creosote (*Larrea tridentata*). Bat Cave Wash and other unnamed washes west of the Colorado River were found to support mesquite, palo verde, and mesquite/palo verde habitat types. Arrowweed and salt cedar were determined to be co-dominant habitats along the Colorado River floodplain.

The California side of the Colorado River floodplain was determined to provide limited wetland habitat due to the general lack of emergent vegetation occurring within the river. North of the Topock Marina in Arizona is an approximately 120-acre peninsula bordered by the Colorado River to the west, south, and east. This area, which is located within the HNWR, includes the southern portion of the Topock Marsh. The Topock Marsh is an extensive wetland community that provides important aquatic marsh and riparian habitat in the region, extending from approximately the BNSF Railway tracks northward for about 10 miles beyond to the Fort Mojave Indian Reservation.

Vegetation community acres mapped for the Groundwater FEIR were presented in Table 4.3-1 of the Groundwater FEIR. Generally, the condition and composition of vegetation and habitat identified within the Project Area for the Groundwater FEIR are similar to those previously analyzed. However, due to changes in the Project Area boundary for this SEIR and additional information obtained from general and focused surveys conducted after the Groundwater FEIR was published, the vegetation communities and mapped acreages now differ from those presented in the Groundwater FEIR Table 4.3-1. Section 4.3.3 provides updated vegetation and habitat information for this SEIR.

Jurisdictional Wetlands and Waters of the United States

Potential jurisdictional wetlands and waters of the United States (U.S.) were documented in the Groundwater FEIR based on wetland delineations conducted in December 2004 and January 2005. Potential jurisdictional wetlands included freshwater marsh and emergent wetlands associated with the Colorado River. Wetland vegetation consisted primarily of common reed (*Phragmites communis*), cattails (*Typha* sp.), sedges (*Carex* sp.), and bulrush (*Scirpus* sp.). The Colorado River and all intermittent drainages were mapped as potential waters of the United States. Table 4.3-2 in the Groundwater FEIR included the types and acreage of wetlands and waters of the United States mapped within the Project Area. The U.S. Army Corps of Engineers

(USACE) did not verify their jurisdiction over wetland features prior to publication of the Groundwater FEIR and will not need to verify the jurisdictional delineation because it was determined in a letter from USACE in 2013 that the Project is exempt under CERCLA 121(e)(1) and will not require a Section 404 permit for impacts to waters of the United States (USACE 2013).

An additional wetland delineation was conducted by CH2M Hill in 2013 (CH2M Hill 2013) and new areas were added to the Project Area, particularly west of Moabi Regional Park and the northeastern portion of the Project Area within Arizona. Therefore, there is additional information gathered for this SEIR regarding potential jurisdictional resources that were not addressed in the Groundwater FEIR. Section 4.3.3 of this SEIR provides updated jurisdictional wetlands and waters information.

Terrestrial Wildlife

Common terrestrial wildlife species observed and documented in the Groundwater FEIR included western whiptail (*Cnemidophorus tigris*), zebra-tailed lizard (*Callisaurus draconoides*), desert horned lizard (*Phrynosoma platyrhinos*), and western diamond-backed rattlesnake (*Crotalus atrox*). Avian species include turkey vulture (*Cathartes aura*), common raven (*Corvus corax*), Gambel's quail (*Callipepla gambelii*), Inca dove (*Columbina inca*), greater roadrunner (*Geococcyx californianus*), black-chinned hummingbird (*Archilochus alexandri*), ash-throated flycatcher (*Myiarchus cinerascens*), western kingbird (*Tyrannus verticalis*), great-tailed grackle (*Quiscalus mexicanus*), and black-tailed gnatcatcher (*Polioptila melanura*). Mammalian species included black-tailed jackrabbit (*Lepus californicus*), desert cottontail (*Sylvilagus audubonii*), Merriam kangaroo rat (*Dipodomys merriami*), antelope ground squirrel (*Ammospermophilus leucurus*), bobcat (*Felis rufus*), pocket mice (*Perognathus* spp.), desert bighorn sheep (*Ovis canadensis nelsoni*), and coyote (*Canis latrans*). The Colorado River and surrounding wetland features was determined to provide habitat for other species, such as mallard (*Anas platyrhynchos*), least bittern (*Ixobrychus exilis*), great blue heron (*Ardea herodias*), Clark's grebe (*Aechmophorus clarkia*), marsh wren (*Cistothorus palustris*), cliff swallow (*Petrochelidon pyrrhonota*), and foraging habitat for bat species such as California myotis (*Myotis californicus*), and western pipistrelle (*Pipistrellus hesperus*).

Terrestrial wildlife species that occur and may occur within the SEIR Project Area generally remain similar to those that were analyzed in the Groundwater FEIR. However, additional general and focused species surveys were conducted on the Project Area after the Groundwater FEIR was published and additional terrestrial wildlife species were observed. Section 4.3.3 provides updated terrestrial wildlife information for this SEIR.

Aquatic Wildlife

The Groundwater FEIR noted that the Colorado River supports several game fish species, including striped bass (*Morone saxatillis*), largemouth bass (*Micropterus salmoides*), bluegill (*Lepomis macrochirus*), white crappie (*Pomoxis annularis*), flathead catfish (*Pylodictis olivaris*), and channel catfish (*Ictalurus punctatus*). While no additional aquatic wildlife species have been documented or observed within the Project Area subsequent to the Groundwater FEIR, an instream habitat typing survey conducted in 2012 noted additional habitat characteristics of the

Colorado River that may support additional aquatic wildlife species (CH2M Hill 2012). Section 4.3.3 provides updated aquatic wildlife information for this SEIR.

Special-Status Species

The Groundwater FEIR defined special-status species as plants and animals that are legally protected or otherwise considered sensitive by federal, state, or local resource conservation agencies and organizations, including:

- Plant and wildlife species that are listed under the federal Endangered Species Act (FESA) and/or the California Endangered Species Act (CESA) as rare, threatened, or endangered
- Plant and wildlife species considered candidates for listing or proposed for listing
- Wildlife species identified by the California Department of Fish and Wildlife (CDFW) as fully protected and/or species of special concern
- Plants considered by the California Native Plant Society (CNPS) to be rare, threatened, or endangered (i.e., CNPS List 1A, 1B, and 2 species are recognized by the CDFW as potentially qualifying for listing; therefore, the Department of Toxic Substances Control (DTSC) considers these species as sensitive for purposes of this SEIR)
- Plants and animals covered by the Lower Colorado River Multi-Species Conservation Program (LCR MSCP)

This SEIR uses the same definition for special-status species as the Groundwater FEIR. The Groundwater FEIR evaluated a total of 31 special-status species with a potential to occur on the Project Area, including one plant species and thirty wildlife species. Additional special-status species have the potential to occur based on the expanded Project Area and additional survey information obtained since the Groundwater FEIR was certified. Section 4.3.3 of this SEIR provides updated special-status species information.

Special-Status Plants

The Groundwater FEIR evaluated the potential for narrow-leaved yerba santa (*Eriodictyon angustifolium*) to occur. The Groundwater FEIR determined that this species was unlikely to occur; therefore, no potential impacts to this special-status plant species were identified in the Groundwater FEIR. This species' potential to occur on the Project Area remains the same as previously evaluated. Based on additional field surveys performed since publication of the Groundwater FEIR, this SEIR evaluates the potential occurrence of eight additional special-status plant species not previously considered. These eight special-status plant species are discussed in further detail in Section 4.3.3 of this SEIR.

Special-Status Terrestrial Wildlife

Special-status terrestrial wildlife species evaluated in the Groundwater FEIR included twenty-five species of which fifteen species were determined to be unlikely to occur and were not further evaluated (refer to Table 4.3-3 of the Groundwater FEIR). The remaining 10 special-status terrestrial wildlife species that were fully evaluated in the Groundwater FEIR included: desert tortoise (*Gopherus agassizii*), Yuma clapper rail (*Rallus longirostris yumanensis*), southwestern willow flycatcher (*Empidonax traillii extimus*), western least bittern (*Ixobrychus exilis hesperis*), yellow-breasted chat (*Icteria virens*), California black rail (*Laterallus jamaicensis corturniculus*), crissal thrasher (*Toxostoma crissale*), Arizona Bell's vireo (*Vireo bellii arizonae*), Sonoran yellow warbler (*Dendroica petechia sonorana*), and pallid bat (*Antrozous pallidus*). The Groundwater FEIR addressed the potential for these species to occur based on data available at the time. These species' potential to occur on the Project Area remains the same as previously evaluated.

Based on additional field surveys performed since publication of the Groundwater FEIR, as well as recent coordination with the USFWS, this SEIR evaluates the potential occurrence of 13 additional special-status terrestrial wildlife species not previously considered. In addition, four of the fifteen species determined to be unlikely to occur by the Groundwater FEIR were determined to have a higher potential to occur than what was determined in the Groundwater FEIR; thus, these species are also evaluated further herein. These 17 total special-status terrestrial wildlife species (i.e., 13 species not previously considered by the Groundwater FEIR and four species considered by the Groundwater FEIR but determined to have a higher potential to occur) are discussed in further detail in Section 4.3.3 of this SEIR.

Special-Status Aquatic Species

The Groundwater FEIR evaluated the potential for five species special-status aquatic species to occur. Three of these species (i.e., bonytail chub (*Gila elegans*), razorback sucker (*Xyrauchen texanus*), and flannelmouth sucker (*Catostomus latipinnis*) were known to occur within the Colorado River and/or the Moabi Regional Park lagoon and were fully evaluated in the Groundwater FEIR. These species are still known to occur in the Project Area and no additional special-status aquatic species are considered herein. However, additional information was collected during a 2012 survey to evaluate habitat characteristics of the Colorado River (CH2M Hill 2012). The new information available for this species is discussed further in Section 4.3.3.1 of this SEIR.

Sensitive Habitats

The Groundwater FEIR defined sensitive habitats as those of special concern to resource agencies or that are afforded specific consideration through CEQA, Section 1602 of the California Fish and Game Code, or Section 404 of the Clean Water Act (CWA). Sensitive habitats described in the Groundwater FEIR included waters of the United States subject to regulation under the CWA (i.e., the Colorado River and other waters of the United States such as ephemeral drainages). Other sensitive habitats evaluated in the Groundwater FEIR included areas mapped as desert wash and desert riparian. The definition and conditions for sensitive habitats described in the Groundwater FEIR have not changed. However, due to an updated wetland delineation and updated Project Area, the acreage of each sensitive habitat within the Project Area has changed. In addition, one additional sensitive habitat was identified within the Project Area during the updated wetland delineation surveys. Section 4.3.3 of this SEIR provides updated sensitive habitat information.

4.3.2.2 Impacts and Mitigation Measures Identified in the 2011 Groundwater FEIR

Impacts to biological resources were addressed in the Groundwater FEIR, Volume II, Section 4.3. Below is a summary of the Groundwater FEIR analysis and associated mitigation measures to address impacts to biological resources.

Groundwater FEIR Effects on Potential Fill of Wetlands and Other Waters of the United States and Disturbance or Removal of Riparian Habitat

The Groundwater FEIR identified areas that qualify for USACE and CDFW jurisdiction that are protected under Section 404 of the CWA and Section 1600 of the California Fish and Game Code, and/or areas considered sensitive natural communities (potential waters of the state) by CDFW. The Groundwater FEIR determined sensitive riparian habitats located along the Colorado River, Bat Cave Wash, and along the confluence of unnamed washes could also be affected. Because of the potential for disturbance or habitat removal of potentially jurisdictional features, the Groundwater FEIR was determined to result in a potentially significant impact (Impact BIO-1) and Mitigation Measure BIO-1 was required.

Mitigation Measure BIO-1 addressed the potential fill of wetlands and other waters of the United States, and disturbance or removal of riparian habitat, through avoidance or permitting if complete avoidance is not possible as determined by the Final Groundwater Remedy. Mitigation Measure BIO-1 required a USACE-verified wetland delineation report and avoidance of verified jurisdictional areas to the extent feasible. For unavoidable impacts to jurisdictional areas, Mitigation Measure BIO-1 required replacement and/or rehabilitation of affected jurisdictional habitat to ensure "no-net-loss" of wetland habitat values and functions. The Groundwater FEIR found that implementation of Mitigation Measure BIO-1 reduced impacts on sensitive habitats to a less than significant level.

Groundwater FEIR Effects on Direct Disturbance of and Loss of Habitat for Special-Status Birds and Desert Tortoise

Disturbance of Special-Status Birds and Loss of Habitat

The Groundwater FEIR identified locations within the Project Area that provide foraging and/or nesting habitat for a variety of special-status bird species. Special-status bird species listed in Table 4.3-3 of the Groundwater FEIR that could occur or are known to occur also have potential to nest in the Project Area for this SEIR. The Groundwater FEIR determined construction and operation would result in temporary and long-term disturbance in the Project Area resulting from grading, clearing, and drilling in upland areas. Because these construction effects would be largely temporary and limited given the overall foraging habitat within the general area, the loss of foraging habitat was determined to not substantially affect any special-status birds.

Removal or disturbance of active nests and impacts to nesting habitat of both special-status species, such as Yuma clapper rail, and other common nesting birds was determined to potentially occur during Project-related activities. Visual or noise disturbance of active nests also could result in nest abandonment and loss for various special-status bird species. Loss of occupied habitat (including foraging and nesting habitat) and active nests of special-status birds was found to result in a substantial adverse effect on local populations of the affected species.

In summary, nesting special-status birds listed in Table 4.3-3 of the Groundwater FEIR, including the Yuma clapper rail and their habitats, were determined to be potentially adversely affected by Project implementation. This impact was determined to be potentially significant (Impact BIO-2a) and Mitigation Measure BIO-2a was required.

Mitigation Measure BIO-2a addressed minimizing potential impacts to special-status birds through habitat and seasonal avoidance. Preconstruction measures such as breeding season surveys and construction measures such as nest-cycle avoidance, implementing buffers around nests, conducting worker awareness training and monitoring during construction activities was required. An avoidance and minimization plan for special-status birds was also required. Implementation of Groundwater FEIR Mitigation Measure BIO-2a was found to reduce impacts on sensitive habitats to a less than significant level.

Disturbance of Desert Tortoise and Loss of Habitat

Desert tortoise was determined to occur within the Project Area due to the presence of suitable habitat, although this species had not been previously observed since 2004 during several focused surveys in the Project Area. However, since there was a slight potential for the desert tortoise to enter the Project Area, the Groundwater FEIR determined the species could be directly impacted if they moved onto the Project Area. This impact was considered potentially significant (Impact BIO-2b) and Mitigation Measure BIO-2b was required.

The Groundwater FEIR Mitigation Measure BIO-2b included preconstruction measures such as designing project elements and construction zones, staging areas, and access routes to minimize direct and indirect impacts to desert tortoise habitat to the extent feasible, and performing preconstruction surveys in accordance with USFWS protocols where unavoidable impacts to tortoise habitat would occur. Construction measures included a qualified desert tortoise biologist (i.e., an experienced tortoise expert whom USFWS would be confident in the evaluation and survey for the presence of the species) identifying minimization measures to reduce impacts along structures, roads, and pipelines, conducting worker awareness training, and conducting biological monitoring. Implementation of Mitigation Measure BIO-2b was found to reduce impacts on sensitive habitats to a less than significant level.

Disturbance of Special-Status Species and Loss of Habitat Caused by Decommissioning

The Groundwater FEIR identified potential impacts to special-status species and loss of habitat that could occur through removal and capping of wellheads, and through the decommissioning of other facilities such as roadways, utilities, and pipelines. Decommissioning activities were determined to likely result in minimal effects on special-status species and their habitats. However, these effects were found to be similar to the effects of construction activities; although, the duration would likely be shorter and cover a smaller footprint. Regardless, the Groundwater FEIR determined this impact would be potentially significant (Impact BIO-2c) and Mitigation Measure BIO-2c was required.

Mitigation Measure BIO-2c included an avoidance and minimization plan to be developed and implemented through consultation with CDFW, BLM, and USFWS. These measures included surveys conducted prior to decommissioning and during the breeding season, as well as implementing a habitat restoration plan to be approved by CDFW, BLM, and USFWS, to restore any disturbed areas to achieve no net loss of habitat functions and values. The plan was intended to include a revegetation seed mix or plantings design, a site grading concept plan, success criteria for restoration, a monitoring plan, and an adaptive management plan. Implementation of Mitigation Measure BIO-2c was found to reduce impacts on special-status species and habitats caused by decommissioning to a less than significant level.

Groundwater FEIR Effects on Fish Mortality, Interference with Spawning Habitat, and Other Adverse Aquatic Effects

The Groundwater FEIR evaluated the potential effects to fish species and spawning habitat that could occur from construction activities. Specifically, the Groundwater FEIR evaluated the potential effects from the freshwater intake structure that was included as a potential component of an initial design of the remedy. The freshwater intake structure would have been constructed near the Colorado River and could have resulted in the increase in sediments, turbidity, and contaminants that could have adversely affected fish and their habitat immediately adjacent to and downstream of construction activities. While in-water work was not likely, the Groundwater FEIR assumed construction of wells or other facilities near the river; therefore, effects could have occurred but would have likely been small, according to analysis presented in the Groundwater FEIR. Additionally, wells, roads, and pipelines would have been placed in Bat Cave Wash or other drainages, which could have conveyed sediments or contaminants during a flash flood.

Constructing the freshwater intake structure (including a cofferdam) adjacent to the Colorado River and Project activities within Bat Cave Wash and other drainages was determined to have the potential to cause a number of potential impacts to fish species and aquatic habitat through increased levels of turbidity, siltation, sedimentation, toxics contamination, and dewatering for the intake structure. Sedimentation and increased turbidity or other contamination could have degraded water quality and adversely affected fish habitat and fish populations in the Colorado River, and could have resulted in fish mortality through stranding during construction of the freshwater intake structure. As a result, this impact was determined to be potentially significant (Impact BIO-3a) and Mitigation Measure BIO-3a was required.

Mitigation Measure BIO-3a addressed the potential impacts to aquatic habitat related to turbidity, erosion, sedimentation, and overall water quality during construction of the intake structure. Mitigation Measure HYDRO-1 was required in the Hydrology Section of the Groundwater FEIR that would reduce water quality impacts related to erosion and pollutant runoff through implementation of Best Management Practices (BMPs). To mitigate fish stranding from installation of the cofferdam and dewatering, the Groundwater FEIR included coordination with a fisheries biologist to develop and implement a fish rescue plan during dewatering activities. Additionally, to ensure compliance, a fisheries biologist was required to be present on-site during initial pumping (dewatering) activities and to oversee the fish rescue operation. Implementation of Mitigation Measure BIO-3a was found to reduce impacts on fish species and aquatic habitats caused by construction of the freshwater intake structure to a less than significant level.

Potential Loss of Aquatic Habitat During Operation of the Intake Structure

The Groundwater FEIR analyzed the potential effects of operating the freshwater intake structure within aquatic habitat by excluding fish from existing habitat or modifying existing habitat. Changes in hydrologic conditions could have resulted from water diversions, and those changes could have resulted in flows and other hydrologic conditions that would have affected the quality and availability of habitat for fish and other aquatic resources near the freshwater intake structure. The Groundwater FEIR described that preferred spawning and rearing habitat could have been affected by the intake structure. Therefore, the impact on special-status fish spawning habitat during operation was determined to be potentially significant (Impact BIO-3b) and Mitigation Measure BIO-3b was required and would reduce impacts to less than significant.

Potential Fish Entrainment and Impingement During Operation of the Intake Structure

The Groundwater FEIR analyzed the potential impacts on fish species during operation of the intake structure, which could cause mortality from potential fish entrainment and impingement. Even with a fish screen installed, razorback sucker and bonytail chub could be impacted through entrainment and impingement of fish eggs and larvae not effectively excluded from the diversion by the fish screen. Additionally, impacts could occur due to the timing of diversion if it occurred during early life stages of fish species in the summer months when entrainment vulnerability is high. However, the Groundwater FEIR determined potential effects to fish species during operation of the intake structure would be considered consistent with the LCR MSCP. Nevertheless, fish eggs and larvae could be affected if the intake structure were to be poorly designed and diversions were to take place during high entrainment-vulnerability periods for early life stages of special-status fish, which is generally April through June, corresponding to the period when the majority of larvae hatch. Therefore, this operational impact was considered potentially significant (Impact BIO-3c) and Mitigation Measure BIO-3c was required.

Mitigation Measure BIO-3c required consultation with USFWS and CDFW to determine the most vulnerable time of the year for entrainment or impingement of razorback sucker and bonytail chub eggs or larvae. Also, a state-of-the-art positive-barrier fish screen would be installed and long-term monitoring conducted to ensure that the screen was operating as intended.

Implementation of Mitigation Measure BIO-3c was found to reduce impacts on fish species from entrainment and impingement during operation of the freshwater intake structure to a less than significant level.

Groundwater FEIR Effects on Consistency with Regional and Local Plans

The Groundwater FEIR evaluated potential impacts to determine consistency with regional and local plans such as the LCR MSCP, *County of San Bernardino 2007 General Plan*, BLM *Lake Havasu Resource Management Plan*, and *Lower Colorado River National Wildlife Refuges Comprehensive Management Plan*. The Groundwater FEIR determined consistency with all regional and local plans, based on the following conclusions:

- Because water diversions would be relatively low, the Groundwater FEIR found there would likely be little effect on the attainment of the LCR MSCP goals and objectives, the conservation strategy of the LCR MSCP, or the viability of the covered species.

- The Groundwater FEIR determined that the remedy did not fall within a prohibited activity of the *Lake Havasu Land Management Plan* and activities would not degrade the biological resources element of the Area of Critical Environmental Concern (ACEC). Therefore, actions associated with cleanup of the contaminated groundwater would not conflict with management goals because these actions would reduce the potential for long-term adverse effects on sensitive resources.
- The Groundwater FEIR concluded there would be no conflict with the overall management goals of the HNWR and the remedy would not be a prohibited activity under the *Lower Colorado River National Wildlife Refuges Comprehensive Management Plan*. The Groundwater FEIR determined that although the physical implementation of remedy activities (i.e., drilling wells, installing pipes and a treatment plant) may not be compatible with the purposes of the refuge, reducing the potential for long-term harm from contaminated groundwater would be compatible and could be permitted.
- The Groundwater FEIR concluded the remedy would not affect substantial areas of habitat and would not substantially diminish habitat values because it would have a small overall footprint and would not occur within pristine habitat. Therefore, the Groundwater FEIR determined the goals and policies for the *County of San Bernardino 2007 General Plan* were not in conflict with implementation of the remedy.

Due to the reasons listed above for each applicable regional and local plan, the Groundwater FEIR determined that impacts would be considered less than significant and no mitigation was required.

Groundwater FEIR Effects on Substantial Interference with Fish or Wildlife Movement Corridors or Nursery Sites

The Groundwater FEIR identified potential wildlife movement corridors within aquatic and terrestrial environments associated with the proposed Project Area. No potential impact on aquatic wildlife movement was identified, even if the freshwater intake structure was selected as a component. In the terrestrial setting, the Groundwater FEIR concluded the remedy would not adversely interfere with any wildlife movement through the Project Area, or through the region due to project components being widely distributed across the Project Area. The Groundwater FEIR reasoned that the dispersed nature of components would result in the site retaining relatively large, contiguous, and intact areas of wildlife habitat within the Project Area, which would remain as viable areas for use by wildlife. Therefore, the Groundwater FEIR determined this potential impact would be less than significant and no mitigation was required.

4.3.3 Existing Setting

Since publication of the Groundwater FEIR, the Project Area boundaries have changed for the Final Remedy Design and additional general and focused species surveys have been performed. The Project Area for the Final Remedy Design totals approximately 762 acres. This section describes the updated physical biological resource characteristics and setting for areas not previously described in the Groundwater FEIR and summarizes new biological data obtained since publication of the Groundwater FEIR.

4.3.3.1 Project Setting

The biological resources setting described in the Groundwater FEIR is generally similar to the setting of the Project Area for the Final Groundwater Remedy Project. However, the Project Area has been updated in part to account for potential activities in Arizona east of the Colorado River. The biological resources setting for two freshwater well sites are described in the *Topock Compressor Station Groundwater Remediation Project Environmental Impact Report Addendum No. 1 for Alternative Freshwater Source Evaluation Activities* (DTSC 2013). The two new freshwater well sites are located in Arizona on HNWR property managed by USFWS, approximately 100 feet west of Oatman-Topock Highway (also known as Mohave County Highway 10), and north and south of the main channel of Sacramento Wash. The nearest residential development in proximity to the freshwater well sites is located approximately 2 miles (10,560 feet) north. The Topock Bay Marina is approximately 0.35 mile (1,848 feet) south of the freshwater well sites, and includes a restaurant and a few scattered residences.

The freshwater well sites are located on flat terrain. The area in and around the freshwater well sites is heavily disturbed from a wildfire that burned 240 acres of dense tamarisk in October 2008, and the ensuing grading and earth work resulted in debris mounds. In addition, a fire occurred in April 2016 within parts of the Project Area in Arizona and burned overall 2,232 acres that burned stands of tamarisk, salt cedar, and other vegetation (Incident Information System 2016). Due to previous and ongoing maintenance activities in and around the freshwater well sites, this area is generally devoid of vegetation in the area of proposed improvements. This area is heavily disturbed as a result of vegetation clearing activities associated within the HNWR.

The Final Groundwater Remedy Project includes additional areas for activities not included in the Groundwater FEIR and also eliminated some areas that were determined to not be needed for the construction, operation and maintenance, and decommissioning phases. The areas that were expanded include the Construction Headquarters and Soil Processing/Clean-Soil Storage Area west of Moabi Regional Park and a small portion of the existing access roads in the southwest portion of the Project Area in California, and an area extending north along Mohave County Highway 10 where a pipeline would connect existing freshwater supply wells to other project infrastructure and a part of the floodplain in Arizona where monitoring wells could be located. Most notably, a large area north of Moabi Regional Park which was originally planned for a freshwater supply well(s) was removed from the SEIR Project Area. The biological resource setting for these areas is overall consistent with what was described in the Groundwater FEIR. Additional detail is provided in the following pages.

Additional general and focused species surveys have been conducted on the Project Area since publication of the Groundwater FEIR and new information has been obtained regarding the presence/absence of general and special-status biological resources. This section summarizes data from the following additional reports and data that were not reviewed and/or not available at the time the Groundwater FEIR was certified:

- Southwestern Willow Flycatcher Presence/Absence Surveys for the PG&E Compressor Station Expanded Groundwater Extraction and Treatment System (GANDA 2005a, 2006a, 2007, 2010, 2012)
- Western Yellow-Billed Cuckoo Presence/Absence Surveys for the PG&E Topock Compressor Station (GANDA 2014, 2015)
- Desert Tortoise Presence/Absence Surveys for the PG&E Compressor Station Expanded Groundwater Extraction and Treatment System (CH2M Hill 2004a-e; GANDA 2005b, 2006b; WSA 2013)
- USFWS species list for the HNWR (USFWS 2008)
- 2012 Focused Survey Results for the Yuma Clapper Rail and the California Black Rail at the Pacific Gas and Electric Groundwater Remediation Project Site (KBS 2012)
- Biological Surveys of Proposed Sites for Geophysical Surveys (CH2M Hill 2012a)
- Biological Survey of Expanded Areas for Sites A, B, and C of the Alternative Freshwater Source Areas (CH2M Hill 2012b)
- Biological Survey of the Action Area for the 2012 Programmatic Biological Assessment Encompassing Site B of Alternative Freshwater Source Areas (CH2M Hill 2012c)
- Pacific Gas and Electric Company Topock Compressor Station Wetland Assessment for Freshwater Well Locations San Bernardino County, California (E2 Consulting Engineers 2012)
- Topock Groundwater Remediation Project Floristic Survey Report (CH2M Hill and GANDA 2013a)
- Topock Groundwater Remediation Project Revised Floristic Survey Report (CH2M Hill and GANDA 2013b)
- Wetlands and Waters of the United States, Delineation for the Topock Compressor Station Groundwater Remediation Project, San Bernardino County, California (Document ID: PGE20130822A) (CH2M Hill 2013)
- Wetlands and Waters of the United States, Final Delineation for the Topock Compressor Station Groundwater Remediation Project (PG&E 2014a)
- Desert Tortoise Habitat Survey, Topock Compressor Station Evaporation Ponds and Access Roadway (Transcon Environmental, Inc. 2015)
- Preliminary Habitat Analysis for Bat Use at PG&E Topock Remediation Project, San Bernardino County, California (Brown 2015a)
- Bat Surveys of the Topock Compressor Station Soil Investigation and Groundwater Remediation Project Areas (Brown 2015b)
- Topock Compressor Station Summer Roosting Bat Surveys and Potential Project Impacts, Final Report (H.T. Harvey & Associates 2015)

- PG&E Topock Compressor Station—Proposed Protective Measures for Roosting Bats (Project 3740-02) (H.T. Harvey & Associates 2016a)
- Topock Compressor Station Spring 2016 Roosting Bat Surveys Report (H.T. Harvey & Associates 2016b)
- Assessment of Potential Impacts to Four Special-Status Species for Soil Environmental Impact Report Investigation and Final Groundwater Remedy Areas, Topock Compressor Station, California (CH2M Hill 2015c)
- Assessment of Biological Resources for a 35-acre area on the West Side of Moabi Regional Park: Final Groundwater Remedy, Topock Compressor Station, California (CH2M Hill 2015d);
- Assessment of Biological Resources for Additional Potential Environmental Impact Areas: Final Groundwater Remedy, Topock Compressor Station, California (CH2M Hill & Transcon Environmental, Inc. 2016)
- Request for Reinitiation of Informal Consultation under Section 7 of the Endangered Species Act regarding Pacific Gas and Electric Topock Compressor Station AESO/SE 02EAAZ00-2014-I-0335 Final Groundwater Remedy (PG&E 2016)

Vegetation and Habitat

Since publication of the Groundwater FEIR, vegetation community mapping in the Project Area has been updated (GANDA and CH2M Hill 2013a, 2013b; CH2M Hill & Transcon Environmental, Inc. 2016). Ten primary upland vegetation communities and three primary wetland vegetation communities were mapped recently across the Project Area. Some of these primary communities include one or more subtypes. The 10 primary upland vegetation community types are creosote bush scrub, tamarisk thickets, arrowweed thickets, blue palo verde woodlands, catclaw acacia thorn scrub, foothill palo verde scrub, allscale scrub, quailbush scrub, western honey mesquite bosque, and screwbean mesquite bosque (Sawyer et al. 2009). The primary wetland vegetation communities include California bulrush marshes, cattail marshes, and common reed marshes. In addition, three land cover types were identified in the Project Area: open water, developed/disturbed, and landscaped. Descriptions of primary upland and wetland vegetation communities are provided in the following sections.

Table 4.3-1 below provides an updated summary of vegetation communities documented within the entire Project Area. The data presented in this table replaces vegetation community information presented in the Groundwater FEIR. A detailed vegetation map with additional community types found in the Project Area is provided in **Figures 4.3-1** through **4.3-1d**.

TABLE 4.3-1
HABITAT TYPES IN THE PROJECT AREA EVALUATED FOR THE FINAL REMEDY DESIGN

Habitat Type		Acreage
Upland Vegetation Communities		
Creosote Bush Scrub		285.2
Tamarisk Thickets		140.0
Athel Tamarisk		*2.2*
Salt Cedar		*64.9*
Salt Cedar/Arrowweed		*0.3*
Salt Cedar/Athel Tamarisk		*51.3*
Salt Cedar/Blue Palo Verde/Honey Mesquite		*9.2*
Salt Cedar/Honey Mesquite		*10.2*
Salt Cedar/Screwbean Mesquite		*1.7*
Arrowweed Thickets (Arrowweed)		45.3
Blue Palo Verde Woodlands		31.5
Blue Palo Verde		*17.9*
Blue Palo Verde/Catclaw Acacia		*12.8*
Blue Palo Verde/Honey Mesquite		*0.7*
Desert Smoke Tree		*0.1*
Catclaw Acacia Thorn Scrub (Catclaw Acacia)		6.4
Foothill Palo Verde Scrub (Hillside Palo Verde)		13.8
Allscale Scrub		17.2
Allscale Scrub		*13.0*
Creosote Bush/Cattle Saltbush		*4.2*
Quailbush Scrub		2.8
Western Honey Mesquite Bosque (Honey Mesquite)		1.2
Screwbean Mesquite Bosque (Screwbean Mesquite)		4.1
Bush Seepweed Scrub		0.4
Wetland Vegetation Communities		
California Bulrush Marshes (California Bulrush)		8.7
Cattail Marshes (Broad-leaved Cattail)		0.1
Common Reed Marshes		4.3
Common Reed		*4.2*
Giant Reed		*0.1*
Other Wetlands[a]		0.5
Other Land Cover Types		
Open Water		89.2[b]
Developed/Disturbed		102.1
Landscaped		4.7
Unmapped Areas[c]		4.7
	Total	**762**

NOTES:
[a] Areas mapped as "other wetlands" are not identified with a specific wetland vegetation community type. Based on jurisdictional delineation data, these "other wetlands" include the following jurisdictional habitat types: Palustrine, Emergent (PEMH), Permanently Flooded (PEMC); Palustrine, Emergent, Seasonally Flooded (PSSA); Palustrine Scrub-Shrub Temporarily Flooded; Riverine Lower Perennial Unconsolidated Bottom Sand Excavated (R2UB2x); Riverine Lower Perennial Unconsolidated Bottom Sand (R2UB2); Riverine Intermittent Stream Bed Cobble-Gravel Temporarily Flooded (R4SB3A); and Palustrine, Emergent, Permanently Flooded (PEMH).
[b] Includes portion of Colorado River within Project Area.
[c] Unmapped areas are depicted as "No Data" on Figure 4.3-1 through 4.3-1d.

SOURCE: GANDA and CH2M Hill 2013a, 2013b; CH2M Hill & Transcon Environmental, Inc. 2016.

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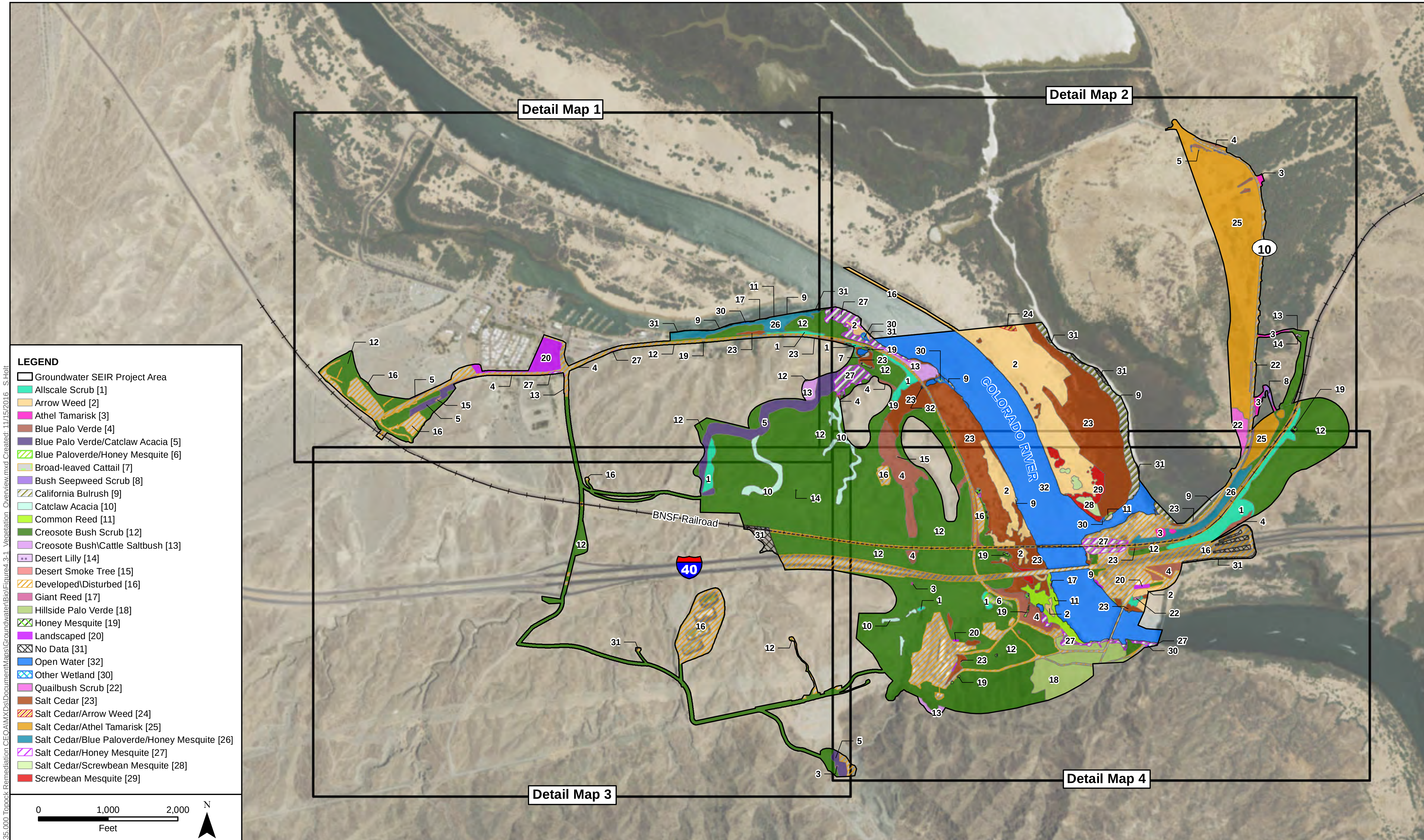
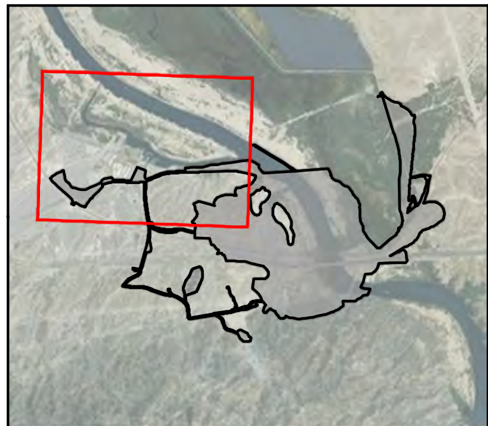


Final Groundwater Remediation Project SEIR
Map Creation Date: 11/15/2016 Sources: ESRI Aerial, ESA

Vegetation: Overview

Figure 4.3-1

ESA North State Resources



LEGEND

Groundwater SEIR Project Area

Common Name

- Allscale Scrub [1]
- Blue Palo Verde [4]
- Blue Palo Verde/Catclaw Acacia [5]
- California Bulrush [9]
- Catclaw Acacia [10]
- Common Reed [11]
- Creosote Bush Scrub [12]
- Creosote Bush\Cattle Saltbush [13]
- Desert Smoke Tree [15]
- Developed\Disturbed [16]
- Giant Reed [17]
- Honey Mesquite [19]
- Landscaped [20]
- No Data [31]
- Other Wetland [30]
- Salt Cedar [23]
- Salt Cedar/Blue Paloverde/Honey Mesquite [26]
- Salt Cedar/Honey Mesquite [27]

0 500 1,000

Feet

N

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Final Groundwater Remediation Project SEIR

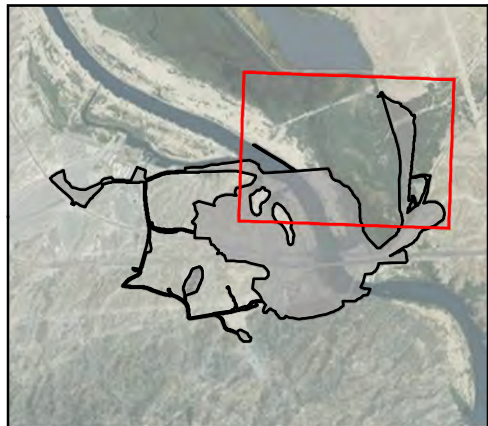
Map Creation Date: 12/6/2016 Sources: ESRI Aerial, ESA, PG&E 2015

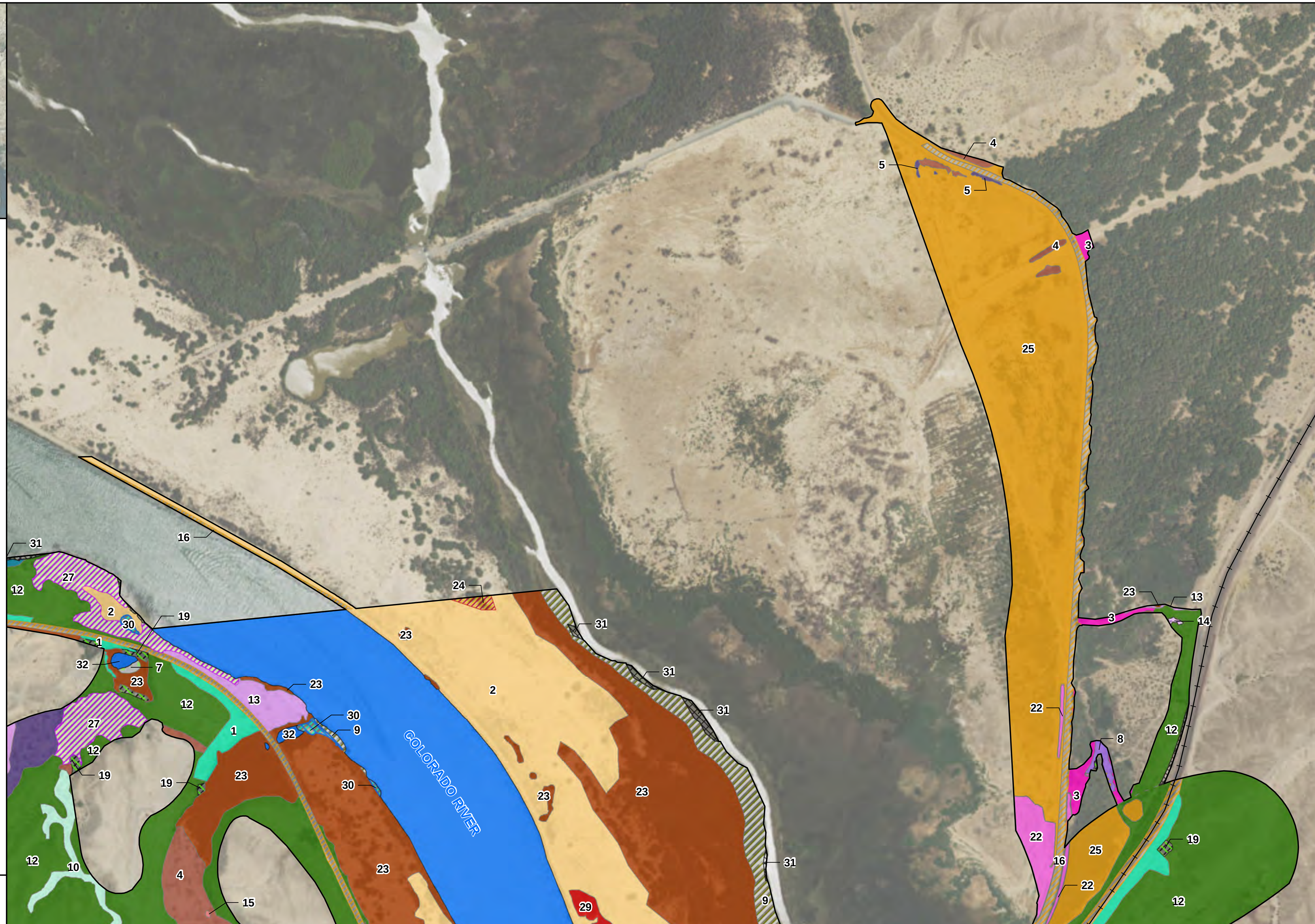
Vegetation: Detail Map 1

Figure 4.3-1a

ESA

North State Resources





LEGEND

- Groundwater SEIR Project Area

Common Name

- Allscale Scrub [1]
- Arrow Weed [2]
- Athel Tamarisk [3]
- Blue Palo Verde [4]
- Blue Palo Verde/Catclaw Acacia [5]
- Broad-leaved Cattail [7]
- Bush Seepweed Scrub [8]
- California Bulrush [9]
- Catclaw Acacia [10]
- Creosote Bush Scrub [12]
- Creosote Bush\Cattle Saltbush [13]
- Desert Lilly [14]
- Desert Smoke Tree [15]
- Developed\Disturbed [16]
- Honey Mesquite [19]
- No Data [31]
- Open Water [32]
- Other Wetland [30]
- Quailbush Scrub [22]
- Salt Cedar [23]
- Salt Cedar/Arrow Weed [24]
- Salt Cedar/Athel Tamarisk [25]
- Salt Cedar/Blue Paloverde/Honey Mesquite [26]
- Salt Cedar/Honey Mesquite [27]
- Screwbean Mesquite [29]

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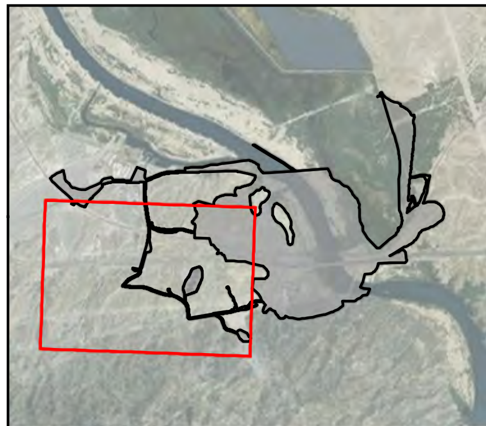
Final Groundwater Remediation Project SEIR

Map Creation Date: 12/6/2016 Sources: ESRI Aerial, ESA, PG&E 2015

Vegetation: Detail Map 2

Figure 4.3-1b

ESA North State Resources



LEGEND

Groundwater SEIR Project Area

Common Name

Allscale Scrub [1]

Athel Tamarisk [3]

Blue Palo Verde/Catclaw Acacia [5]

Catclaw Acacia [10]

Creosote Bush Scrub [12]

Desert Lilly [14]

Developed\Disturbed [16]

No Data [31]

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Feet

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Final Groundwater Remediation Project SEIR

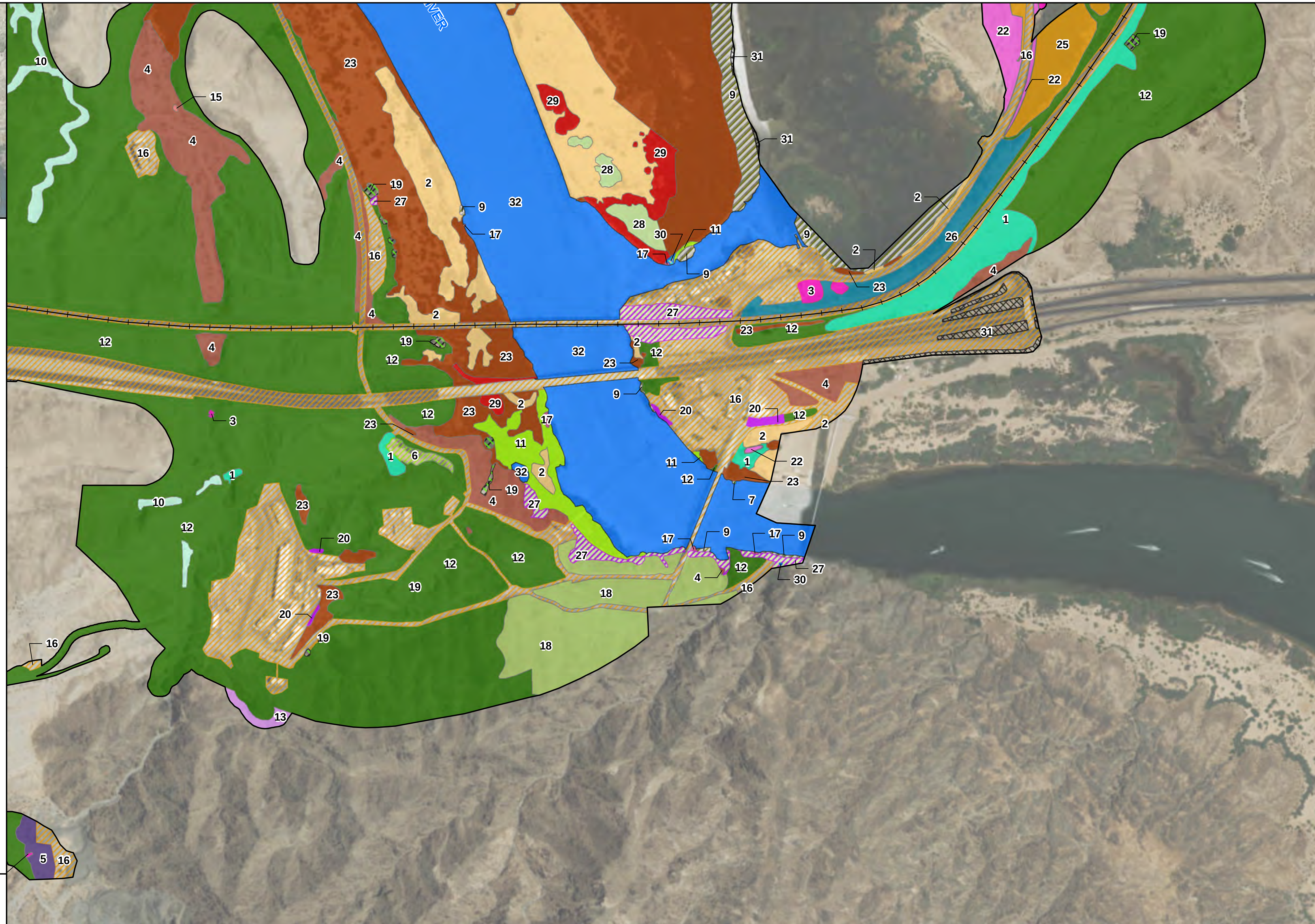
Map Creation Date: 12/6/2016 Sources: ESRI Aerial, ESA, PG&E 2015

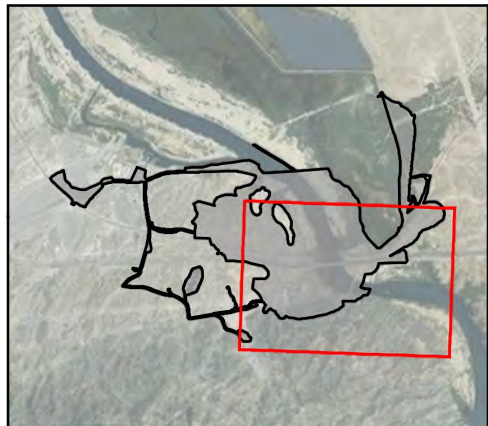
Vegetation: Detail Map 3

Figure 4.3-1c

ESA

North State Resources





LEGEND

Groundwater SEIR Project Area

Common Name

- Allscale Scrub [1]
- Arrow Weed [2]
- Athel Tamarisk [3]
- Blue Palo Verde [4]
- Blue Palo Verde/Catclaw Acacia [5]
- Blue Paloverde/Honey Mesquite [6]
- Broad-leaved Cattail [7]
- California Bulrush [9]
- Catclaw Acacia [10]
- Common Reed [11]
- Creosote Bush Scrub [12]
- Creosote Bush\Cattle Saltbush [13]
- Desert Smoke Tree [15]
- Developed\Disturbed [16]
- Giant Reed [17]
- Hillside Palo Verde [18]
- Honey Mesquite [19]
- Landscaped [20]
- No Data [31]
- Open Water [32]
- Other Wetland [30]
- Quailbush Scrub [22]
- Salt Cedar [23]
- Salt Cedar/Athel Tamarisk [25]
- Salt Cedar/Blue Paloverde/Honey Mesquite [26]
- Salt Cedar/Honey Mesquite [27]
- Salt Cedar/Screwbean Mesquite [28]
- Screwbean Mesquite [29]

0 500 1,000

Feet

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Final Groundwater Remediation Project SEIR

Map Creation Date: 12/6/2016 Sources: ESRI Aerial, ESA, PG&E 2015

Vegetation: Detail Map 4

Figure 4.3-1d

ESA

North State Resources

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Terrestrial Vegetation Communities

Creosote Bush Scrub

The most common and widespread plant community in the Project Area is creosote bush scrub. This vegetation type is characterized by widely-spaced creosote bush (*Larrea tridentata*) with associated species such as white bursage (*Ambrosia dumosa*), white rhatany (*Krameria bicolor*), brittlebush (*Encelia farinosa*), beavertail cactus (*Opuntia basilaris* var. *basilaris*), and silver cholla (*Cylindropuntia echinocarpa*). Creosote bush scrub occurs throughout the dissected alluvial terraces in the Project Area. Creosote bush scrub totals 285.2 acres of the Project Area. This total acreage includes an area totaling less than 0.1 acre identified as desert lily on Figure 4.3-1 through 4.3-1d.

Tamarisk Thicket

Tamarisk thicket is found primarily on the east side of the Oatman-Topock Highway and along the low sandy terraces adjacent to the Colorado River and the inlet to Pirate's Cove. This vegetation type is also found near the terminus of the larger ephemeral washes south of the National Trails Highway. Vegetation is characterized by open to dense stands of the non-native and invasive salt cedar (*Tamarix ramosissima*) and/or athel tamarisk (*Tamarix aphylla*). In many locations salt cedar or athel tamarisk occur as monospecific stands; in other areas associated trees and shrubs include western honey mesquite (*Prosopis glandulosa* var. *torreyana*), screwbean mesquite (*Prosopis pubescens*), blue palo verde (*Parkinsonia florida*) and arrow weed (*Pluchea sericea*). Herbaceous vegetation is absent within dense thickets of salt cedar and athel tamarisk, but scattered herbaceous species such as fanleaf crinklemat (*Tiquilia plicata*), Spanish needle (*Palafoxia arida*) and *Cryptantha* spp. are often present in the openings between the trees in some areas. Tamarisk thicket comprises 140 acres of the Project Area.

Arrowweed Thicket

Arrowweed thicket is found on the low sandy terraces along the Colorado River and the Moabi Regional Park slough. Arrowweed is the sole dominant shrub species with individuals widely scattered or aggregated into dense, nearly impenetrable stands. It often intermixes with tamarisk thickets and mesquite bosque. Associated species include salt cedar, smoke tree (*Psorothamnus spinosus*), western honey mesquite, brittlebush, and desert broom (*Baccharis sarothroides*). Scattered herbaceous vegetation in the more open areas includes fanleaf crinklemat, Spanish needle, *Cryptantha* spp., and Mediterranean grass (*Schismus barbatus*). Arrowweed thicket comprises 45.3 acres of the Project Area.

Blue Palo Verde Woodland

Blue palo verde woodland occurs along the edges and throughout the channel bottoms of the larger ephemeral washes in the dissected alluvial terraces south of the Colorado River. This vegetation type is also present on the Havasu National Wildlife Refuge. Total vegetation cover is generally low, but species diversity is relatively high, especially in the larger washes, as compared to the other vegetation types in the Project Area. Blue palo verde is the dominant tree with scattered individuals of salt cedar, athel tamarisk, and smoke tree also present in some areas. Associated shrubs include catclaw acacia (*Senegalia greggii*), Anderson's desert thorn (*Lycium andersonii*), brittlebush, sweetbush (*Bebbia juncea* var. *aspera*), cheesebush (*Hymenoclea* *salsola*), climbing milkweed (*Funastrum hirtellum*), desert lavender (*Hyptis emoryi*), white bursage, white rhatany, and creosote bush. Common herbaceous species include small-seeded spurge (*Chamaesyce polycarpa*.), small-flowered California poppy (*Eschscholzia minutiflora*), Emory rock daisy (*Perityle emoryi*), Spanish needle, and Arizona lupine (*Lupinus arizonicus*). Blue palo verde woodland comprises 31.5 acres of the Project Area.

Catclaw Acacia Thorn Scrub

In the Project Area catclaw acacia thorn scrub is limited to the bottoms of moderate-sized ephemeral washes in the dissected terraces south of the National Trails Highway. This vegetation type is characterized by widely scattered shrubs dominated by catclaw acacia. Common associated species include Anderson's desert thorn, brittlebush, sweetbush, cheesebush, desert lavender, white bursage, white rhatany and creosote bush. Herbaceous species include small-seeded spurge, Arizona lupine, and Spanish needle. Catclaw acacia thorn scrub comprises 6.4 acres of the Project Area.

Hillside Palo Verde Scrub

Hillside palo verde scrub is restricted to a small area east of the compressor station along the slopes of the Chemehuevi Mountains. Vegetation in this area is characterized by scattered hillside palo verde (*Parkinsonia microphylla*). Associated species in this area include creosote bush, pygmy-cedar (*Peucephyllum schottii*), brittlebush, white rhatany, beavertail cactus, buckhorn cholla (*Cylindropuntia acanthocarpa*), California barrel cactus (*Ferocactus cylindraceus* var. *cylindraceus*), and inflated desert trumpet (*Eriogonum inflatum* var. *inflatum*). Hillside palo verde scrub comprises 13.8 acres of the Project Area.

Quailbush Scrub

Quailbush scrub is dominated by big saltbush (*Atriplex lentiformis*) and occurs on low-lying alkaline or saline soils. This community is most common on the HNWR west of the Oatman-Topock Highway. The only common associate at this site is bush seepweed (*Suaeda moquinii).* A small area of Quailbush scrub also occurs near the Colorado River at the foot of the southernmost natural gas pipeline bridge. Quailbush scrub comprises 2.8 acres of the Project Area.

Allscale Scrub

Allscale scrub is dominated by cattle saltbush (*Atriplex polycarpa*) and is the most common alkaline tolerant shrubland alliance in the Project Area. In the Project Area, allscale scrub is most common along the National Trails Highway. A small area of allscale shrub is also present south of the pipeline bridge and cattle saltbush is the characteristic shrub in a large open area on the east side of the BNSF Railway tracks. Allscale scrub comprises 17.2 acres of the Project Area.

Western Honey Mesquite Bosque

Western Honey Mesquite bosque is mostly found on the low sandy terraces along the Colorado River, where it occurs intermixed with tamarisk thickets, but also occurs in a few scattered locations on the HNWR on the east side of the Oatman-Topock Highway. Western honey mesquite bosque comprises 1.2 acres of the Project Area.

Screwbean Mesquite Bosque

Screwbean Mesquite bosque is largely restricted to the low terraces along the Colorado River where it is concentrated in three relatively small areas. It is most abundant across from the Topock Marina, along the southwestern shoreline. It is also a principal component of the screwbean/tamarisk thicket vegetation. It is common on the California side of the Colorado River near the BNSF Railway bridge. It is locally common and near the cattail marshes. Screwbean mesquite was also planted on the HNWR following a 2008 wildfire. Screwbean mesquite bosque comprises 4.1 acres of the Project Area.

Wetland Vegetation Communities

Along the Colorado River and its inlets are patches of wetlands with various marsh plants forming three principal wetland communities, from the mostly submerged broad-leaved cattail (*Typha latifolia*) marshes and California bulrush (*Schoenoplectus californicus*) marshes, to the adjacent but somewhat drier common reed (*Phragmites australis*) marshes. The common reed marshes are concentrated and most extensive along the edges of the low terraces next to the Colorado River, whereas the bulrush marshes occur just offshore in standing water that include shoreline. California bulrush is also the dominant species in the portion of the Topock Marsh along the west side of the Oatman-Topock Highway. It is likely that the common reed species in the Project Area is an invasive, non-indigenous form of *Phragmites australis*. Wetland vegetation communities comprise 13.6 acres of the Project Area.

Land Cover Types

Open Water

Open water includes the unvegetated, fully inundated areas. This includes isolated areas of open water and the Colorado River. Total open water in the Project Area is 89.2 acres.

Landscaped Areas

Landscaped areas include those areas planted with non-native, ornamental species within or near developed areas. Common species found within the vegetation community include Mexican fan palm (*Washingtonia robusta*) and oleander (*Nerium oleander*). Landscaped areas comprise 4.7 acres of the Project Area.

Developed/Disturbed Areas

Developed/disturbed areas within the Project Area include I-40, BNSF Railway, dirt access roads, and the facilities and infrastructure associated with the Station. Developed/disturbed areas comprise 102.1 acres of the Project Area.

Jurisdictional Wetlands and Waters

Jurisdictional wetlands and waters in the Project Area were delineated in 2012 and 2014 to satisfy Mitigation Measures BIO-1 of the Groundwater FEIR (CH2M Hill 2013; PG&E 2014a). Wetland delineations conducted in 2012 and 2014 followed accepted USACE protocol for delineating waters of the United States, the *Corps of Engineers Wetlands Delineation Manual* and regional supplement for the *Arid West Region.* Follow-up surveys were performed in 2016 to identify potential jurisdictional wetlands and waters in areas recently added to the Project Area (CH2M

Hill & Transcon Environmental, Inc. 2016). Follow up surveys in 2016 did not involve formal wetland delineations; however, new drainage features were mapped based on the extent of defended bed and bank characteristics. The potential jurisdictional features identified on the Project Area are summarized in **Table 4.3-2** and depicted on **Figures 4.3-2** through **4.3-2d**. The data presented in this table replaces jurisdictional resources information presented in the Groundwater FEIR.

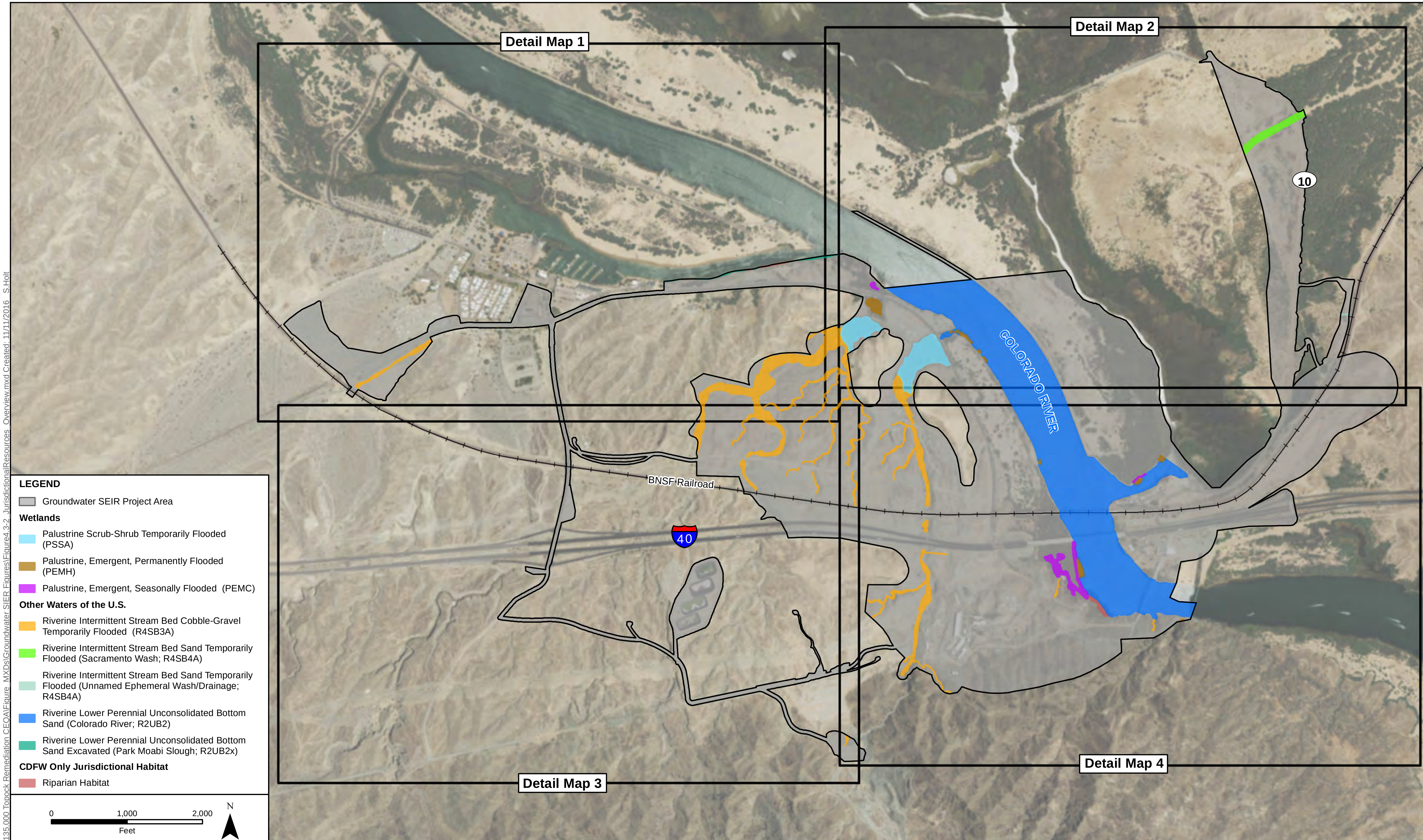
TABLE 4.3-2
SUMMARY OF JURISDICTIONAL RESOURCES IN THE PROJECT AREA

Jurisdictional Resources[a, b]	Acreage
Wetlands	
Palustrine Scrub-Shrub Temporarily Flooded (PSSA)	7.8
Palustrine, Emergent, Permanently Flooded (PEMH)	1.5
Palustrine, Emergent, Seasonally Flooded (PEMC)	2.4
Other Waters of the United States	
Riverine Intermittent Stream Bed Cobble-Gravel Temporarily Flooded (R4SB3A)	20.9
Riverine Lower Perennial Unconsolidated Bottom Sand (Colorado River; R2UB2)	88.3
Riverine Lower Perennial Unconsolidated Bottom Sand Excavated (Moabi Regional Park Slough; R2UB2x)	0.3
Riverine Intermittent Stream Bed Sand Temporarily Flooded (Sacramento Wash; R4SB4A)	1.9
Riverine Intermittent Stream Bed Sand Temporarily Flooded (Unnamed Ephemeral Wash/Drainage; R4SB4A)	<0.1
CDFW Only Jurisdictional Habitat	
Riparian Habitat	0.5
GRAND TOTAL	**123.6**

NOTES:
[a] Wetlands and Other Waters of the United States are subject to USACE and CDFW jurisdiction; USACE does not have jurisdiction over riparian habitats identified as CDFW Only Jurisdictional Habitats.
[b] Approximately 1.3 acres of riparian habitat was delineated in Arizona. Riparian habitat beyond USACE jurisdiction in Arizona is excluded from the riparian habitat presented in this table given these areas are not subject to USACE or CDFW jurisdiction.

SOURCE: CH2M Hill 2013, 214; CH2M Hill & Transcon Environmental, Inc. 2016.

It is assumed that the wetlands and other waters of the United States mapped within the Project Area are considered jurisdictional under Section 404 of the Clean Water Act (CWA) and therefore also qualify for jurisdiction under Section 401 of the CWA administered by the Regional Water Quality Control Board (RWQCB), and Section 1600 of the California Fish and Game Code administered by CDFW (CH2M Hill 2013). An additional 1.8 acres of riparian vegetation was mapped along the fringes of these resources, of which 0.5 acre within California occur exclusively within CDFW jurisdiction (i.e., no USACE jurisdiction).



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Final Groundwater Remediation Project SEIR

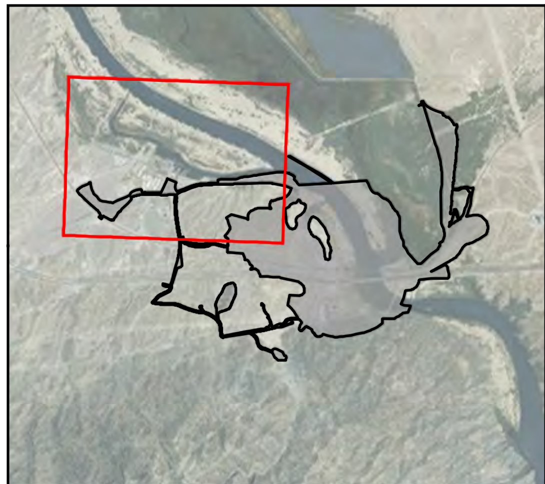
Map Creation Date: 11/11/2016 Sources: ESRI Aerial, ESA

Jurisdictional Resources: Overview

Figure 4.3-2

ESA

North State Resources



LEGEND

Groundwater SEIR Project Area

Wetlands

Palustrine Scrub-Shrub Temporarily Flooded (PSSA)

Other Waters of the U.S.

Riverine Intermittent Stream Bed Cobble-Gravel Temporarily Flooded (R4SB3A)

Riverine Lower Perennial Unconsolidated Bottom Sand Excavated (Park Moabi Slough; R2UB2x)

CDFW Only Jurisdictional Habitat

Riparian Habitat

0 500 1,000
Feet
N

Final Groundwater Remediation Project SEIR

Map Creation Date: 11/11/2016 Sources: ESRI Aerial, ESA, PG&E 2015

Jurisdictional Resources: Detail Map 1

Figure 4.3-2a

ESA

North State Resources

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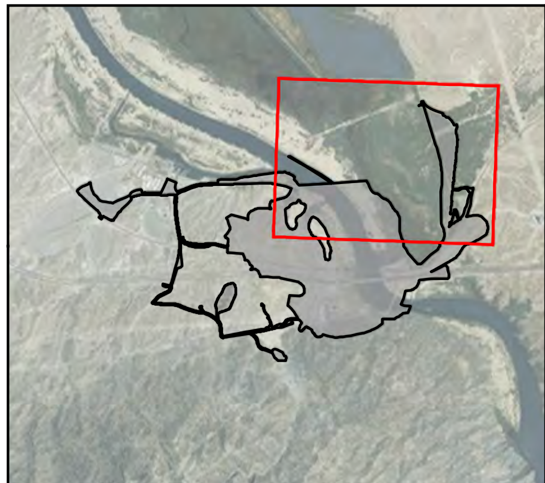

LEGEND

Groundwater SEIR Project Area

Wetlands

- Palustrine Scrub-Shrub Temporarily Flooded (PSSA)
- Palustrine, Emergent, Permanently Flooded (PEMH)
- Palustrine, Emergent, Seasonally Flooded (PEMC)

Other Waters of the U.S.

- Riverine Intermittent Stream Bed Cobble-Gravel Temporarily Flooded (R4SB3A)
- Riverine Intermittent Stream Bed Sand Temporarily Flooded (Sacramento Wash; R4SB4A)
- Riverine Intermittent Stream Bed Sand Temporarily Flooded (Unnamed Ephemeral Wash/Drainage; R4SB4A)
- Riverine Lower Perennial Unconsolidated Bottom Sand (Colorado River; R2UB2)
- Riverine Lower Perennial Unconsolidated Bottom Sand Excavated (Park Moabi Slough; R2UB2x)

0 500 1,000
Feet
N

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Final Groundwater Remediation Project SEIR

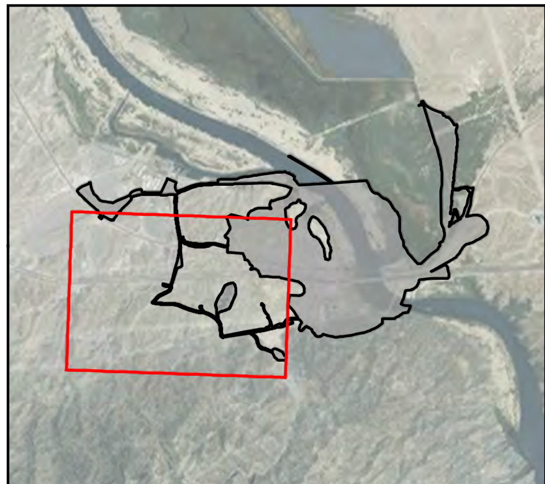
Map Creation Date: 11/11/2016 Sources: ESRI Aerial, ESA, PG&E 2015

Jurisdictional Resources: Detail Map 2

Figure 4.3-2b

ESA

North State Resources



LEGEND

Groundwater SEIR Project Area

Other Waters of the U.S.

Riverine Intermittent Stream Bed Cobble-Gravel Temporarily Flooded (R4SB3A)

0 500 1,000
Feet
N

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Final Groundwater Remediation Project SEIR

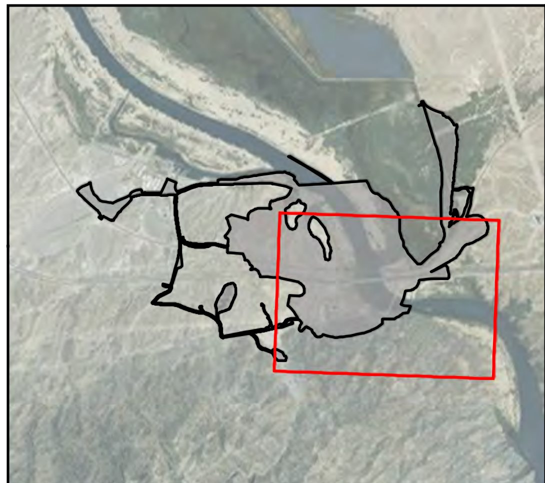
Map Creation Date: 11/11/2016 Sources: ESRI Aerial, ESA, PG&E 2015

Jurisdictional Resources: Detail Map 3

Figure 4.3-2c

ESA

North State Resources



LEGEND

Groundwater SEIR Project Area

Wetlands

Palustrine Scrub-Shrub Temporarily Flooded (PSSA)

Palustrine, Emergent, Permanently Flooded (PEMH)

Palustrine, Emergent, Seasonally Flooded (PEMC)

Other Waters of the U.S.

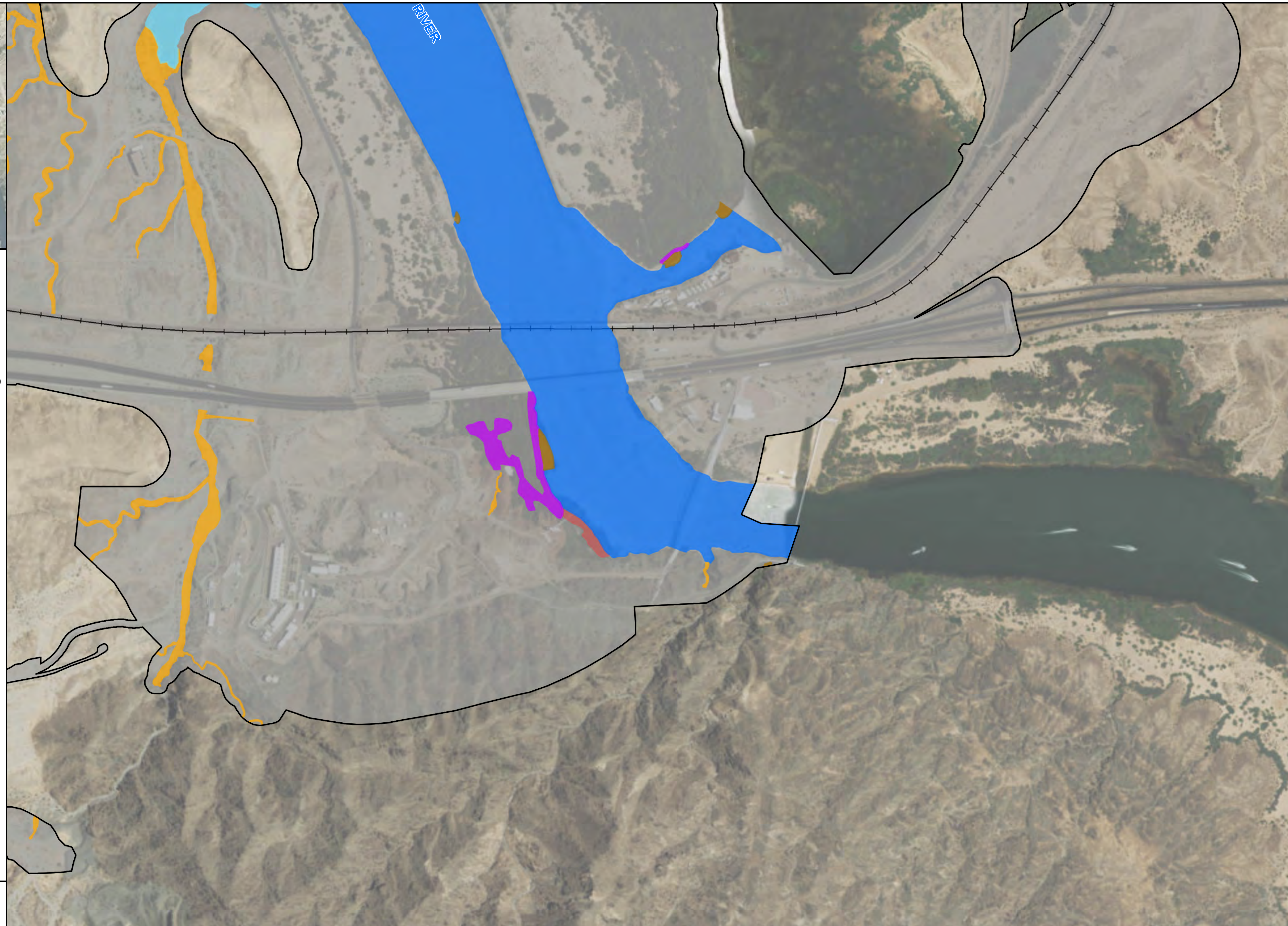
Riverine Intermittent Stream Bed Cobble-Gravel Temporarily Flooded (R4SB3A)

Riverine Lower Perennial Unconsolidated Bottom Sand (Colorado River; R2UB2)

CDFW Only Jurisdictional Habitat

Riparian Habitat

0 500 1,000
Feet
N



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Final Groundwater Remediation Project SEIR

Map Creation Date: 11/11/2016 Sources: ESRI Aerial, ESA, PG&E 2015

Jurisdictional Resources: Detail Map 4

Figure 4.3-2d

ESA

North State Resources

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Terrestrial Wildlife

Common terrestrial wildlife species that occur or are expected to occur on the Project Area for the Final Remedy Design include those previously identified in the Groundwater FEIR. Seven common bat species were found to occur or have potential to occur based on results of surveys performed since publication of the Groundwater FEIR, including Yuma myotis (*Myotis yumanensis*), California myotis (*Myotis californicus*), western canyon bat (*Parastrellus hesperus*), Mexican free-tailed bat (*Tadarida brasiliensis*), big brown bat (*Eptesicus fuscus*), southern yellow bat (*Lasiurus xanthinus*), and hoary bat (*Lasiurus cinereus*) (Brown 2015a, 2015b). Suitable bat roosting habitat occurs within the crevices and small mammal burrows along cliff faces and slopes associated with the desert washes, and bat surveys confirmed day roosting activity within Bat Cave Wash and beneath the western end of the BNSF Railway bridge. In addition, suitable maternity roosting habitat was documented on the Project Area.

Additional special-status terrestrial wildlife species were confirmed to be present on the Project Area since publication of the Groundwater FEIR. These species are referenced in the discussion of special-status species.

Aquatic Wildlife

No additional common aquatic wildlife species have been documented or observed within the Project Area subsequent to the Groundwater FEIR. However, an instream habitat typing survey conducted in 2012 (CH2M Hill 2012) noted additional habitat characteristics of the Colorado River that may support additional habitat for aquatic wildlife species. This survey documented isolated pockets of gravel, cobble, or sandy substrates with minimal current scour occur along the western banks of the Colorado River that could be used as spawning habitat or possibly as larval rearing areas for many fish species (although less likely for rearing, due to the dominant fast flows and relatively small size of these sites). Some of these pocket areas, in back eddies and the lee of outcrops, were observed to have active fish nests. For these small-sized potential spawning areas, the more sandy areas to the north near Bat Cave Wash had the least favorable habitat potential. The small areas of potential cobble/gravel spawning or rearing habitat observed in the south included areas of favorable water depth (1 to 2 meters) for spawning (CH2M Hill 2012).

Special-Status Species

The results of additional general and focused surveys, as well as recent coordination with the USFWS, determined that eight special-status plant species and 13 special-status wildlife species not previously evaluated in the Groundwater FEIR may occur in the Project Area. The eight special-status plant species include: Small-flowered androstephium (*Androstephium breviflorum*), gravel milk-vetch (*Astragalus sabulonum*), Emory’s crucifixion-thorn (*Castela emoryi*), mousetail suncup (*Chylismia arenaria* ssp. *arenaria*), glandular ditaxis (*Ditaxis claryana*), spiny-hair blazing star (*Mentzelia tricuspis*), Arizona pholistoma (*Pholistoma auritum* var. *arizonicum*), and Narrow-leaved psorothamnus (*Psorothamnus fremontii* var. *attenuates*). The 13 additional special-status wildlife species include: northern Mexican gartersnake (*Thamnophis eques megalops*), Lucy’s warbler (*Oreothlypis luciae*), mountain plover (*Charadrius montanus*), loggerhead shrike (*Lanius ludovicianus*), ring-tailed cat (*Bassariscus astutus*), southwestern river otter (*Lontra canadensis sonora*), Nelson's bighorn sheep (*Ovis canadensis nelsoni*), cave myotis (*Myotis vellifer*), Arizona myotis (*Myotis occultus*), western red bat (*Lasiurus blossevillii*), pocketed free-tailed bat (*Nyctinomops femorosaccus*), big free-tailed bat (*Nyctinomops macrotis*), and western mastiff bat (*Eumops perotis*). The additional special-status species evaluated in this SEIR that were not included in the Groundwater FEIR discussion are included in **Table 4.3-3**. In addition, four special-status species were determined to have a higher potential to occur than what was determined in the Groundwater EIR. These species are also included in Table 4.3-3 and include the western yellow-billed cuckoo (*Coccyzus americanus occidentalis*), pallid bat, Townsend's big-eared bat (*Corynorhinus townsendii pallescens*), and California leaf-nosed bat (*Macrotus californicus*).

The special-status species listed in the previous paragraph are discussed further in the following subsections. Refer to Section 4.3.2.1 of this SEIR for a list of species that were adequately addressed in the Groundwater FEIR.

TABLE 4.3-3
SPECIAL-STATUS SPECIES POTENTIALLY OCCURRING IN THE PROJECT AREA THAT WERE NOT EVALUATED IN THE GROUNDWATER FEIR OR HAVE AN ELEVATED POTENTIAL FOR OCCURRENCE

Species	Status[a]	Habitat	Potential for Occurrence[b]
Plants			
Small-flowered androstephium *Androstephium breviflorum*	CRPR 2.2	Perennial bulbiferous herb that occurs in Mojavean desert scrub; widely scattered in stabilized to semi-stabilized sandy areas in valleys from 220 – 800 meters in elevation. Blooms from March - April.	**Present**; this plant was found during the 2012 floristic survey in Arizona (east side of the Oatman-Topock Highway, north of the BNSF railroad tracks), where it is not considered a special-status plant (CH2M HILL and GANDA 2013a, 2013b). This species is considered present only within the Arizona portion of the Project Area.
Gravel milk-vetch *Astragalus sabulonum*	CRPR 2.2	Annual/perennial herb that occurs in desert dunes, Mojavean Desert scrub and Sonoran Desert scrub in sandy sometimes gravelly soils. Can be found in flats, washes or roadsides from 60 to 930 meters in elevation. Blooms from February–June.	**Present**; this plant was found during the 2012 floristic survey in Arizona, where it is not considered a special-status plant (CH2M HILL and GANDA 2013a, 2013b). This species is considered present only within the Arizona portion of the Project Area.
Emory's crucifixion-thorn *Castela emoryi*	CRPR 2.3	Perennial deciduous shrub that occurs in Mojavean desert scrub, playas, and Sonoran desert scrub from 90 to 670 meters in elevation. Blooming period range is April–September.	**Unlikely to occur**; the species was not observed within the Project Area during the various biological surveys referenced in this document, including the 2012 floristic survey. The nearest record occurs near Chemehuevi Wash 19 miles southeast of Topock (CH2M HILL & GANDA 2011).
Mousetail suncup *Chylismia arenaria* ssp. *arenaria*	CRPR 2.2	Perennial herb found in Mojavean desert scrub on rocky slopes and canyon walls; may also be found in washes from 70 to 915 meters in elevation. Blooming period range is January–May.	**Present**. Four individuals found along the steep, nearly vertical rocky slopes in or near Bat Cave Wash during the 2012 floristic survey (CH2M HILL and GANDA 2013a, 2013b).
Glandular ditaxis *Ditaxis claryana*	CRPR 2.2	Perennial herb typically found in Mojavean desert scrub and Sonoran desert scrub from 0 to 465 meters in elevation. Blooming period range is October–March.	**Unlikely to occur**; though suitable habitat exists, the species was not observed during the various biological surveys referenced in this document, including the 2012 floristic survey (CH2M HILL & GANDA 2011).
Spiny-hair blazing star *Mentzelia tricuspis*	CRPR 2.1	Annual herb found along sandy, gravelly slopes and washes within Mojavean desert scrub. Occurs from 150–1,280 meters in elevation and blooms between March and May.	**Present**; this plant was found during the 2012 floristic survey in Arizona (below the BNSF railroad tracks), where it is not considered a special-status plant (CH2M HILL and GANDA 2013a, 2013b). This species is considered present only within the Arizona portion of the Project Area.

TABLE 4.3-3
SPECIAL-STATUS SPECIES POTENTIALLY OCCURRING IN THE PROJECT AREA THAT WERE NOT EVALUATED IN THE GROUNDWATER FEIR OR HAVE AN ELEVATED POTENTIAL FOR OCCURRENCE

Species	Status[a]	Habitat	Potential for Occurrence[b]
Arizona pholistoma *Pholistoma auritum* var. *arizonicum*	CRPR 2.3	Annual herb found within Mojavean desert scrub from 275 to 835 meters in elevation. Blooming period occurs in March.	**Unlikely to occur**; though suitable habitat is present, the species was not observed during the various biological surveys referenced in this SEIR and the nearest known occurrence is 15 miles northwest of the Project Area in the Dead Mountains (CH2M HILL & GANDA 2011).
Narrow-leaved psorothamnus *Psorothamnus fremontii* var. *attenuates*	CRPR 2.3	Perennial shrub found in Sonoran desert scrub on granitic or volcanic soils. Occurs from 335 to 915 meters in elevation and blooms in April.	**Unlikely to occur**; though suitable habitat is present, the species was not observed during the various biological surveys referenced in this document. Furthermore the species is only known to occur in the Whipple Mountains approximately 30 miles south of Project Area (CH2M HILL & GANDA 2011).
Reptiles			
Northern Mexican gartersnake *Thamnophis eques megalops*	Fed: T	Primarily found within riparian and moist habitats such as source-area wetlands (e.g., cienegas, stock tanks [small earthen impoundment], etc.), large river riparian woodlands and forests, and streamside gallery forests with limited, if any, herbaceous ground cover or dense grass. Occurs at elevations from 130 to 8,497 feet.	**Likely to Occur**; Recently discovered north of the Project Area at Beal Lake (within HNWR) in 2015. Potential sheltering habitat exists in Arizona at the water's edge and along the shoreline of Topock Marsh where dense vegetation may provide suitable cover. Additional potential sheltering habitat may be found away from the Topock Marsh itself, in the form of any small crack, crevice, hole, wood debris piles or isolated patches of dense vegetation.
Birds			
Lucy's warbler *Oreothlypis luciae*	State: CSC	Nest in California and Arizona during the summer breeding season (mid-April to early July). Suitable habitat includes mesquite bosques, preferring honey mesquite thickets (*Prosopis glandulosa*), with moderate use of tamarisk, screw bean mesquite (*Prosopis pubescens*), and cottonwood-willow areas. Cavity nester, frequently using nests excavated by Ladder-backed woodpeckers (*Picoides scalaris*).	**Present**; a dead fledgling was observed beneath power lines in the Project Area, on the Arizona side of the Colorado River (CH2M Hill & Transcon Environmental, Inc. 2016). The species may be present within suitable habitat on both sides of the River. In California, there is suitable habitat for this species within the mouth of Bat Cave Wash. In Arizona, there is suitable habitat along both sides of the Oatman-Topock Highway.
Mountain plover *Charadrius montanus*	State: CSC	Winter in southern California and Arizona and inhabits sparsely covered chenopod scrub and valley and foothill grassland habitats.	**Unlikely to occur**; suitable habitat does not occur in the Project Area.

TABLE 4.3-3
SPECIAL-STATUS SPECIES POTENTIALLY OCCURRING IN THE PROJECT AREA THAT WERE NOT EVALUATED IN THE GROUNDWATER FEIR OR HAVE AN ELEVATED POTENTIAL FOR OCCURRENCE

Species	Status[a]	Habitat	Potential for Occurrence[b]
Loggerhead shrike *Lanius ludovicianus*	State: CSC	Nests in a variety of habitats, including broad-leaved upland forest, desert washes, Joshua tree woodland, Mojavean desert scrub, pinon and juniper woodlands, riparian woodland, and Sonoran desert scrub.	**Likely to occur**; the species was observed within the vicinity of the Project Area during several of the focused wildlife surveys (GANDA 2009a, 2009b, 2007). Potentially suitable habitat is available in the Project Area. Historic California Natural Diversity Database (CNDDB) record approximately 3 miles southeast of the Project Area (CNDDB 2013).
Western yellow-billed cuckoo [c] *Coccyzus americanus occidentalis*	Fed: T State: E	Riparian forest nester in flood bottoms of larger river systems. Requires multistory habitat for foraging.	**Present**; species documented within and adjacent to to the Project Area, along the southwestern portion of Topock Marsh (GANDA 2009a, 2010, 2012, 2014, and 2015). The Project Area provides little suitable nesting and foraging habitat for the species.
Mammals			
Pallid bat *Antrozous pallidus*	State: CSC	Occurs in a variety of sites; most common in open dry habitats. Roosts in undisturbed rocky sites.	**Present**; Species detected in Project Area in 2015 and 2016 during focused bat surveys (H.T. Harvey & Associates 2015). Historic CNDDB record near Needles (CNDDB 2013).
Ring-tailed cat *Bassariscus astutus*	State: FP	Suitable habitat for ringtails consists of a mixture of forest and shrub land in close association with rocky areas or riparian habitats.	**Present.** An individual was observed within the Topock Station on October 25, 2007. A second ring-tailed cat sighting was made at the Station a few years later in the same location (PG&E 2014b). No other ring-tailed cat sightings have been reported in the Project Area before or after these dates.
Townsend's big-eared bat *Corynorhinus townsendii pallescens*	State: CSC[d] LCR MSCP	Variety of habitats, including oak savanna, riparian, and grassland; roosts in mines, caves, and buildings.	**Present**; Species detected in Project Area in 2015 during focused bat surveys (H.T. Harvey & Associates 2015). Documented near Lake Mead and near Blythe (BOR 2008). Not expected to establish maternity roosts on-site (H.T. Harvey & Associates 2016b).
California leaf-nosed bat *Macrotus californicus*	State: CSC LCR MSCP	Habitat includes temperate deserts. Does not migrate or hibernate but finds warm daytime roosts in caves, mines, or buildings. Generally forages only 2 hours at night.	**Present**; Four individuals captured near the southern boundary of the Project Area in 2016 during mist net surveys (H.T. Harvey & Associates 2016b). Recorded in a mine near Lake Havasu (CNDDB 2013). No suitable maternity roosting habitat present within the Project Area (H.T. Harvey & Associates 2016b).

TABLE 4.3-3
SPECIAL-STATUS SPECIES POTENTIALLY OCCURRING IN THE PROJECT AREA THAT WERE NOT EVALUATED IN THE GROUNDWATER FEIR OR HAVE AN ELEVATED POTENTIAL FOR OCCURRENCE

Species	Status[a]	Habitat	Potential for Occurrence[b]
Southwestern river otter *Lontra canadensis sonora*	State: CSC	Habitat occurs within the Colorado River basin in flowing waters and riparian woodland.	**Unlikely to occur**; suitable habitat does not occur in the Project Area.
Nelson's bighorn sheep *Ovis canadensis nelsoni*	State: FP within the Western Mojave Plan	Commonly utilized habitats include alpine, alpine dwarf scrub, chaparral, chenopod scrub, Great Basin scrub, Mojavean desert scrub, montane dwarf scrub, pinon and juniper woodlands, riparian woodland, and Sonoran desert scrub. Foraging habitat extends to the lower elevation scrub vegetation communities. Nearby steep, rugged terrain is required for predator evasion and lambing.	**Present**; suitable lambing habitat occurs in the mountains south of the Project Area, but not within the Project Area. Suitable foraging and movement habitat extends from the foothills of the mountains down into the floodplain and upland areas of the Project Area. The species was detected on the Project Area most recently in March 2016.
Cave myotis *Myotis vellifer*	State: CSC	Caves are the main roosts for this southwestern species, although it also uses mines, and occasionally buildings and bridges. It is primarily a "crevice dweller," preferring "crevices, pockets, and holes in the ceilings of its underground retreats." This species is also known to roost in barn swallow nests. Also forages over dense riparian vegetation and in drier desert washes.	**Present**; Species detected in Project Area in 2015 during focused bat surveys (H.T. Harvey & Associates 2015).
Arizona myotis *Myotis occultus*	State: CSC	Commonly found in conifer forests in the 6,000- to 9,000-foot elevation range, although nursery colonies are found in much lower elevations (e.g., along the Colorado River in California). This species has been found using bridges and attics as maternity roosts, with colony size up to 800. They are known to forage in association with orchards, permanent water, and riparian vegetation, and at higher elevations over ponds in forest clearings.	**Could occur**; known to occur in lower elevations along the Colorado River which is immediately east of the Project Area. No CNDDB records in area, but potential to occur near the Project Area (Brown 2015b).

TABLE 4.3-3
SPECIAL-STATUS SPECIES POTENTIALLY OCCURRING IN THE PROJECT AREA THAT WERE NOT EVALUATED IN THE GROUNDWATER FEIR OR HAVE AN ELEVATED POTENTIAL FOR OCCURRENCE

Species	Status[a]	Habitat	Potential for Occurrence[b]
Western red bat *Lasiurus blossevillii*	State: CSC	Day roosts are commonly in edge habitats adjacent to streams or open fields, in orchards, and sometimes in urban areas. There may be an association with intact riparian habitat (particularly willows, cottonwoods, and sycamores). Roost sites are generally hidden from view from all directions except below; lack obstruction beneath, allowing the bat to drop downward for flight; lack lower perches that would allow visibility by predators; have dark ground cover to minimize solar reflection; have nearby vegetation to reduce wind and dust; and are generally located on the south or southwest side of a tree. This species may also occasionally use caves, as both dead and live red bats, including a pregnant female, have been collected from Carlsbad Caverns in New Mexico.	**Present**; Species detected in 2016 during acoustic monitoring in the tamarisk grove near the viaduct on Bat Cave Wash, under the railroad bridge on the western banks of the Colorado River, and along the tamarisk groves in Arizona (H.T. Harvey & Associates 2016b). Roosting expected in the Project Area during spring and fall migration; maternity roosting not expected (H.T. Harvey & Associates 2016b).
Pocketed free-tailed bat *Nyctinomops femorosaccus*	State: CSC	Roosts primarily in crevices of rugged cliffs, high rocky outcrops and slopes. It has been found in a variety of plant associations, including desert shrub and pine-oak forests. The species may also roost in buildings, caves, and under roof tiles. This bat forages mainly on large moths, but its diet includes small moths and beetles, with small amounts of a variety of other insects.	**Could occur**; suitable foraging and roosting habitat present on the steep slopes and cliffs on the Project Area. No CNDDB records in area, but potential to occur near the Project Area (Brown 2015b).
Big free-tailed bat *Nyctinomops macrotis*	State: CSC	Inhabits rugged, rocky habitats in arid landscapes. It has been found in a variety of plant associations, including desert shrub, woodlands, and evergreen forests. It appears to be associated with lowlands, but has been documented at around 8,000 ft. in New Mexico. It roosts mainly in the crevices of rocks in cliffs, as well as buildings, caves, and tree cavities. Maternity roosts have been documented in rock crevices and high site fidelity	**Could occur**; suitable foraging and roosting habitat present on the steep slopes and cliffs on the Project Area. No CNDDB records in area, but potential to occur near the Project Area (Brown 2015b).
Western mastiff bat *Eumops perotis*	State: CSC	Primarily a cliff-dwelling species that forms maternity colonies of several dozen to several hundred under exfoliating rock slabs (e.g., granite, sandstone or columnar basalt). Maternity roosts of this species can contain males and females. Roosts are located high above the ground allowing a clear vertical drop of at least 3 meters. Forages in dry desert washes, floodplains and within a mix of vegetation.	**Present**; Species detected in Project Area in 2015 during focused bat surveys (H.T. Harvey & Associates 2015).

TABLE 4.3-3
SPECIAL-STATUS SPECIES POTENTIALLY OCCURRING IN THE PROJECT AREA THAT WERE NOT EVALUATED IN THE GROUNDWATER FEIR OR HAVE AN ELEVATED POTENTIAL FOR OCCURRENCE

Species	Status[a]	Habitat	Potential for Occurrence[b]

[a] **Legal Status Definitions**

Federal Listing Categories
E = Endangered (legally protected)
T = Threatened (legally protected)
C = Candidate proposed for listing (legally protected)

State (CA) Listing Categories
E = Endangered (legally protected)
T = Threatened (legally protected)
FP = Fully Protected (legally protected, no take allowed)
CSC = California Species of Concern (no formal protection)
C = Candidate proposed for listing (legally protected)

California Native Plant Society's Rare Plant Rank (CRPR) Categories
2 Plant species considered rare or endangered in California but more common elsewhere (but not legally protected under the federal and California Endangered Species Acts
0.1 Seriously threatened in California (over 80 percent of occurrences threatened/high degree and immediacy of threat)
0.2 Fairly threatened in California (20-80 percent occurrences threatened/moderate degree and immediacy of threat)
0.3 Not very threatened in California (<20 percent of occurrences threatened/low degree and immediacy of threat or no current threats known)

Lower Colorado River Multi-Species Conservation Program (LCR MSCP) species covered under the plan.

NOTES:
[b] **Potential for Occurrence Definitions**
Unlikely to occur: Potentially suitable habitat present, but species unlikely to be present in the Project Area because of current status of the species and very restricted distribution.
Could occur: Suitable habitat is available in the Project Area; however, there are few or no other indicators that the species might be present.
Likely to occur: Habitat conditions, behavior of the species, known occurrences in the Project vicinity, or other factors indicate a relatively high likelihood that the species would occur in the Project Area.
Present: The species, or evidence of its presence, was observed in the Project Area during reconnaissance-level surveys or was reported by others.
[c] The western yellow-billed cuckoo was a candidate for federal listing at the time the Groundwater FEIR was published. The species was listed as threatened by the USFWS in October 2014 (USFWS 2014a).
[d] The Townsend's big-eared bat was identified as a candidate for listing under the CESA in 2013. However, The California Fish and Game Commission recently determined that listing of the species as threatened or endangered under the CESA was not warranted.

SOURCE: CNDDB 2013, CNPS 2013, BOR 2004, and as provided within the table.

Special-Status Plants

Small-flowered androstephium and gravel milk-vetch are both California Native Plant Society's California Rare Plant Rank (CRPR) Rank 2.2 species that occur in Mojavean and Sonoran desert scrub habitat on sandy soils. Although both species are considered special-status plants in California, these plants were found only during the 2012 floristic survey in Arizona where they are not considered special-status plants (CH2M HILL and GANDA 2013a, 2013b). Approximately 70 individuals of small-flowered androstephium were observed in the sandy soils on the west side of the BNSF Railway tracks, and a single gravel milkvetch plant was found adjacent to the Sacramento Wash on the east side of the Oatman-Topock Highway (CH2M Hill & GANDA 2013b). These species are considered present within the Arizona portion of the Project Area only.

Emory's crucifixion-thorn, Arizona pholistoma, and narrow-leaved psorothamnus are all listed as CRPR Rank 2.3 species, and glandular ditaxis is listed as a CRPR Rank 2.2 species. All four species occur in desert scrub habitat that is present on the Project Area. However, none of these species were observed during general and focused floristic surveys conducted on the Project Area. Therefore, these four species are considered unlikely to occur.

Mousetail suncup is a CRPR Rank 2.2 species that occurs in Mojavean desert scrub on rocky slopes and canyon walls, and may also be found in washes. The largest population of the species on the Project Area occurs on a vertical conglomerate rock wall above Bat Caves Wash, while other individuals also occur on other conglomerate rocks, a granitic rock face in a wash at the eastern end of the Project Area, and on a steep rocky slope next to the BNSF Railway tracks. Therefore, this species is considered present on the Project Area. Populations of mousetail suncup on the Project Area represent a significant range extension for the species as they are over 90 miles northeast of previously recorded populations in California (CH2M Hill & GANDA 2013b).

Spiny-hair blazing star is a CRPR Rank 2.1 species that occurs along sandy, gravelly slopes and washes within Mojavean desert scrub that is present within the Project Area. This species was found during the 2012 floristic survey in Arizona, on the rocky slopes just west of and below the BNSF Railway tracks. Although spiny-haired blazing star is considered a special-status plant in California, it is not considered a special-status species in Arizona (CH2M Hill and GANDA 2013a, 2013b). This species is considered present within the Arizona portion of the Project Area only.

Special-Status Aquatic Species

Special-status fish species known to occur within the Project Area remain the same as described in the Groundwater FEIR (i.e., bonytail chub, razorback sucker, and flannelmouth sucker). No additional special-status fish species are expected to occur in the Project Area. An instream habitat typing survey was conducted since publication of the Groundwater FEIR (CH2M Hill 2012). This survey was performed per Mitigation Measures BIO-3b in the Groundwater FEIR for evaluating alternative locations for a freshwater intake structure, which is no longer part of the proposed Project. While this survey did not identify occurrence of any new special-status species, the survey did provide more detail regarding potential spawning habitat for the bonytail chub, razorback sucker, and flannelmouth sucker along the portion of the Colorado River that bisects the Project Area. Potentially suitable spawning habitat for these species was confirmed in isolated pockets along the western banks of the Colorado River.

Special-Status Wildlife

The northern Mexican garternsake is federally listed as threatened and is primarily found within riparian and moist habitats such as source-area wetlands (e.g., cienegas, stock tanks (small earthen impoundment), etc.), large river riparian woodlands and forests, and streamside gallery forests with limited, if any, herbaceous ground cover or dense grass (USFWS 2016). The nearest known viable population is approximately 35 miles southeast of the Project Area, in the Bill Williams River near Parker, Arizona. However, several sightings of northern Mexican gartersnake were documented in spring 2015 at the Beal Lake Conservation Area (BLCA), located within the HNWR. At this time, the distribution and abundance of northern Mexican gartersnake within the BLCA, as well as its distribution on other portions of the HNWR is not well known. Nonetheless, this species is considered likely to occur within portions of the Project Area in Arizona, given these nearby detections and presence of suitable habitat along the southern shoreline of Topock Marsh (PG&E 2016). Within the Project Area, the Oatman-Topock Highway has a narrow shoulder with a rocky fill slope that abuts directly with the southern tip of the Topock Marsh. This roadway shoulder may serve the gartersnake for short-term dispersal purposes but does not provide suitable sheltering habitat due to lack of vegetation or other refugia (such as small mammal burrows, wood debris piles, or rock piles).

The Lucy’s warbler is a California Species of Special Concern and can be found in California during the summer breeding season (mid-April to early July). A dead Lucy’s warbler fledgling was observed within the Project Area, on the Arizona side of the Colorado River. While the species was observed in Arizona (where it is not considered a special-status species), suitable habitat occurs on both sides of the Colorado River. Within the California portion of the Project Area, suitable Lucy’s warbler habitat occurs within the mouth of Bat Cave Wash (CH2M Hill & Transcon Environmental, Inc. 2016).

The mountain plover is a California Species of Special Concern that occurs in chenopod scrub, valley, and foothill grassland habitats. There are no known occurrences of this species within or in the vicinity of the Project Area and suitable habitat is not present. Therefore, this species is considered unlikely to occur on the Project Area.

The loggerhead shrike is a California Species of Special Concern that requires open land with lookout perches for hunting, preferring areas with short vegetation such as pastures, lawns, and freshly plowed fields throughout most of Mexico and the southern half of the United States. They nest in dense, brushy vegetation, either in hedgerows or isolated trees, adjacent to open foraging grounds. Shrikes will use a variety of vegetation communities, including broadleaved upland forest, desert washes, Joshua tree woodland, Mojavean desert scrub, pinon and juniper woodlands, riparian woodland, and Sonoran desert scrub. The species was observed within the vicinity of the Project Area during several of the focused wildlife surveys (GANDA 2009a, 2009b, 2007). Therefore, this species is considered likely to occur on the Project Area.

The western yellow-billed cuckoo is a federally threatened species that requires structurally complex riparian vegetation with tall trees and a dense woody vegetative understory. They breed in large blocks of riparian vegetation, particularly woodlands populated by cottonwoods and willows. The Groundwater FEIR determined that the species, a candidate for federal listing under FESA at the time of publication, was unlikely to occur given that little suitable nesting and foraging habitat is present in the Project Area (DTSC 2011). However, since certification of the Groundwater FEIR, presence of the species in and immediately adjacent to the Project Area has been confirmed (GANDA 2009a, 2010, 2012, 2014, and 2015). The species has specifically been detected in riparian habitat along the western margin of the Topock Marsh. While the species was detected in suitable habitat near Topock Marsh, the availability of suitable habitat in the broader Project Area is relatively limited given the lack of dense riparian habitat supporting native willow and cottonwood trees. In addition, the species was formally listed as threatened under the FESA subsequent to the Groundwater FEIR (USFWS 2014a), and critical habitat for the species has been proposed (USFWS 2014b). Primary constituent elements of proposed western yellow-billed cuckoo include: (1) riparian woodlands with mixed willow-cottonwood vegetation, mesquite-thorn-forest vegetation, or a combination of these that contain habitat for nesting and foraging in contiguous or nearly contiguous patches that are greater than 325 feet in width and 200 acres or more in extent; (2) presence of a prey base (large insect fauna and tree frogs); and (3) river systems that are dynamic and provide hydrologic processes that encourage sediment movement and deposits that allow seedling germination and promote plant growth, maintenance, health, and vigor (USFWS 2014b). A portion of the 23,452-acre Unit 8 (CA/AZ–2) of the proposed critical habitat is located within the Project Area. According to the critical habitat proposal, this unit supports a small population of western yellow-billed cuckoos, has great potential for riparian habitat restoration, and provides a movement corridor to habitat patches farther north. USFWS's proposal notes that tamarisk is prevelant in this unit, which reduces habitat value for the species,

Ring-tailed cat is a California Fully Protected species and occurs in shrub land associated with rocky areas or riparian habitats. An individual ring-tailed cat was observed within the Station on October 25, 2007, and a second sighting was made a few years later in the same location (PG&E 2014b). Therefore, this species is considered present on the Project Area.

Special-status bat species documented or with a potential to occur within the Project Area that were not evaluated in the Groundwater FEIR include cave myotis, Arizona myotis, western red bat, pocketed free-tailed bat, big free-tailed bat, and western mastiff bat. All six bat species are listed as California Species of Special Concern. The cave myotis, western red bat, and western mastiff bat were confirmed to be present in the Project Area (H.T. Harvey & Associates 2015, 2016). The Arizona myotis, pocketed free-tailed bat, and big free-tailed bat were determined to have potential to occur based on habitat suitability and known occurrences in the vicinity of the Project Area (Brown 2015b).

The pallid bat, Townsend's big-eared bat, California leaf-nosed bat were included in the special-status species evaluation in the Groundwater FEIR. The pallid bat was identified in the Groundwater FEIR as a species that could occur in the Project Area. However, since certification of the Groundwater FEIR, presence of the pallid bat in the Project Area has been confirmed. The

Groundwater FEIR indicated that both the Townsend's big-eared bat and California leaf-nosed bat were unlikely to occur. A single male Townsend's big-eared bat was observed on the Project Area during a 2015 bat survey (H.T. Harvey & Associates 2015). While this occurrence of Townsend's big-eared bat demonstrates presence of the species within and around the Project Area, it does not provide definitive evidence if this is a resident species on-site. Four California leaf-nosed bats (three pregnant females and one male) were observed during the spring 2016 bat survey (H.T. Harvey & Associates 2016b). Thus, the Townsend's big-eared bat and California leaf-nosed bat presence in the Project Area has been confirmed since the Groundwater FEIR. It should be noted that neither species is expected to establish maternity roosts within the Project Area (H.T. Harvey & Associates 2016b).

Southwestern river otter is a California Species of Special Concern that occurs within the Colorado River basin, specifically within flowing waters and riparian woodlands. This species has not been observed within the Project Area and suitable habitat is not present. Therefore, this species is considered unlikely to occur on the Project Area.

Nelson's bighorn sheep is a California Fully Protected species that uses Mojavean desert scrub habitats adjacent to steep, rugged terrain such as those on the Project Area. Suitable lambing habitat occurs in the mountains south of the Project Area, but not within the Project Area. Suitable foraging and movement habitat extends from the foothills of the mountains down into the floodplain and upland areas of the Project Area. Fort Mojave Indian Tribe members observed two adult and two juvenile sheep next to Maze Locus A during the annual prayer ceremony in June 2013. Felton Bricker, Tribal Monitor, has reported observations of sheep in his monitoring logs during the AOC cleanup. Therefore, this species is considered present within the Project Area. Most recently, two bighorn sheep were observed within 250 feet of soil investigation activities, and within the Project Area, on March 3 and March 7, 2016 (CH2M Hill 2016).

Sensitive Habitats

One sensitive habitat that was not evaluated in the Groundwater FEIR, western honey mesquite bosque (i.e., honey mesquite), was identified in the Project Area during wetland delineation surveys and floristic surveys (CH2M Hill 2013).Western honey mesquite bosque is mostly found on the low sandy terraces along the Colorado River in both California and Arizona where it intermixes with tamarisk thickets, but also occurs in a few scattered locations in the HNWR on the east side of the Oatman-Topock Highway in Arizona. Approximately 1.2 acres of western honey mesquite bosque is mapped within the Project Area (refer to Table 4.3-1). Impacts to non-disturbed western honey mequite bosque are not anticipated; thus, this sensitive habitat is not discussed further in Section 4.3.5 of this SEIR.

4.3.4 Regulatory Background

4.3.4.1 Federal

Federal Endangered Species Act

Pursuant to the FESA, USFWS has regulatory authority over federally listed species. Section 9 of the FESA prohibits the "take" of a listed species. "Take" is defined by the FESA as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.” Under federal regulations, take is further defined to include the modification or degradation of habitat where such activity results in death or injury to wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering.

Section 7 of the FESA outlines procedures for federal interagency cooperation to protect and conserve federally listed species and designated critical habitat. Critical habitat identifies specific areas that have the physical and biological features essential to the conservation of a listed species and that may require special management considerations or protection. Section 7(a)(2) requires federal agencies to consult with USFWS to ensure that they are not undertaking, funding, permitting, or authorizing actions likely to jeopardize the continued existence of listed species or destroying or adversely modifying designated critical habitat.

For projects where federal action is not involved and take of a listed species may occur, the project proponent may seek an incidental take permit under Section 10(a) of the FESA. Section 10(a) of FESA allows USFWS to permit the incidental take of listed species if such take is accompanied by a habitat conservation plan that ensures minimizing and mitigation of impacts associated with the take.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) implements domestically a series of international treaties that provide for migratory bird protection. The MBTA authorizes the Secretary of the Interior to regulate the taking of migratory birds; the act provides that it shall be unlawful, except as permitted by regulations, “to pursue, take, or kill any migratory bird, or any part, nest or egg of any such bird” (16 USC 703). This prohibition includes both direct and indirect acts, although harassment and habitat modification are not included unless they result in direct loss of birds, nests, or eggs. The current list of species protected by the MBTA includes almost all bird species that are native to the United States. Permits for take of nongame migratory birds can be issued only for specific activities, such as scientific collection, rehabilitation, propagation, education, taxidermy, and protection of human health and safety and personal property.

Clean Water Act, Section 404

Section 404 of the CWA requires project proponents to obtain a permit from USACE before performing any activity that involves any discharge of dredged or fill material into waters of the United States. Waters of the United States include navigable waters of the United States, interstate waters, all other waters where the use or degradation or destruction of the waters could affect interstate or foreign commerce, tributaries to any of these waters, and wetlands that meet any of these criteria or that are adjacent to any of these waters or their tributaries. Many surface waters and wetlands in California meet the criteria for waters of the United States.

Clean Water Act, Section 402

CWA Section 402 regulates construction-related stormwater discharges to surface waters through the National Pollutant Discharge Elimination System (NPDES) program, which is administered by the U.S. Environmental Protection Agency (USEPA). In California, the State Water Resources

Control Board is authorized by USEPA to oversee the NPDES program through the RWQCB, in this case, the Colorado River (Region 7) RWQCB.

Clean Water Act, Section 401

CWA Section 401(a)(1) specifies that any applicant for a federal license or permit to conduct any activity that may result in any discharge into navigable waters shall provide the federal licensing or permitting agency with a certification that any such discharge will not violate state water quality standards. The RWQCBs administer the Section 401 program with the intent of prescribing measures for projects that are necessary to avoid, minimize, and mitigate adverse effects on water quality and ecosystems.

Rivers and Harbors Appropriations Act, Section 10

Section 10 of the Rivers and Harbors Appropriations Act of 1899 relates to the protection of navigable water in the United States and regulates any construction affecting navigable waters and any obstruction, excavation, or filling. Section 10 requires permits for all structures, such as riprap, and activities, such as dredging, in navigable waters of the United States. Navigable waters are defined as those subject to the ebb and flow of the tide and susceptible to use in their natural condition or by reasonable improvements as means to transport interstate or foreign commerce. USACE grants or denies permits based on the effects on navigation. Most activities covered under this act are also covered under Section 404 of the CWA. All activities involving navigable waters of the United States require a Section 10 permit. Projects must obtain approval of plans for construction, dumping, and dredging. Agencies involved in the coordination of the Rivers and Harbors Appropriations Act include the U.S. Coast Guard, USACE, USEPA, and state and local agencies.

Federal Land Management Policy Act

Congress established the Federal Land Management Policy Act of 1976 to direct federal agencies to manage public lands in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archaeological values and that, where appropriate, will preserve and protect certain public lands in their natural condition, provide food and habitat for fish and wildlife and domestic animals, and provide for outdoor recreation and human occupancy and use.

U.S. Bureau of Land Management Resource Management Plan

The Project Area is located within the Beale Slough Riparian and Cultural ACEC. This ACEC was designated through the BLM Lake Havasu Field Office Record of Decision and Approved Resource Management Plan (BLM 2007). ACEC designations highlight areas where special management attention is needed to protect, and prevent irreparable damage to important historical, cultural, and scenic values, fish, or wildlife resources or other natural systems or processes; or to protect human life and safety from natural hazards (Section 202I(3) of the Federal Land Policy and Management Act of 1976). The Beale Slough ACEC has been designated to protect both cultural and natural resources. This large ACEC contains regional rare riparian resources and wildlife habitat at Beale Slough to the north of the Project Area and a cultural element on the Project Area (BLM 2007: 106, Map 28).

The Arizona BLM Lake Havasu Field Office administers portions of land adjacent to the Project Area. *The BLM Lake Havasu Resource Management Plan* (BLM 2007), which covers a portion of the Project Area, guides management of public lands and their resource values for multiple uses and sustained yield to ensure they are utilized in a manner that will best meet the present and future needs of the public. As required by the Federal Land Management Policy Act and current BLM policy, BLM established management directions for the balanced use of such renewable and nonrenewable resources as rangeland, wildlife, wilderness, recreation, cultural resources, and other natural, scenic, scientific, and historical values within the planning area.

U.S. Fish and Wildlife Service National Refuge System – Havasu National Wildlife Refuge

Established in 1941 with the signing of Executive Order 8647 by President Franklin D. Roosevelt, the HNWR encompasses 37,515 acres in California and Arizona. The majority of the HNWR is located in Arizona and approximately 69 acres if the Project Area in Arizona is located within the HNWR.

The overarching goal of the USFWS Refuge System is to conserve a diversity of fish, wildlife, plants, and their habitats for the benefit of current and future generations. By fulfilling this goal, the Refuge System can maintain the biological integrity, diversity, and environmental health of each refuge with a focus on native species and can contribute to the conservation, and, where appropriate, restoration of representative ecosystems and ecological processes in the United States. A variety of management plans are developed for refuges, which include habitat management plans, comprehensive conservations plans, and annual habitat management plans. These plans focus on maintaining the refuge system for the conservation of migratory birds, anadromous and inter-jurisdictional fish, and marine mammals. The HNWR is primarily managed to maintain and enhance riparian and wetland habitat (USFWS 1994) adjacent to the Colorado River. Refuges are also managed for recreation and public interaction. Refuges have regulations that limit or define the amount of recreation use in the refuge. Pertaining to the HNWR, regulations focus primarily on the types and timing of particular recreation uses. The *Lower Colorado River National Wildlife Refuges Comprehensive Management Plan* for HNWR offers guidance for managing habitat, fish, wildlife, and special-status species. The plan also delineates sensitive and important habitats, or areas of substantial biodiversity into Special Project and Protection Areas (USFWS 1994).

4.3.4.2 State of California

California Fish and Game Code – California Endangered Species Act

The California Endangered Species Act (CESA) is similar in many ways to the FESA. CESA is administered by the CDFW. CESA provides a process for CDFW to list species as threatened or endangered in response to a citizen petition or by its own initiative (Fish and Game Code Section 2070 et seq.). Section 2080 of CESA prohibits the take of species listed as threatened or endangered pursuant to the Act (Fish and Game Code Section 2080). Take is defined in

California Fish and Game Code Section 86 as to hunt, pursue, catch, capture or kill or attempt to hunt, pursue, catch capture or kill. Section 2081 allows CDFW to authorize take prohibited under Section 2080 provided that: (1) the taking is incidental to an otherwise lawful activity; (2) the taking will be minimized and fully mitigated; (3) the applicant ensures adequate funding for minimization and mitigation; and (4) the authorization will not jeopardize the continued existence of listed species (Fish and Game Code Section 2081).

California Fish and Game Code – Fully Protected Species

Protection of fully protected species is described in Sections 3511, 4700, 5050, and 5515 of the California Fish and Game Code. These sections of the Fish and Game Code prohibit take or possession of fully protected species and do not provide for authorization of incidental take of fully protected species. CDFW has informed nonfederal agencies and private parties that their actions must avoid take of any fully protected species.

California Fish and Game Code Section 1602 – Streambed Alteration

All diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake in California that supports wildlife resources are subject to regulation by CDFW under Section 1602 of the California Fish and Game Code. Under Section 1602, it is unlawful for any person, governmental agency, or public utility to do the following without first notifying CDFW:

- Substantially divert or obstruct the natural flow of, or substantially change or use any material from, the bed, channel, or bank of any river, stream, or lake; or
- Deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake.

"Stream" is defined as a body of water that flows at least periodically or intermittently through a bed or channel that has banks and supports fish or other aquatic life. This definition includes watercourses with a surface or subsurface flow that supports or has supported riparian vegetation. CDFW's jurisdiction within altered or artificial waterways is based on the value of those waterways to fish and wildlife. A CDFW streambed alteration agreement must be obtained for any project that would result in an impact on a river, stream, or lake.

California Fish and Game Code Sections 3503 and 3503.5 – Protection of Bird Nests and Raptors

Section 3503 of the California Fish and Game Code states that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird. Section 3503.5 specifically states that it is unlawful to take, possess, or destroy any raptors (i.e., species in the orders Falconiformes and Strigiformes), including their nests or eggs. Typical violations of these codes include destruction of active nests resulting from removal of vegetation in which the nests are located. Violation of Section 3503.5 could also include failure of active raptor nests resulting from disturbance of nesting pairs by nearby soil investigation activities. This statute does not provide for the issuance of any type of incidental take permit.

Porter-Cologne Water Quality Control Act

Under the Porter-Cologne Water Quality Control Act, waters of the state fall under the jurisdiction of the appropriate RWQCB. The RWQCB must prepare and periodically update water quality control plans (basin plans). Each basin establishes numerical or narrative water quality objectives to protect established beneficial uses, which include wildlife, fisheries, and their habitats. Projects that affect wetlands or waters of the state must meet discharge requirements of the RWQCB, which may be issued in addition to a water quality certification or waiver under Section 401 of the CWA.

4.3.4.3 State of Arizona

The Arizona Game and Fish Department (AGFD) regulates the Arizona Revised Statutes (A.R.S.) and AGFD Commission Policies that have been established to conserve, protect, restore, and enhance fish and wildlife populations and their habitats. Violation of these laws or other policies can result in criminal prosecution and/or civil liability.

A.R.S. Section 17-101 and 17-102 – Wildlife and Take

Pursuant to A.R.S. Section 17-102, wildlife is the property of the state, and can be taken only as authorized by the Arizona Game and Fish Commission. Wildlife is defined in A.R.S. Section 17-101(A)(22) as ―all wild mammals, wild birds, and the nest or eggs thereof, reptiles, amphibians, mollusks, crustaceans, and fish, including their eggs or spawn. Take is defined in A.R.S. Section 17-101(A)(18) as ―pursuing, shooting, hunting, fishing, trapping, killing, capturing, snaring or netting wildlife or the placing or using of any net or other device or trap in a manner that may result in the capturing or killing of wildlife. Therefore, it is unlawful to take, possess, transport, buy, sell or offer or expose for sale wildlife except as expressly permitted under A.R.S. Section 17-309(A)(2).

A.R.S. Section 17-235 and 17-236 – Migratory Birds, Nests, and Eggs

A.R.S. Section 17-235 authorizes the Arizona Game and Fish Commission to regulate the taking of migratory birds in accordance with the MBTA, as described above. Under A.R.S. Section 17-236(A), ―it is unlawful to take or injure any bird or harass any bird upon its nest, or remove the nests or eggs of any bird, except as may occur in normal horticultural and agricultural practices and except as authorized by commission order.

Other Arizona Regulations

The Native Plant Law, A.R.S. Section 3-901-907, is administered by Arizona Department of Agriculture. The law lists plants protected under the law and permitting procedures.

And State Water Laws are administered by the Arizona Department of Water Resources, A.R.S. Section45-152, which establishes the need and procedure for obtaining a permit to appropriate surface water. A.R.S. Title 45 Chapter 2 establishes groundwater code. The type of well drilling permit required to use groundwater depends on location.

4.3.4.4 Local

Lower Colorado River Multi-Species Conservation Program

Implemented in 2005, the LCR MSCP is intended to balance the use of water resources in the Lower Basin of the Colorado River with the conservation of native species in compliance with the FESA. The LCR MSCP outlines a 50-year effort to conserve 26 federally listed and state-listed candidate and sensitive species along the Lower Colorado River, including birds, fish, small mammals, bats, reptiles, amphibians, insects, and plants. The program area covers more than 400 miles of the Lower Colorado River from Lake Mead to the southernmost border with Mexico, and includes Lakes Mead, Mohave, and Havasu, as well as the historic 100-year floodplain along the main stem of the Lower Colorado River. The LCR MSCP provides FESA compliance for current and future operations, including water diversions and hydroelectric power generation in this area.

The LCR MSCP outlines general and species-specific measures to conserve species and their habitats. Primary components of the plan include native fish augmentation, species research, species and ecosystem monitoring, conservation area development, protection of existing habitat, and adaptive management.

Critical to the Lower Colorado River system are the unique habitats that support a huge number of resident and migratory species. Native riparian habitat has declined from historical acreage because of factors such as dam construction, river channelization, conversion to irrigated agriculture, urbanization, wildfire, and invasive species. In most areas along the Lower Colorado River, overbank flooding that native plant species need to reproduce no longer occurs. The LCR MSCP requires the creation and management of more than 8,100 acres of riparian, marsh, and backwater habitat for the targeted species, including 5,940 acres of cottonwood/willow, 1,320 acres of honey mesquite, 512 acres of marsh, and 360 acres of backwaters.

County of San Bernardino (California) 2007 General Plan

The *County of San Bernardino 2007 General Plan* outlines conservation and regulatory guidelines for natural resources. The Conservation Element of the plan provides direction regarding the conservation, development, and utilization of the San Bernardino County's natural resources. Its objective is to prevent wasteful exploitation, destruction, and neglect of resources. Sensitive biological features are floral or faunal species of rare and/or endangered status, depleted or declining species, and species and habitat types of unique or limited distribution, including alkali wet meadows, pebble plains, limestone substrate, walnut woodland, Joshua tree woodland, perennial springs, and riparian woodlands. The Conservation Element is oriented primarily toward natural resources (San Bernardino County 2007:V-1).

The Conservation Element includes regions within the County. The Project falls within the desert region habitat of the Conservation Element, covering roughly 93 percent of the County land area (San Bernardino County 2007:V-5).

Goals and policies of the conservation element include programs incorporating resource agencies and nonprofit conservation groups, as well as the application of technological tools such as

Geographic Information Systems (GIS) to assist in coordinating and implementing the conservation of sensitive biological features.

Pertinent goals and policies include:

GOAL CO 1: The County will maintain to the greatest extent possible natural resources that contribute to the quality of life within the County.

GOAL CO 2: The County will maintain and enhance biological diversity and healthy ecosystems throughout the County.

Policy CO 2.1: The County will coordinate with state and federal agencies and departments to ensure that their programs to preserve rare and endangered species and protect areas of special habitat value, as well as conserve populations and habitats of commonly occurring species, are reflected in reviews and approvals of development programs.

GOAL D/CO 1: Preserve the unique environmental features and natural resources of the Desert Region, including native wildlife, vegetation, water and scenic vistas.

Mohave County (Arizona) General Plan

Chapter 5 of the Mohave County General Plan describes the natural resources relating to Mohave County's environment. Goals and Policies are provided to manage the key natural resource issues of the County for hillside protection, wetlands protection, and habitat preservation. Pertinent goals and policies include:

Goal 5: To protect Mohave County's environmental amenities and sensitive areas in recognition of their importance to the County's quality of life.

Policy 5.1 Mohave County should work with the State Land Department, the BLM and other Federal agencies to identify and protect sensitive lands (wetlands, sensitive habitats and other valuable natural resources) as may be determined by the County.

Policy 5.2 The County should limit development impacts on environmentally sensitive areas by encouraging innovative designs and mitigation.

Policy 5.3 The County should encourage development proposals that preserve or enhance identified wildlife habitat areas.

Policy 5.4 Mohave County shall work with the State and Federal governments to protect the integrity of State Trust Lands and public lands, and ensure that land exchanges and disposals be considered in accordance with the General Plan goals and policies.

4.3.5 Environmental Impacts

4.3.5.1 Thresholds of Significance

Based on the current (2016) California Environmental Quality Act (CEQA) Guidelines, Appendix G, a project may be deemed to have a significant effect on the environment with respect biological resources if it would:

- Have a substantial adverse effect on waters, riparian, or sensitive habitat protected by federal or state regulations, including federal wetlands (as defined by Section 404 of the CWA), riparian habitats, or other sensitive natural community identified in any local or regional plans, policies, or regulations, or by CDFW or USFWS;
- Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW or USFWS;
- Have the potential to substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife species to drop below self-sustaining levels, reduce the number or restrict the range of a rare or endangered plant or animal; or
- Interfere substantially with the movement of any native resident or migratory fish or wildlife species, or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.

The complete list of CEQA significance criteria used in the biological resources analysis is included in the Modified Initial Study (see Appendix IS), which also explains why the proposed Project would not result in new significant impacts or substantially increase the severity of impacts previously identified in the Groundwater FEIR (see Public Resources Code, Section 21166; CEQA Guidelines, Section 15162) on biological resources with respect to consistency with regional and local plans. As a result, those impacts will not be addressed further in this SEIR and are summarized below.

Consistency with Local and Regional Plans

The Groundwater FEIR identified the following local and regional policies/plans in the vicinity of the Project: the Lower Colorado River Multi-Species Conservation Program, BLM's *Lake Havasu Land Management Plan,* or the *Lower Colorado River National Wildlife Refuges Comprehensive Management Plan*. The Proposed Project would not involve activities that are prohibited in the area of influence of the aforementioned plans, nor would it cause irreparable damage to the characteristics managed in these plans. This condition has not changed since certification of the Groundwater FEIR. The Project would not result in new significant impacts or substantially increase the severity of impacts previously identified in the Groundwater FEIR on biological resources with respect to consistency with local and regional policies/plans. Therefore, this issue is not evaluated further in this SEIR.

4.3.5.2 Approach to Analysis

This section presents a revised analysis per Public Resources Code section 21166 and CEQA Guidelines sections 15162 governing conditions required for preparation of a SEIR, including substantial changes to the Project or circumstances under which the Project is taken that result in major revisions to the original FEIR. Subsequent to certification of the Groundwater FEIR, the Final Remedy Design was prepared to include design details not available in 2011. This section outlines the approach to the potential biological resources impacts based on the Project specific information now available, as well as the additional information obtained regarding the existing environmental setting (see Section 4.3.3 summarizing the additional information included in the Final Remedy Design).

Generally, the analysis of impacts on biological resources, including terrestrial and aquatic resources, is based on consideration of Project activities and the anticipated disturbance footprint, existing habitat conditions in the Project Area, the known or presumed occurrence of special-status species at or near the Project Area, and coordination with the regulatory agencies (such as CDFW, USFWS, and USACE). The analysis of impacts considers all phases of the Project (i.e., construction, operation and maintenance, and decommissioning), as well as direct impacts resulting from the direct injury or mortality to species and loss of habitat, or indirect impacts from the result of excessive noise, lighting, dust and human presence adjacent to sensitive biological resources.

Some of the mitigation measures included in this section refer to various plans or other documents that have been prepared and included in the Final Remedy Design or are part of the project's federal requirements. The applicable plans related to biological resources are components of the C/RAWP (CH2M Hill 2015b) and the Operation and Maintenance Manual (Appendix L of Final Remedy Design, CH2M Hill 2015a). Many of these plans and documents included in the Final Remedy Design were prepared to implement mitigation measures previously adopted as part of DTSC's January 31, 2011, decision approving Alternative E as the groundwater remedy (DTSC 2011).

Mitigation measures are provided for impacts that are determined to be significant despite implementation of requirements of the C/RAWP and Operation and Maintenance Manual. Mitigation includes applicable measures from the Groundwater FEIR that have not yet been fully implemented, as well as new or revised measures tailored specifically to implementation of the Final Groundwater Remedy Project. New measures include mitigation to address significant impacts to biological resources that were not previously considered in the Groundwater FEIR.

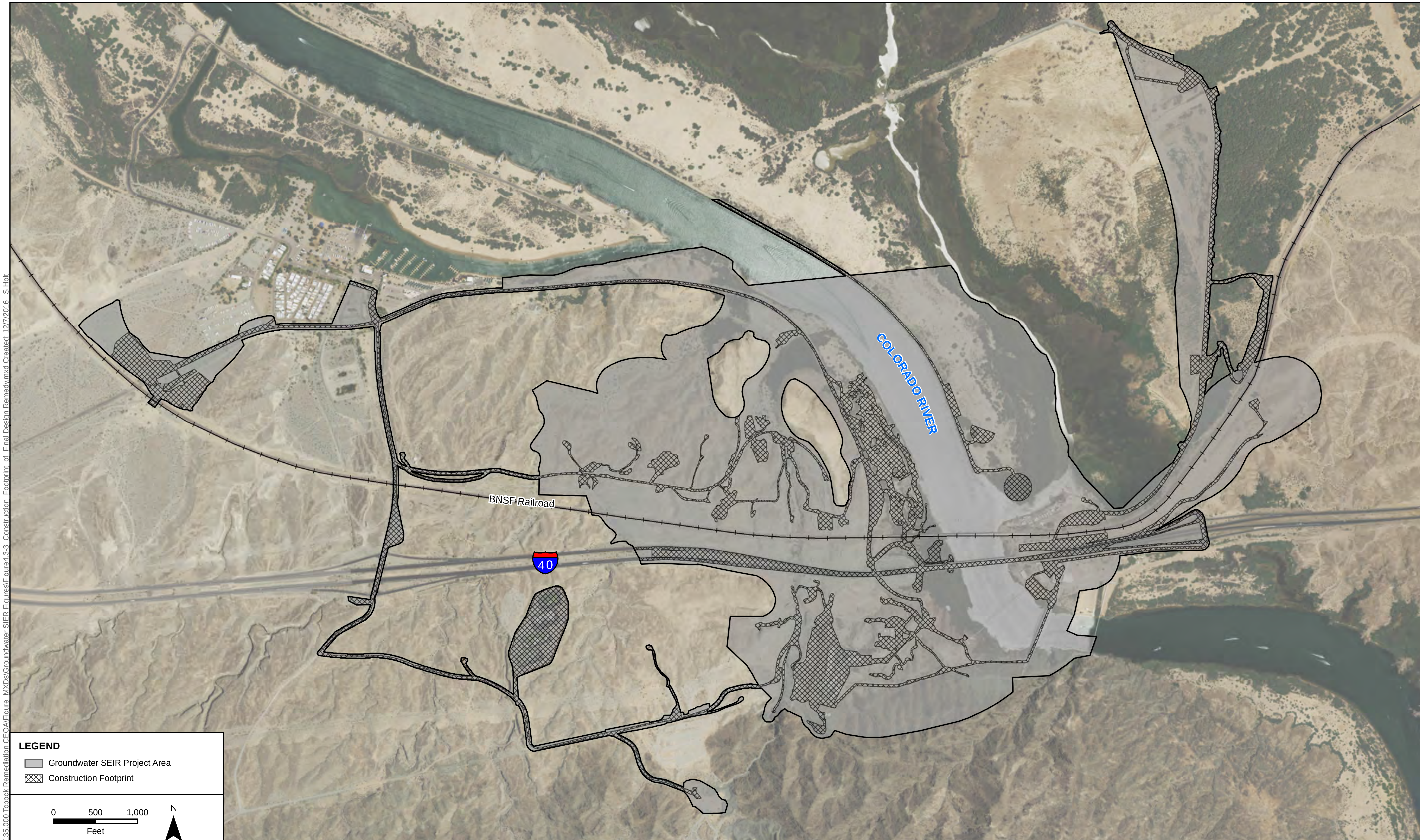
Appendix GWMM to this SEIR presents a comparison between the mitigation measures included in the Groundwater FEIR as reflected in the Mitigation Monitoring and Reporting Program approved by DTSC on January 31, 2011, and those presented in this SEIR for the Final Groundwater Remedy Project.

All plans and documents included in the Final Remedy Design and references in this SEIR are appended to this SEIR as Appendix BOD. In addition, the documents are available online at the following link: http://dtsc-topock.com/documents/cleanup-implementation/groundwater/remedy-design/remedial-design-documents.

Construction Impact Methodology

Subsequent to certification of the Groundwater FEIR, additional details were developed regarding new or modified infrastructure needed to support the remedy, which resulted in additional soil disturbance and augmented facility footprints from what was analyzed in the Groundwater FEIR. In addition, the Final Groundwater Remedy Project includes a Future Activity Allowance for all Project infrastructure to be constructed (wells, pipelines, structures, etc.). Generally, the Future Activity Allowance includes two components: (1) an additional allowance for all Project infrastructure, established at up to 25 percent of the parameter set forth in the Final Remedy Design, and (2) up to 10 additional monitoring well boreholes to be installed in Arizona as part of the monitoring program. The Future Activity Allowance could include construction of pipelines and electrical power underground, boreholes potentially located in the floodplain area and generally in the vicinity of existing/planned boreholes, monitoring well boreholes in Arizona, and additional structures near existing/planned structures and facilities (i.e., near the Station, Transwestern Bench, and Construction Headquarters, etc.). The exact locations of proposed Project facilities to be constructed under the Future Activity Allowance are not known at this time, but construction of these additional proposed Project facilities would occur within the Project Area. This SEIR therefore also includes analysis of the anticipated effects associated with the Future Activity Allowance.

Direct impacts to vegetation communities, jurisdictional resources, and special-status species habitat were quantified through a GIS analysis in which the construction footprint for the Final Remedy Design was overlain with biological data layers. The construction footprint for the Final Remedy Design totals approximately 147 acres; the construction footprint is delineated to capture the known footprints of proposed Project facilities as well as the immediately adjacent work areas needed construction. **Figure 4.3-3** depicts the construction footprint for the proposed Project facilities. In addition, a data layer delineating existing disturbance (i.e., those areas that have undergone past or reoccurring disturbance such that the biological function is lost or greatly reduced) within the construction footprint was used to characterize potential impacts to biological resources. The analyses herein assume up to 36.85 acres of additional ground disturbance to non-disturbed areas within the Project Area could result with development of additional facilities under the Future Activity Allowance. This includes development of additional facilities under the 25 Percent Potential Allowance as well as installation of up to 10 additional monitoring well boreholes in Arizona (500 square feet of ground disturbance is assumed for each additional monitoring well borehole). The 36.85 acres of additional ground disturbance is slightly greater than 25 percent of the construction footprint needed for planned facilities and is expected to represent a conservative (high end) estimate for additional direct impacts to non-disturbed biological resources. The amount of additional direct impacts to biological resources is likely to be less than 36.85 acres given that construction of additional Project facilities may occur within areas disturbed during installation of planned proposed Project facilities.



Final Groundwater Remediation Project SEIR

Map Creation Date: 12/7/2016 Sources: ESRI Aerial, ESA

Construction Footprint of Final Groundwater Remedy Design

Figure 4.3-3

ESA North State Resources

G:\Projects\15.135.000 Topock Remediation CEQA\Figure MXDs\Groundwater SIER Figures\Figure4.3-3 Construction Footprint of Final Design Remedy.mxd Created: 12/7/2016 S.Holt

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Table 4.3-4 includes a summary of wells, lengths of piping and roads, and footprints of treatment infrastructure. This table provides a comparison of infrastructure evaluated in the Groundwater FEIR and infrastructure evaluated herein for the Final Remedy Design. New or modified proposed Project facilities that have the potential to impact biological resources during construction are summarized in detail below.

TABLE 4.3-4
SUMMARY OF INFRASTRUCTURE

Proposed Project Facilities	Groundwater FEIR Estimate	Final Remedy Design	Future Activity Allowance	Total	Difference Between FEIR Limit and Total New SEIR Features[b]
Boreholes[a]	170	191	58	249	61
Disturbed Ground (cubic yards)	13,400	45,200	11,300	56,500	43,100
Fluid Conveyance Piping (linear feet, underground)	50,000	127,500 [c]	31,875	159,375	109,375
Electrical/Communications Conduits (linear feet, underground)	50,000	124,000 [c]	31,000	155,000	105,000
Buildings and Structures (square feet)	110,000	42,000	10,500	52,500	(57,500)
Roadway Improvements (linear feet)	6,000	8,150 (new) and 4,060 (improvements to existing)	2,038 (new) and 1,015 (improvements to existing)	10,188 (new) and 5,075 (improvements to existing)	9,263

[a] Each borehole may contain multiple wells; inclusive of both remediation and monitoring wells.
[b] Difference equals Total SEIR Boreholes (249) minus Groundwater FEIR Limit boreholes (170) minus Installed Boreholes (18).
[c] 124,000 linear feet of piping and/or conduits in 43,200 linear feet of trenches.

SOURCE: CH2M Hill, 2015a, 2015b.

Freshwater supply for the Final Groundwater Remedy Project would primarily be from freshwater wells in Arizona (namely well HNWR-1A) and not a freshwater intake structure along the Colorado River as considered in the Groundwater FEIR. Freshwater could also be supplied from the existing nearby secondary supply well HNWR-1, the existing contingent Topock-2/-3 wells, or the contingent installed Site B well (see Figure 3-4 in Chapter 3, "Project Description"). Although well HNWR-1A was already installed as part of the 2013 Addendum to the Groundwater FEIR, pipelines are needed as part of the Final Groundwater Remedy Project to connect it and secondary supply wells to infrastructure in California. Other supporting infrastructure for HNWR-1A includes an approximately 350-square-foot concrete well pad, 165-square-foot sand collection system, and 100-square-foot electrical pad and foundation.

The Final Groundwater Remedy Project includes construction of a Construction Headquarters (approximately 1.85 acres) and a Soil Processing/Clean-Soil Storage Area (approximately 2.68 acres) near Moabi Regional Park, which were not included or analyzed in the Groundwater FEIR. The Construction Headquarters would serve as the primary location for contractor site offices and for the mobilization and management of equipment, supplies, and site workers/contractors to/from the Project Area throughout the duration of construction activities. The Soil Processing/Clean-Soil Storage Area includes staging areas for multiple phases of soil staging, as well as a truck waiting area. This area would also include a 20-foot by 20-foot shade structure and elevated water tank.

Improvements at the Transwestern Bench as part of the Final Groundwater Remedy Project include construction of an Operations Building (approximately 2,200 square feet), a 10,000-gallon underground septic waste tank, an electrical equipment concrete pad (approximately 240 square feet), stormwater catch basins, and a security equipment and fencing. These improvements were not specifically envisioned at the time the Groundwater FEIR was certified in 2011.

A Carbon Amendment Building and Carbon Storage Tank would be constructed as part of the Final Groundwater Remedy Project at the MW-20 Bench, which is an area that has been used to support various field and IM activities since 2004. In addition, a truck loading/unloading station and security equipment and fencing would be constructed. This facility was envisioned at the time the Groundwater FEIR was certified; however, four possible locations were presented in the CEQA analysis, one of which was the MW-20 Bench.

The TCS Evaporation Ponds would be used in the Final Groundwater Remedy Project to dispose of some of the remedy-produced water generated by the proposed Project. The ponds would be upgraded to include a one-story 430-square-foot masonry utility building to house a new natural gas fueled generator, which would include fencing. Additionally, a containment area for truck loading would be constructed (approximately 800 square feet) and cameras installed. Other improvements to the ponds would not affect biological resources. The utility building and containment area were not specifically envisioned at the time the Groundwater FEIR was certified in 2011.

These Project modifications have resulted in an increase in soil disturbance from 13,400 cubic yards in the Groundwater FEIR to 45,200 cubic yards in the Final Remedy Design, which is more than three times that amount analyzed in the Groundwater FEIR. In addition, accounting for the Future Activity Allowance, the total amount of soil disturbance analyzed in this SEIR is 56,500 cubic yards (see Table 4.3-5), or four times the amount analyzed in the Groundwater FEIR. This results primarily from additional roadways and facility footprints (described above), and the fact that remedy pipelines are to be constructed underground (versus aboveground which was assumed in the Groundwater FEIR). Additionally, while subsurface trenching for fluid conveyance piping at the northern and southern crossings under Bat Cave Wash was envisioned in the Groundwater FEIR, an analysis of potential impacts to biological resources was not included in the Groundwater FEIR.

There are a total of 23 proposed staging areas to be used in the Final Groundwater Remedy Project. Some of the previously proposed staging areas analyzed in the Groundwater FEIR are no longer being considered for use. DTSC has detailed conditions PG&E must follow when using Staging Areas 6, 7, 12, 13, and 25, to minimize impacts on the areas and surrounding areas. See Table 3-6 in Chapter 3, “Project Description” for a list of staging areas.

With the exception of security lighting in the Construction Headquarters area, temporary lighting would be supplied by portable generators and lights, as needed and consistent with any applicable mitigation measures and conditions of approval. While night work is not planned as part of routine construction activities, it may be determined that limited circumstances require the continuation of work into the nighttime periods because it cannot be disrupted or suspended (for example, special conditions during drilling or concrete pouring) or work may require an early morning start to ensure completion within 1 day or because of heat constraints. For these special circumstances, nighttime construction lighting would be limited to active construction areas during nighttime or early-morning operation. To minimize lighting impacts, lighting would include shrouding or shielding for portable lights, the use of the lowest allowable height and fewest feasible numbers of lights consisting of downward-facing fixtures fitted with cutoff shields to reduce light diffusion.

Operation & Maintenance Impact Methodology

Normal operation of the groundwater remedy would include groundwater extraction and recirculation, carbon substrate storage and deliveries; carbon substrate injections, and monitoring and control of the system. There would also be activities associated with freshwater supply, conveyance, and storage; remedy-produced water management; pre-injection water treatment (if required); power supply and distribution; and the Remedy SCADA system. All of these systems would require regularly scheduled maintenance to keep the systems functioning in an efficient and optimal manner. Operation and maintenance may also include excavation to access buried infrastructure, such as pipelines.

Key operation and maintenance activities include routine or preventative maintenance used to mitigate performance losses at injection and extraction wells and is generally conducted without intrusive modifications to the wellhead or well and do not require removing existing equipment from the well for access. Well maintenance may also involve removal of existing well equipment, and in some instance wells may need to be replaced. Well replacement would follow similar methods used to construct wells.

After construction and use of the Construction Headquarters during the construction phase, the area would become the Long-Term Remedy Support Area, which would function as PG&E’s support area for the lifetime of the groundwater remedy, as discussed later in the operation and maintenance impact methodology section. This component was not envisioned at the time the Groundwater FEIR was certified. Operation and maintenance activities at the Long-Term Remedy Support Area would include on-site sample processing, and vehicle and equipment storage, decontamination, and maintenance. Routine and non-routine operation and maintenance activities would include inspection and preventative maintenance of the generator and solar panels; water delivery to the potable water tank; inspection and maintenance of the booster pump; removal and off-site disposal of sewage; decontamination of vehicles and equipment; management of rainwater collected in the secondary containment; inspection and maintenance of the sump pump; and off-site hauling of wastewater from the decontamination water storage tank.

Operation and maintenance activities at the TCS Evaporation Ponds would include ongoing maintenance of the power system and remote sensing equipment. Use of the TCS Evaporation Ponds for remedy produced water was not envisioned at the time the Groundwater FEIR was certified.

There is potential for construction of additional proposed Project facilities (e.g., wells, access roads, etc.) to occur during operation and maintenance of the proposed Project as part of the Future Activity Allowance. Thus, the analysis of operation and maintenance impacts includes analysis of potential impacts associated with construction of additional proposed Project facilities. The methodology for quantifying potential ground disturbance associated with the Future Activity Allowance during the operation and maintenance phase is the same as described above for the construction phase.

Operation and maintenance activities for the proposed Project would occur during the entire period in which cleanup activities would be ongoing and until the cleanup goals and objectives of the Final Groundwater Remedy Project have been met. Depending on the performance of the Final Groundwater Remedy Project, the anticipated remedial timeframe is estimated to be about 30 years, followed by up to 10 years of long-term monitoring and concurrently up to 20 years of arsenic monitoring.

Decommissioning Impact Methodology

The steps and schedule for decommissioning and restoration may occur during multiple mobilizations and would be affected by the specific infrastructure to be decommissioned. Decommissioning activities would occur within the same footprints of locations where remedy infrastructure was previously installed. Decommissioning and restoration of Project facilities is largely projected to occur decades in the future and would be affected by information and conditions that become available prior to and at the time of decommissioning and restoration. However, some restoration activities would begin during Phase 1 Construction, e.g., restoration of disturbed areas after well installation activities have been completed, revegetation to offset habitat loss that could not be avoided during construction.

4.3.5.3 Impact Analysis

IMPACT BIO-1 **Potential Fill of Wetlands and Other Waters of the United States/California, and Disturbance or Removal of Riparian Habitat.** Implementation of the proposed Project could result in disturbance to ephemeral waters under USACE and CDFW jurisdiction. This impact would be **potentially significant**, as previously identified in the Groundwater FEIR.

Construction

The Groundwater FEIR determined that Project activities could occur in areas that qualify for USACE jurisdiction and are protected under Section 404 of the CWA, areas subject to CDFW jurisdiction under Section 1600 of the California Fish and Game Code, and supporting sensitive riparian habitat (CDFW jurisdiction exclusively). The exact locations of infrastructure were not known when the Groundwater FEIR was certified; thus, the Groundwater FEIR did not quantify impacts to jurisdictional resources and sensitive riparian habitat.

In accordance with Mitigation Measure BIO-1 of the Groundwater FEIR, the Final Remedy Design avoids USACE and CDFW jurisdictional areas to the extent feasible. However, avoidance was not feasible for the following known Project facilities: Inner Recirculation Loop Well IRL-4; remedy and monitoring wells and associated piping/conduits in Bat Cave Wash; freshwater supply well HNWR-1A, contingent Site B well, associated equipment, and a portion of the freshwater pipeline within the 100-year floodplain of the Colorado River; and Riverbank Extraction Well RB-5, monitoring well MW-W, a portion of Pipeline C, and a portion of an access road within the 100-year floodplain of the Colorado River. Based on the locations of proposed Project facilities, approximately 2.44 acres of ephemeral waters under USACE and CDFW jurisdiction delineated within the Project Area would be directly impacted during construction of the proposed Project. Of these 2.44 acres of potential direct impacts, approximately 1.58 acres of impact would occur to jurisdictional areas that are currently disturbed or developed. Thus, approximately 0.86 acre of non-disturbed jurisdictional ephemeral waters would be impacted during construction activities for installation of proposed Project facilities. Direct impacts to wetlands and CDFW-jurisdictional riparian habitat are not anticipated with construction of proposed Project facilities. Direct impacts to jurisdictional areas are depicted on **Figure 4.3-4** through **4.3-4d**.

In addition to the known infrastructure, the proposed Project could result in additional acres of disturbance to jurisdictional resources and sensitive riparian habitat during construction. Specifically, the proposed Project includes a Future Activity Allowance provision for construction of additional facilities (e.g., wells, access roads, etc.) beyond those currently planned. To estimate additional direct impacts to jurisdictional areas under the Future Activity Allowance, this analysis assumes that impacts to such areas would increase proportionally with the potential increase in the overall construction footprint. Therefore, given that impacts to jurisdictional areas represent approximately 2 percent of the construction footprint for planned proposed Project facilities (i.e., 2.44 acres of 147 total acres), additional direct impacts to jurisdictional areas under the Future Activity Allowance are estimated at up to 0.75 acre (i.e., roughly 2 percent of 36.85 acres). It is further assumed that all additional direct impacts would occur to jurisdictional areas that are not currently disturbed. It is likely that direct impacts to undisturbed jurisdictional wetlands and waters resulting from construction of additional proposed Project facilities would be less than 0.75 acre given limited extent of wetlands and waters in the Project Area and that additional facilities would be sited to avoid undisturbed jurisdictional areas to the extent feasible, as required by Mitigation Measure BIO-1 of the Groundwater FEIR and Section 4.2.3 of the C/RAWP.

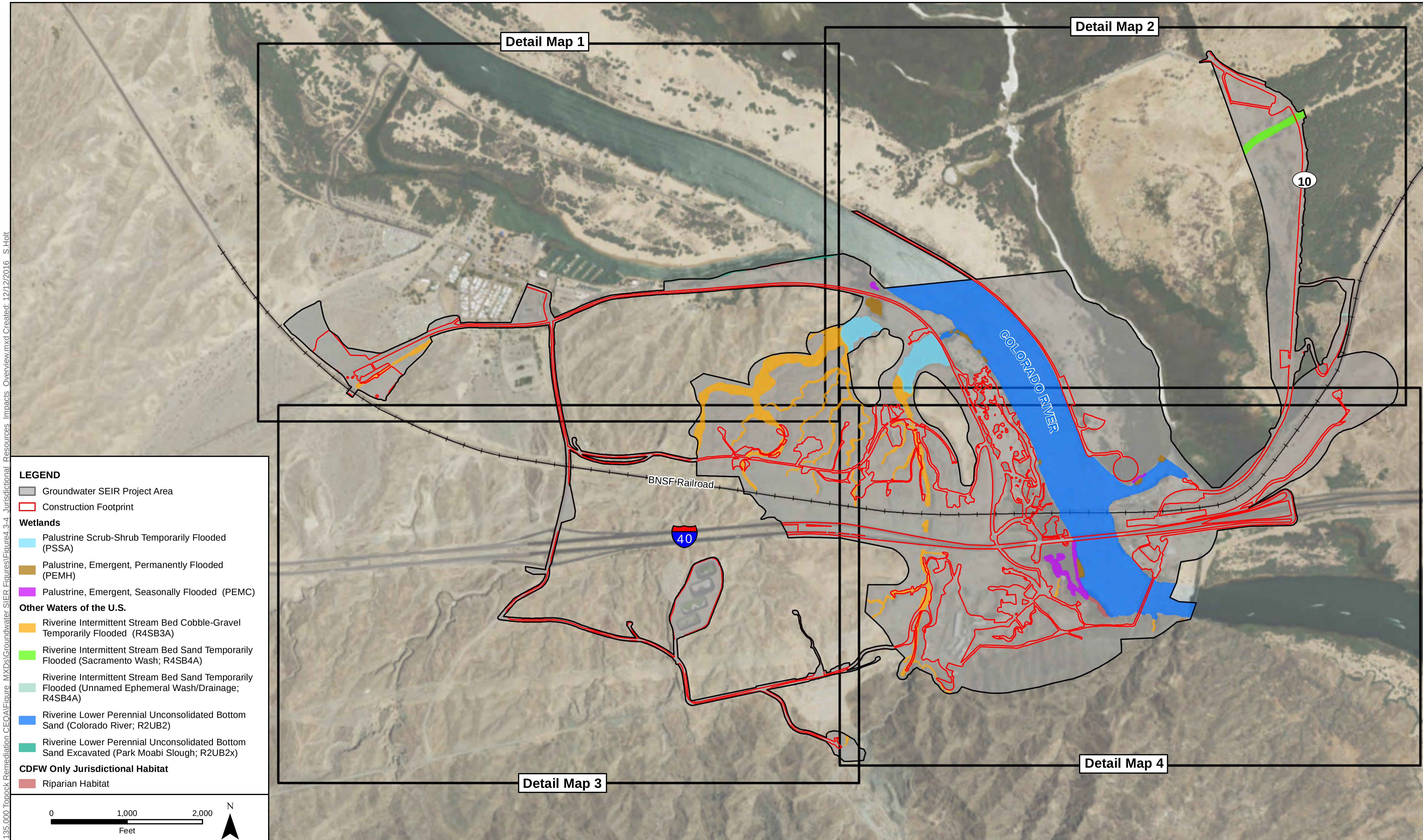
While the proposed Project has been determined to be exempt from obtaining regulatory agency permits by the USACE (USACE 2013) and CDFW because it is an activity undertaken entirely on a CERCLA site, direct impacts to jurisdictional areas that have not been subject to previous disturbance would be potentially significant. As detailed above, direct impacts to undisturbed jurisdictional areas could total up to 1.61 acres (i.e., 0.86 acre resulting from construction of planned facilities and 0.75 acre resulting from construction of additional facilities under the Future Activity Allowance). Direct impacts to jurisdictional areas that are currently disturbed are not considered significant and would not require mitigation.

In addition to the potential direct impacts discussed above, invasive species recruitment within jurisdictional and sensitive riparian habitats may occur as a result of soil disturbance and tracking of seeds on vehicle tires and equipment associated with construction activities. Invasive species can out-compete native species and severely degrade the quality of jurisdictional resources and habitat. However, because these areas are already dominated by aggressive, quick-growing invasive species (e.g., salt cedar), potential invasive species recruitment would be less than significant.

The C/RAWP (CH2M Hill 2015b) outlines specific requirements that would assist in the avoidance and minimization of impacts to jurisdictional wetlands and waters. These include the following:

- Section 4.2.3, Site Preparation and Demarcation, requires that site preparation and demarcation activities identify biologically sensitive areas, and establish access routes and work areas that would minimize impacts to the extent possible. To the extent feasible, primary work zones would be limited to previously disturbed areas (that is, minimizing use of undisturbed areas and those potentially exposed to differential compaction).
- Section 4.6.5, Aesthetic/Biological Resource-Related Site Management and Compliance Measures, identifies the existing compliance documents and directives related to biological resources that would be required to be followed before, during, and after construction. Collectively, the procedures are focused on avoidance measures that require site inspection for and avoidance of species.

In addition, Attachment 1 to Exhibit 6.1-1 in Appendix K to the C/RAWP provides additional detail regarding BMPs and wetlands avoidance measures incorporated in the Final Remedy Design. Such measures include a biological monitor providing a worker environmental awareness training prior to work within or near jurisdictional areas, pre-construction demarcation and photo documentation of jurisdictional areas in proximity to construction activities under the supervisions of a qualified biologist prior, measures to protect perennial vegetation (e.g., stands of arrowweed), prohibition of equipment use in areas of ponded or flowing water, and post-construction documentation of construction areas.



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Final Groundwater Remediation Project SEIR

Map Creation Date: 12/12/2016 Sources: ESRI Aerial, ESA

Jurisdictional Resources Impacts: Overview

Figure 4.3-4

ESA

North State Resources

LEGEND

- Groundwater SEIR Project Area
- Construction Footprint
- Disturbed/Developed (Existing)

Wetlands

- Palustrine Scrub-Shrub Temporarily Flooded (PSSA)

Other Waters of the U.S.

- Riverine Intermittent Stream Bed Cobble-Gravel Temporarily Flooded (R4SB3A)
- Riverine Lower Perennial Unconsolidated Bottom Sand Excavated (Park Moabi Slough; R2UB2x)

CDFW Only Jurisdictional Habitat

- Riparian Habitat

0 500 1,000
Feet
N

Final Groundwater Remediation Project SEIR

Map Creation Date: 12/12/2016 Sources: ESRI Aerial, ESA, PG&E 2015

Jurisdictional Resources Impacts: Detail Map 1

Figure 4.3-4a

ESA North State Resources

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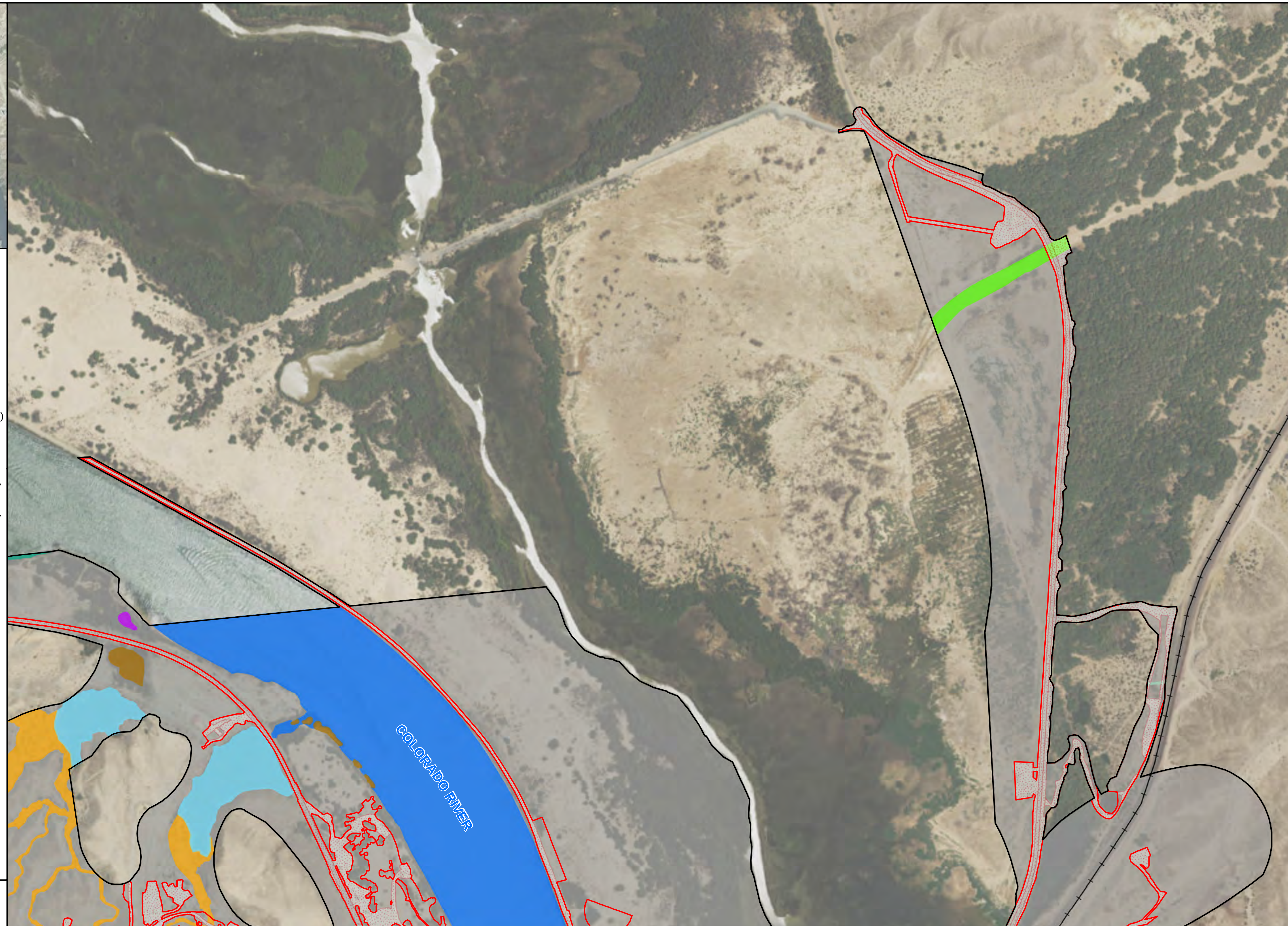

LEGEND

Groundwater SEIR Project Area

Construction Footprint

Disturbed/Developed (Existing)

Wetlands

Palustrine Scrub-Shrub Temporarily Flooded (PSSA)

Palustrine, Emergent, Permanently Flooded (PEMH)

Palustrine, Emergent, Seasonally Flooded (PEMC)

Other Waters of the U.S.

Riverine Intermittent Stream Bed Cobble-Gravel Temporarily Flooded (R4SB3A)

Riverine Intermittent Stream Bed Sand Temporarily Flooded (Sacramento Wash; R4SB4A)

Riverine Intermittent Stream Bed Sand Temporarily Flooded (Unnamed Ephemeral Wash/Drainage; R4SB4A)

Riverine Lower Perennial Unconsolidated Bottom Sand (Colorado River; R2UB2)

Riverine Lower Perennial Unconsolidated Bottom Sand Excavated (Park Moabi Slough; R2UB2x)

0 500 1,000 Feet N

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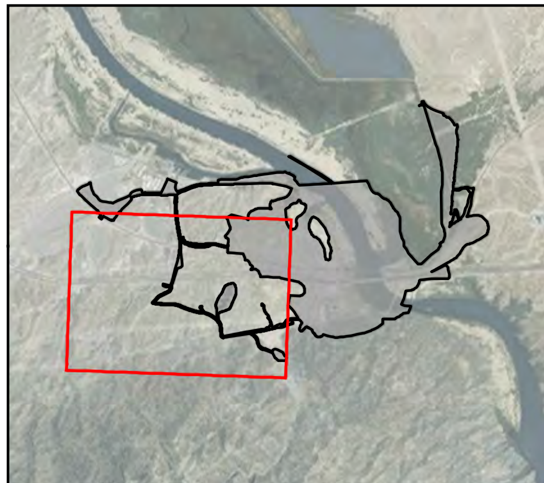
Final Groundwater Remediation Project SEIR

Map Creation Date: 12/12/2016 Sources: ESRI Aerial, ESA, PG&E 2015

Jurisdictional Resources Impacts: Detail Map 2

Figure 4.3-4b

ESA North State Resources



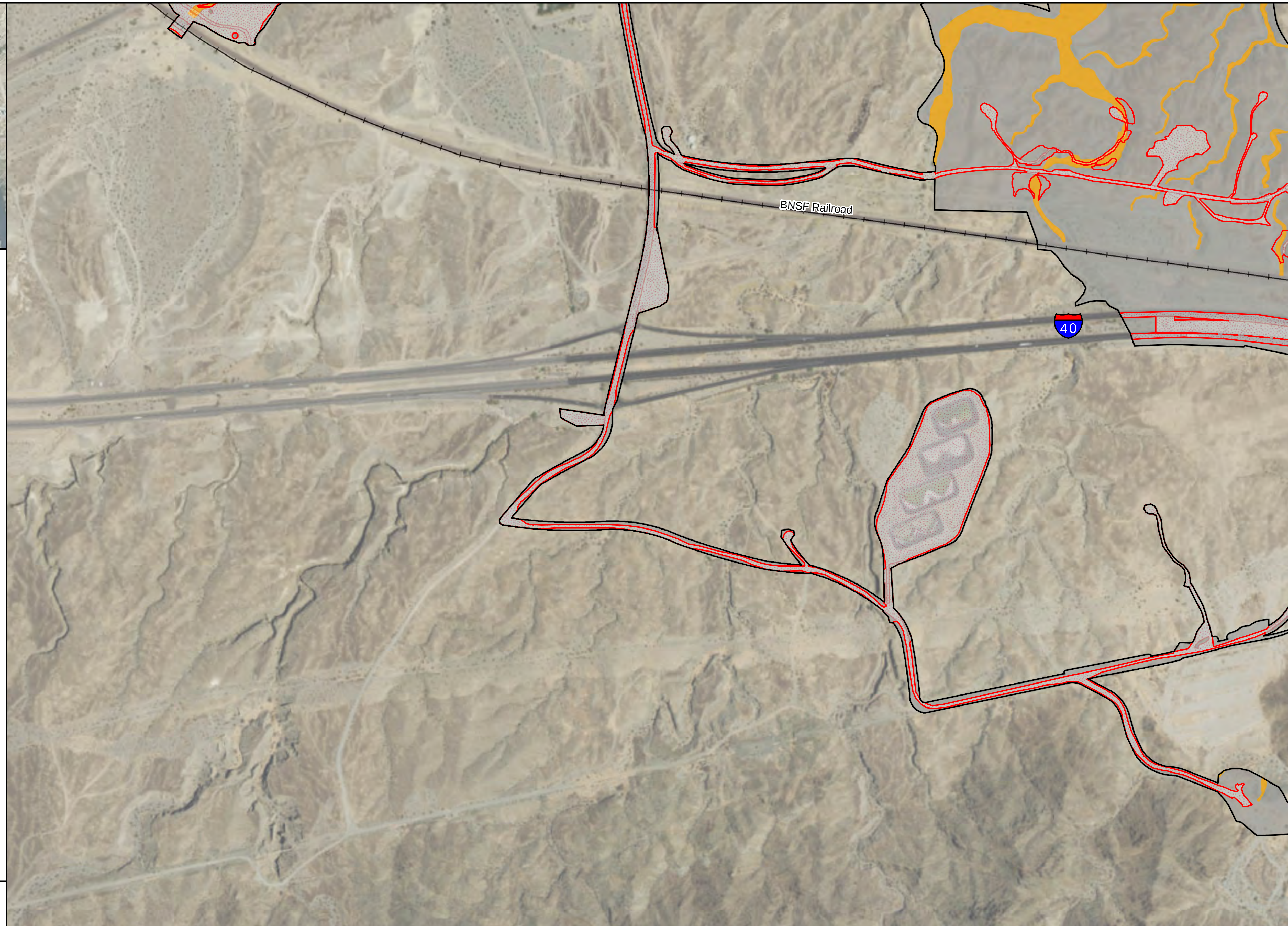
LEGEND

- Groundwater SEIR Project Area
- Construction Footprint
- Disturbed/Developed (Existing)

Other Waters of the U.S.

- Riverine Intermittent Stream Bed Cobble-Gravel Temporarily Flooded (R4SB3A)

0 500 1,000
Feet
N



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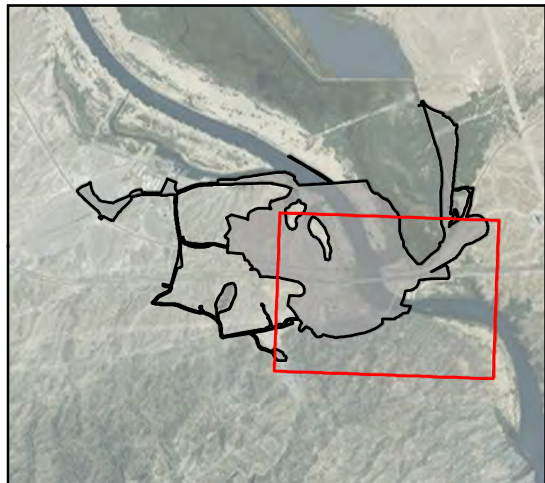
Final Groundwater Remediation Project SEIR

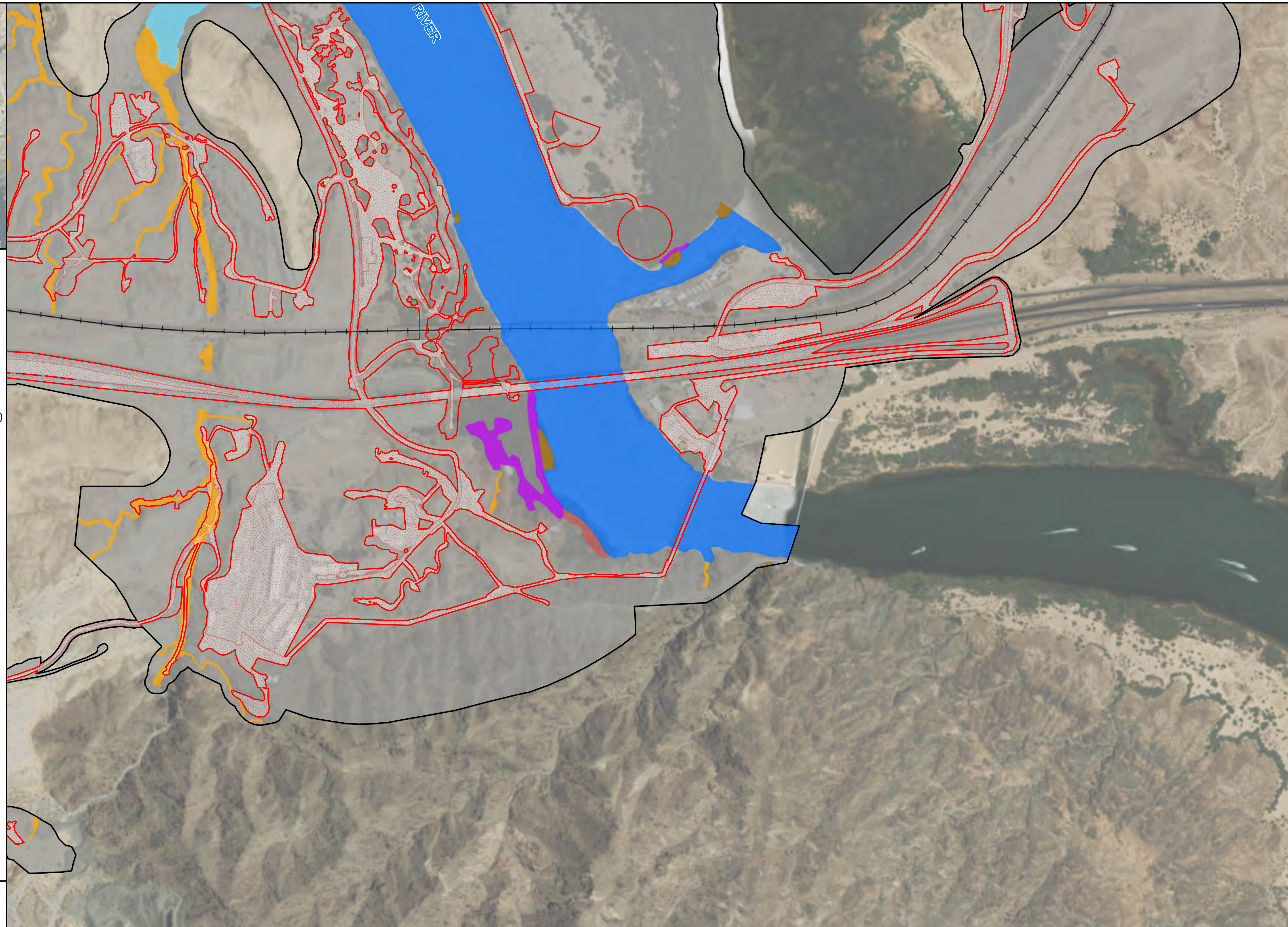
Map Creation Date: 12/12/2016 Sources: ESRI Aerial, ESA, PG&E 2015

Jurisdictional Resources Impacts: Detail Map 3

Figure 4.3-4c

ESA North State Resources





LEGEND

- Groundwater SEIR Project Area
- Construction Footprint
- Disturbed/Developed (Existing)

Wetlands

- Palustrine Scrub-Shrub Temporarily Flooded (PSSA)
- Palustrine, Emergent, Permanently Flooded (PEMH)
- Palustrine, Emergent, Seasonally Flooded (PEMC)

Other Waters of the U.S.

- Riverine Intermittent Stream Bed Cobble-Gravel Temporarily Flooded (R4SB3A)
- Riverine Lower Perennial Unconsolidated Bottom Sand (Colorado River; R2UB2)

CDFW Only Jurisdictional Habitat

- Riparian Habitat

0 500 1,000
Feet
N

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Final Groundwater Remediation Project SEIR

Map Creation Date: 12/12/2016 Sources: ESRI Aerial, ESA, PG&E 2015

Jurisdictional Resources Impacts: Detail Map 4

Figure 4.3-4d

ESA North State Resources

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Direct impacts to undisturbed jurisdictional wetlands and waters would remain potentially significant despite implementation of the measures outlined in the C/RAWP. To address significant direct impacts to jurisdictional wetlands and waters, **Mitigation Measure BIO-1a** would require in-place restoration of undisturbed jurisdictional areas impacted by construction at a 1:1 ratio. In addition to in-place restoration, compensatory mitigation at a minimum 2:1 ratio and in the form of acquisition and preservation in perpetuity, restoration, and/or enhancement will be required to address the temporal loss of function and value of jurisdictional areas. Mitigation Measure BIO-1a also requires implementation of the *Havasu National Wildlife Refuge Habitat Restoration Plan* (Appendix G to the C/RAWP (CH2M Hill 2015b)) and *Habitat Restoration Plan for Riparian Vegetation and Other Sensitive Habitats* (Appendix O to the C/RAWP (CH2M Hill 2015b)). These plans were developed with oversight and approval by CDFW, USFWS, and DOI in compliance with Mitigation Measure BIO-1 of the Groundwater FEIR and describe the approach for restoration in the HNWR and broader Project Area for the duration of the construction and operation and maintenance phases of the proposed Project. Components of these plans, including avoidance and minimization measures, success criteria, monitoring and reporting requirements, and adaptive management guidelines, are summarized in Mitigation Measure BIO-1a below. Implementation of these plans will be informed by the technical memorandum, *Assessment of Proposed Mitigation Planting Areas for Final Groundwater Remedy Impacts*, included as Appendix V to the C/RAWP (CH2M Hill 2015b), which provides preliminary information on the condition within fourteen proposed mitigation planting areas. Successful implementation of on-site restoration prescribed by these plans, as well as compensation to address temporal loss would reduce impacts to a level less than significant by ensuring no net loss of jurisdictional resources in the region. Mitigation Measure BIO-1a applies to both planned construction as well as construction of unplanned facilities associated with the Future Activity Allowance.

Operation & Maintenance

Generally, operation and maintenance activities would take place within areas disturbed during construction. Ground-disturbing activities within jurisdictional areas during the operation and maintenance phase of the proposed Project could include excavations at well sites for maintenance, repair, or replacement of these Project facilities. To allow access to these Project facilities, well sites within jurisdictional areas would not be restored following their construction. Thus, operation and maintenance ground disturbance at Project facilities installed during the construction phase would not result in additional impacts to jurisdictional areas.

There is potential for construction of additional facilities (e.g., wells, access roads) to occur during the long-term operation and maintenance phase of the proposed Project as part of the Future Activity Allowance. Construction of proposed Project facilities during operation and maintenance phase has potential to result in additional direct impacts to jurisdictional wetlands and waters. As described in the discussion of construction impacts, additional direct impacts to undisturbed jurisdictional areas under the Future Activity Allowance are estimated at up to 0.75 acre (i.e., roughly 2 percent of 36.85 acres). It is likely that direct impacts to undisturbed jurisdictional wetlands and waters resulting from construction of additional proposed Project facilities would be less than 0.75 acre given limited extent of wetlands and waters in the Project

Area and that additional facilities would be sited to avoid undisturbed jurisdictional areas to the extent feasible, as required by Mitigation Measure BIO-1 of the Groundwater FEIR and Section 4.2.3 of the C/RAWP. While the proposed Project has been determined to be exempt from obtaining regulatory agency permits by the USACE (USACE 2013) and CDFW because it is an activity undertaken entirely on a CERCLA site, direct impacts to undisturbed jurisdictional wetlands and waters resulting from construction of additional Project facilities during the operation and maintenance phase would be potentially significant. Direct impacts to jurisdictional areas that are currently disturbed are not considered significant and would not require mitigation.

The Operation & Maintenance Manual (Appendix L of Final Remedy Design, CH2M Hill 2015a) outlines specific requirements that would assist in the avoidance and minimization of impacts to jurisdictional areas during operation and maintenance activities. These include the following:

- Section 7.4, Access Road and Pathway Maintenance, describes BMPs for the maintenance of pathways and roads. The BMPs include pruning for shrub overgrowth and soil stabilization to prevent erosion of vegetated areas, and are from the Massachusetts Unpaved Roads BMP Manual, prepared by the Berkshire Regional Planning Commission, 2001).
- Section 7.5, Vegetation Control for Maintenance of Wireless Infrastructure, describes that certain wireless devices would require clear line of sight for proper operation (e.g., remote control infrastructure of well pumps). The sites where such devices are located would be inspected on a periodic basis and overgrowth would be pruned or managed (e.g., tie back, bundle, etc.) to maintain clear lines of sight. Vegetation control measures would be consistent with the project mitigation directives such as the protection of mature plants and the avoidance/protection of ethnobotanical sensitive plants. In addition, vegetation control measures will be consistent with the project's revegetation plans.

Direct impacts to undisturbed jurisdictional wetlands and waters resulting from construction of additional Project facilities during the operation and maintenance phase would remain potentially significant despite implementation of the requirements outlined in Section 7.4 and Section 7.5 of the Operation & Maintenance Manual. Mitigation Measure BIO-1a would address this potentially significant impact. As summarized above, Mitigation Measure BIO-1a would require in-place restoration, compensatory mitigation to address temporal loss of function and value of jurisdictional areas, and implementation of habitat restoration plans for unavoidable impacts to jurisdictional wetlands and waters. Habitat restoration plans for the HNWR and broader Project Area were developed with oversight and approval by CDFW, USFWS, and DOI in compliance with Mitigation Measure BIO-1 of the Groundwater FEIR and include avoidance and minimization measures, success criteria, monitoring and reporting requirements, and adaptive management guidelines (refer Mitigation Measure BIO-1a description later in this section). Successful implementation of the restoration plans, as well as compensation to address temporal loss would reduce impacts to a level less than significant by ensuring no net loss of jurisdictional resources in the region.

Decommissioning

Decommissioning of the proposed Project would generally be beneficial to biological resources, including jurisdictional resources, in the long-term as Project facilities would be removed and areas impacted would be restored to native habitats. However, decommissioning activities (e.g., removal and capping of wellheads, restoration of roadways, and removal of pipelines) may result in impacts on jurisdictional wetlands and waters. The nature of potential decommissioning impacts would be similar to those described above for construction. Potential direct impacts to jurisdictional wetlands and waters resulting from decommissioning cannot be reasonably quantified at this time. However, the extent of direct impacts are expected to be negligible given that decommissioning activities would take place in areas impacted during the construction and operation and maintenance phase of the proposed Project. Nonetheless, potential impacts to jurisdictional wetlands and waters during decommissioning activities would be potentially significant. To address this impact, **Mitigation Measure BIO-1b** would require development and implementation of a restoration plan to specify requirements of decommissioning restoration actions. Components of the final habitat restoration plan, including avoidance and minimization measures, success criteria, monitoring and reporting requirements, and adaptive management guidelines, are summarized in Mitigation Measure BIO-1a below. Successful implementation of the final restoration plan would reduce impacts to a level less than significant by ensuring rehabilitation of impacted jurisdictional wetlands and waters in the Project Area following the completion of the proposed Project.

Comparison of Impact BIO-1 Impacts (Revised) to Groundwater FEIR Impact Analysis

Impacts to jurisdictional wetlands and waters were not quantified in the Groundwater FEIR as the exact location of infrastructure was not known. Nevertheless, the Groundwater FEIR determined that impacts to sensitive habitat areas and wetlands associated with construction, operation and maintenance, and decommissioning activities would result in a potentially significant impact. To mitigate the impact, the Groundwater FEIR prescribed implementation of Mitigation Measure BIO-1, which required a pre-construction biological survey to identify jurisdictional wetlands and waters within the Project Area and design adjustments to avoid disturbance to sensitive areas. For unavoidable impacts to jurisdictional wetlands and waters were found that could be avoided, Mitigation Measure BIO-1 required replacement and/or rehabilitation to affected jurisdictional habitat to ensure "no-net-loss." The Groundwater FEIR concluded implementation of Mitigation Measure BIO-1 would reduce potential impacts to jurisdictional habitat to less than significant levels.

Jurisdictional wetlands and waters were delineated following publication of the Groundwater FEIR in 2012, 2014, and 2016 to satisfy Mitigation Measures BIO-1 (see Section 4.3.3.1), and habitat restoration plans were developed. Mitigation Measure BIO-1a for this SEIR requires replacement and/or rehabilitation of affected jurisdictional habitat to ensure "no-net-loss," and requires implementation of habitat restoration plans prepared since publication of the Groundwater FEIR. Mitigation Measure BIO-1a includes additional mitigation requirements beyond those outlined in previously prepared habitat restoration plans to ensure "no-net-loss" of function and value of impacted jurisdictional areas. These additional requirements reflect recent coordination with CDFW regarding their substantive policies related to mitigation of impacts to jurisdictional areas in desert ecosystems. Mitigation Measure BIO-1b for this SEIR requires preparation and implementation of a final restoration plan to address restoration following decommissioning of the proposed Project. Given that this SEIR identified the same conclusions as the Groundwater FEIR, the Project would not result in any new significant impacts or substantially more severe impacts on jurisdictional wetlands and waters from what was previously identified in the Groundwater FEIR.

Mitigation Measures

Mitigation Measure BIO-1: Potential Fill of Wetlands and Other Water of the United States and Disturbance or Removal of Riparian Habitat (Measure Completed – no longer applicable).

Mitigation Measure BIO-1a: No-net-loss of Jurisdictional Wetlands/Waters Function or Value (New Measure). Unavoidable direct impacts to jurisdictional areas shall be documented by a wetland specialists or Field Contact Representative (FCR) during implementation of the proposed Project. To document unavoidable direct impacts, the extent of work areas near jurisdictional areas shall be delineated in the field using GPS technology and pre- and post-impact conditions of jurisdictional areas documented with photographs. The nature of construction within work areas shall also be described, including the Project facilities installed, equipment utilized, and duration of construction activities. Documentation of unavoidable impacts shall be submitted to CDFW and DTSC to ensure adequate mitigation is provided consistent with the requirements below.

Unavoidable direct impacts to non-disturbed jurisdictional ephemeral waters (estimated at up to approximately 1.61 acres including direct impacts resulting from planned facilities and additional facilities constructed under the Future Activity Allowance) shall be mitigated to ensure no-net-loss of function or value. Mitigation shall include both (a) and (b) detailed below. Mitigation for ground disturbance associated with restoration and enhancement activities shall not be required.

a) In-place restoration of jurisdictional areas directly impacted by construction at a 1:1 ratio (i.e., 1 acre of restoration for each acre of direct impact to non-disturbed jurisdictional area) shall occur. In-place restoration of areas directly impacted during construction will occur in two phases. The first phase will involve restoration within the areas directly impacted by construction where it will not interfere with continued operation and maintenance of the proposed Project (e.g., restoration of temporary construction work areas). The first phase of restoration shall begin within 1 year of completing construction. The second phase will involve restoration of areas that will be occupied by Project facilities to occur following decommissioning of the proposed Project. Restoration of jurisdictional areas following decommissioning of the proposed Project will be guided by a Final Habitat Restoration Plan (refer to Mitigation Measure BIO-1b).

b) To address temporal loss of jurisdictional areas directly impacted by construction, PG&E shall provide compensatory mitigation at a minimum 2:1 ratio (2 acres of compensation for each acre of direct impacts to non-disturbed jurisdictional area). Compensatory mitigation to address temporal loss shall be agreed upon with CDFW prior to the start of construction, involve the same amount and quality of jurisdictional area(s) disturbed, and include one or more of the following approaches: 1) acquisition and preservation in perpetuity; 2) restoration; and/or 3) enhancement. Acquisition and preservation may include establishment of a conservation easement or purchase of credits from a CDFW-approved mitigation banking program. Restoration may include conversion of non-wetland habitat to functioning wetland habitat. Enhancement may include removal of non-native species in existing wetland habitat. As summarized in the technical memorandum, *Assessment of Proposed Mitigation Planting Areas for Final Groundwater Remedy Impacts*, included as Appendix V to the C/RAWP (CH2M Hill 2015b), PG&E has identified restoration areas within the historical floodplain of the Colorado River. The historical floodplain no longer functions as a riparian habitat with hydrologic connectivity to the river; therefore, restoration in the historical floodplain may qualify as compensatory mitigation to address temporal loss if hydrologic function can be restored. PG&E shall prepare a mitigation plan prior to the start of construction to specify methodology, success criteria, and monitoring and reporting for compensatory mitigation. The plan shall be subject to CDFW approval and in conformance with the identified performance standards, and submitted to DTSC, BLM, BOR, USFWS, and DOI for review, as appropriate based on location of impacts.

Restoration of jurisdictional areas within the Project Area shall be guided by the *Havasu National Wildlife Refuge Habitat Restoration Plan* (Appendix G to the C/RAWP (CH2M Hill 2015b)) and *Habitat Restoration Plan for Riparian Vegetation and Other Sensitive Habitats* (Appendix O to the C/RAWP (CH2M Hill 2015b)), as approved by CDFW, USFWS, and DOI. Implementation of these plans will be informed by the technical memorandum, *Assessment of Proposed Mitigation Planting Areas for Final Groundwater Remedy Impacts*, included as Appendix V to the C/RAWP (CH2M Hill 2015b), which provides preliminary information on the condition within fourteen proposed mitigation planting areas.

The habitat restoration plans also specify on-site restoration success criteria, monitoring and reporting requirements, and adaptive management guidelines for salvage and replanting of trees, shrubs, and perennial species. In accordance with the habitat restoration plans, removal of riparian trees (e.g., palo verde trees) shall be replaced at a 3:1 ratio (i.e., planting three trees in restoration areas for each tree removed during construction). The success criteria for mitigation plantings shall be a final minimum plant replacement ratio of 2.25:1 (75% overall survival rate) of mitigation plantings at the end of a minimum 5-year monitoring period. Adaptive management guidelines outline modifications to restoration approaches, as appropriate, to ensure successful establishment of native vegetation and desired density of cover of plants. As required by the plans, the following adaptive management actions shall be implemented if success criteria are not being met: weed control, irrigation modification, herbivory protection, and additional plantings. Reporting to DTSC, CDFW, and USFWS shall be completed within 90 days of completing each monitoring year.

The habitat restoration plans also specify design and construction avoidance and minimization measures, including:

- Locating pipelines, wells, and staging and storage areas along roadways, pipeline rights-of-way, and other previously disturbed areas to avoid impacts to vegetation to the extent feasible.
- Performing pre-activity surveys prior to ground disturbance to identify and demark with flagging, fencing, and/or signage areas of native vegetation and sensitive habitats in the immediate vicinity of the construction areas.
- Providing construction workers with environmental awareness training regarding biological resources including sensitive species and habitats.

Timing:	Implementation of habitat restoration plans shall occur during the construction and operation and maintenance phases of the proposed Project. Compensation for unavoidable impacts shall occur prior to unavoidable impacts occurring.
Responsibility:	PG&E would be responsible for the implementation of these measures. DTSC would be responsible for ensuring compliance.
Significance after Mitigation:	With mitigation, this impact would be reduced to a **less than significant** level.

Mitigation Measure BIO-1b: Final Habitat Restoration Plan (New Measure). A final habitat restoration plan shall be developed and implemented following decommissioning of the proposed Project. The final habitat restoration plan will address restoration of areas that were impacted during construction, operation and maintenance, and decommissioning of the proposed Project, specifying salvage/replanting measures, as well as success criteria, monitoring, and adaptive management requirements for restored areas. Success criteria for restoration areas will be similar to that identified in the existing habitat restoration plans (i.e., 75% overall survival rate of mitigation plantings at the end of a minimum 5-year monitoring period). Adaptive management actions to ensure successful establishment of native vegetation and desired density of cover of plants will include weed control, irrigation modification, herbivory protection, and additional plantings. The plan shall be submitted to DTSC, CDFW, BLM, BOR, USFWS, and DOI for review.

Timing:	Following decommissioning.
Responsibility:	PG&E would be responsible for the implementation of these measures. DTSC would be responsible for ensuring compliance.
Significance after Mitigation:	With mitigation, this impact would be reduced to a **less than significant** level.

IMPACT BIO-2 **Direct Disturbance of and Loss of Habitat for Special-Status Birds, Desert Tortoise, Ring-Tailed Cat, Nelson's Bighorn Sheep, Special-Status Bats, Northern Mexican Gartersnake, and Special-Status Plants.** Implementation of the proposed Project could affect special-status species either directly or through habitat modifications. This impact would be **potentially significant** for special-status birds, and desert tortoise, as previously identified in the Groundwater FEIR; and **potentially significant** for ring-tailed cat, Nelson's bighorn sheep, roosting special-status bats, northern Mexican gartersnake, and special-status plants, which are new impacts from the Groundwater FEIR.

Construction

In general, construction activities would occur throughout the Project Area within and adjacent to habitat for several special-status species. Construction impacts to the following special-status species known from the Project Area are discussed in the following subsections: special-status bird species, desert tortoise, ring-tailed cat, Nelson's bighorn sheep, special-status bats, northern Mexican gartersnake, and special-status plants. Direct impacts to vegetation communities are depicted on **Figure 4.3-5** through **4.3-5d**. Direct impacts to vegetation communities informed quantification of habitat impacts for certain special-status species.

Critical habitat for the bonytail chub exists within the Project Area, specifically within the Colorado River and its 100-year floodplain. However, as discussed in the PBA (Appendix U to the C/RAWP (CH2M Hill 2015b)), the proposed Project is not expected to adversely affect the primary constituent elements of bonytail chub critical habitat given the limited amount of vegetation removal that would occur within the 100-year floodplain of the Colorado River. Furthermore, the proposed Project facilities are mostly located closer to the upland edge of the floodplain, well away from the river, so the effects would be mitigated by a broad swath of undisturbed vegetation between the facilities and the river. The PBA concludes that conservation measures prescribed by the PBA would minimize impacts to bonytail critical habitat to immeasurable or undetectable levels. In addition, since publication of the Groundwater FEIR, critical habitat for the western yellow-billed cuckoo has been proposed in the Project Area. Only one monitoring well (i.e., MW-Y Alternate well location) is proposed within suitable habitat for the western yellow-billed cuckoo. The proposed Project is not expected to adversely affect the primary constituent elements of the proposed habitat given the limited amount of vegetation removal that would occur where suitable nesting habitat exists along the western margin of the Topock Marsh. Given that impacts to critical habitat are not expected to be measurable or detectable, critical habitat is not discussed further in this SEIR. Potential impacts to federally listed species and their critical habitat are being addressed for the proposed Project through Section 7 consultation between BLM and USFWS.

The C/RAWP (CH2M Hill 2015b) outlines specific requirements that would assist in the avoidance and minimization of construction-related impacts to special-status species. These measures include the following:

- Section 4.2.3, Site Preparation and Demarcation, requires that site preparation and demarcation activities identify biologically sensitive areas, and establish access routes and work areas that would minimize impacts to the extent possible. To the extent feasible, primary work zones would be limited to previously disturbed areas (that is, minimizing use of undisturbed areas and those potentially exposed to differential compaction). Specific measures are provided in the appendices noted further below.

- Section 4.6.5, Aesthetic/Biological Resource-Related Site Management and Compliance Measures, identifies the existing compliance documents and directives related to biological resources that would be required to be followed before, during, and after construction. Collectively, the procedures are focused on avoidance measures that require site inspection for and avoidance of species. In addition to the compliance measures and BMPs in preexisting documents and directives listed above, BMPs would be implemented during construction to protect wildlife from incurring injuries within open trenches, boreholes, or pipes that are stored in work areas. Options to accomplish this objective include covering and isolating open trenches and boreholes, limiting the size of trenches, creating exit points from trenches, and inspecting trenches for wildlife.

Appended to the C/RAWP are habitat- and species-specific mitigation plans that specify additional avoidance, minimization, and mitigation requirements applicable to the proposed Project. These appendices include the following:

- Appendix G, Havasu National Wildlife Refuge, Habitat Restoration Plan, addresses activities that would be conducted within the HNWR. Avoidance and minimization measures during construction include locating activities and infrastructure in previously disturbed areas, and flagging sensitive undisturbed areas.
- Appendix N, Aesthetics and Visual Resources Protection and Revegetation Plan, describes avoidance and minimization measures that would be implemented to reduce impacts to vegetation resources and provides information on plant salvage and other replacement methods that would be used where long-term impacts to vegetation are unavoidable.
- Appendix O, Habitat Restoration Plan for Riparian Vegetation and Other Sensitive Habitats, describes avoidance and minimization measures that would be implemented to reduce impacts to riparian vegetation and other sensitive habitats, and provides information on plant salvage and other replacement methods that would be used where long-term impacts are unavoidable.
- Appendix S in the C/RAWP provides the Final Bird Impact Avoidance and Minimization Plan (BIAMP), which describes general avian avoidance and minimization measures, as well as species-specific mitigation measures for federally listed species, including the southwestern willow flycatcher and Yuma clapper rail.
- Appendix U, Programmatic Biological Assessment (PBA), identifies specific species and habitat of interest and describes specific measures such as habitat surveys and limiting activities in certain areas to certain times of the year. The PBA describes management measures for the protection of potential habitat for federally listed species.

- Appendix V, Technical Memorandum: Assessment of Proposed Mitigation Planting Areas for Final Groundwater Remedy Impacts, describes proposed mitigation planting areas to mitigate for disturbed areas where impacts are unavoidable.

The sections and appendices of the C/RAWP that outline specific requirements applicable to special-status species and their habitat are referenced as applicable in the following species-specific impact analyses.

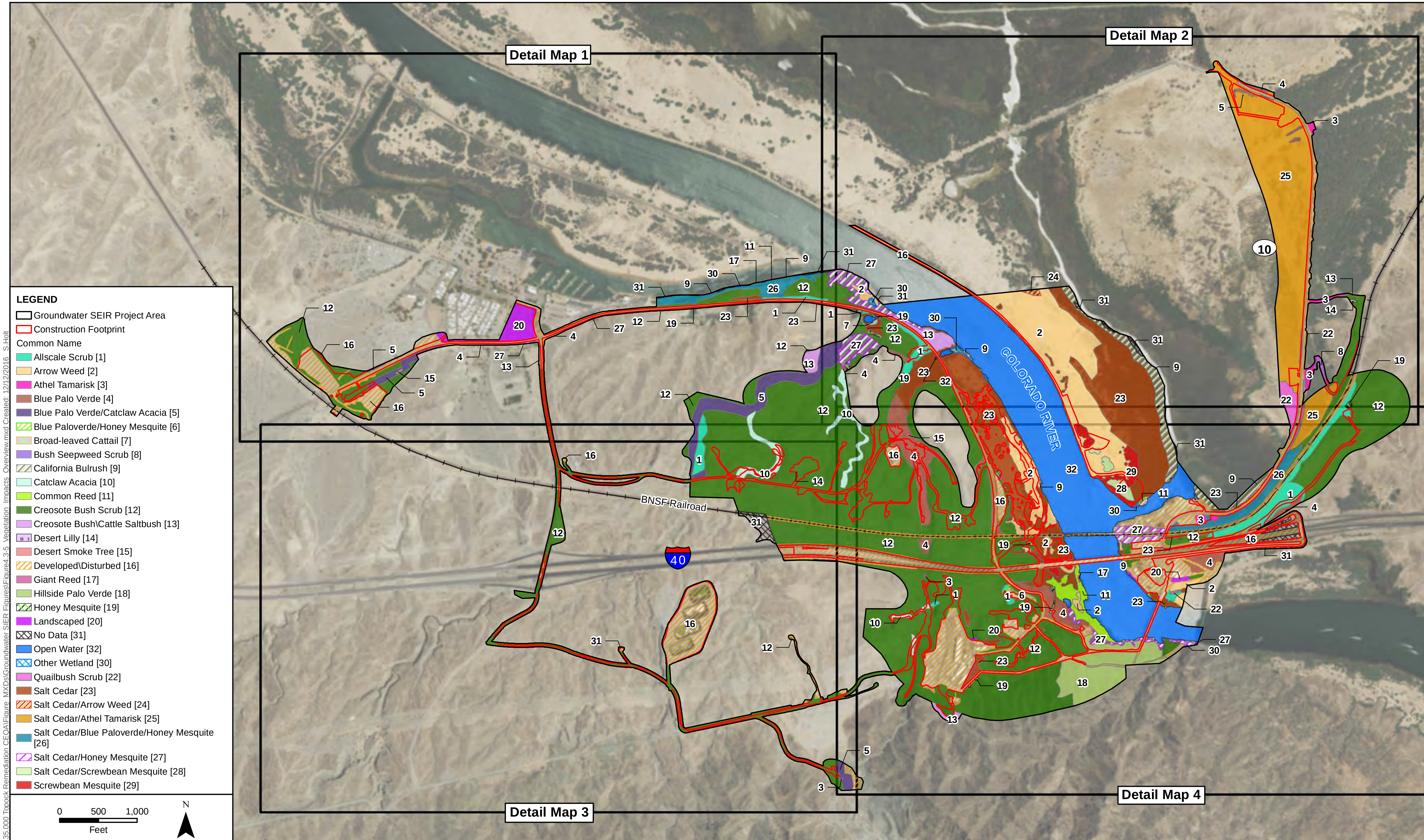
Disturbance to Special-Status Bird Individuals and Habitat

As described in Section 4.3.3.1 herein and in the Groundwater FEIR, the Project Area provides foraging and/or nesting habitat for a variety of special-status bird species, including some federally listed species. The nature of construction impacts to special-status bird habitat associated with the Final Design remains the same as described in the Groundwater FEIR (i.e., disturbance or loss of habitat during grading and vegetation clearing). However, additional special-status bird species were confirmed to be present or determined to likely occur within the Project Area, including the federally listed western yellow-billed cuckoo and non-listed Lucy's warbler and loggerhead shrike (both California Species of Special Concern). Thus, additional species would be subject to the potential construction impacts described in the Groundwater FEIR.

As currently planned, construction of Project facilities would disturb approximately 16.28 acres of potentially suitable and currently undisturbed foraging and nesting habitat for special-status birds. All native habitats in the Project Area (i.e., all vegetation communities with the exception of developed, disturbed, or landscaped areas) are assumed to provide foraging and nesting habitat for the variety of special-status bird species known to occupy the Project Area. Construction of Project facilities would impact both upland vegetation communities as well as wetland vegetation communities along the Colorado River, Bat Cave Wash and the East Ravine. Impacts to individual avian species would vary depending on habitat preferences (e.g., habitat impacts to riparian bird species would be less than impacts to species that utilize upland habitats). The Future Activity Allowance provision for construction of additional Project facilities (e.g., wells, access roads, etc.) could result in additional acres of disturbance to foraging and nesting habitat within the Project Area. This analysis assumes up to 36.85 acres of additional ground disturbance could result with development of additional Project facilities under the Future Activity Allowance (refer to Section 4.3.5.2). This analysis further assumes a worst-case scenario that all additional ground disturbances would occur within suitable foraging and nesting habitat for special-status birds. Therefore, total direct impacts to foraging and nesting habitat for special-status birds may total up to 53.13 acres. As required by Section 4.2.3 of the C/RAWP, Project facilities would be required to be sited to avoid native habitats to extent feasible.

Similar to the conclusion of the Groundwater FEIR, impacts to foraging and nesting habitat are not expected to substantially affect any special-status birds given the general availability of habitat in the Project Area and vicinity. While some nesting and foraging habitat would be disturbed with construction of project facilities, the proposed Project would not preclude use of the Project Area by special-status birds for nesting and foraging purposes.

Active nests of common and special-status birds are protected by the MBTA and CFG Code 3500. Construction activities implemented as part of the Final Design (including planned and those associated with the Future Activity Allowance) could result in the inadvertent removal of active nests, including eggs and nestlings, of both special-status species and common bird species. These impacts are also described in the Groundwater FEIR and remain generally similar under the Final Remedy Design. In addition to direct removal of active nests and as reported in the Groundwater FEIR, visual or noise disturbance of active nests could result in nest abandonment and loss for various special-status bird species, and this could result in a substantial adverse effect on local populations of the affected species.



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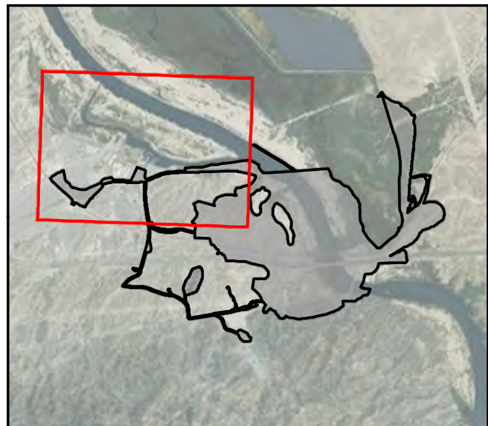
Final Groundwater Remediation Project SEIR
Map Creation Date: 12/12/2016 Sources: ESRI Aerial, ESA

Vegetation Impacts: Overview

Figure 4.3-5

ESA North State Resources



LEGEND

- Groundwater SEIR Project Area
- Construction Footprint
- Disturbed/Developed (Existing)

Common Name

- Allscale Scrub [1]
- Blue Palo Verde [4]
- Blue Palo Verde/Catclaw Acacia [5]
- California Bulrush [9]
- Catclaw Acacia [10]
- Common Reed [11]
- Creosote Bush Scrub [12]
- Creosote Bush\Cattle Saltbush [13]
- Desert Smoke Tree [15]
- Developed\Disturbed [16]
- Giant Reed [17]
- Honey Mesquite [19]
- Landscaped [20]
- No Data [31]
- Other Wetland [30]
- Salt Cedar [23]
- Salt Cedar/Blue Paloverde/Honey Mesquite [26]
- Salt Cedar/Honey Mesquite [27]

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Final Groundwater Remediation Project SEIR

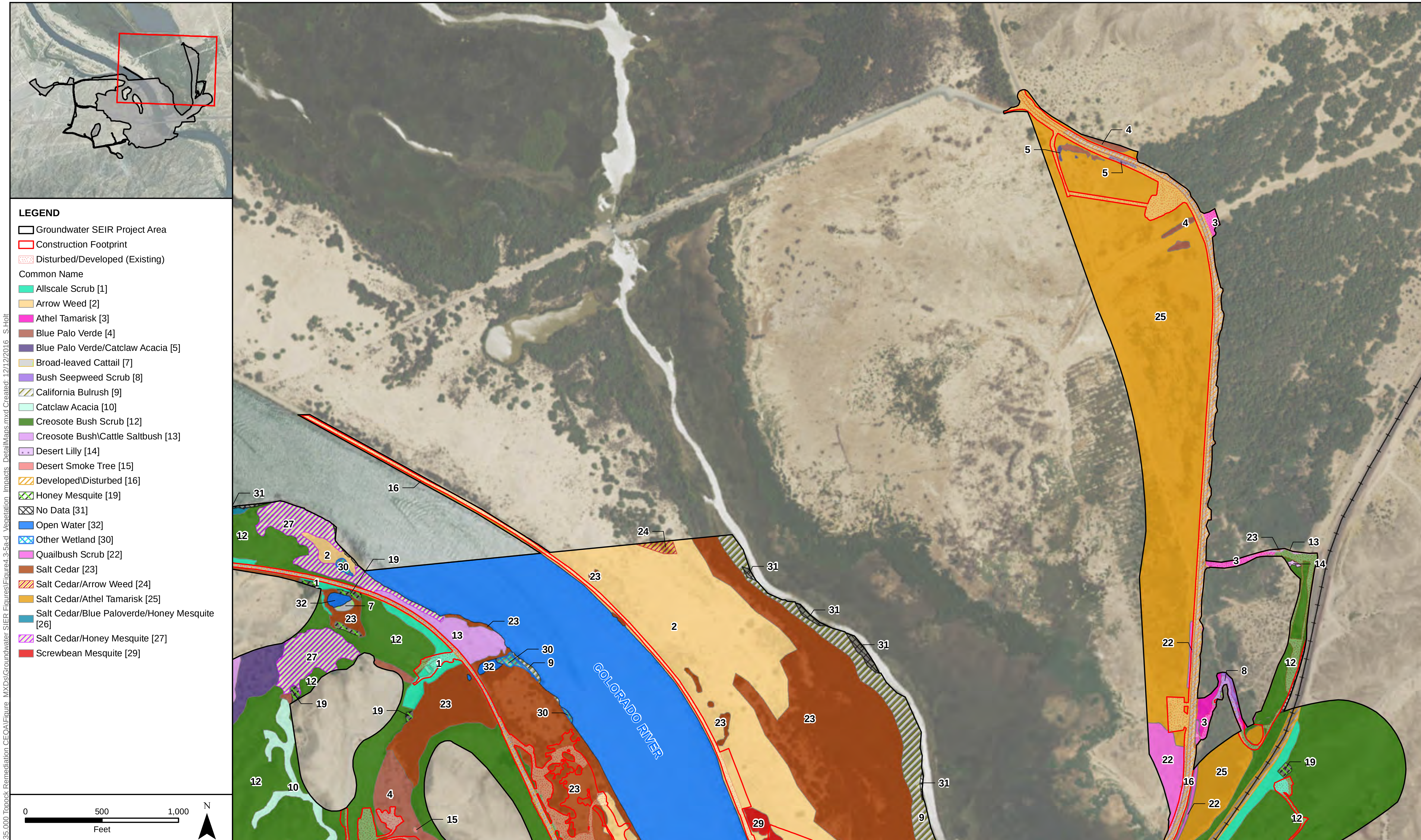
Map Creation Date: 12/12/2016 Sources: ESRI Aerial, ESA, PG&E 2015

Vegetation Impacts: Detail Map 1

Figure 4.3-5a

ESA

North State Resources



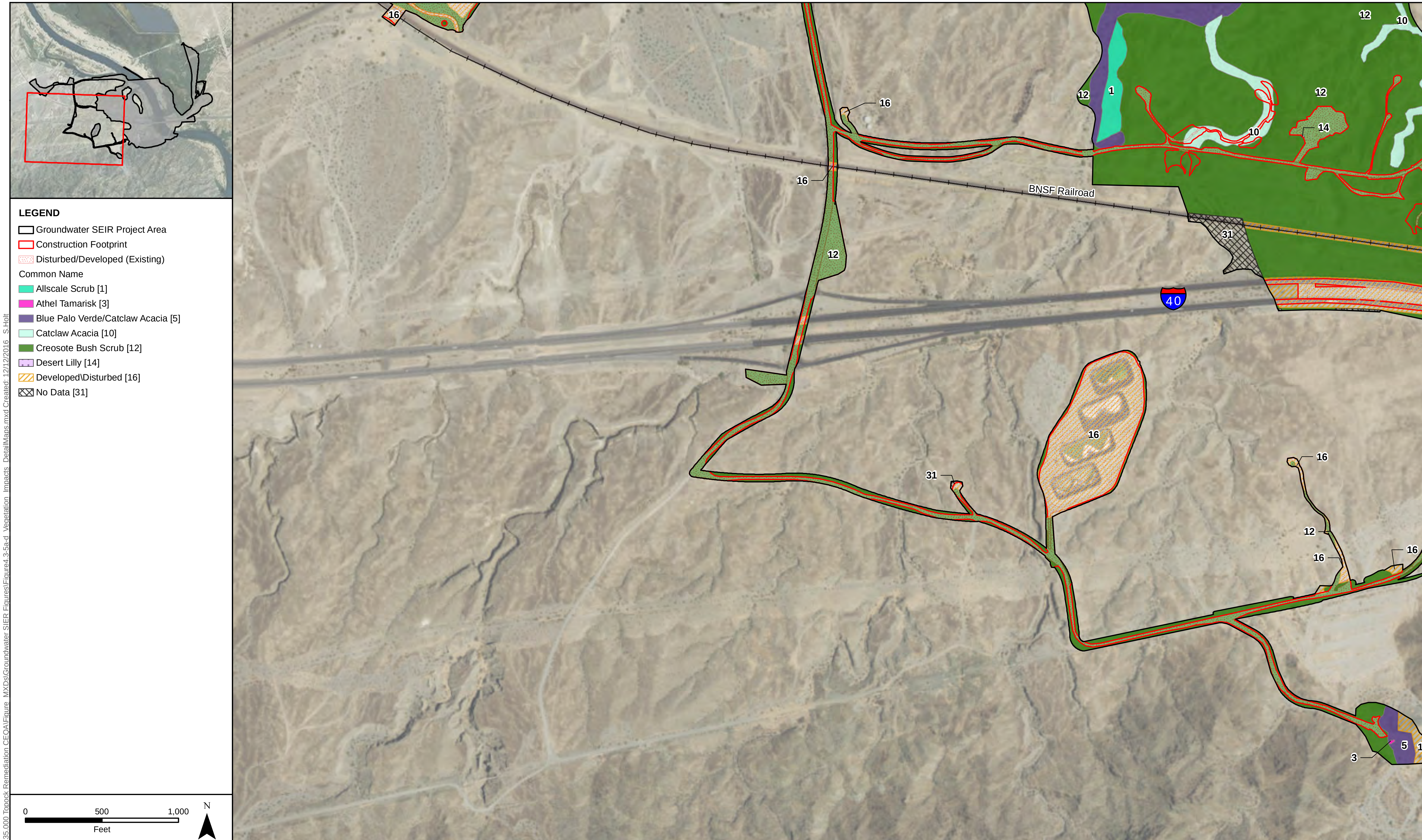
Final Groundwater Remediation Project SEIR

Map Creation Date: 12/12/2016 Sources: ESRI Aerial, ESA, PG&E 2015

Vegetation Impacts: Detail Map 2

Figure 4.3-5b

ESA North State Resources



Final Groundwater Remediation Project SEIR

Map Creation Date: 12/12/2016 Sources: ESRI Aerial, ESA, PG&E 2015

Vegetation Impacts: Detail Map 3

Figure 4.3-5c

ESA North State Resources

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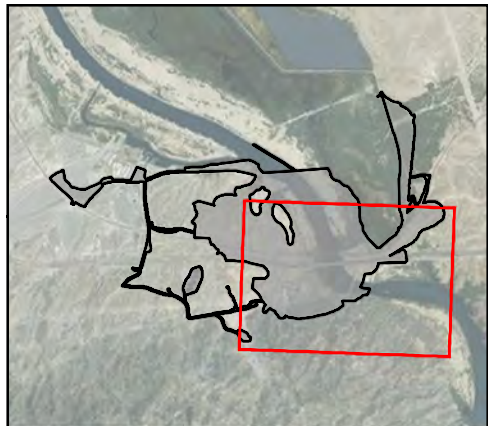

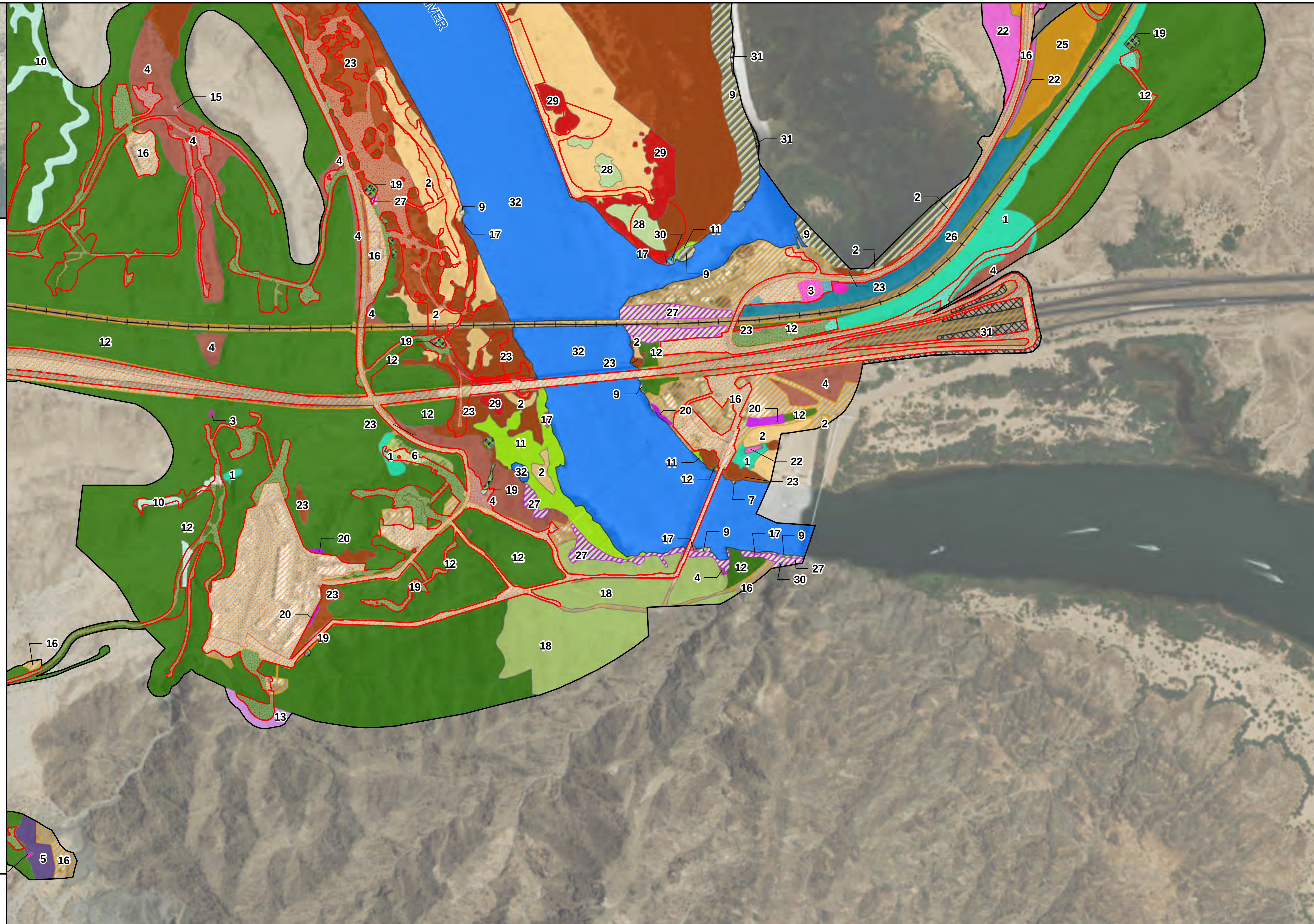

LEGEND

- Groundwater SEIR Project Area
- Construction Footprint
- Disturbed/Developed (Existing)

Common Name

- Allscale Scrub [1]
- Arrow Weed [2]
- Athel Tamarisk [3]
- Blue Palo Verde [4]
- Blue Palo Verde/Catclaw Acacia [5]
- Blue Paloverde/Honey Mesquite [6]
- Broad-leaved Cattail [7]
- California Bulrush [9]
- Catclaw Acacia [10]
- Common Reed [11]
- Creosote Bush Scrub [12]
- Creosote Bush\Cattle Saltbush [13]
- Desert Smoke Tree [15]
- Developed\Disturbed [16]
- Giant Reed [17]
- Hillside Palo Verde [18]
- Honey Mesquite [19]
- Landscaped [20]
- No Data [31]
- Open Water [32]
- Other Wetland [30]
- Quailbush Scrub [22]
- Salt Cedar [23]
- Salt Cedar/Athel Tamarisk [25]
- Salt Cedar/Blue Paloverde/Honey Mesquite [26]
- Salt Cedar/Honey Mesquite [27]
- Salt Cedar/Screwbean Mesquite [28]
- Screwbean Mesquite [29]

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Final Groundwater Remediation Project SEIR

Map Creation Date: 12/12/2016 Sources: ESRI Aerial, ESA, PG&E 2015

Vegetation Impacts: Detail Map 4

Figure 4.3-5d

ESA

North State Resources

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Requirements outlined in the C/RAWP (CH2M Hill 2015b) would assist in the avoidance and minimization of impacts to special-status bird species. Specifically, site preparation and demarcation requirements (Section 4.2.3 of C/RAWP) will assist in avoiding and minimizing impacts to biologically sensitive areas that may support foraging and nesting habitat for special-status birds. In addition, restoration requirements, as detailed in Appendix G, N, O, and V to the C/RAWP, will ensure habitat for special-status birds is restored following construction.

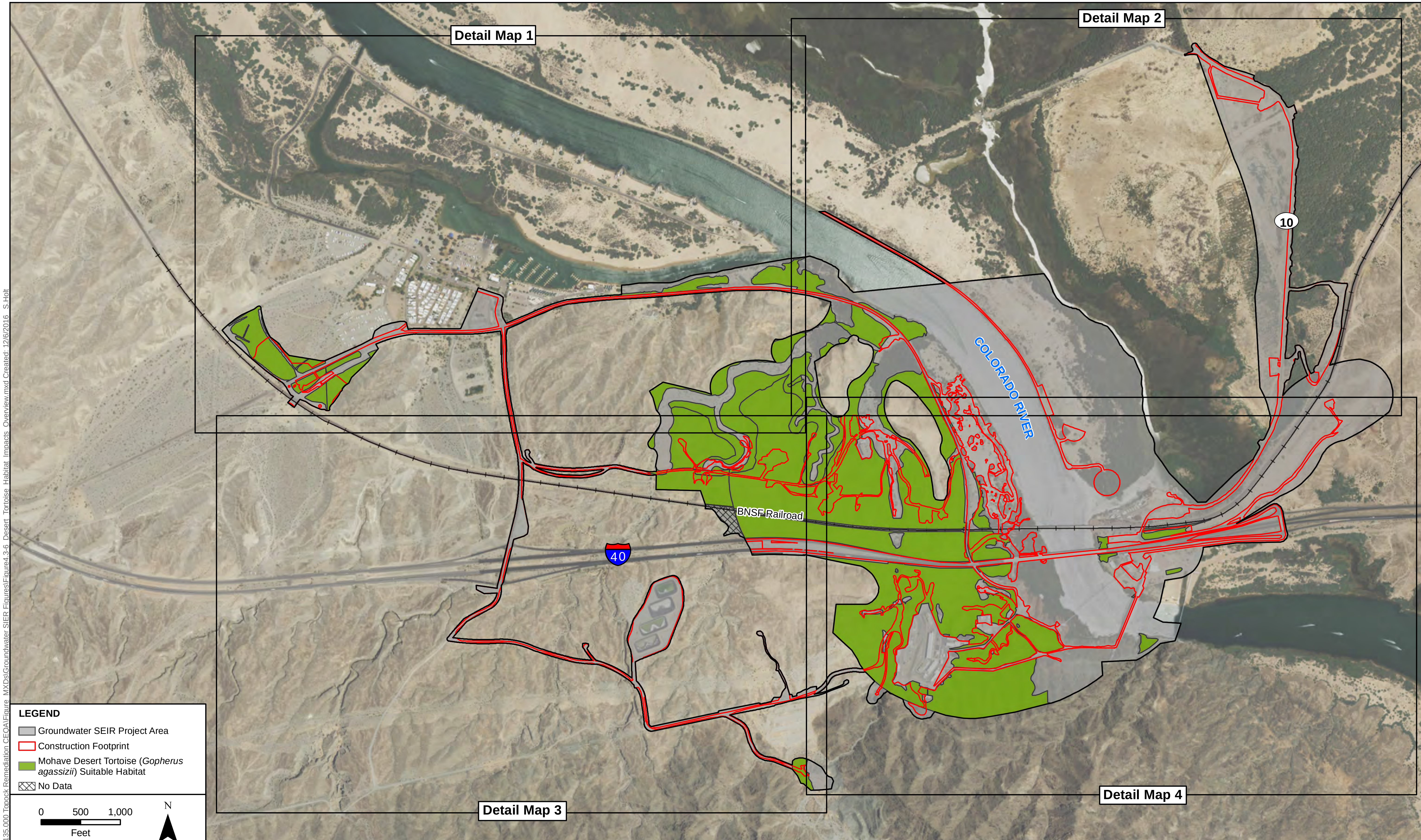
Construction impacts on nesting birds (both special-status and common species) would remain potentially significant despite implementation of the above-referenced components of the C/RAWP. To address significant impacts on nesting birds, **Mitigation Measure BIO-2a** as included in the Groundwater FEIR and revised herein, would require implementation of impact avoidance and minimization measures, as outlined in the BIAMP and previously approved by CDFW, and DTSC, USFWS and DOI. This measure applies to both planned construction as well as any construction associated with the Future Activity Allowance. The BIAMP was prepared to satisfy Mitigation Measure BIO-2a of the Groundwater FEIR and includes measures to address all potential impacts to special-status birds associated with the Final Design. Generally, the BIAMP recommends that construction occur outside avian breeding seasons. For ground-disturbing activities that must occur during the avian breeding season, the BIAMP requires conducting preconstruction nesting surveys to identify active nest sites and appropriately sized buffers for avoidance. The BIAMP also includes general measures to minimize impacts to special-status birds such as prohibition of cross-country travel and containment of trash and food in closed containers to minimize attraction of opportunistic predators. The BIAMP is included as Appendix S to the C/RAWP (CH2M Hill 2015b). The BIAMP includes all measures applicable to federally listed bird species (i.e., southwestern willow flycatcher, western yellow-billed cuckoo, and Yuma clapper rail) that were identified in the PBA (included as Appendix U to the C/RAWP). Implementation of the BIAMP through Mitigation Measure BIO-2a would reduce impacts to less than significant as impacts to nesting birds would be avoided through seasonal avoidance or establishing avoidance buffers around active nests for activities performed during the avian breeding season.

Disturbance to Desert Tortoise Individuals and Habitat

The nature of construction impacts to the desert tortoise associated with the Final Remedy Design remains the same as described in the Groundwater FEIR (i.e., disturbance or loss of marginal habitat during grading and vegetation clearing and potential injury or mortality of individuals). As currently planned, approximately 26.59 acres delineated as suitable desert tortoise habitat during 2013 field surveys are located within the construction footprint of the Final Design. Of these 26.59 acres of potential direct impacts, 22.18 acres would occur to desert tortoise habitat that is currently disturbed or developed. Thus, approximately 4.41 acres of undisturbed desert tortoise habitat would be subject to disturbance during construction of Project facilities. **Figure 4.3-6** depicts to desert tortoise habitat impacts associated within planned facilities.

In addition to the known infrastructure, construction of additional Project facilities (e.g., wells, access roads) under the Future Activity Allowance could result in additional acres of disturbance to desert tortoise habitat within the Project Area. This analysis assumes up to 36.85 acres of additional ground disturbance could result with construction of additional proposed Project facilities under the Future Activity Allowance (refer to Section 4.3.5.2 of this SEIR). To estimate additional direct impacts to suitable desert tortoise habitat under the Future Activity Allowance, this analysis assumes that impacts to such habitat would increase proportionally with the potential increase in the overall construction footprint. Therefore, given that impacts to suitable desert tortoise habitat represent approximately 20 percent of the construction footprint for planned facilities (i.e., 29.21 acres of 147 total acres), additional direct impacts to desert tortoise habitat under the Future Activity Allowance are estimated at up to 7.4 acres (i.e., 20 percent of 36.85 acres). It is assumed that all additional direct impacts would occur to desert tortoise habitat that is not currently disturbed. It is likely that direct impacts to undisturbed desert tortoise habitat resulting from construction of additional proposed Project facilities would be less than 7.4 acres given that additional facilities would be sited to avoid desert tortoise habitat to the extent feasible, as required by Section 4.2.3 of the C/RAWP.

Requirements outlined in the C/RAWP (CH2M Hill 2015b) would assist in the avoidance and minimization of impacts to desert tortoise and its habitat. Specifically, site preparation and demarcation requirements (Section 4.2.3 of C/RAWP) will assist in avoiding impacts to biologically sensitive areas that may support desert tortoise. In addition, site management and compliance measures (Section 4.6.5 of C/RAWP) include BMPs to protect wildlife from incurring injuries within open trenches, boreholes, or pipes, such as covering trenches and boreholes and creating exit points at open trenches using planks or dirt ramps. Restoration requirements, as detailed in Appendix G, N, O, and V to the C/RAWP, will ensure desert tortoise habitat is restored following construction.



Final Groundwater Remediation Project SEIR

Map Creation Date: 12/6/2016 Sources: ESRI Aerial, PG&E 2015

Desert Tortoise Habitat Impacts: Overview

Figure 4.3-6

ESA

North State Resources

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Final Groundwater Remediation Project SEIR

Map Creation Date: 12/6/2016 Sources: ESRI Aerial, PG&E 2015

Desert Tortoise Habitat Impacts: Detail Map 1

Figure 4.3-6a

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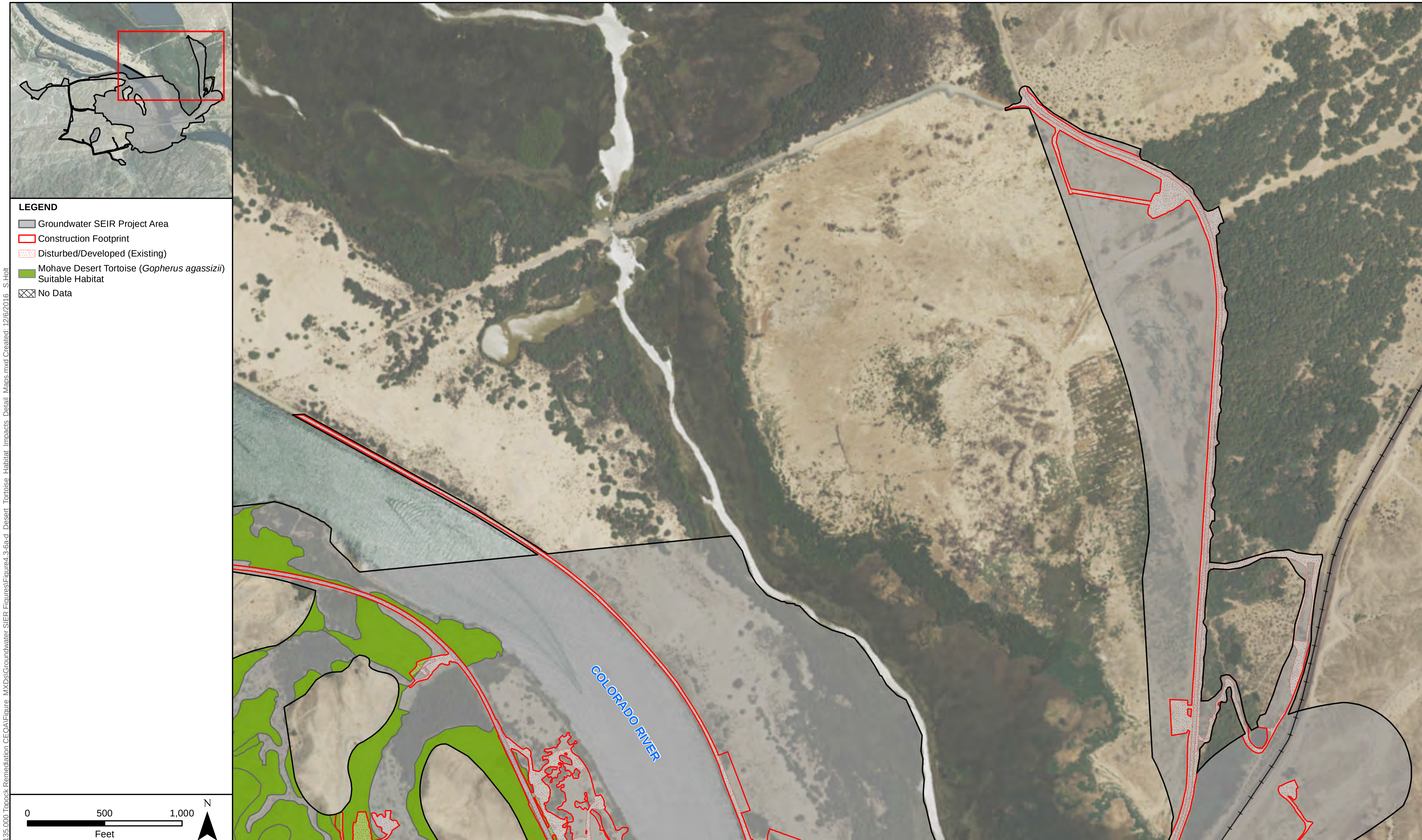


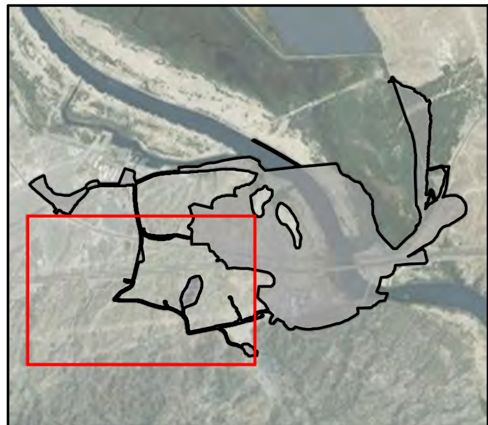
Final Groundwater Remediation Project SEIR

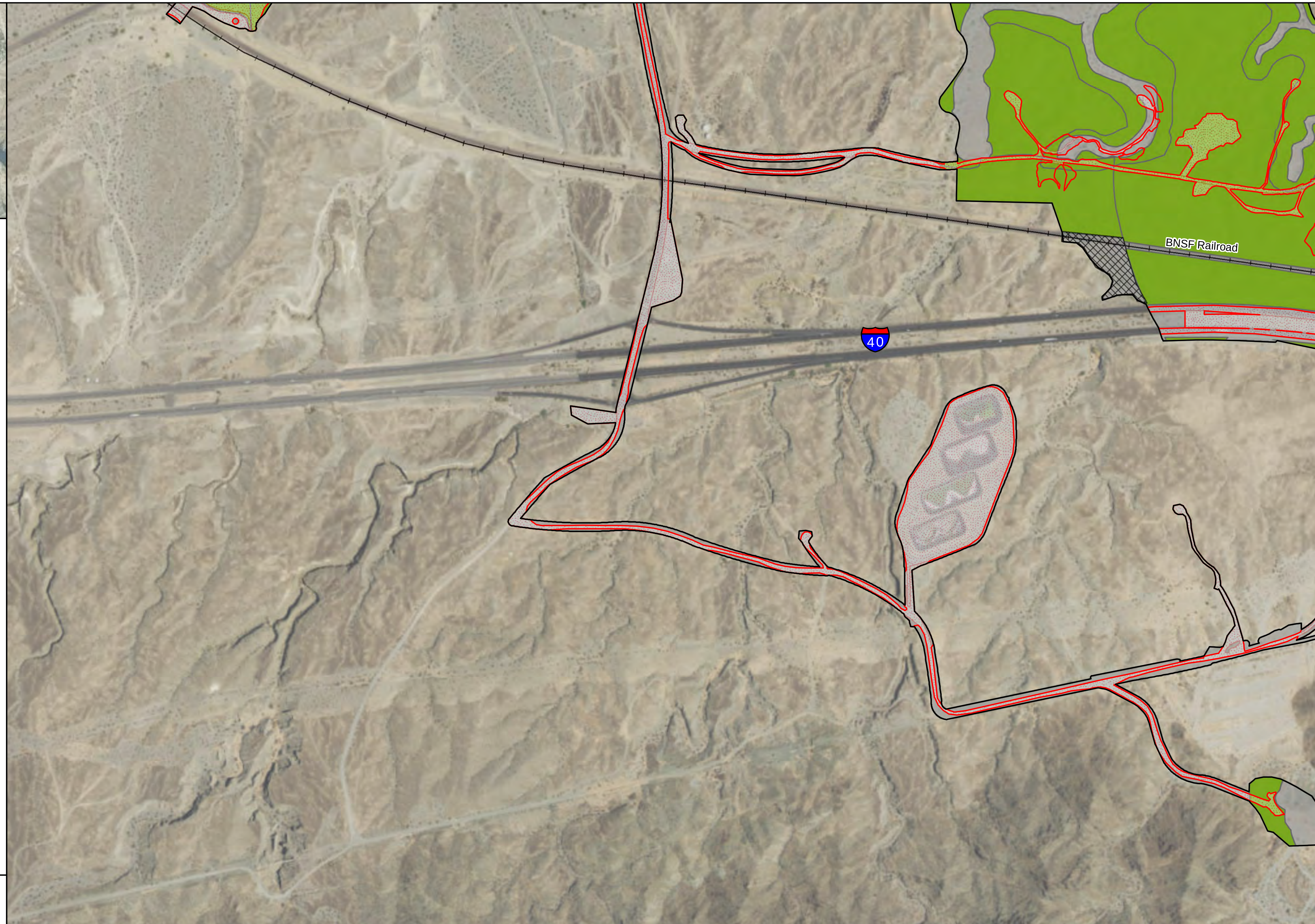
Map Creation Date: 12/6/2016 Sources: ESRI Aerial, PG&E 2015

Desert Tortoise Habitat Impacts: Detail Map 2

Figure 4.3-6b

ESA North State Resources





LEGEND

- Groundwater SEIR Project Area
- Construction Footprint
- Disturbed/Developed (Existing)
- Mohave Desert Tortoise (*Gopherus agassizii*) Suitable Habitat
- No Data

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Feet
N

Final Groundwater Remediation Project SEIR

Map Creation Date: 12/6/2016 Sources: ESRI Aerial, PG&E 2015

Desert Tortoise Habitat Impacts: Detail Map 3

Figure 4.3-6c

ESA North State Resources

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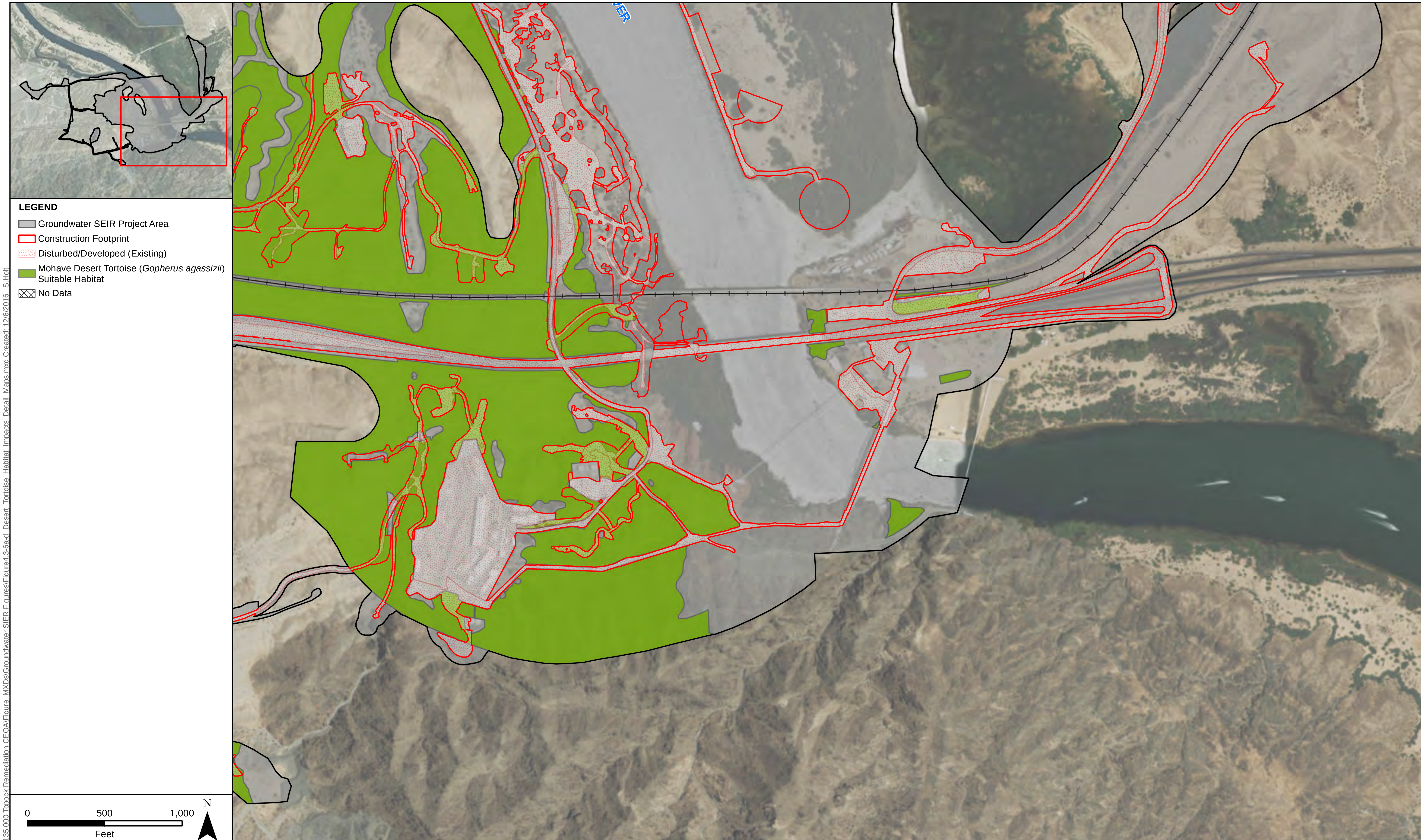

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Final Groundwater Remediation Project SEIR

Map Creation Date: 12/6/2016 Sources: ESRI Aerial, PG&E 2015

Desert Tortoise Habitat Impacts: Detail Map 4

Figure 4.3-6d

ESA North State Resources

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The construction impacts to desert tortoise and its habitat (including planned impacts and those associated with the Future Activity Allowance) would remain potentially significant despite implementation of the above-referenced components of the C/RAWP. To address significant impacts on desert tortoise and its habitat, **Mitigation Measure BIO-2b** as included in the Groundwater FEIR and revised herein, would require implementation of avoidance and minimization measures identified in the PBA. This measure applies to both planned construction as well as any construction associated with the Future Activity Allowance. The PBA includes measures specific to the desert tortoise, and USFWS provided concurrence with the measures identified in the PBA in February 2007. Measures identified in the PBA address all potential impacts to desert tortoise associated with the Final Remedy Design. The PBA is included as Appendix U to the C/RAWP (CH2M Hill 2015b). Measures included in the PBA require preconstruction surveys in accordance with USFWS protocols, micro-siting Project facilities in previously disturbed areas or in area with sparse vegetation, and construction monitoring by a qualified desert tortoise biologist. The PBA also includes general measures, such as a 20 mile per hour (mph) speed limit on access roads, checking under vehicles for desert tortoise, containment of trash and food in closed containers to minimize attraction of opportunistic predators, and prohibition of cross-country travel. Implementation of measures in the PBA would reduce desert tortoise impacts to a less than significant level as measures in the PBA would minimize the likelihood for desert tortoise to be harmed during construction of the proposed Project.

Disturbance to Ring-Tailed Cat Individuals and Habitat

Potential impacts to the ring-tailed cat were not analyzed in the Groundwater FEIR. An individual ring-tailed cat was observed within the Station on October 25, 2007. A second ring-tailed cat sighting was made at the Station a few years later. The limits of ring-tailed cat habitat were not formally delineated within the Project Area during field surveys; the species utilizes very specific habitats for denning (rock crevices, tree hollows, mines, abandoned buildings, etc.) and generally forages in and moves through riparian canyon areas. Ring-tailed cat dens have not been discovered in the Project Area, but may exist. As required by Section 4.2.3 of the C/RAWP, proposed Project facilities would be required to be sited to avoid native habitats to extent feasible.

Disturbance to suitable ring-tailed cat foraging and movement habitat is not expected to substantially affect the species given the general availability of habitat in the Project Area and vicinity. While some foraging and movement habitat would be disturbed with construction of Project facilities, the proposed Project would not preclude use of the Project Area by the ring-tailed cat for foraging and movement purposes. Therefore, construction impacts to suitable foraging and movement habitat would be less than significant.

Direct impacts to ring-tailed cat could also include injury or death through direct contact with equipment, through collapse or damage of an active or occupied den typically in rock crevices or abandoned burrows on-site, or indirectly through den abandonment as a result of nearby construction. As a California Fully Protected species, construction impacts to ring-tailed cat individuals and occupied dens would be potentially significant.

Requirements outlined in the C/RAWP (CH2M Hill 2015b) would assist in the avoidance and minimization of impacts to ring-tailed cat. Specifically, site preparation and demarcation requirements (Section 4.2.3 of C/RAWP) will assist in avoiding or minimizing impacts to biologically sensitive areas that may support dens. In addition, restoration requirements, as detailed in Appendix G, N, O, and V to the C/RAWP, will ensure suitable habitat is restored following construction.

Construction impacts to ring-tailed cat individuals and occupied dens would remain potentially significant despite implementation of the above-referenced components of the C/RAWP. To address significant impacts on this species, **Mitigation Measure BIO-2d** would require pre-activity surveys to identify any potential locations of ring-tailed cats near ground-disturbing activities and take appropriate actions to avoid harm to the species. This measure applies to both planned construction as well as any construction associated with the Future Activity Allowance. Implementation of this measure would reduce impacts to less than significant by ensuring that potential ring-tailed cat dens near construction areas are identified and avoided.

Disturbance to Nelson's Bighorn Sheep Individuals and Habitat

Potential impacts to the Nelson's bighorn sheep were not analyzed in the Groundwater FEIR as the species was not previously known to occur. Nelson's bighorn sheep were most recently observed in the Project Area on March 3 and March 7, 2016. Additionally, skeletal and fur remains of a large ungulate (possibly a Nelson's bighorn sheep) was observed on the Project Area in April 2015 during a focused desert tortoise survey. While the limits of suitable habitat for Nelson's bighorn sheep were not formally delineated, all native habitats in the Project Area (i.e., all vegetation communities with the exception of developed/disturbed and landscape land covers) are assumed to provide foraging and movement habitat for the species. The primary risks to Nelson's bighorn sheep during construction include noise or visual disruptions and potential direct injury or mortality of individuals. Loss of lambing habitat is not expected as lambing habitat does not occur on the Project Area (refer to Table 4.3-3).

As currently planned, construction of the Final Design would disturb approximately 16.28 acres of potentially suitable and currently undisturbed Nelson's bighorn sheep foraging and movement habitat. The Future Activity Allowance provision for construction of additional proposed Project facilities (wells, access roads, etc.) could result in additional acres of disturbance to foraging and movement habitat within the Project Area. This analysis assumes up to 36.85 acres of additional ground disturbance could result with development of additional proposed Project facilities under the Future Activity Allowance (refer to Section 4.3.5.2). This analysis further assumes a worst-case scenario that all additional ground disturbances would occur within suitable foraging and movement habitat for Nelson's bighorn sheep. Therefore, total direct impacts to bighorn sheep foraging and movement habitat may total up to 53.13 acres. As required by Section 4.2.3 of the C/RAWP, proposed Project facilities would be required to be sited to avoid native habitats to extent feasible.

Direct impacts to suitable Nelson's bighorn sheep foraging and movement habitat during construction of the proposed Project would be relatively minor compared to the extent of available habitat in the Project Area and vicinity. While some foraging and movement habitat would be disturbed with construction of Project facilities, the proposed Project would not preclude use of the Project Area by the Nelson's bighorn sheep for foraging and movement purposes. Therefore, construction impacts to suitable foraging and movement habitat would be less than significant.

There is evidence that human disturbance can alter habitat use and activity patterns of bighorn sheep, although the response to disturbance varies among individuals and with degree of previous exposure to human contact. Potential disturbance to Nelson's bighorn sheep individuals could include disruption of the movement of sheep passing through the Project Area from late October to mid-May. However, recent sightings near the Station suggest that sheep have habituated to human activities in and around the Station, including operation and maintenance activities at the Station, vehicle traffic on roads, and the general presence of people in the area. Therefore, the impacts of human disturbance on Nelson's bighorn sheep on the Project Area may be lower than would be expected on individuals that have not been exposed to regular human activity. Regardless, there is potential for individuals to be disturbed or injured or killed during construction of the proposed Project. As a California Fully Protected species, construction impacts to Nelson's bighorn sheep individuals would be potentially significant.

It should be noted that Nelson's bighorn sheep in the region are susceptible to respiratory disease (as evident in Mojave Preserve). However, this respiratory disease (pneumonia) is passed to bighorn sheep from contact with domestic sheep. Given that the proposed Project would not introduce domestic sheep to the Project Area, the proposed Project would not contribute to the potential spread of respiratory disease in bighorn sheep.

Requirements outlined in the C/RAWP (CH2M Hill 2015b) would assist in the avoidance and minimization of impacts to Nelson's bighorn sheep. Specifically, site preparation and demarcation requirements (Section 4.2.3 of C/RAWP) will assist in avoiding or minimizing impacts to biologically sensitive areas that may support bighorn sheep foraging habitat or movement areas. In addition, restoration requirements, as detailed in Appendices G, N, O, and V to the C/RAWP, will ensure suitable habitat is restored following construction.

Construction impacts to Nelson's bighorn sheep individuals would remain potentially significant despite implementation of the above-referenced components of the C/RAWP. To address potential significant impacts to this species, **Mitigation Measure BIO-2e** would require ground-disturbing activities to halt if a Nelson's bighorn sheep is found within 125 feet of Project activities. This measure applies to both planned construction as well as any construction associated with the Future Activity Allowance. Implementation of this measure would reduce impacts to less than significant by ensuring ground-disturbing activities occur only when Nelson's bighorn sheep are absent from an area within 125 feet of work areas.

Disturbance to Special-Status Bat Individuals and Habitat

Potential impacts to special-status bat species were not analyzed in the Groundwater FEIR as special-status bat species were not previously known to occur. Since certification of the Groundwater FEIR, the presence of six special-status species (i.e., pallid bat, Townsend's big-eared bat, California leaf-nosed bat, cave myotis, western red bat, and western mastiff bat) within the Project Area has been confirmed and three other species have potential to occur (i.e., Arizona myotis, pocketed free-tailed bat, and big free-tailed bat) (Brown 2015b; H.T. Harvey & Associates 2015). The Townsend's big-eared bat was elevated from a California Species of Special Concern to a candidate for listing under the CESA since publication of the Groundwater FEIR. CDFW released a Status Review report in June 2016 that determined full listing under CESA is not warranted. All special-status bat species documented or with potential to occur are California Species of Special Concern.

The primary risk to special-status bat species associated with the Final Design include potential disturbances to foraging habitat and active day and maternity roost sites. The operation of machinery in desert washes could disturb the vegetation that attracts insects for bats to prey on, thus impacting their foraging habitat. In addition, activities adjacent to slopes and cliff faces in the Project Area could result in disturbance to roosting bats during the maternity roosting season of March 15 through August 31. Potential impacts to foraging habitat, day roost sites, and maternity roost sites are described further in the following subsections.

Foraging

Special-status bats with a potential to occur on the Project Area generally forage over edge habitats along streams, grasslands, and within a variety of wooded habitats gleaning insects from surfaces and capturing insects on the wing. Suitable foraging habitat for special-status bat species on the Project Area generally occurs in the bottoms of drainages and areas that contain scattered palo verde and ironwood trees. A bat survey conducted on the Project Area in 2015 identified suitable foraging habitat for several bat species within Bat Cave Wash and the East Ravine, as well as the Topock Marsh and areas adjacent to the Colorado River (Brown 2015a, 2015b).

As currently planned, construction of the proposed Project would directly impact approximately 16.28 acres of suitable foraging habitat for special-status bat species. All native habitats in the Project Area (i.e., all vegetation communities with the exception of developed, disturbed, or landscaped areas) are assumed to provide foraging habitat for the special-status bat species known to occupy the Project Area. In addition, the Future Activity Allowance could result in additional acres of disturbance to foraging habitat within the Project Area. This analysis assumes up to 36.85 acres of additional ground disturbance could result with development of additional Project facilities under the Future Activity Allowance (refer to Section 4.3.5.2 of this SEIR). This analysis further assumes a worst-case scenario that all additional ground disturbances would occur within suitable foraging habitat for special-status bat species. Therefore, total direct impacts to foraging habitat for special-status bat species may total up to 53.13 acres.

Requirements outlined in the C/RAWP (CH2M Hill 2015b) would assist in the avoidance and minimization of impacts to suitable foraging habitat for bats. Specifically, site preparation and demarcation requirements (Section 4.2.3 of C/RAWP) will assist in avoiding impacts to biologically sensitive areas that may support foraging areas for special-status bats. Restoration requirements, as detailed in Appendix G, N, O, and V to the C/RAWP, will ensure suitable foraging habitat for bats is restored following construction. In addition, the Project has been designed to avoid work from dusk till dawn, where feasible, when bats are most active and foraging. While night work is not planned as part of routine construction activities, it may be determined that limited circumstances require the continuation of work into the nighttime periods because it cannot be disrupted or suspended (for example, special conditions during drilling or concrete pouring) or work may require an early morning start to ensure completion within 1 day or because of heat constraints. For these special circumstances, nighttime construction lighting would be limited to active construction areas during nighttime or early-morning operation. As described in Section 4.3.5.2 of this SEIR, to minimize lighting impacts, lighting would include shrouding or shielding for portable lights, the use of the lowest allowable height and fewest feasible numbers of lights consisting of downward-facing fixtures fitted with cutoff shields to reduce light diffusion.

Direct impacts to foraging habitat is not expected to substantially affect special-status bat species or preclude use of the Project Area for foraging purposes given the limited amount of foraging habitat that would be impacted relative to the amount of foraging habitat available within the Project Area and vicinity. Thus, impacts to foraging habitat for all special-status bat species would be less than significant.

Day Roosting

All special-status bat species known or with potential to occur in the Project Area generally roost during the day in crevices located in rocky outcrops and cliffs, caves, mines, trees, and structures such as buildings and bridges, hanging from walls and ceilings, and with an available drop off for flight. Day roosts may be used by bats during the day time for sleeping (torpor) and can consist of individuals, groups of males (bachelor roost), or a colony of bats. The Project Area provides suitable roosting habitat for all special-status bat species known or with potential to occur in the Project Area, particularly within the crevices and small mammal burrows along cliff faces and slopes associated with the desert washes. Bat surveys conducted on the Project Area observed day roosting activity within Bat Cave Wash and beneath the western end of the BNSF Railway bridge.

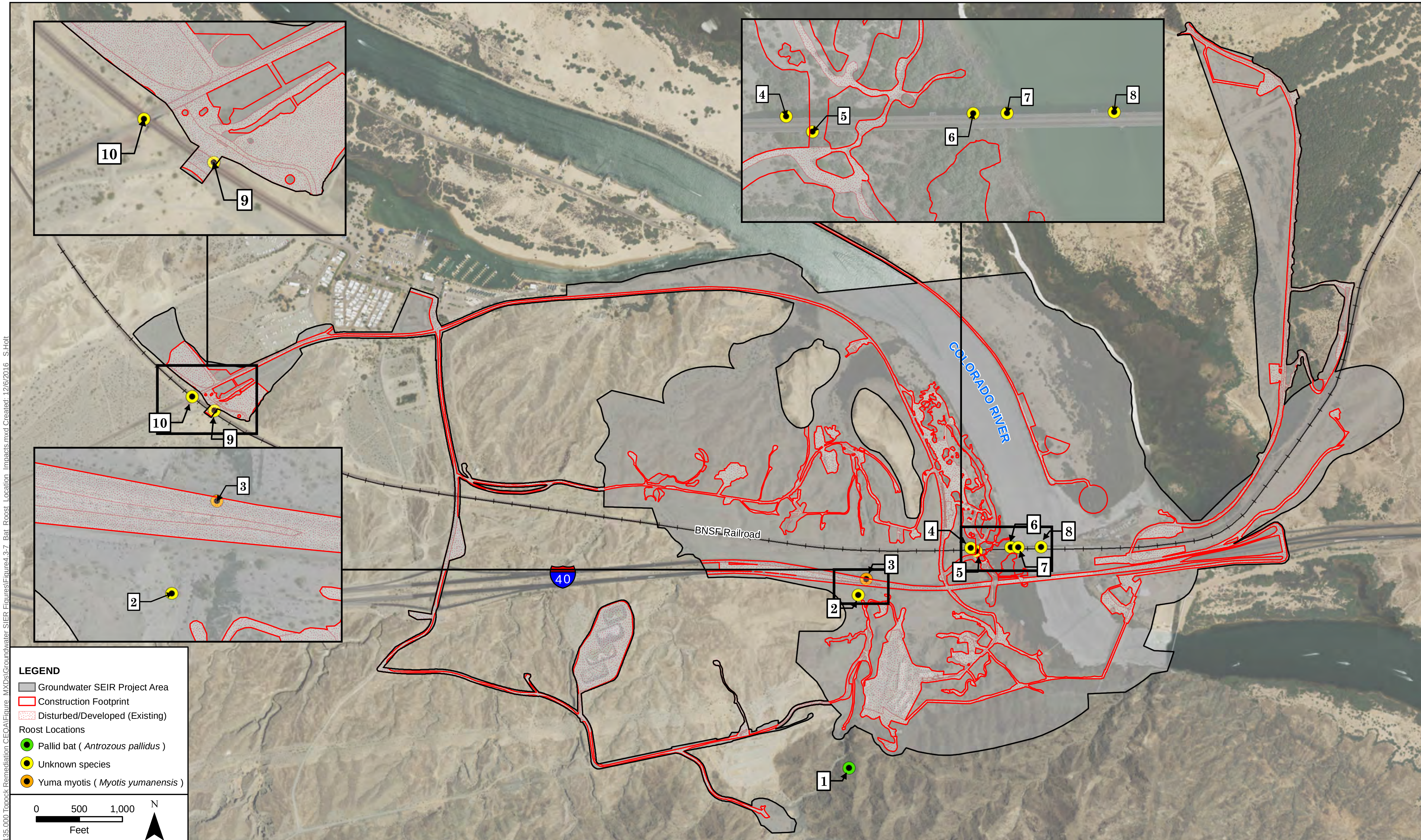
Project activities are proposed primarily within upland areas and the channel bottom of desert washes; however, disturbance to day roosting may occur as a result of Project activities (including planned and potential construction associated with the Future Activity Allowance) occurring adjacent to slopes that contain rock crevices and cliff faces. Disturbances to day roosts occupied by special-status bat species would be less than significant as the impact would not be expected to reduce populations to below self-sustaining levels. Requirements outlined in the C/RAWP (CH2M Hill 2015b) would assist in the avoidance and minimization of impacts to day roosting sites. Specifically, site preparation and demarcation requirements (Section 4.2.3 of C/RAWP) would assist in avoiding impacts to biologically sensitive areas that may support day-roosting bats.

Maternity Roosting

Maternity roosting habitat is similar to day roosting habitat, but a maternity roost contains one or several lactating female bats raising their young (pups). Maternity roosts are afforded additional protection because they are considered bat nursery sites that contains the next generation of bats that are unable to fly or feed themselves. Three special-status bat species could potentially establish maternity roots within the Project Area: pallid bat, cave myotis, and California mastiff bat (Brown 2015a, 2015b). In addition, one postlactating female pallid bat was successfully tracked back to her roost in the southern portion of Bat Cave Wash during 2016 surveys; although, suitable maternity roosting habitat for the pallid bat is limited within the Project Area (i.e., primarily at the southern end of Bat Cave Wash where it is narrow in width) (H.T. Harvey & Associates 2016a).

Ten roost sites have been identified within the Project Area (**Figure 4.3-7**). Project activities occurring near these roost sites (including planned and potential construction associated with the Future Activity Allowance) during the maternity roosting season of March 15 through August 31 may result in potential direct and indirect impacts to a bat maternity roost. Increased human activity, noise, and vibration around maternity roost sites can result in the abandonment of a maternity roost (H.T. Harvey & Associates 2004). Disturbances to maternity roosts can result in females leaving the roost and abandoning their pups, thereby reducing population growth and propagation of subsequent generations. Thus, impacts to maternity roost sites occupied by special-status bat species would be a potentially significant.

Requirements outlined in the C/RAWP (CH2M Hill 2015b) would assist in the avoidance and minimization of impacts to day roosting sites. Specifically, site preparation and demarcation requirements (Section 4.2.3 of C/RAWP) would assist in avoiding impacts to biologically sensitive areas that may support maternity roost sites. Construction impacts to maternity roost sites occupied by special-status bat species would remain potentially significant despite implementation of the above-referenced components of the C/RAWP. To address potential significant impacts to maternity roost sites occupied by special-status bat species, **Mitigation Measure BIO-2f** would require maternity roosting season avoidance, and if the maternity season cannot be avoided, implementation of avoidance measures (e.g., avoidance buffers and limiting night-time lighting zone). In addition, this measure requires recurring surveys (i.e., once every three or five years depending on results) to confirm known roosting locations, as needed for the purposes of planning construction of facilities during the operational lifespan of the proposed Project. This measure applies to both planned construction as well as any construction associated with the Future Activity Allowance. Implementation of this measure would reduce impacts to less than significant through seasonal avoidance or establishing avoidance buffers around identified maternity roost sites for activities performed near maternity roost sites and during the maternity roosting season.



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Final Groundwater Remediation Project SEIR

Map Creation Date: 12/6/2016 Sources: ESRI Aerial, PG&E 2015

Bat Roost Locations

Figure 4.3-7

ESA

North State Resources

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Disturbance to Northern Mexican Gartersnake Individuals and Habitat

Potential impacts to the northern Mexican gartersnake were not analyzed in the Groundwater FEIR as the species was not previously known to occur. This species was recently observed in Arizona north of the Project Area at Beal Lake in spring 2015. While the limits of suitable habitat for northern Mexican gartersnake were not formally delineated, suitable habitat in the Project Area exists along the shoreline of Topock Marsh in Arizona where dense vegetation may provide suitable cover (PG&E 2016).

The potential for impacts to the northern Mexican gartersnake associated with the Topock Groundwater Remedy pertains only to activities that occur in Arizona and, particularly those activities within 600 feet of Topock Marsh. Planned construction associated with the proposed Project near the Topock Marsh in Arizona includes installation of freshwater supply wells and associated infrastructure in proximity to the freshwater supply well, trenching for installation of conveyance pipeline along the Oatman Highway; installation of two groundwater monitoring wells; and temporary use of a construction laydown area to the south of the Topock Marina. In addition, the species is known to utilize talus/rock piles, rip/rap, or any organic or inorganic debris pile. While these features are not currently present in the Project Area near the southern margin of Topock Marsh, temporary material stockpiles (such as pipe) may be required during construction. Direct impacts to the northern Mexican gartersnake resulting from these activities could include injury or death through direct contact with equipment. Construction activities could also affect the behavior of dispersing individuals; however, the likelihood of affecting dispersing individuals is considered low because construction activities adjacent to suitable habitats would have limited effects (noise, duration, etc.). As a federally listed species, impacts to northern Mexican gartersnake individuals would be potentially significant. Suitable emergent marsh habitat within the Topock Marsh will not be lost, removed, or manipulated with implementation of the proposed Project. to conduct planned activities.

Requirements outlined in the C/RAWP (CH2M Hill 2015b) would assist in the avoidance and minimization of impacts to northern Mexican gartersnake. Specifically, site preparation and demarcation requirements (Section 4.2.3 of C/RAWP) would assist in avoiding or minimizing impacts to biologically sensitive areas where the species may occur.

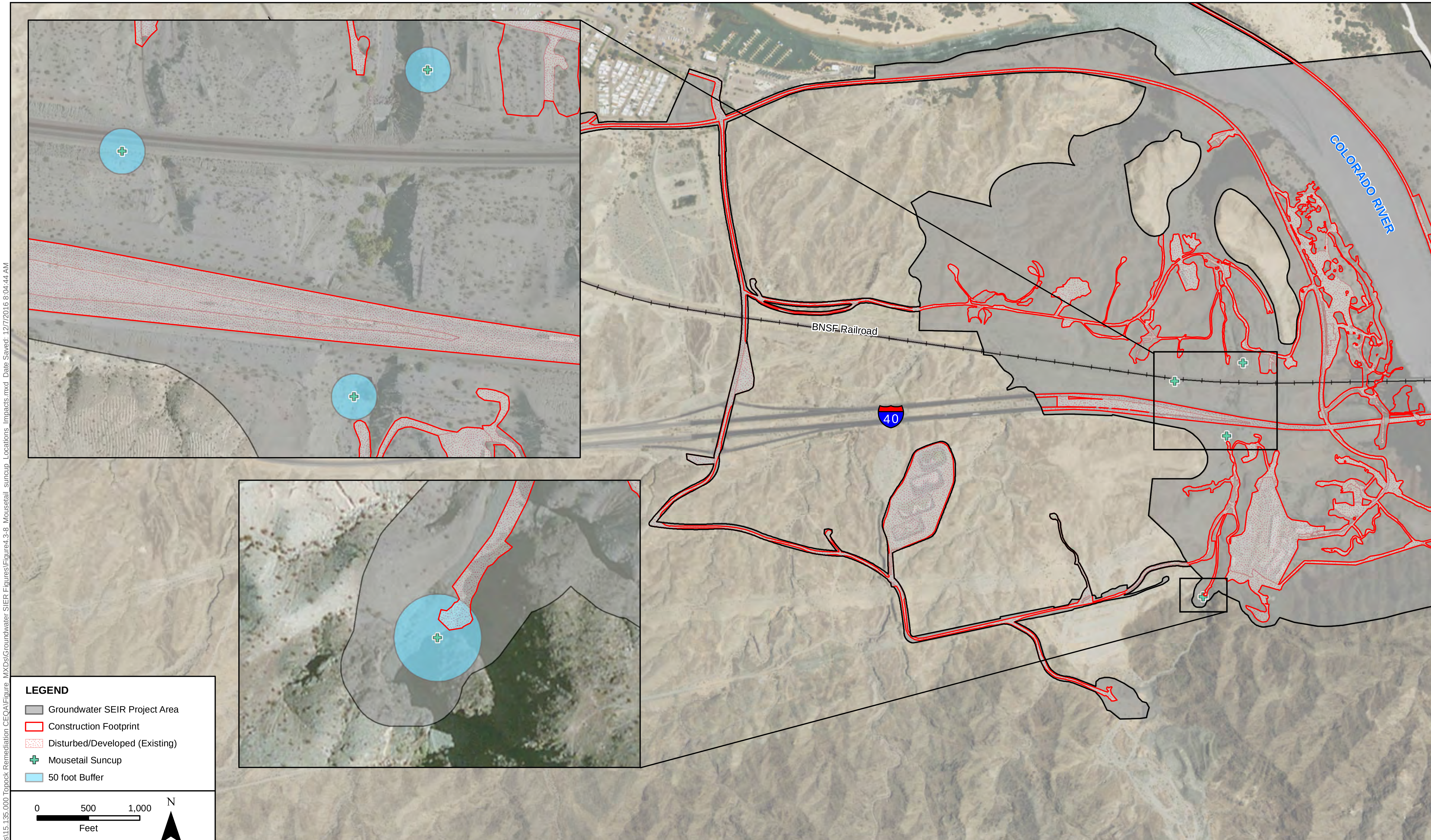
Impacts to northern Mexican gartersnake individuals during construction activities would remain potentially significant despite implementation of the above-referenced components of the C/RAWP. To address potential significant impacts to this species, **Mitigation Measure BIO-2g** would require implementation of measures to avoid and minimize the potential for individuals to be harmed during implementation of the proposed Project. This measure applies to both planned construction as well as any construction associated with the Future Activity Allowance. Implementation of this measure would reduce impacts to less than significant by ensuring gartersnakes are not present where ground-disturbing activities occur and travel speeds on access roads near suitable habitat are minimized to reduce likelihood for vehicle strikes.

Disturbance to Special-Status Plant Individuals

Potential impacts to special-status plants were not analyzed in the Groundwater FEIR as none were previously known to occur. Four special-status plant species were documented in the Project Area since certification of the Groundwater FEIR, including spiny-hair blazing star, mousetail suncup, small-flowered androstephium, and gravel milk-vetch (refer to Table 4.3-3). The spiny-hair blazing star, small-flowered androstephium, and gravel milk-vetch are currently considered present in the Arizona portion of the Project Area only, where they are not considered a special-status species. The mousetail suncup was observed within the California portion of the Project Area, where it is considered a special-status species. Documented populations of mousetail suncup in California were specifically located within proximity of the construction footprint of the proposed Project (**Figure 4.3-8**).

Construction activities could result in removal or indirect disturbance of special-status plant individuals. Indirect disturbance of individuals resulting from construction activities could include generating dust which can adversely impact plants by coating the surfaces of the leaves and reducing the rates of metabolic processes, such as photosynthesis and respiration. Indirect disturbance could also occur from the use of water from the IM-3 Facility for dust suppression during construction which has higher salt loading that could potentially damage, reduce or impede growth by changing the native soil composition and causing it to be far less favorable to native plants. In addition, the Final Design includes a Future Activity Allowance provision for construction of additional proposed Project facilities (e.g., wells, access roads, etc.) beyond those currently planned. It is possible that construction of additional proposed Project facilities as part of the Future Activity Allowance could directly or indirectly impact populations of special-status plant species. Removal of and indirect disturbance to special-status plants would be potentially significant.

Requirements outlined in the C/RAWP (CH2M Hill 2015b) would assist in the avoidance and minimization of impacts to special-status plant species. Specifically, site preparation and demarcation requirements (Section 4.2.3 of C/RAWP) would assist in avoiding impacts to biologically sensitive areas that may support individuals of special-status species. Restoration requirements, as detailed in Appendix G, N, O, and V to the C/RAWP, will ensure suitable habitat for special-status plants is restored following construction.



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Final Groundwater Remediation Project SEIR

Map Creation Date: 12/7/2016 Sources: ESRI Aerial, PG&E 2015

Mousetail Suncup Locations

Figure 4.3-8

ESA

North State Resources

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Potential construction impacts to special-status plants would remain potentially significant despite implementation of the above-referenced components of the C/RAWP. To address potential significant impacts to this species, **Mitigation Measure BIO-2h** would require one pre-activity survey prior to the construction phase of the proposed Project to locate and flag for avoidance mousetail suncup individuals that may be impacted by ground-disturbing activities in California. Other special-status species observed during the pre-activity survey would also be flagged for avoidance. Mitigation Measure BIO-2h requires establishment of a 50-foot avoidance buffer around known locations of special-status plants; the measure requires mitigation for unavoidable impacts to special-status plants. This measure applies to both planned construction as well as any construction associated with the Future Activity Allowance. Recurring focused botanical surveys may also be performed for construction of additional facilities under the Future Activity Allowance. Implementation of this measure would reduce impacts to less than significant by identifying locations of any special-status plants and establishing avoidance buffers where necessary.

Operation & Maintenance

Generally, operation and maintenance activities would take place within areas disturbed during construction. Ground-disturbing activities during the operation and maintenance phase of the proposed Project include excavations along underground pipelines and at well sites for maintenance, repair, or replacement of these Project facilities. To allow access to these Project facilities, pipeline corridors and well sites would not be revegetated following construction. While these activities would generally take place in areas disturbed during construction, wildlife could potentially be harmed or disturbed during these ground-disturbing activities. In addition, there is potential for construction of additional Project facilities (e.g., wells, access roads, etc.) to occur during operation and maintenance of the proposed Project as part of the Future Activity Allowance. Construction of additional Project facilities could occur in undisturbed areas supporting suitable habitat for special-status species.

Potential impacts to special-status species during operation and maintenance activities would be similar to those described above for construction. Human activity associated with operation and maintenance of the proposed Project would result in potential disturbance to special-status wildlife species, including northern Mexican gartersnake, special-status birds, desert tortoise, ring-tailed cat, Nelson’s bighorn sheep, and special-status bats. Specifically, human activity could alter habitat use and activity patterns of individuals occurring within the Project Area. In addition, vehicular use on access roads and ground disturbing activities could result in injury or mortality of individuals. Construction of additional Project facilities as part of the Future Activity Allowance could result in up to 36.85 acres of additional ground disturbance within the Project Area (refer to Section 4.3.5.2). However, additional Project facilities would be sited to avoid native habitats to extent feasible, as required by Section 4.2.3 of the C/RAWP. Impacts to special-status species resulting from construction of additional Project facilities during the operation and maintenance phase of the proposed Project would be potentially significant.

The Operation and Maintenance Manual (Appendix L of Final Remedy Design, CH2M Hill 2015a) outlines specific requirements that would assist in the avoidance and minimization of impacts to special-status species during operation and maintenance activities. These include the following:

- Section 7.4, Access Road and Pathway Maintenance, describes BMPs for the maintenance of pathways and roads. The BMPs include pruning for shrub overgrowth and soil stabilization to prevent erosion of vegetated areas, and are from the Massachusetts Unpaved Roads BMP Manual, prepared by the Berkshire Regional Planning Commission, 2001).
- Section 7.5, Vegetation Control for Maintenance of Wireless Infrastructure, describes that certain wireless devices would require clear line of sight for proper operation (e.g., remote control infrastructure of well pumps). The sites where such devices are located would be inspected on a periodic basis and overgrowth would be pruned or managed (e.g., tie back, bundle, etc.) to maintain clear lines of sight. Vegetation control measures would be consistent with the project mitigation directives such as the protection of mature plants and the avoidance/protection of ethnobotanical sensitive plants. In addition, vegetation control measures will be consistent with the project's revegetation plans.

Direct impacts to special-status species resulting from construction of additional Project facilities during the operation and maintenance phase would remain potentially significant despite implementation of the requirements outlined in the Operation and Maintenance Manual. Mitigation Measures BIO-2a, 2b, and 2d-2h would address potentially significant operation and maintenance impacts on special-status species. Specific to special-status plant species, there is potential for known populations of spiny-hair blazing star, small-flowered androstephium, and gravel milk-vetch to expand into the California portion of the Project Area during the operational life-span of the Proposed Project given the existence of nearby populations in Arizona (where they are not considered special-status species). Existing populations of mousetail suncup may also expand during the operational life-span of the Proposed Project, and other special-status plants may be discovered on-site. Mitigation Measure BIO-2h prescribes recurring focused presence/absence surveys for special-status plants for the purposes of planning installation of new Project facilities as part of the Future Activity Allowance during the operation phase of the Proposed Project. These surveys would ensure potential populations of special-status species are avoided or appropriate mitigation is provided for unavoidable impacts.

Decommissioning

Decommissioning of the proposed Project would generally be beneficial to biological resources in the long-term as Project facilities would be removed and areas impacted would be restored to native habitats. However, decommissioning activities (e.g., removal and capping of wellheads, restoration of roadways, and removal of pipelines) may result in impacts on special-status species (including northern Mexican gartersnake, special-status birds, desert tortoise, ring-tailed cat, Nelson's bighorn sheep, special-status bats, and special-status plants). The nature of potential decommissioning impacts would be similar to those described above for construction. Specifically, decommissioning would require increased human activity, use of heavy equipment, and general ground disturbance resulting in potential disturbance of individuals and habitat. Potential direct impacts to special-status species resulting from decommissioning cannot be reasonably quantified at this time. However, the extent of direct impacts are expected to be negligible given that decommissioning activities would take place in areas impacted during the construction and operation and maintenance phase of the proposed Project. Nonetheless, potential impacts to northern Mexican gartersnake, special-status birds, desert tortoise, ring-tailed cat, Nelson's bighorn sheep, special-status bats, and special-status plant species during decommissioning activities would be potentially significant.

To address potential significant impacts on special-status species during decommissioning, **Mitigation Measure BIO-2c** as included in the Groundwater FEIR and revised herein, would require development and implementation of a detailed Avoidance and Minimization Plan to minimize disturbance to special-status species and their habitats associated with the decommissioning activities. The Avoidance and Minimization Plan will be prepared based on surveys conducted prior to decommissioning, and during the breeding seasons closest to the start date of decommissioning. The Avoidance and Minimization Plan will specify species-specific measures, including seasonal restrictions for decommissioning activities (e.g., avoidance of the avian breeding season), as well as avoidance buffers around known locations of special-status species or their habitats. To the extent appropriate, the Avoidance and Minimization Plan for decommissioning activities will include applicable measures identified in the existing BIAMP and PBA. The plan will also specify revegetation seed mix or plantings design, a site grading concept plan, success criteria for restoration, a monitoring plan for achieving no net loss of habitat values and functions, and an adaptive management plan. Successful implementation of the Avoidance and Minimization Plan would reduce impacts to a level less than significant by identifying locations of any special-status species, avoiding breeding seasons and/or establishing avoidance buffers where necessary, and restoring habitat areas impacted during implementation of proposed Project.

Comparison of Impact BIO-2 Impacts (Revised) to Groundwater FEIR Impact Analysis

Special-Status Birds

The Groundwater FEIR determined that impacts to special-status bird species associated with construction, operation and maintenance, and decommissioning would be a potentially significant impact. To mitigate the impacts, the Groundwater FEIR required Mitigation BIO-2a, which required preparation and implementation of an avoidance and minimization plan for special-status bird species that would reduce the impacts to nesting birds and special-status birds to less than significant levels through preconstruction and construction measures (e.g., siting to avoid direct and indirect impacts to nesting habitat, preconstruction nest surveys, and establishing avoidance buffers around active nests). An avoidance and minimization plan has since been completed (i.e., the BIAMP), and Mitigation Measure BIO-2a as revised from the Groundwater FEIR, would be required to implement the impact avoidance and minimization measures required by the BIAMP (Appendix S of the C/RAWP). The impact determination in this SEIR is the same as the conclusions in the Groundwater FEIR. Therefore, the Project would not result in any new significant impacts or substantially more severe impacts on special-status birds than previously identified in the Groundwater FEIR.

Desert Tortoise

The Groundwater FEIR determined that impacts to desert tortoise associated with construction, operation and maintenance, and decommissioning would be a potentially significant impact. The Groundwater FEIR proposed Mitigation Measure BIO-2b, which required a preconstruction desert tortoise surveys and implementation of avoidance and minimization measures prescribed by the PBA. The Groundwater FEIR concluded Mitigation Measure BIO-2b would reduce the impact a less than significant level. To address significant impacts on desert tortoise and its habitat in this SEIR, Mitigation Measure BIO-2b as revised from the Groundwater FEIR, would require pre-activity desert tortoise clearance surveys and implementation of avoidance and minimization measures identified in the PBA. The impact determination in this SEIR is the same as the conclusions in the Groundwater FEIR. Therefore, the Project would not result in any new significant impacts or substantially more severe impacts on desert tortoise than previously identified in the Groundwater FEIR.

Ring-Tailed Cat

The ring-tailed cat was observed on the Project Area prior to publication of the Groundwater FEIR in 2007 and again a few years later. Potential impacts to the ring-tailed cat were not analyzed in the Groundwater FEIR and no mitigation measures were required. As discussed above, impacts on ring-tailed cat are potentially significant, and would represent a new significant impact than previously identified in the Groundwater FEIR. This SEIR would require implementation of Mitigation Measure BIO-2d, which would reduce potentially significant impacts to ring-tailed cat a less than significant level.

Nelson’s Bighorn Sheep

Potential impacts to the Nelson’s bighorn sheep were not analyzed in the Groundwater FEIR and no mitigation measures were required. Since the publication of the Groundwater FEIR, the species was confirmed to occur on the Project Area (most recently observed in March 2016). As discussed above, impacts on Nelson’s bighorn sheep are potentially significant, and would represent a new significant impact than previously identified in the Groundwater FEIR. This SEIR would require implementation of Mitigation Measure BIO-2e, which would reduce potentially significant impacts to Nelson’s bighorn sheep to a less than significant level.

Special-Status Bats

Potential impacts to special-status bat species were not analyzed in the Groundwater FEIR and no mitigation measures were required. Since the publication of the Groundwater FEIR, nine special-status bat species were confirmed to be present or determined to have potential to occur on the Project Area. As discussed above, impacts on special-status bats are potentially significant, and would represent a new significant impact than previously identified in the Groundwater FEIR. This SEIR would require implementation of Mitigation Measure BIO-2f, which would reduce potentially significant impacts to special-status bats to a less than significant level.

Northern Mexican Gartersnake

Potential impacts to the northern Mexican gartersnake were not analyzed in the Groundwater FEIR and no mitigation measures were required. Since the publication of the Groundwater FEIR, the species was confirmed to be present in the vicinity of the Project Area (documented in Arizona at Beal Lake in spring 2015). As discussed above, impacts on northern Mexican gartersnake are potentially significant, and would represent a new significant impact than previously identified in the Groundwater FEIR. This SEIR would require implementation of Mitigation Measure BIO-2g, which would reduce potentially significant impacts to this species to a less than significant level.

Special-Status Plants

Potential impacts to special-status plant species were not analyzed in the Groundwater FEIR and no mitigation measures were required. Since the publication of the Groundwater FEIR, four special-status plants were confirmed to be present in the Project Area. As discussed above, impacts to mousetail suncup (and other potentially occurring special-status plant species) in California are potentially significant, and would represent a new significant impact than previously identified in the Groundwater FEIR. This SEIR would require implementation of Mitigation Measure BIO-2h, which would reduce potentially significant impacts to the species to a less than significant level.

Mitigation Measures

Mitigation Measure BIO-2a: Disturbance of Special-Status Birds and Loss of Habitat (Groundwater FEIR Measure with Revisions). The proposed Project has been designed to minimize removal of habitat for special-status birds. Impact avoidance and minimization measures required by the BIAMP shall be implemented (refer to Appendix S of the C/RAWP (CH2M Hill 2015b)). Avoidance and minimization measures required by the BIAMP include prohibiting construction near or in special-status bird habitat; limiting construction during the breeding seasons; requiring an on-site biological monitoring during field activities; implementing buffers around active nests to the extent practical and feasible to limit noise and visual disturbances; and conducting worker awareness training and monitoring to assess the activity effect, ambient activities, site conditions, and bird behavior to determine the efficacy of nest avoidance buffers.

Timing:	Before and during ground-disturbing construction, operation and maintenance activities, and prior to the start of decommissioning.
Responsibility:	PG&E would be responsible for the implementation of these measures. DTSC would be responsible for ensuring compliance.
Significance after Mitigation:	With mitigation, this impact would be reduced to a **less than significant** level.

Mitigation Measure BIO-2b: Disturbance of Desert Tortoise and Loss of Habitat (Groundwater FEIR Measure with Revisions). To the extent feasible, project construction (including planned facilities and those potentially constructed as part of the Future Activity Allowance) shall be designed to minimize removal of habitat for the desert tortoise. Before any ground-disturbing project activities begin, a qualified desert tortoise biologist shall identify potential desert tortoise habitat in areas that could be affected. Through coordination with the designated qualified biologist, PG&E shall ensure that the footprints of Project elements and construction zones, staging areas, and access routes are designed to avoid direct or indirect effects on potential desert tortoise habitat to the extent feasible. Through coordination with the designated qualified biologist, PG&E shall ensure that the footprints of Project facilities and construction zones, staging areas, and access routes are designed to avoid direct or indirect effects on potential desert tortoise habitat to the extent feasible. In areas where impacts to potential desert tortoise habitat are unavoidable, measures outlined in the PBA and in the USFWS letter concurring with the PBA, shall be implemented, as described below.

A qualified desert tortoise biologist shall conduct pre-activity desert tortoise clearance surveys immediately prior to activities that would result in unavoidable impacts to tortoise habitat. The pre-activity survey will occur immediately prior to ground-disturbance. Pre-activity clearance surveys shall be in full accordance with the substantive requirements of USFWS protocols. Any desert tortoise burrows and pallets outside of, but near, work areas shall be flagged so that they may be avoided during work activities. At conclusion of work activities, all flagging shall be removed. Should any live tortoises be found during the clearance survey, or if a tortoise moves into the work area, all work shall stop immediately and the animal shall be left to move out of the work area on its own accord. To the extent feasible, tortoises shall not be handled. PG&E will have a USFWS-approved desert tortoise handler available if and when a tortoise requires active relocation. USFWS shall be contacted prior to handling any live tortoises. All encounters of desert live desert tortoises shall be reported to USFWS, BLM, CDFW, and DTSC. Information to be reported will include for each individual: the location (narrative, vegetation type, and maps) and date of observation; general conditions and health; any apparent injuries and state of healing; and diagnostic markings.

PG&E shall designate a field contact representative (FCR) who will be responsible for overseeing compliance with proper execution of the mitigation measures. The FCR will be on-site during implementation of all ground disturbing activities. The FCR shall be trained by the qualified desert tortoise biologist and have authority to halt activities that are in violation of the mitigation measures/or pose a danger to listed species. The FCR will have a copy of the mitigation measures and may be a project manager, PG&E representative, or qualified biologist. All employees and contractors shall be required to attend a worker awareness training prior to working on the proposed Project. The FCR shall maintain record of all employees and contractors who have completed the worker awareness training.

USFWS may identify additional conservation measures should Project plans change, or if new information regarding the distribution or abundance of desert tortoise becomes available. PG&E shall implement any additional conservation measures identified by USFWS through the Section 7 consultation process.

Timing:	Before and during ground-disturbing construction, operation and maintenance activities, and prior to the start of decommissioning.

Responsibility:	PG&E would be responsible for the implementation of these measures. DTSC would be responsible for ensuring compliance.
Significance after Mitigation:	With mitigation, this impact would be reduced to a **less than significant** level.

Mitigation Measure BIO-2c: Disturbance of Special-Status Species and Loss of Habitat Caused by Decommissioning (Groundwater FEIR Measure with Revisions). To avoid impacts on special-status species that may occur within the project area as a result of decommissioning activities, an Avoidance and Minimization Plan shall be developed and implemented through consultation with CDFW, BLM, and USFWS. The Avoidance and Minimization Plan will specify species-specific measures, including seasonal restrictions for decommissioning activities (i.e., avoidance of the avian breeding season and maternity roosting season for bats where habitat exists) as needed, as well as avoidance buffers around known locations of special-status species or their habitats. Avoidance and minimization measures identified in the plan shall be based on surveys conducted prior to decommissioning, and during the breeding season (as previously defined in the Groundwater FEIR for each species or suite of species). To the extent appropriate, the Avoidance and Minimization Plan for decommissioning activities will include applicable measures identified in the existing BIAMP and PBA. Restoration of any disturbed areas shall include measures to achieve no net loss of habitat functions and values existing before project implementation. These measures shall be achieved by developing and implementing a final habitat restoration plan (refer to Mitigation Measure BIO-1b). The plan shall include a revegetation seed mix or plantings design, a site grading concept plan, success criteria for restoration, a monitoring plan for achieving no net loss of habitat values and functions, and an adaptive management plan. Success criteria for restoration areas will be similar to that identified in the existing habitat restoration plans (i.e., 75% overall survival rate of mitigation plantings at the end of a minimum 5-year monitoring period). Adaptive management actions to ensure successful establishment of native vegetation and desired density of cover of plants will include weed control, irrigation modification, herbivory protection, and additional plantings. The final habitat restoration plan shall be submitted to DTSC, CDFW, BLM, BOR, USFWS, and DOI for review.

Timing:	Prior to the start of decommissioning.
Responsibility:	PG&E would be responsible for the implementation of these measures. DTSC would be responsible for ensuring compliance.
Significance after Mitigation:	With mitigation, this impact would be reduced to a **less than significant** level.

Mitigation Measure BIO-2d: Disturbance to Ring-Tailed Cat Individuals and Habitat (New Measure). The following measures shall be implemented to avoid and minimize impacts to ring-tailed cat:

i. Pre-activity surveys for ring-tailed cats shall be conducted by a qualified biologist with species-specific experience prior to the start of ground disturbing activities (including during construction, operation and maintenance, and decommissioning phases) where suitable denning habitat is present. No activities that will result in disturbance to dens or individual ring-tailed cats will proceed prior to completion of the surveys. If no active dens are found, no further action is needed. If a ring-tailed cat den is present, additional measures shall be implemented as outlined below, and the CDFW shall be notified of any active dens within the proposed disturbance area.

ii. If an active ring-tailed cat den is found during pre-activity surveys, Project facilities that may result in direct impacts to the active den shall be reconfigured to avoid the loss of the den if feasible. If Project facilities cannot be modified to avoid a den, activities with the potential to disturb the den shall cease and CDFW shall be contacted immediately. If approved by CDFW, demolition of the den site shall commence only outside of the breeding season (February 1 to August 30) when the den has been confirmed to be vacated. If an occupied non-breeding den is found in an area scheduled to be impacted, prior to disturbance, the CDFW shall be notified to review and approve the proposed procedures to ensure that no take of the species occurs as a result of the action. Areas with unoccupied dens that need to be removed shall first be disturbed at dusk, just prior to removal that same evening, to allow adult ring-tailed cats to escape during the darker hours.

Timing:	Before and during ground-disturbing construction and operation and maintenance activities, and prior to the start of decommissioning.
Responsibility:	PG&E would be responsible for the implementation of these measures. DTSC would be responsible for ensuring compliance.
Significance after Mitigation:	With mitigation, this impact would be reduced to a **less than significant** level.

Mitigation Measure BIO-2e: Disturbance of Nelson's Bighorn Sheep (New Measure). If a Nelson's bighorn sheep is observed during ground-disturbing activities (including during construction, operation and maintenance, and decommissioning phases), work within 125 feet of individuals shall be halted (CDFW 2016). Project activities can recommence after the bighorn sheep moves more than 125 feet away on its own. If proximity of Nelson's bighorn sheep to a proposed construction area may result in construction delays, PG&E shall contact CDFW prior to proceeding with ground disturbing activities to determine an appropriate course of action.

Timing:	During ground-disturbing construction, operation and maintenance, and decommissioning activities.

Responsibility:	PG&E would be responsible for the implementation of these measures. DTSC would be responsible for ensuring compliance.
Significance after Mitigation:	With mitigation, this impact would be reduced to a **less than significant** level.

Mitigation Measure BIO-2f: Disturbance or Loss of Special-status Bat Species (New Measure). Bats occupying Roost 9 (refer to Figure 4.3-7) shall be safely excluded after the maternity season (which ends August 31) and before bats go into hibernation or torpor (which begins October 31) through the use of a one-way door. Exclusion of bats shall be performed by a biologist holding a Memorandum of Understanding from CDFW to handle bats in California or a biologist otherwise licensed by the State of California to do so. After bats are safely excluded, fast drying foam shall be used to fill the void to prevent bats from re-entering the cavity.

To the extent possible, ground disturbance within proximity of suitable maternity roosting habitat for special-status bat species as shown in Figure 4.3-7 should occur outside the maternity season (March 15 through August 31). If activities critical to meeting the Project objectives are determined necessary during the maternity season, measures (i) through (v) below will be implemented. Measures (i) through (v) are not required for activities implemented outside the maternity season.

i. High- and low-frequency noise disturbance shall be minimized by establishing avoidance buffers around known roost locations. Required buffer distance will vary by roost site and noise source. Table 4.3-5 provides buffer requirements for known roosting sites and noise source. Note, vehicles and heavy equipment may travel under the railroad bridges on National Trails Highway as these vehicles are generally moving quickly and are not expected to create much frequency noise while passing under the bridges.

ii. To minimize potential effects to bats during nighttime activities, the Project must reduce or eliminate light levels at night. If artificial lighting at night is needed, floodlights shall be adjusted so that the angle of the beam is less than 70 degrees and directed away from roost sites. All nighttime lights shall be directed downward if possible. If lighting is required for minimum safety and security purposes, light barriers shall be used to reduce the potential for light to reach roosts. For example, if lights are needed to ensure safety of a work area, the light could be positioned so that a hillside blocks the light reaching the roosts sites. Smaller barriers, such as plywood sheeting, can be used, but lighting shall not surround a roost within the given buffer zones. Lights with high blue-white or ultraviolet content shall be avoided. When using nighttime lighting a buffer of 250 feet shall be maintained between every light source near roost sites 2 through 9, and a buffer of 400 feet shall be maintained near roost sites 1 and 10 (Table 4.3-5).

iii. To minimize effects of increased human activities, pedestrians shall not approach active roosts during the maternity season, and a 65-foot buffer shall be maintained between roosts and foot traffic.

iv. To minimize air quality degradation near roosts, stationary heavy equipment vehicles, large generators, and large idling trucks producing diesel exhaust shall not operate for more than

2 minutes within 250 feet of a bat roost (Table 4.3-5). Vehicles shall not idle their engine while under a bridge.

v. A biological monitor shall be on-site during ground disturbing activities within proximity of roosts to ensure avoidance and minimization measures (including avoidance buffers) are properly implemented.

Because roosting bats, including maternity colonies, switch roosts especially on a season-by-season basis, roost locations shall be identified by a qualified biologist specializing in bats at least once each for the spring and summer periods of the maternity season once every 3 years. Additionally, because western red bats could potentially breed in the large tamarisk groves located in Arizona, acoustic surveys for a minimum of three consecutive nights during fair weather (above 50 degrees Fahrenheit, no rain or high winds) during the summer maternity season shall occur once every 3 years. If western red bats are recorded acoustically, an attempt to locate active roost sites shall occur to establish appropriate buffer zones around each roost. If known roost sites do not change locations after three sets of surveys (over the course of 9 years) roosts shall be surveyed for spring and summer periods once every 5 years thereafter. Avoidance and minimization measures described (i) through (v) shall be implemented when activities are planned near newly discovered roosting locations between March 15 and August 31.

TABLE 4.3-5
BAT ROOST BUFFER DISTANCES PER EQUIPMENT CATEGORY[A]

	Buffer Distance (feet) by Equipment Category[b]					
Roost Site	Construction Trucks and Heavy Equipment	Small Vehicles	Drilling, Trenching, and Light Equipment	Light Source	Pedestrian Traffic and Water Sampling Equipment	Stationary Diesel Exhaust Sources >2 minutes
1	120	90	150	400	65	250
2	90	65	150	250	65	250
3	90	65	150	250	65	250
4	90	65	150	250	65	250
5	90	65	150	250	65	250
6	90	65	150	250	65	250
7	90	65	150	250	65	250
8	90	65	150	250	65	250
9	90	65	150	250	65	250
10	90	65	150	250	65	250
Hypothetical Townsend's big-eared bat roost	400	200	200	400	200	250

[a] Roost buffers shall be implemented when ground disturbing activities are scheduled to occur during the maternity season (March 15 through August 31). Roost buffers are not needed for activities occurring outside the maternity season.
[b] Equipment Categories (see Appendix BOD for more detail):
Construction Trucks and Heavy Equipment/Stationary Diesel Exhaust Sources: e.g., dump trucks, 18-wheeled flatbed trucks, front-end loaders, water trucks.
Small Vehicles: e.g., pick-up trucks, UTVs.
Drilling, Trenching, and Light Equipment: e.g., excavators, backhoes, road graders, drill rigs, trenching machines.
Pedestrian Traffic and Water Sampling Equipment: e.g., hand tools, water quality instruments.

SOURCE: H.T. Harvey & Associates 2016.

Timing:	Before and during ground-disturbing construction, operation, and maintenance activities, and prior to the start of decommissioning.
Responsibility:	PG&E would be responsible for the implementation of these measures. DTSC would be responsible for ensuring compliance.
Significance after Mitigation:	With mitigation, this impact would be reduced to a **less than significant** level.

Mitigation Measure BIO-2g: Disturbance of Northern Mexican Gartersnake (New Measure). The following measures shall be implemented for activities undertaken within 600 feet of potential northern Mexican gartersnake habitat at the southern end of Topock Marsh in Arizona. These measures are additional to the general measures required by Section 3.4 of the PBA (included as Appendix U to the C/RAWP).

1. Workers shall exercise caution when traveling near potential gartersnake habitat along the southern margin of Topock Marsh. During the most-active season for northern Mexican gartersnakes (February 1st to November 30th), workers will not exceed 10 mph when traveling off-road to maximize the likelihood that gartersnakes would be seen and avoided by drivers. During the inactive season (December 1st to January 31st) workers will not exceed 25 mph when traveling off-road. Construction personnel will abide by the posted speed limit while traveling on the Oatman-Topock Highway.

2. Work will stop if a gartersnake is found within the immediate area to be disturbed and the gartersnake will be allowed to leave the site on its own volition.

3. A qualified biologist shall perform preconstruction surveys prior to ground disturbing activities with the intention of identifying potential microhabitat sites (artificial or natural cover such as debris, wood, or rock piles, wildcat dump sites, high rodent burrow densities, etc.) favorable to gartersnakes in the disturbance area to focus search effort for potential gartersnakes.

4. When possible, ground disturbing activities should be avoided when snakes may be inactive and underground, in order to avoid injury to snakes. Construction will be completed when the northern Mexican gartersnake is active (February1st through November 30th).

5. Material stockpiles located near the southern margin of Topock Marsh shall be limited to designated storage areas that are more than 600 feet from potentially suitable northern Mexican gartersnake habitat or on the opposite side of the Oatman Highway.

6. All open holes and trenches shall be inspected for trapped gartersnakes at the beginning, middle, and end of the work day, at a minimum. During excavation of trenches and to the extent possible, earthen ramps or wooden planks shall be provided to facilitate the escape

of any wildlife species that may inadvertently become entrapped and to leave the site on its own volition (adapted from General Project Management Measure Number 17 of the PBA [Appendix U to the C/RAWP (CH2M Hill 2015b)]).

Timing:	During ground-disturbing construction, operation and maintenance, and decommissioning activities.
Responsibility:	PG&E would be responsible for the implementation of these measures. DTSC would be responsible for ensuring compliance.
Significance after Mitigation:	With mitigation, this impact would be reduced to a **less than significant** level.

Mitigation Measure BIO-2h: Disturbance of Special-Status Plants (New Measure). To reduce potential construction-related impacts to populations of mousetail suncup and other potentially occurring special-status plant species, at least one pre-construction survey shall be conducted prior to the start of any ground-disturbing activities in areas of suitable habitat. The survey shall be conducted in areas where construction is planned and during the blooming period of those species which are either known to occur or likely to occur in the area (i.e., generally March through May but dependent on rainfall patterns). The survey shall be conducted by a qualified botanist skilled at identification of the plant species in the region. The qualified botanist shall determine where pre-construction surveys are required based on existing habitat conditions. The locations of identified special-status plants shall be flagged and mapped using GPS, and an avoidance buffer of at least 50 feet shall be established identified locations to ensure no direct or indirect impacts occur.

To the maximum extent feasible, additional Project facilities to be constructed under the Potential Future Activity Allowance shall be sited to avoid suitable habitat for special-status plant species. If additional Project facilities to be constructed under the Potential Future Activity Allowance cannot be sited to avoid suitable habitat, one of the following measures shall apply.

- Assume suitable habitat is occupied by special-status plant species and provide mitigation (as prescribed in (i) through (iii) below); or
- Verify absence or avoidance of individuals by performing focused presence/absence surveys within the suitable habitat to be impacted. Verification of presence/absence shall require data from at least 2 years of focused surveys within the previous 5 years. Focused presence/absence surveys shall be performed by a qualified botanist during the blooming period of potentially occurring species (i.e., generally March through May but dependent on rainfall patterns). If special-status plant species are observed and avoidance cannot be achieved, mitigation shall be provided (as prescribed in (i) through (iii) below).

Results of all surveys performed following construction of the Proposed Project shall be incorporated onto a comprehensive map of suitable habitat and known rare plant populations within the Project Area.

If disturbance within 50 feet of a special-status plant species cannot be avoided, PG&E shall contact CDFW prior to removing individuals to determine appropriate minimization and mitigation measures. Such measures may include, but may not be limited to, the approaches listed below. PG&E shall not proceed with ground disturbing activities that may directly or indirectly impact areas within 50 feet of special-status plants without first conferring with CDFW. The appropriate means to mitigate unavoidable impacts shall be determined based on coordination with CDFW while taking into account the nature and extent of unavoidable impacts and the species' rarity and known distribution within the Project Area. Mitigation may include a combination of the approaches outlined below, or other approaches determined by CDFW to sufficiently mitigate the impact. To the extent possible, mitigation of unavoidable impacts to special-status plants may occur in conjunction with mitigation for temporal loss of jurisdictional wetlands and waters.

i. *Seed Collection for Restoration*: Seed from individuals to be impacted would be collected prior to ground-disturbing activities. The seed would be collected following the protocols set forth by the Center for Plant Conservation and, if long-term storage is necessary, placed in a secure seed bank facility such as the Agricultural Research Service National Center for Genetic Resources Preservation in Fort Collins, Colorado. Collected seed would be applied to restoration areas within the Project Area. Restoration plans developed for the proposed Project would be revised to include success criteria for restoration of the special-status plant species to ensure successful re-establishment of the impacted species. Success criteria for impacted special-status plants would be developed through coordination with CDFW.

ii. *Enhancement of Known Populations*: Known populations of the species to be impacted would be enhanced by undertaking actions to increase the size of the known population. Such actions may include improving the quality of occupied habitat (e.g., invasive species removal) and/or seeding to facilitate population expansion. Enhancement of known populations may occur at off-site populations that are currently conserved or within the occupied portions of the Project Area that can be conserved. An enhancement plan for impacted special-status plants would be developed through coordination with CDFW. The plan shall be approved by CDFW and submitted to DTSC, BLM, BOR, USFWS, and DOI for review.

iii. *Preservation of Occupied Habitat*: Habitat occupied by the species to be impacted would be permanently protected by establishing a conservation easement. PG&E would coordinate with CDFW to determine the conditions of the conservation easement, including the required acreage of occupied habitat to be conserved and requirement monitoring and management of the conserved population. The agreed upon conditions would be detailed in a mitigation plan for impacted special-status plants. The plan shall be approved by CDFW and submitted to DTSC, BLM, BOR, USFWS, and DOI for review.

Timing:	Before ground-disturbing construction, operation and maintenance activities, and prior to decommissioning activities.
Responsibility:	PG&E would be responsible for the implementation of these measures. DTSC would be responsible for ensuring compliance.
Significance after Mitigation:	With mitigation, this impact would be reduced to a **less than significant** level.

Impact BIO-3 **Fish Mortality, Interference with Spawning Habitat, and Other Adverse Aquatic Effects.** Increased sedimentation and turbidity, the release of contaminants, and standing during construction activities could also adversely affect fish habitat and movement in the Colorado River. This impact would be **potentially significant**, as previously identified in the Groundwater FEIR. Direct impacts associated with loss of aquatic habitat and potential fish entrainment associated with an intake structure on the Colorado River would be **less than significant**, which is reduced from the Groundwater FEIR.

Construction

The Final Design would not result in direct impacts to fish species or their habitat as no construction would take place in aquatic habitats (i.e., the Colorado River). However, as evaluated in the Groundwater FEIR, construction of the proposed Project could increase sediments, turbidity, and contaminants that could indirectly affect fish and their aquatic habitat immediately adjacent to and downstream of the Project Area. While addition information regarding the quality of aquatic habitats in the Project Area was collected per Mitigation Measures BIO-3b in the Groundwater FEIR, the potential impacts associated with increased sediments, turbidity, and contaminants remain the same as previously described in the Groundwater FEIR (i.e., degradation of water quality resulting in adverse effects to fish habitat and populations). This impact would remain potentially significant.

To address potential significant indirect impacts on fish species and their aquatic habitat, **Mitigation Measure HYDRO-1,** as included in the Groundwater FEIR and revised herein (see Section 4.6 of this SEIR), would require implementation of BMPs to reduce water quality impacts related to erosion and pollutant runoff. The *Best Management Practices Plan for Groundwater Remedy Construction* (Appendix M of the C/RAWP (CH2M Hill 2015b)) includes the BMPs necessary to reduce impacts to water quality. These BMPs were developed in compliance with Mitigation Measure HYRDO-1 of the Groundwater FEIR and include erosion control (e.g., preservation of existing vegetation, use of geotextiles, and road maintenance), sediment control (e.g., use of silt fencing and fiber rolls/sediment wattles, gravel bag berms, sandbag berms, or straw-bale barriers), materials management control (e.g., proper delivery and storage of materials, stockpile management procedures, spill prevention and control, and solid waste management), wind erosion control (e.g., periodic site watering to control dust), tracking control (e.g., reducing tracking of mud and dirt onto paved roads by establishing a stabilized point of entrance/exit to construction sites), non-stormwater BMPs (e.g., water conservation practices, dewatering operations, and vehicle and equipment fueling), and good housekeeping BMPs (e.g., minimizing exposure of construction materials to precipitation and immediately cleaning up and properly disposing leaked material). Implementation of these measures would reduce water quality impacts to a less than significant level by ensuring erosion and pollutants are properly managed and contained.

Operation & Maintenance

In general, human activity associated with operation and maintenance is not expected to result in impacts to fish species or their habitat given those activities would not take place within aquatic habitats. However, ground disturbance during the operation and maintenance phase of the proposed Project could increase sediments, turbidity, and contaminants that could indirectly affect fish and their habitat immediately adjacent to and downstream of the Project Area. Ground-disturbing activities during the operation and maintenance phase include excavations along underground pipelines and at well sites for maintenance, repair, or replacement of these Project facilities, as well as construction of additional facilities (e.g., wells, access roads, etc.) as part of the Future Activity Allowance. Indirect impacts to fish and their habitat resulting from ground-disturbing activities implemented during the operation and maintenance phase of the proposed Project would be potentially significant.

To address potential significant indirect impacts on fish species and their habitat, Mitigation Measure HYDRO-1, as included in the Groundwater FEIR and revised herein, would require implementation of BMPs to reduce water quality impacts related to erosion and pollutant runoff. Appendix D of the Operation and Maintenance Manual (Appendix L of Final Remedy Design, CH2M Hill 2015a) includes a SWPPP prepared for operation and maintenance. The SWPPP was prepared in compliance with Mitigation Measure HYDRO-1 of the Groundwater FEIR. This measure applies to both planned construction as well as any construction associated with the Future Activity Allowance. The SWPPP includes BMPs to reduce or prevent pollutants from being released in stormwater discharges and/or authorized non-stormwater discharges that may affect receiving water quality. Required BMPs include good housekeeping measures, preventive maintenance measures, material handling and waste management, erosion and sediment controls, an employee training program, and quality assurance and record keeping. The SWPPP includes a monitoring implementation plan, sampling and analysis Plan, and reporting requirements. Implementation of the SWPPP would reduce water quality impacts to a less than significant level by ensuring erosion and pollutants are properly managed and contained.

Decommissioning

Potential impacts to fish species and their habitat during the decommissioning phase would be similar to those described above for construction. Specifically, ground disturbance associated with decommissioning could result in increases in sediments, turbidity, and contaminants that could indirectly affect fish and their habitat immediately adjacent to and downstream of the Project Area. Potential impacts to aquatic species and their habitats during decommissioning activities would be potentially significant.

To address potential significant impacts on fish species and their habitats during the decommissioning phase, Mitigation Measure BIO-2c**,** as included in the Groundwater FEIR and revised herein, would require development and implementation of an avoidance and minimization plan that prescribes species-specific protective measures. In addition, Appendix G to the IM-3 Decommissioning Plan (CH2M Hill 2015b) includes BMPs to protect water quality during decommissioning. These BMPs include erosion control (e.g., preservation of existing vegetation, use of geotextiles, and road maintenance), sediment control (e.g., use of silt fencing and fiber rolls/sediment wattles, gravel bag berms, sandbag berms, or straw-bale barriers), materials management control (e.g., proper delivery and storage of materials, stockpile management procedures, spill prevention and control, and solid waste management), wind erosion control (e.g., periodic site watering to control dust), tracking control (e.g., reducing tracking of mud and dirt onto paved roads by establishing a stabilized point of entrance/exit to construction sites), non-stormwater BMPs (e.g., water conservation practices, dewatering operations, and vehicle and equipment fueling), and good housekeeping BMPs (e.g., minimizing exposure of construction materials to precipitation and immediately cleaning up and properly disposing leaked material). Implementation of the BMPs identified in Appendix G of the IM-3 Decommissioning Plan would reduce water quality impacts to a less than significant level by ensuring erosion and pollutants are properly managed and contained.

Comparison of Impact BIO-3 Impacts (Revised) to Groundwater FEIR Impact Analysis

The Groundwater FEIR evaluated potential construction and operation and maintenance of a freshwater intake structure on the Colorado River to provide freshwater to the remedial system. The Final Groundwater Remedy Design has selected freshwater intake wells within the HNWR in Arizona as opposed to the freshwater intake structure previously proposed within the Colorado River and analyzed in the Groundwater FEIR. Potential Project impacts to aquatic wildlife and habitats would be considerably less than what was analyzed in the Groundwater FEIR because Project activities would not occur directly within the Colorado River. Mitigation Measures BIO-3a, 3b, and 3c, as identified in the Groundwater FEIR to reduce potential impacts related to overall water quality, degradation of aquatic habitat, and potential fish entrainment and impingement associated with construction and operation of the previously proposed freshwater intake structure, would not be required as part of the Final Design given that construction of a freshwater intake structure is no longer proposed.

The Groundwater FEIR did not analyze potential impacts related to the decommissioning phase of the Project. Therefore, no impacts were identified or mitigation measures required. As discussed above, decommissioning impacts on aquatic species and their habitat would be similar in nature to those described for construction and are potentially significant. Thus, decommissioning impacts to aquatic species and their habitat represent a new significant impact. This SEIR would require implementation of Mitigation Measure BIO-2c, which would reduce potentially significant impacts to a less than significant level.

IMPACT BIO-4 **Substantial Interference with Fish or Wildlife Movement Corridors or Nursery Sites.** The Project could impede the use of bat maternity roosts, which are considered a type of native wildlife nursery site. Modifying, destroying or impeding the use of active maternity roosts of special-status bat species could result in substantial interference to the species reproduction and distribution. This impact would be **potentially significant**, which is a new impact from the Groundwater FEIR.

Construction

Wildlife movement typically fall into one of three movement categories: (1) dispersal (e.g., juvenile animals from natal areas, or individuals extending range distributions); (2) seasonal migration; and (3) movements related to home range activities (foraging for food or water, defending territories, searching for mates, breeding areas, or cover). A wildlife corridor is defined as a piece of habitat, usually linear in nature that connects two or more habitat patches that would otherwise be fragmented or isolated from one another. Wildlife corridors are usually bounded by urban land areas or other areas unsuitable for wildlife. The corridor generally contains suitable cover, food, and/or water to support species and facilitate movement while in the corridor. Larger, landscape-level corridors (often referred to as "habitat or landscape linkages") can provide both transitory and resident habitat for a variety of species. Impacts to wildlife movement corridors associated with construction of the proposed Project remain the same as described in the Groundwater FEIR. As reported in the Groundwater FEIR, the dispersed nature of the Project facilities would result in the site retaining relatively large, contiguous, and intact areas of wildlife habitat within the Project Area, which would remain as viable areas for use by wildlife. Therefore, this impact would be less than significant and no mitigation would be required.

Wildlife nursery sites include areas that a species use for the purposes of breeding and/or rearing their offspring. These can include, but are not limited to, known breeding/nesting grounds for migratory birds, maternity roosting sites for bats (e.g., rock crevices, caves, large trees, bridges, and buildings), and spawning sites for fish species. Potential impacts to spawning sites for fish species are addressed in the threshold above (i.e., *Fish Mortality, Interference with Spawning Habitat, and Other Adverse Aquatic Effects*).

The portion of the HNWR located north and east of the Project Area is the closest known nursery site for migratory birds and fish species (both common and special-status) to the Station (USFWS 2007 and 2008). The Project does not include any activities in this location, and there would be no impact this portion of the HNWR. Buildings associated with the Station and bridges that occur within and adjacent to the Project Area (I-40 and the BNSF Railway) could support maternity roosting site for bats; however, impacts from the Project are not anticipated to affect these structures.

The Project Area contains suitable bat maternity roosting areas for a number of common and special-status bat species, particularly within Bat Cave Wash and the East Ravine. The proposed Project may result in impacts to active bat maternity roosts. Potentially significant impacts to bat maternity roosts are detailed in Impact BIO-2 above. To address potential significant impacts to maternity roost sites occupied by special-status bat species, Mitigation Measure BIO-2f would require pre-activity surveys and, if a maternity roost site is identified, implementation of avoidance measures (e.g., 50-foot exclusion zone). This measure applies to both planned construction as well as any construction associated with the Future Activity Allowance. Implementation of Mitigation Measure BIO-2f would reduce impacts to bat maternity roost sites to a less than significant level through seasonal avoidance or establishing avoidance buffers around identified maternity roost sites for activities performed during the maternity roosting season.

Operation & Maintenance

In general, human activity associated with operation and maintenance is not expected to result in impacts to wildlife movement corridors or nursery sites. However, ground disturbance during the operation and maintenance phase of the proposed Project may result in impacts to active bat maternity roosts. Ground-disturbing activities during the operation and maintenance phase include excavations along underground pipelines and at well sites for maintenance, repair, or replacement of these proposed Project facilities, as well as construction of additional facilities (e.g., wells, access roads, etc.) as part of the Future Activity Allowance. Impacts to maternity roost sites occupied by special-status bat species resulting from ground-disturbing activities implemented during the operation and maintenance phase of the proposed Project would be potentially significant.

To address potential significant impacts to maternity roost sites occupied by special-status bat species, Mitigation Measure BIO-2f would require pre-activity surveys and, if a maternity roost site is identified, implementation of avoidance measures (e.g., 50-foot exclusion zone). This measure applies to both ground-disturbing operation and maintenance activities and construction associated with the Future Activity Allowance. Implementation of Mitigation Measure BIO-2f would reduce impacts to bat maternity roost sites to a less than significant level through seasonal avoidance or establishing avoidance buffers around identified maternity roost sites for activities performed near maternity roost sites during the maternity roosting season.

Decommissioning

Decommissioning of the proposed Project would generally be beneficial to biological resources in the long-term as Project facilities would be removed and areas impacted would be restored to native habitats. However, ground-disturbing activities during the decommissioning phase may result in impacts to maternity roost sites occupied by special-status bat species similar to those described above for construction. Impacts to maternity roost sites occupied by special-status bat species during the decommissioning phase of the proposed Project would be potentially significant.

To address potential significant impacts on special-status species during decommissioning, Mitigation Measure BIO-2c**,** as included in the Groundwater FEIR and revised herein, would require development and implementation of a detailed Avoidance and Minimization Plan to minimize disturbance to special-status species and their habitats associated with the decommissioning activities. The Avoidance and Minimization Plan will be prepared based on surveys conducted prior to decommissioning, and during the breeding seasons closest to the start date of decommissioning. The Avoidance and Minimization Plan will specify species-specific measures, including seasonal restrictions for decommissioning activities (e.g., avoidance of the maternity roosting season), as well as avoidance buffers around known locations of maternity roost sites occupied by special-status bat species. Successful implementation of the Avoidance and Minimization Plan would reduce impacts to a level less than significant by identifying locations of any maternity roost sites and avoiding the maternity roosting season and/or establishing avoidance buffers where necessary.

Comparison of Impact BIO-4 Impacts (Revised) to Groundwater FEIR Impact Analysis

The Groundwater FEIR determined that construction of the proposed Project would not have a significant impact on wildlife movement corridors or linkages and no mitigation measures were provided. This determination specific to wildlife movement corridors and linkages remains the same under the Final Design. Subsequent to the Groundwater FEIR, additional studies were conducted that analyzed the potential wildlife nursery sites on the Project Area. Specifically, 10 bat roosting sites that may be impacted during construction, operation and maintenance, and decommissioning of the proposed Project have since been identified within the Project Area (Figure 4.3-7). Therefore, the proposed Project may result in potential new significant impacts to wildlife nursery sites than what was previously identified in the Groundwater FEIR, and new mitigation (Mitigation Measure BIO-2f), described earlier, would be required to reduce potential impacts to a less than significant level.

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4.4 Cultural Resources

4.4.1 Introduction

This section describes the reasonably foreseeable and potentially significant adverse environmental effects of the Pacific Gas and Electric Company (PG&E) Topock Compressor Station Final Groundwater Remediation Project (Final Groundwater Remedy Project or proposed Project) as identified in the Project Description of this subsequent environmental impact report (SEIR) and related to cultural resources in the Project Area. Specifically, this chapter considers the potentially significant adverse effects of the proposed Project during the construction, operation and maintenance, and decommissioning phases, as compared to those identified in the Topock Compressor Station Groundwater Remediation Project Final EIR (Groundwater FEIR; DTSC 2011), consistent with Public Resources Code section 21166 and the California Environmental Quality Act (CEQA) Guidelines sections 15162, 15168, and including changes in impacts related to historical resources, archaeological resources, paleontological resources, and human remains.

4.4.2 Summary of 2011 Groundwater FEIR Cultural Resources Analysis

The Cultural Resources section of the Groundwater FEIR included a detailed discussion of the environmental setting and potential effects of the proposed remedy on cultural resources. Although largely programmatic, the Groundwater FEIR provided a detailed analysis of the construction and operation of physical facilities anticipated at that time to be necessary to implement the groundwater remedy. The Groundwater FEIR also included a project-level analysis of the conceptual technical methods selected for the final remedy. This SEIR incorporates the analysis in the Groundwater FEIR by reference and evaluates, on a project specific level, the potential effects associated with construction and operation of the *Basis of Design Report/Final (100%) Design Submittal for the Final Groundwater Remedy, PG&E Topock Compressor Station, Needles, California, November* (Final Remedy Design; CH2M 2015a) and the *Construction/Remedial Action Work Plan for the Final Groundwater Remedy* (C/RAWP; CH2M Hill 2015b) that were unknown at the time the analysis was conducted for the Groundwater FEIR. The Final Remedy Design is included in its entirety as Appendix BOD to this SEIR. Information included in the cultural resources analysis of the Groundwater FEIR is summarized in the following pages.

4.4.2.1 Setting Identified in the 2011 Groundwater FEIR

The following summarizes the setting relative to cultural resources described in the Groundwater FEIR (DTSC 2011).

Archaeological Setting

The Groundwater FEIR describes the Project Area as located at the boundary between the Mojave Desert and the Sonoran Desert biotic zones. The portion of the Project Area west of the Colorado River is in the Mojave Desert and the portion of the Project Area east of the Colorado River is in the Sonoran Desert. Each of these areas has a somewhat distinct prehistory, although three broad prehistoric periods including Paleoindian, Archaic, and Late Prehistoric were identified for the California deserts (Davy et al. 2004). Each of the periods is briefly summarized below. These conditions have not changed since certification of the Groundwater FEIR.

Paleoindian or Paleoarchaic

The Paleoindian or Paleoarchaic (ca. 12,000 to 7,500 years “Before Present” [B.P.]) is the earliest established period of human occupation in the region. The Lake Mojave complex represents the manifestation of this early period in the Mojave Desert and the San Dieguito complex, which shares many characteristics with the Lake Mojave complex, represents the manifestation of this early period in the Sonoran Desert (Davy et al. 2004). The Lake Mojave complex was described in detail in the Groundwater FEIR (see section 4.4.1.1).

To date, no scientifically verified evidence of Lake Mojave complex sites has been reported in the Topock area, but it is possible that such sites could be present on stable surfaces such as well-developed desert pavements. Additionally, archaeological sites associated with Lake Mojave complex sites could occur in depositional environments along the Colorado River floodplain but would be very deeply buried within Holocene alluvial sediments (DTSC 2011).

The San Dieguito complex is found from western Arizona to the California coast. Leaf-shaped and large-stemmed projectile points, scraping tools, and crescentics are typical of San Dieguito Complex material culture (Warren 1967). Other features include intaglios, cleared circles on desert pavement, rock rings, and trails (Davy et al. 2004).

Archaic

The Archaic period (ca. 7,500 to 1,500 B.P.) was a time of environmental and cultural change, with highly mobile populations shifting to more sedentary lifestyles in the Late Archaic period (Davy et al. 2004). This time period is associated with the Pinto complex, which was described in detail in the Groundwater FEIR (see section 4.4.1.1). Archaic period sites could be present in the Project Area on stable surfaces such as well-developed desert pavements, or in depositional environments along the Colorado River floodplain. If present, materials associated with this time period could be deeply buried within Holocene alluvial sediments.

Late Prehistoric

The Late Prehistoric period (1,500 B.P. to 150 B.P.) is characterized by agriculture and the introduction of pottery. The term “Patayan” is typically used to describe the particular Late Prehistoric cultural manifestation that is found in the region of the Project Area (McGuire and Schiffer 1982), and was described in detail in the Groundwater FEIR (see section 4.4.1.1).

Patayan sites near the Project Area have not typically produced clear evidence of subsistence history. However, one site identified by Geib and Keller in 2002 (Davy et al. 2004), Bighorn Cave, suggests a rich plant-based diet that complemented hunting and gathering expeditions. The earliest components of the Bighorn Cave site include agave parts, cactus stems, screwbean mesquite pods, juniper bark, and goosefoot or pigweed greens. Domesticated corn kernels, squash rinds, and a bean were also found, although in small quantities in the earliest components of the site (Davy et al. 2004).

Ethnographic Setting

The ethnographic setting of the Groundwater FEIR described the Native American Tribes that have long-standing historical and cultural ties to the Project Area and the surrounding region, including the Mojave (or Mohave), Chemehuevi, Hualapai, Quechan, Cocopah, Halchidhoma/Maricopa, Havasupai, Serrano, Cahuilla, and Yavapai peoples. A detailed discussion of the ethnographic literature pertaining to each of these Tribes can be found in the Groundwater FEIR (see section 4.4.1.1). A brief summary of each Tribe as described in the Groundwater FEIR follows below. These conditions have not changed since certification of the Groundwater FEIR.

Mojave

The Mojave, or Aha Makav, are a Yuman-speaking people whose precontact territory, according to the ethnographic literature, included both riverine and inland areas; their riverine settlement area was mainly north of the Bill Williams River up to the present Nevada border. This main area of Mojave occupation extended on both sides of the lower Colorado River from south of Davis Dam to Topock (Stewart 1983:55). At one time, however, they also occupied Cottonwood Island farther to the north, and the Chemehuevi and Colorado valleys to the south (Stewart 1969:257–276). Habitation patterns and types at the time of contact with European explorers typically consisted of flat-topped shade structures during the summer months and low, rectangular, sand-covered structures during the winter months (Kroeber 1925). Subsistence for the Mojave was dependent partially on agriculture, with crops such as maize, tepary beans, pumpkins, and melons forming the foundation of their diet. Fish was the most important protein source for the Mojave, with dip nets, drag nets, traps, and large basketlike scoops used to catch fish out of the river. Traditional Mojave religion places special emphasis on the experience of and interpretation of dreams, with dreams affecting nearly all facets of life and behavior.

Chemehuevi

The Chemehuevi are a Numic-speaking group also known as Nuwu (The People). Individual bands of Chemehuevi people traditionally inhabited a large range, containing areas in Nevada, California, and Arizona. The Chemehuevi were largely hunter-gatherers who traveled cyclically through a traditional range over the course of a year; however, at the time of contact with European explorers, many Chemehuevi practiced floodplain agriculture. Habitation styles varied depending on the band, with some bands inhabiting caves or protected canyons, while others lived in conical brush structures and wickiups, which are dome-shaped structures covered with grass or bark. In contrast with the rest of the Southern Paiute bands, the Chemehuevi would also sometimes build a modified version of a mud-covered house that was usually built without a front wall (Kelly and Fowler 1986). Settlements were typically close to horticultural fields and riverine areas, or near oases. Historical accounts suggest that the Chemehuevi belief systems include a form of shamanism where power was bestowed upon a person through dreams (Kelly and Fowler 1986).

Hualapai

Like the Mojave, the Hualapai, or “Hwal’bay,” speak a Yuman language. The word “Hualapai” means “People of the Tall Pines” (HDCR 2010). According to McGuire (1983:25), the canyons of the Colorado River formed the northern border of their traditional area, while the Black Mountains formed its western boundary. The southern boundary of their traditional area is near the Bill Williams and Santa Maria Rivers, with the eastern border generally running across the Coconino Plateau to Cataract Creek Canyon. Throughout much of prehistory, the Hualapai were hunter-gatherers, organized socially by families and camps into larger “subtribes” and tribes (McGuire 1983). For much of the year, families would live together in small camps that numbered approximately 25 persons. Wickiups and caves or other rock shelters were common habitation sites in early prehistory, although ramada-like structures became more common for summer use. Cactus, prickly pear, saguaro, barrel cactus, and yucca were collected during the summer, with plant collecting shifting toward nuts, juniper berries, piñon cones, and sumac berries in the autumn. Hualapai men would typically hunt rabbits, rodents, mule deer, bighorn sheep, and pronghorn antelope over the year. In addition to their reliance on wild foods, the Hualapai grew squash, maize, beans, watermelons, and wheat on irrigated plots. Today, ranching and recreational enterprises are economically important. The Hualapai practiced shamanism and had a complex mourning ritual with ceremonial crying (Kroeber 1935).

Quechan

At the time the first Spanish missions were established, the Quechan occupied the lower Colorado River corridor up and downstream of the Gila River confluence near Yuma. The Quechan language is a member of the Yuman linguistic family, closely related to Mojave and Cocopah, and numerous native speakers continue to reside on the Fort Yuma Reservation. Like other lower Colorado River groups, the Quechan practiced flood-based agriculture, and agriculture remains important economically to the Quechan Tribe. Maize, tepary beans, squash, pumpkins, and melons were staple crops. Fishing and the gathering of wild plant foods, especially mesquite and screwbean, were also very important in the subsistence economy. The Quechan used dreams to seek guidance in life and spiritually based power was a principal aspect of religious belief and practice (Forde 1931; Kroeber 1925).

Cocopah

During the historic period, the Cocopah occupied the banks of the Hardy River in northern Baja California and the Colorado River south of the Quechan and other portions of the Colorado River delta (Alvares de Williams 1983). The Cocopah share linguistic and cultural traditions with the other lower Colorado River groups. This included flood horticulture generally similar to that practiced by their Quechan neighbors to the north, growing grains, beans, corn, and melons in the floodplains of the Colorado River. Agriculture was, and remains, important to Cocopah Tribal members. Like other lower Colorado River groups, the Cocopah travelled widely in pre-contact times across the desert and along the Colorado River corridor. They maintain a cultural interest in this traditional cultural area. During the late 18th and early 19th centuries, the Cocopah were traditional allies of the Maricopa of the middle Gila River and the Halchidhoma, who then occupied the river corridor in the vicinity of Blythe. This alliance and religious travel to Yuman sacred sites may have brought the Cocopah to the Topock vicinity on occasion.

Halchidhoma/Maricopa

During the early historic period, the Yuman-speaking Halchidhoma occupied the banks of the Colorado River north of the Quechan (Kroeber 1925). They were closely linked culturally and politically with the Maricopa of the middle Gila River (Harwell and Kelly 1983). Spanish- and Mexican-era accounts, including statements by Halchidhoma and Maricopa themselves, tend to use the designations somewhat interchangeably. The Halchidhoma were thought of by other native groups as simply a division of the Maricopa located on the Colorado River. The subsistence and settlement practices, social organization, and general cultural characteristics of the Halchidhoma appear to have been very similar to those of other Lower Colorado River groups of Yuman speech.

Serrano

The Serrano are a group whose language belongs to the Takic branch of the Uto-Aztecan stock, like the Cahuilla, and they shared many cultural traits with the Cahuilla. Like the Desert Cahuilla, Desert Serrano readily harvested mesquite. Given the absence of desert agave in Serrano territory, various species of yucca were harvested instead, though still in a manner similar to how the Cahuilla used agave. Serrano villages on the Mojave River did not have direct local access to piñon and acorns but were able to procure them either through exchange or through visits to mountain area clans that had direct access to these resources. The Mojave River Serrano clan communities formed part of a long-distance exchange route that moved Olivella shell and other beads to the east, and textiles and other goods to the west, between Oraibi in northeastern Arizona and the Santa Barbara Channel. The Mojave also played a key role in this long-distance trade to the Pacific (Bean and Smith 1978).

Cahuilla

The Cahuilla language is classified within the Takic family of the Uto-Aztecan stock, closely related to several other southern California languages such as Luiseno, Serrano, and Gabrielino. Ethnographers have divided the Cahuilla into three geographic units—the Mountain, Pass, and Desert Cahuilla. Of these groups, the Desert Cahuilla resided closest to Topock. The Desert Cahuilla subsistence economy focused on the gathering of wild plant foods from lowland environments, including mesquite, screwbean, cactus, and hard seeds (Bean 1978). Groups inhabiting settlements in the Coachella Valley in the 19th century often retained gathering areas in the Santa Rosa Mountains or in other upland environments, such as the northern Chocolate Mountains. At least by 1824, the Desert Cahuilla were practicing irrigation agriculture (Bean 1978), producing foods similar to those grown by Yuman-speaking groups on the Colorado River, including maize, beans, squashes, pumpkins, melons, and wheat. Cahuilla religious beliefs and practices include sacred songs and oral texts that tell of the creation of the world and place of the Cahuilla within that creation.

Yavapai

The Yavapai are a group whose language is classified as Upland Yuman, which is related closely to the languages of the Hualapai and the Havasupai. The Yavapai are typically arranged into four general subtribe groups: Tolkapaya, Yavepe, Wipukpaya, and Kewevkapaya. The Yavapai occupied much of what is now central and west-central Arizona, and as such, parts of the Yavapai traditional territory include portions of the Havasu National Wildlife Refuge and areas immediately to the west and southwest of the Topock area (Khera and Mariella 1983). Subsistence practices of the Yavapai generally followed the seasonal ripening of different plant foods, with bands migrating throughout their local territory as food became available throughout the year. Important plant materials collected for subsistence included nuts, seeds, and berries, as well as the fruit of the banana yucca. These crops were typically more plentiful in higher elevations and during the autumn months, with leafy greens collected in the spring and desert fruits collected in the summer. Small-scale agriculture also supplemented the Yavapai diet, primarily including corn, beans, squash, and tobacco (Khera and Mariella 1983). Like other Yuman-speaking groups, spiritual leaders can gain knowledge, power, and songs through sleeping in sacred places (such as caves) (Khera and Mariella 1983).

Havasupai

The Havasupai are another Upland Yuman-speaking group, closely related to the Hualapai and Yavapai. The traditional territory of the Havasupai includes an area south of the Colorado River in the Grand Canyon area, extending to Bill Williams Mountain and the San Francisco Peaks. The territory extends laterally from the Aubrey Cliffs in the west to the Little Colorado River in the east (Schwartz 1983). The Havasupai had a relatively set annual subsistence cycle, with agriculture in the low-lying Cataract Canyon area occupying most of the warmer months, and hunting on the surrounding plateau occurring in the cooler months of autumn and winter. Corn, beans, and squash were raised in the irrigated agricultural fields of the low-lying canyons, with other crops, including peaches, figs, and apricots, becoming more common in historic times. Subsistence during the winter months on the surrounding plateau included deer, antelope, and rabbits, as well as the collection of plant materials, including pinon nuts and mescal (Schwartz 1983). Similar to other Yuman-speaking tribes in the region, the Havasupai place great importance on dreams and dreaming.

Historical Setting

The Groundwater FEIR provided a summary of the historical settlement and uses of the Project Area. A brief summary is provided below.

The most significant trends and events of the historic era (starting around 1800 A.D.) in the Project Area were associated with the use of the area as a major transportation corridor, including the development of the Atchison, Topkea, and Santa Fe Railway (AT&SF) and National Old Trails Highway/Route 66. During the operation of Route 66, the town of Needles remained an important stopping place for westbound travelers as they moved across the Mojave Desert, serving as one of the closest places to purchase fuel, water, and food before journeying across California (Davy et al. 2004). By the 1960s, Route 66 began to show signs of age and was eventually decommissioned in 1986 (Davy et al. 2004).

Archaeological and Historical Resources

The discussion below summarizes the conditions described in the Groundwater FEIR. Additional information identified since 2011 is provided in Section 4.4.3.1 of this SEIR.

Methods and Sources of Information

The Groundwater FEIR summarized the identification efforts and results for archaeological and historic-period built resources. Surveys were conducted in 2004 (Davy et al. 2004; McDougall et al. 2004; McDougall 2004) and a synthesized report prepared in 2007 (McDougall and Horne 2007). Additional surveys were conducted in 2010 (Price et al. 2010; Moloney and Haydu 2010). Additional surveys and new information has become available since certification of the Groundwater FEIR and is provided in Section 4.4.3.1 of this SEIR.

Inventory of Resources

These surveys resulted in the identification of 195 known resources, including 139 prehistoric archaeological sites, 23 historic-period resources[1], and 33 isolates. Of the 195 resources, 87 were located within the Project Area for the Groundwater FEIR (Table 4.4-3). Two resources (CA-SBR-219 – Topock Maze and P-36-027678) were listed in the National Register of Historic Places (NRHP) and three (portions of CA-SBR-2910H – National Old Trails Highway; portions of CA-SBR-6693H – A&P/AT&SF Railroad; and CA-SBR-11701 – prehistoric lithic scatter) had been found eligible for the NRHP (DTSC 2011), and were therefore considered eligible for the California Register of Historical Resources (CRHR). The remainder of resources were unevaluated, but discretionarily determined to be eligible for the CRHR by DTSC and therefore considered to qualify as historical resources under CEQA for the purposes of the Groundwater EIR. Additional surveys and new information has become available since certification of the Groundwater FEIR and additional information is provided in Section 4.4.3.1 of this SEIR.

Native American Heritage Resources

Methods and Sources of Information

The Groundwater FEIR described the results of DTSC's tribal communication program. The communication program in support of the Groundwater FEIR development was initiated on October 1, 2007 with a letter to the Native American Heritage Commission (NAHC) requesting a Sacred Lands Search (SLF) along with a list of Native American tribes, communities, groups, organizations, and individuals with historical ties to the area that should be involved in the process. The NAHC replied on October 18, 2007 that a search of the SLF failed to indicate the presence of Native American cultural resources in the area. The NAHC also provided a list of 10 Native American contacts that may have knowledge of cultural resources in the Project Area. This NAHC tribal contact list was expanded to 13 based on prior experience in the region and ongoing existing Native American interest in other PG&E Topock Compressor Station (Station) projects.

On February 15, 2008, a letter was mailed to each of the Native American contacts informing them of preparation of the Groundwater EIR. Follow-up calls to each Native American representative were completed to ensure receipt of the contact letter and to solicit comments directly. In the instances that phone calls were unsuccessful, a follow-up e-mail was sent to the Native American representative.

[1] Historic-period resources were not further subdivided into built or archaeological resources categories in the Groundwater FEIR.

As part of the Notice of Preparation (NOP) process in 2008 for the Groundwater FEIR, members of the Native American community were invited to scoping meetings held for purposes of assisting DTSC in determining the scope and content of the environmental document. A series of five scoping meetings were held during which oral and/or written comments were submitted. Written comments to DTSC were also collected throughout the NOP commenting period, including written comments from Native Americans. Following the NOP process, DTSC and its consultants prepared and implemented a separate Native American Communication Plan (NACP). The NACP was intended to inform Native American tribal representatives about the EIR process and provide them with adequate opportunity beyond the NOP process to comment. **Table 4.4-1** briefly summarizes concerns expressed during the environmental review process for the Groundwater FEIR. Additional meetings, information, and materials have occurred since certification of the Groundwater FEIR and is provided in Section 4.4.3 of this SEIR.

TABLE 4.4-1
SUMMARY OF NATIVE AMERICAN CONCERNS EXPRESSED DURING THE GROUNDWATER FEIR PROCESS[2]

Tribal Entity	Concerns
*Chemehuevi Indian Tribe	The tribe expressed pronounced water-quality concerns in regard to the Colorado River and possible contamination from the groundwater plume. As the Chemehuevi reservation and riverside resort casino are downriver of the Project Area and contaminated groundwater plume, the tribe expressed that an unsuccessful remediation of the groundwater plume may result in socioeconomic and environmental impacts on the tribe.
*Cocopah Indian Tribe	The tribe expressed that the Colorado River is an important cultural element to all tribes along the river, and the region has been occupied and utilized by Yuman-speaking tribes throughout history. The tribe also expressed concerns about cultural resources in the surrounding landscape, which are consider irreplaceable and unique to the region and that the preservation of a feature known as the Topock Maze (as well as the surrounding landscape) should be “foremost in all future remediation plans for the area.”
*Colorado River Indian Tribes	The tribe expressed the desire that the prevention of the contaminated groundwater plume from reaching the Colorado River be the primary motivation in the selection of remediation strategies. Like the Chemehuevi, the Colorado River Indian Tribes Reservation and riverside resort casino are located downriver and that unsuccessful remediation of the groundwater plume may result in socioeconomic and environmental impacts on the tribe.
*Fort Mojave Indian Tribe	The tribe indicated that the Topock Maze and surrounding cultural landscape is more than an archaeological site to them and is where the deceased spirits go to pass on to the next world. The tribe also expressed a deep cultural connection to the Colorado River, as Matavilya (Creator) named the Mojave “AhaMakav” People of the water. The Mohave have a cultural responsibility to care for the Colorado River as water is life and the Mohave have co-existed with the waters of the Colorado River since time immemorial. Due to the strong Spiritual, Religious, and Cultural ties to the Topock area, the Fort Mojave Indian Tribe believes that any remediation activity that requires additional direct, indirect, and cumulative impacts to the lands would be detrimental and continue the historic and contemporary desecration of the area. The tribe believes that the naturally occurring reductive zone in the fluvial sediments of the Colorado River is“[the] earth’s natural process of self-healing after an unnatural intrusion.”
*Fort Yuma-Quechan Indian Tribe	The tribe expressed concerns that government entities have not taken tribal concerns into consideration, citing as an example the installation of wells in Arizona despite Native American opposition. The tribe also indicated that the river and aquifer are important to the Quechan culture. For the Quechan, the river, plants, animals, land, and air are all interconnected, with damage to one resulting in damage to the entire whole. In addition, trails, geoglyphs/intaglios, cleared areas, lithic scatters, pottery scatters, and rock rings are important and are not always associated with subsistence activities, and that clay deposits are also important cultural sites, as high-quality clay was important for pottery-making, face-painting, and as a form of sunscreen.
Havasupai Indian Tribe	The Environmental Programs Manager expressed that the Havasupai Indian Tribe was aware of the project but did not have any specific comments. No formal input on the proposed project was provided.

[2] These concerns were expressed to DTSC during the development of the Groundwater FEIR, roughly from 2007 to 2011

TABLE 4.4-1
SUMMARY OF NATIVE AMERICAN CONCERNS EXPRESSED DURING THE GROUNDWATER FEIR PROCESS[2]

Tribal Entity	Concerns
*Hualapai Indian Tribe	The tribe expressed that the land, water, plants, and animals are all important to the tribe, with any disturbance to the land once used by ancestors considered damaging. To the tribe, the best practice related to places of spiritual or cultural importance is to respect it and not to disturb it. Other concerns included possible impacts on Spirit Mountain and Boundary Cone, both of which are north of the Project Area, and possible disturbances to grave sites. Specific concerns also included trails near the Topock area, areas of piñyon, the aquifer as a whole, and suggested changes to the Topock Maze National Register of Historic Places nomination to include a stronger statement of significance for traditional culture.
Morongo Band of Mission Indians	The Cultural Heritage Program coordinator expressed confidence that salient cultural resources concerns were being addressed by representatives from the Colorado River Indian Tribes and the Fort Mojave Indian Tribe, both of which are actively involved.
San Manuel Band of Mission Indians	A representative from the Environmental Department at the San Manuel Band of Mission Indians expressed that the Project Area is outside the traditional area for the tribe. However, there is a concern that ground disturbing activities may affect graves in the area.
Serrano Nation of Indians	The chairwoman of the Serrano Nation of Indians expressed that the Project Area is outside the tribe's traditional area. No formal input on the proposed project was provided.
Torres-Martinez Desert Cahuilla Indian Tribe	A representative from the Torres-Martinez Desert Cahuilla Indian Tribe expressed that the Project Area is outside the tribe's traditional area. No formal input on the proposed project was provided.
Twenty-Nine Palms Indian Tribe	The Twenty-Nine Palms Indian Tribe did not provided any formal input on the project.
Yavapai-Prescott Tribe	The compliance officer for the Yavapai-Prescott Tribe expressed that the tribe has concerns about cleanup activities creating areas of ground disturbance. As an example, there are concerns that additional wells are being drilled in the Project Area for personal and/or monetary gain on the part of the consultants hired to formulate the final remedy. There is a concern that these additional wells are adding very little to the scientific foundation of the project, but are irrevocably damaging cultural resources.

NOTES:
* = Interested Tribe
DTSC = California Department of Toxic Substances Control, NOP = notice of preparation.

SOURCE: DTSC 2011.

Inventory of Resources

The Groundwater FEIR described the significance of the Topock Maze and surrounding landscape to the Tribes. The Maze is a large geoglyph of piled gravel windrows of dark desert-pavement terraces, to the west and northwest of the Station. Each windrow is comprised of piled gravel, most of which is darkened with desert varnish, with the spaces in between the windrows appearing lighter in color without a covering of darkened rock. The Maze does not have a beginning, end, or "solution" per se (Earle 2005). The Groundwater FEIR described the Topock Maze as comprising three separate locations. Locus A is the largest of the loci (17.7 acres) and is located west of the Station, south of I-40. Locus B (9 acres) and Locus C (6 acres) are located north of the Station, on the east and west sides of Bat Cave Wash, respectively. While the Topock Maze is a cultural focal point, representatives of several tribes explained that the entire area around the Maze is important culturally. Moreover, the Topock area is part of a larger cultural landscape along the Colorado River. The origin of the Topock Maze has been disputed. Some arguments support a Native American origin, while others have suggested that the Maze is a byproduct of railroad construction, which occurred between 1888 and 1893. Nevertheless, the Topock Maze and the surrounding area, including not only the other cultural sites and geoglyphs in the vicinity but also the landscape itself, are an integral part of the worldview of the Fort Mojave and other Yuman tribes. DTSC determined that, based on the weight of the evidence, the area surrounding the Topock Maze appeared to qualify as a historical resource under CEQA as an area that is significant in the social and cultural annals of California. This historical resource was referred to as the “Topock Cultural Area” (TCA) in the Groundwater FEIR. Since certification of the Groundwater FEIR, the Topock Cultural Area has been designated by the U.S. Department of the Interior (DOI) a traditional cultural property (TCP), known as the Topock TCP, and detailed information about this process and the Topock TCP is provided below in Section 4.4.3.1 of this SEIR.

Paleontological Resources

Methods and Sources of Information

The Groundwater FEIR summarized the database research and geological formations present in the Project Area. A paleontological records check was conducted by Dr. Samuel McLeod, Vertebrate Paleontology Division of the Natural History Museum of Los Angeles County on March 2, 2010 and by Eric Scott, Curator of Paleontology Division of Geological Sciences Museum of San Bernardino County (SBCM) on March 8, 2010.

Inventory of Resources and Geological Formations/Units

The records check from the SBCM indicated that three fossil localities (SBCM 1.39.1, SBCM 1.39.2 and SBCM 1.39.3), lie within the Project Area. Three formations were identified in the Groundwater FEIR (Quaternary Alluvium, Bouse, and Chemehuevi). Additional documentation regarding paleontological resources has been developed since certification of the Groundwater FEIR and is provided in below in Section 4.4.3.1 of this SEIR.

4.4.2.2 Impacts and Mitigation Measures Identified in the Groundwater FEIR

Impacts to cultural resources were addressed in the Groundwater FEIR, Volume II, Section 4.4. Below is a summary of the analysis and associated mitigation measures for cultural resources.

Groundwater FEIR Effects on Historical Resources

Topock Cultural Area

The Groundwater FEIR concluded that the Project could result in a potentially significant impact to the Topock Cultural Area (TCA). While direct impacts to the Topock Maze (CA-SBR-219), as it is manifested archaeologically, were not anticipated, the introduction of additional infrastructure, ground-disturbing activity, and overall nature of modern intrusions associated with the Project were determined to result in changes to the character, nature, and use of the historical resource and the Project would indirectly affect the Topock Maze environment. Such activities would also directly and indirectly adversely affect the Topock Cultural Area. To reduce the impact, the Groundwater FEIR included Mitigation Measure CUL-1a.

Mitigation Measure CUL-1a required establishment of a cultural impact mitigation program and a Corrective Measures Implementation Workplan (CMI Workplan), with specific activities stipulated for each phase of the Project, to reduce the potential for impacts on historical resources within the Project Area, and to help preserve the values of and access to the Topock Cultural Area for local tribal users. The measure included avoidance and protection of known resources; development of a written access plan; retention of a qualified cultural resources consultant; development of a site security plan; outreach and signage to limit public access to sensitive areas; establishing a Technical Review Committee (TRC); avoidance and protection of indigenous plants of traditional cultural significance; measures to reduce impacts from noise and nighttime work; development of a Cultural Resources Implementation Plan (CIMP) with protocols for communication; treatment of archaeological materials; review of cultural resources and project design documents; restoration; decommission of the Interim Measure 3 Groundwater Extraction and Treatment Facility (IM-3 Facility); repatriation of clean soil cuttings; noise reduction; tribal notification; accommodating key tribal ceremonies, tribal monitoring and compensation; protective devices; reporting; inspection of remediation facilities; re-use of previously disturbed areas; avoidance of the archaeological manifestation of the Topock Maze; open grant funding; and development of a worker education program.

However, the Groundwater FEIR concluded that even with implementation of Mitigation Measure CUL-1a, the Project would result in a significant and unavoidable impact to this historical resource.

Other Identified Historical Resources

The Groundwater FEIR concluded that the Project could result in a potentially significant impact to historical resources other than the Topock Cultural Area. A total of three resources (portions of CA-SBR-2910H – National Old Trails Highway; portions of CA-SBR-6693H – A&P/AT&SF Railroad; and CA-SBR-11701 – prehistoric lithic scatter) had been determined eligible or recommended eligible for the NRHP (DTSC 2011), and were therefore considered eligible for the CRHR. The remainder of the resources were unevaluated, but discretionarily determined to be eligible for the CRHR by DTSC and therefore considered to qualify as historical resources under CEQA for the purposes of the Groundwater FEIR. Therefore, all known resources within the Groundwater FEIR Project Area were considered to be historical resources for the purposes of CEQA. To reduce the potential impact, the Groundwater FEIR included Mitigation Measure CUL-1b/c.

Mitigation Measure CUL-1b/c required consideration of the location of historical resources; preparation of a cultural resources study; preparation of a treatment plan; monitoring of ground-disturbing activities during project construction; and protective actions pertaining to the discovery of any previously unidentified potentially significant cultural resources.

However, the Groundwater FEIR concluded that even with implementation of Mitigation Measure CUL-1b/c, the Project would result in a significant and unavoidable impact to other identified historical resources.

As Yet Undiscovered Historical Resources

The Groundwater FEIR concluded that the Project could result in a potentially significant impact to as yet undiscovered historical resources. The Groundwater FEIR found that there could be undocumented resources that may qualify as historical resources within the Project Area and that they could be discovered during ground disturbance. To reduce the potential impact the Groundwater FEIR included Mitigation Measure CUL-1b/c.

Mitigation Measure CUL-1b/c required consideration of the location of historical resources; preparation of a cultural resources study; preparation of a treatment plan; monitoring of ground-disturbing activities during project construction; and protective actions pertaining to the discovery of any previously unidentified potentially significant cultural resources.

However, the Groundwater FEIR concluded that even with implementation of Mitigation Measure CUL-1b/c, the Project would result in a significant and unavoidable impact to as yet undiscovered historical resources.

Groundwater FEIR Effects on Unique Archaeological Resources

The Groundwater FEIR concluded that the proposed Project could result in a potentially significant impact to unique archaeological resources. The archaeological resources identified in the Project Area had not yet been formally evaluated to determine whether they qualify as unique archaeological resources under CEQA. In addition, the Groundwater FIER found that there could be undocumented archaeological resources that may qualify as unique archaeological resources within the Project Area and that they could be discovered during ground disturbance. To reduce the potential impact the Groundwater FEIR proposed Mitigation Measures CUL-1b/c-2 and CUL-1b/c-3.

Mitigation Measures CUL-1b/c-2 and CUL-1b/c-3 required evaluating the resources as part of the final design cultural resources study, including evaluation of known resources and areas that are likely to contain buried or obscured resources, and preparation of a treatment plan.

However, the Groundwater FEIR concluded that even with implementation of Mitigation Measures CUL-1b/c-2 and CUL-1b/c-3, the Project would result in a significant and unavoidable impact to unique archaeological resources.

Groundwater FEIR Effects on Paleontological Resources

The Groundwater FEIR concluded that the proposed Project could result in a potentially significant impact to unique paleontological resources or sites or unique geologic feature. Given the regional location of the Project Area within the Colorado River Valley, the Groundwater FEIR found that there was the potential for unique paleontological resources to occur within the Project Area. Pleistocene Quaternary alluvium units, Bouse Formation, and Chemehuevi Formation were found to be located in the Project Area and they all have the potential to contain fossils, some of which may be considered unique under CEQA. Because of this, the Project Area was considered highly sensitive for paleontological resources and ground disturbance could encounter unique paleontological resources. To reduce the potential impact to less than significant, the Groundwater FEIR included Mitigation Measure CUL-3, which required a paleontological investigation, including a survey and assessment of the final design area to determine whether preconstruction recovery of sensitive resources and/or construction monitoring are warranted.

Groundwater FEIR Effects on Human Remains

The Groundwater FEIR concluded that the proposed Project could result in a potentially significant impact to human remains. While none of the documented sites in the Project Area were known to contain burials of grave goods, the lack of systematic archaeological excavation was seen as indicator that there was not enough data to conclude that the Project Area did not contain human remains. The Groundwater FEIR found that given the site density and historical uses of the Project Area, there was a potential to encounter human remains, and that ground disturbance could encounter human remains. To reduce the potential impact, the Groundwater FEIR included Mitigation Measure CUL-4.

Mitigation Measure CUL-4 required retention of a Qualified Cultural Resource Consultant to train construction personnel in the identification of human remains, in consultation with tribal monitor(s), archaeological and tribal monitoring, and protocols to ensure compliance with all applicable local, state, and federal laws.

However, the Groundwater FEIR concluded that even with implementation of Mitigation Measure CUL-4, the Project would result in a significant and unavoidable impact to human remains.

4.4.3 Existing Setting

This section describes the physical cultural resource characteristics and setting with regard to the Final Remedy Design to be conducted in the Project Area, focusing on those areas where there have been changes since certification of the Groundwater FEIR.

4.4.3.1 Archaeological and Historic-Period Built Resources

Methods and Sources of Information

Additional studies have been conducted and documents prepared since certification of the Groundwater FEIR, including:

- A Summary of the Sixth Annual Monitoring and Condition Assessment of 18 Selected Archaeological Sites at PG&E's Topock Compressor Station Expanded Groundwater Extraction and Treatment System (Applied EarthWorks, Inc. 2011)
- Technical Memorandum: Archaeological and Historical Survey of Proposed Sites for Geophysical Surveys (Mirro 2012a)
- Technical Memorandum: Archaeological Survey for the Evaluation of Alternative Freshwater Sources in the Topock Remediation Project Area (Mirro 2012b)

- Technical Memorandum: Updated Archaeological Survey for the Evaluation of Alternative Freshwater Sources in the Topock Remediation Project Area (Mirro and Hearth 2012)
- Cultural and Historic Properties Management Plan, Topock Remediation Project, Volume I (BLM 2012)
- Topock Compressor Station Tribal Cultural Values Assessment (McDowell et al. 2014)
- Technical Memorandum: Archaeological Survey for the Evaluation of Alternative Fresh Water Sites in the Topock Remediation Project Area (Hearth and Mirro 2013)
- Topock Remediation Project Additional Soils Investigation: Condition Assessments at Fourteen Archaeological and Historical Sites (Hearth et al. 2013)
- Archaeological and Historical Investigations for the PG&E Topock Compressor Station, Addendum 10: Annual Report of Archaeological and Historical Resource Investigations During 2012 (Hearth and Price 2013)
- Historical Resource Evaluation of the PG&E Topock Compressor Station (Smallwood 2013)
- National Register of Historic Places Eligibility Evaluation of CA-SBR-11862H (Earle and Price 2013)
- National Register of Historic Places Eligibility Evaluation of CA-SBR-11704H (Earle and Price 2014)
- Geoarchaeological Assessment for the Topock Remediation Project (Brady and Associates 2014)
- Results of Pre-Construction Field Verification Inspections for the Topock Compressor Station Groundwater Remedy (Moloney and Price 2014)
- Topock Compressor Station Groundwater Remediation Project: Condition Assessments at Sixty-Nine Archaeological and Historical Sites (Moloney and Price 2014)
- Finding of No Adverse Effect: Alterations to the National Old Trails Arch Bridge Spanning the Colorado River at Topock (Smallwood 2014)
- Cultural Impact Mitigation Program for the Topock Remediation Project (PG&E 2014)
- Additional Archaeological and Historical Survey at Moabi Regional Park (Moloney 2015)
- Archaeological and Historical Investigations for the PG&E Topock Compressor Station, Addendum 11: Annual Report of Archaeological and Historical Resource Investigations During 2013 (Moloney and Smith 2015)

- Archaeological and Historical Investigations for the PG&E Topock Compressor Station, Addendum 12: Annual Report of Archaeological and Historical Resource Investigations During 2014 (Moloney and Price 2015a)
- Topock Compressor Station Remediation Project: 2015 Annual Archaeological and Historical Site Monitoring and Condition Assessments (Moloney and Hanes 2015)
- Pre-Investigation Historical Resources Field Verification for the Topock Compressor Station Soil Investigation Project (Moloney and Price 2015b)
- Technical Memorandum: Additional Pre-Investigation Historical Resources Field Verification, Topock Compressor Station Soil Investigation Project (Price 2016)
- Historical Resource Evaluation and Finding of No Adverse Effect for the PG&E Topock Compressor Station (Smallwood and Smith 2016)
- Additional Archaeological and Historical Survey, Subsequent EIR for the Topock Compressor Station, Final Groundwater Remediation Project (Moloney and Hanes 2016a)
- Results of the 2016 Archaeological Field Review in the Topock Compressor Station Tribal Cultural Values Assessment Study Area (Moloney and Hanes 2016b)
- Topock Compressor Station Remediation Project 2016 Annual Archaeological and Historical Site Monitoring and Condition Assessments (Moloney and Hanes 2016c)
- Cultural and Historical Property Treatment Plan for the Topock Compressor Station Groundwater Remediation Project (Hanes and Price, in progress)

Inventory of Resources

As a result of these studies, a total of 129 archaeological and historic-period built resources (123 archaeological and six historic-period built) have been documented within the current Project Area (in **Table 4.4-2**) since certification of the Groundwater FEIR, as described in the Introduction chapter of this SEIR (see Section 2.2.3). Of the 129 archaeological and historic-period built resources, 13 are within or overlap planned Project components within the Project Area (see Table 4.4-2). Each of these resources is described in more detail in the following section.

The archaeological resources include 98 prehistoric archaeological resources, 18 historic-period archaeological resources, and seven multicomponent archaeological resources. The 98 prehistoric archaeological resources include 71 archaeological sites and 27 isolates. The archaeological sites consist of 41 lithic assay stations (including one with a rock alignment, one with groundstone and a tool, one with a ceramic fragment, and one with a rock cairn), 13 lithic scatters (including one with quarry features, one with a rock cairn, and one with ceramics), six lithic quarries (one with an intaglio), four lithic reduction stations, three trail alignments, two possible temporary camps, one rock shelter, and one circular intaglio. The isolates consist of lithics (n=15), ceramics (n=10), and ground stone (n = 2).

The 18 historic-period archaeological resources include 15 sites and three isolates. The sites consist of four refuse deposits, one gravel processing site with refuse; one semicircular cobble hunting blind with refuse; one concrete bridge footing; one with remnants/refuse from the El Rancho Colorado Road House and Gas Station; one with remnants from a Depression-era itinerant laborer camp ("Camp J"); one sedimentation pond and a ditch associated with "Camp J"; one with the remains of a railroad segment or siding; one with a cellar and associated debris; one associated with explosives storage; one with a series of rock retaining walls, trails, cement footings, and bedrock pits; and one dirt road. The three isolates include one with a truck body and two with refractory spheres.

The seven multicomponent archaeological resources consist of seven archaeological sites (no isolates). The sites include three with prehistoric lithics and historic-period refuse/artifacts, two with prehistoric lithics and features associated with military maneuvers, one with a prehistoric lithic scatter and historic-period refuse with roads and quarries/tailings, and one with prehistoric lithics, rock art features, bedrock milling features, and historic-period materials.

The six historic-period built resources include: segments of National Old Trails Highway/ Route 66, the Atlantic and Pacific (A&P)/AT&SF/Burlington Northern Santa Fe (BNSF) Railway alignment, a rock and mortar masonry bridge, the Route 66 Welcome Sign, the Topock Compressor Station, and the Old Trails Arch Bridge.

TABLE 4.4-2
ARCHAEOLOGICAL AND HISTORIC-PERIOD BUILT RESOURCES IN THE PROJECT AREA

Primary #	Trinomial	Other Identifier	Resource Description	Date Recorded/Updated	NRHP/CRHR Eligibility Status	Contributor to Topock TCP	Within Planned Component within Project Area
Prehistoric Archaeological Resources							
-	*CA-SBR-11698	-	Site: lithic assay station and small rectangular rock alignment	10/5/2004; 12/6/2013	[a] Recommended not eligible for NRHP; [f] Not evaluated/Discretionarily eligible	Yes	No
-	*CA-SBR-11701	-	Site: lithic quarry	6/8/2004	[a] Recommended eligible	Yes	No
-	*CA-SBR-11702	-	Site: lithic scatter/quarry	6/9/2004; 12/6/2013	[a] Recommended not eligible for NRHP; [e] Not evaluated for CRHR/Discretionarily eligible	Yes	No
-	*CA-SBR-11703	-	Site: lithic scatter and one rock cairn	7/26-27/2004; 12/6/2013	[a] Recommended not eligible for NRHP; [e] Not evaluated for CRHR/Discretionarily eligible	Yes	No
-	*CA-SBR-11864	Æ-Topock-004	Site: lithic assay station	11/12/2004; 12/7/2013	[e] Not evaluated/ Discretionarily eligible	Yes	No
-	*CA-SBR-11867	Æ-Topock-007	Site: lithic assay station	9/29/2004; 9/30/2013	[e] Not evaluated/ Discretionarily eligible	Yes	No
-	*CA-SBR-11871	Æ-Topock-011	Site: lithic assay station	10/7/2004; 6/1/2014	[e] Not evaluated/ Discretionarily eligible	Yes	No
-	*CA-SBR-11872	Æ-Topock-012	Site: lithic assay station	10/8/2004; 6/1/2014	[e] Not evaluated/ Discretionarily eligible	Yes	No
-	*CA-SBR-11879	Æ-Topock-019	Site: lithic quarry	10/19/2004; 6/6/2014	[f] Not evaluated/ Discretionarily eligible	Yes	No
-	*CA-SBR-11898	Æ-Topock-038	Site: lithic assay station	10/29/2004; 12/4/2013	[e] Not evaluated/ Discretionarily eligible	Yes	No
-	*CA-SBR-11899	Æ-Topock-039	Site: lithic quarry	10/29/2004; 2/7/2014	[e] Not evaluated/ Discretionarily eligible	Yes	No
-	*CA-SBR-11900	Æ-Topock-040	Site: lithic assay station	10/29/2004; 5/13/2014	[f] Not evaluated/ Discretionarily eligible	Yes	No
-	*CA-SBR-11901	Æ-Topock-041	Site: lithic assay station	10/29/2004; 5/13/2014	[f] Not evaluated/ Discretionarily eligible	Yes	No
-	*CA-SBR-11902	Æ-Topock-042	Site: lithic assay station	10/29/2004; 5/13/2014	[f] Not evaluated/ Discretionarily eligible	Yes	No
-	*CA-SBR-11905	Æ-Topock-045	Site: lithic assay station	11/2/2004; 10/16/2015	[e] Not evaluated/ Discretionarily eligible	Yes	No
-	*CA-SBR-11922	Æ-Topock-62	Site: rock alignment and trail	11/10/2004; 5/25/16	[f] Not evaluated/ Discretionarily eligible	Yes	No
-	*CA-SBR-11929	Æ-Topock-069	Site: lithic assay station, one groundstone artifact and one cobble tool	11/22/2004	[e] Not evaluated/ Discretionarily eligible	Yes	No
-	*CA-SBR-11936	Æ-Topock-076	Site: lithic quarry	11/30/2004; 5/7/2014	[e] Not evaluated/ Discretionarily eligible	Yes	No
-	*CA-SBR-11937	Æ-Topock-077	Site: lithic quarry	11/30/2004; 12/7/2013	[e] Not evaluated/ Discretionarily eligible	Yes	No
-	*CA-SBR-11938	Æ-Topock-078	Site: lithic scatter	12/1/2004; 12/1/2014	[e] Not evaluated/ Discretionarily eligible	Yes	No
-	*CA-SBR-11939	Æ-Topock-079	Site: lithic assay station and one ceramic fragment	12/1/2004; 2/10/2014	[e] Not evaluated/ Discretionarily eligible	Yes	Yes
-	*CA-SBR-11940	Æ-Topock-080	Site: lithic assay station	12/1/2004	[e] Not evaluated/ Discretionarily eligible	Yes	No
-	*CA-SBR-11941	Æ-Topock-081	Site: lithic assay station	12/1/2004; 5/13/2014	[f] Not evaluated/ Discretionarily eligible	Yes	No
-	*CA-SBR-11942	Æ-Topock-082	Site: lithic assay station	12/2/2004; 12/3/2013	[e] Not evaluated/ Discretionarily eligible	Yes	No
-	*CA-SBR-11943	Æ-Topock-083	Site: possible temporary camp	12/2/2004; 12/6/2013	[f] Not evaluated/ Discretionarily eligible	Yes	No
-	*CA-SBR-11944	Æ-Topock-084	Site: lithic assay station	12/3/2004	[f] Not evaluated/ Discretionarily eligible	Yes	No
-	*CA-SBR-11945	Æ-Topock-085	Site: lithic assay station and one eroded rock cairn	12/3/2004	[e] Not evaluated/ Discretionarily eligible	Yes	No
-	*CA-SBR-11946	Æ-Topock-086	Site: lithic assay station	12/6/2004	[e] Not evaluated/ Discretionarily eligible	Yes	No
-	*CA-SBR-11947	Æ-Topock-087	Site: lithic assay station	12/6/2004	[e] Not evaluated/ Discretionarily eligible	Yes	No
36-011950	*CA-SBR-11950	Æ-Topock-090	Site: lithic assay station	12/7/2004	[e] Not evaluated/ Discretionarily eligible	Yes	No
36-011951	*CA-SBR-11951	Æ-Topock-091	Site: lithic assay station	12/7/2004	[e] Not evaluated/ Discretionarily eligible	Yes	No

TABLE 4.4-2
ARCHAEOLOGICAL AND HISTORIC-PERIOD BUILT RESOURCES IN THE PROJECT AREA

Primary #	Trinomial	Other Identifier	Resource Description	Date Recorded/Updated	NRHP/CRHR Eligibility Status	Contributor to Topock TCP	Within Planned Component within Project Area
-	*CA-SBR-11952	Æ-Topock-092	Site: lithic assay station	12/7/2004	[e] Not evaluated/ Discretionarily eligible	Yes	No
-	*CA-SBR-11953	Æ-Topock-93/94/95	Site: lithic scatter	12/7/2004; 12/14/2014	[e] Not evaluated/ Discretionarily eligible	Yes	No
-	*CA-SBR-11956	Æ-Topock-096	Site: lithic assay station	12/8/2004; 12/5/2013	[e] Not evaluated/ Discretionarily eligible	Yes	No
-	*CA-SBR-11959	Æ-Topock-099	Site: lithic assay station	12/8/2004; 12/5/2013	[e] Not evaluated/ Discretionarily eligible	Yes	No
-	*CA-SBR-11960	Æ-Topock-100	Site: lithic assay station	12/8/2004; 12/15/2014	[e] Not evaluated/ Discretionarily eligible	Yes	No
-	*CA-SBR-11961	Æ-Topock-101	Site: lithic assay station	12/8/2004; 12/3/2013	[e] Not evaluated/ Discretionarily eligible	Yes	No
-	*CA-SBR-11962	Æ-Topock-102	Site: lithic assay station	12/9/2004; 12/3/2013	[e] Not evaluated/ Discretionarily eligible	Yes	No
-	*CA-SBR-11963	Æ-Topock-103	Site: lithic assay station	12/9/2004; 12/3/2013	[e] Not evaluated/ Discretionarily eligible	Yes	No
-	*CA-SBR-11964	Æ-Topock-104	Site: lithic assay station	12/9/2004; 12/8/2013	[e] Not evaluated/ Discretionarily eligible	Yes	No
-	*CA-SBR-11965	Æ-Topock-105	Site: lithic assay station	12/9/2004; 12/4/2013	[e] Not evaluated/ Discretionarily eligible	Yes	No
-	*CA-SBR-11966	Æ-Topock-106	Site: lithic assay station	12/9/2004; 12/4/2013	[e] Not evaluated/ Discretionarily eligible	Yes	No
-	*CA-SBR-11967	Æ-Topock-107	Site: lithic assay station	12/9/2004; 12/12/2014	[e] Not evaluated/ Discretionarily eligible	Yes	No
-	*CA-SBR-11968	Æ-Topock-108	Site: lithic assay station	12/10/2004; 10/17/2015	[e] Not evaluated/ Discretionarily eligible	Yes	No
-	*CA-SBR-11969	Æ-Topock-109	Site: lithic quarry and one small circular intaglio	12/10/2004	[e] Not evaluated/ Discretionarily eligible	Yes	No
-	*CA-SBR-11970	Æ-Topock-110	Site: trail alignment	12/10/2004	[e] Not evaluated/ Discretionarily eligible	Yes	No
-	*CA-SBR-11972	Æ-Topock-112	Site: lithic assay station	12/13/2004; 5/8/2014	[f] Not evaluated/ Discretionarily eligible	Yes	No
-	*CA-SBR-11978	Æ-Topock-118	Site: lithic assay station	12/15/2004; 6/1/2014	[e] Not evaluated/ Discretionarily eligible	Yes	No
-	*CA-SBR-11979	Æ-Topock-119	Site: lithic assay station	12/15/2004; 12/7/2013	[e] Not evaluated/ Discretionarily eligible	Yes	No
-	*CA-SBR-11991	Æ-Topock-131	Site: lithic assay station	12/23/2004; 12/7/2013	[e] Not evaluated/ Discretionarily eligible	Yes	No
-	*CA-SBR-11992	Æ-Topock-132	Site: possible temporary camp	12/22/2004; 12/7/2013	[e] Not evaluated/ Discretionarily eligible	Yes	No
-	*CA-SBR-11993	Æ-Topock-133	Site: rock shelter	12/22/2004; 12/30/2015	[e] Not evaluated/ Discretionarily eligible	Yes	No
-	*CA-SBR-11994	Æ-Topock-134	Site: lithic assay station	12/23/2004; 10/17/2015	[e] Not evaluated/ Discretionarily eligible	Yes	No
36-021482	*CA-SBR-13790	Æ-Topock-139	Site: circular intaglio	10/4/2008	[e] Not evaluated/ Discretionarily eligible	Yes	No
36-021489	*CA-SBR-13796	Æ-Topock-147	Site: lithic reduction station	3/23/2010	[e] Not evaluated/ Discretionarily eligible	Yes	No
36-023217	*CA-SBR-14698	Æ-Topock-149	Site: lithic assay station	6/3/2010	[e] Not evaluated/ Discretionarily eligible	Yes	No
36-027681	*CA-SBR-17219	Æ-Topock-183	Site: lithic scatter	9/11/2013	[e] Not evaluated/ Discretionarily eligible	Yes	No
36-026683	*CA-SBR-17221	Æ-Topock-185	Site: lithic scatter	10/2/2013	[e] Not evaluated/ Discretionarily eligible	Yes	No
36-027733	*CA-SBR-17254	Æ-Topock-189	Site: lithic reduction station	9/13/2014	[f] Not evaluated/ Discretionarily eligible	Yes	No
36-027734	*CA-SBR-17255	Æ-Topock-190	Site: lithic reduction station	9/13/2014	[f] Not evaluated/ Discretionarily eligible	Yes	No
-	*AZ L:7:71 (ASM)	Æ-Topock-151	Site: lithic assay station	9/8/2010	[e] Not evaluated/ Discretionarily eligible	Yes	No
-	*AZ L:7:81 (ASM)	Æ-Topock-191	Site: lithic scatter	9/13/2014	[f] Not evaluated/ Discretionarily eligible	Yes	No
-	-	*Æ-Topock-199	Site: lithic/ceramic scatter	8/5/2015	[f] Not evaluated/ Discretionarily eligible	Yes	No
-	-	*Æ-Topock-200	Site: lithic scatter	8/5/2015	[f] Not evaluated/ Discretionarily eligible	Yes	No
-	-	*Æ-Topock-201	Site: lithic scatter	9/24/2015	[f] Not evaluated/ Discretionarily eligible	Yes	No
-	-	*Æ-Topock-202	Site: lithic scatter	9/24/2015	[f] Not evaluated/ Discretionarily eligible	Yes	No

TABLE 4.4-2
ARCHAEOLOGICAL AND HISTORIC-PERIOD BUILT RESOURCES IN THE PROJECT AREA

Primary #	Trinomial	Other Identifier	Resource Description	Date Recorded/Updated	NRHP/CRHR Eligibility Status	Contributor to Topock TCP	Within Planned Component within Project Area
-	-	*Æ-Topock-203	Site: lithic scatter	9/24/2015	[f] Not evaluated/ Discretionarily eligible	Yes	No
-	-	*Æ-Topock-204/H	Site: lithic scatter	12/8/2015	[f] Not evaluated/ Discretionarily eligible	Yes	No
-	-	*Æ-Topock-207	Site: lithic reduction station	5/25/16	[f] Not evaluated/ Discretionarily eligible	Yes	No
-	-	*Æ-Topock-210	Site: trail and associated trail markers	5/25/16	[f] Not evaluated/ Discretionarily eligible	Yes	Yes (trail only)
-	-	*Æ-Topock-214	Site: lithic assay station	10/2/16	[f] Not evaluated/ Discretionarily eligible	Yes	No
36-020378	-	Æ-Topock-ISO-01	Isolate: hammerstone	11/11/2004	[e] Not evaluated/ Discretionarily eligible	Yes	No
36-020380	-	Æ-Topock-ISO-03	Isolate: ceramic fragment	10/8/2004	[e] Not evaluated/ Discretionarily eligible	Yes	No
36-020392	-	Æ-Topock-ISO-15	Isolate: quartzite flake	11/16/2004	[e] Not evaluated/ Discretionarily eligible	Yes	No
36-020393	-	Æ-Topock-ISO-17	Isolate: quartzite chopper or hammerstone	11/30/2004	[e] Not evaluated/ Discretionarily eligible	Yes	No
36-020394	-	Æ-Topock-ISO-18	Isolate: tested quartzite cobble	12/1/2004	[e] Not evaluated/ Discretionarily eligible	Yes	No
36-020396	-	Æ-Topock-ISO-20	Isolate: tested quartzite cobble	12/1/2004	[f] Not evaluated/ Discretionarily eligible	Yes	No
36-020397	-	Æ-Topock-ISO-21	Isolate: rhyolite core	12/1/2004	[f] Not evaluated/ Discretionarily eligible	Yes	No
36-020398	-	Æ-Topock-ISO-22	Isolate: quartzite flake	12/2/2004	[e] Not evaluated/ Discretionarily eligible	Yes	No
36-020399	-	Æ-Topock-ISO-23	Isolate: tested quartzite cobble	12/3/2004	[f] Not evaluated/ Discretionarily eligible	Yes	No
36-020410	-	Æ-Topock-ISO-34	Isolate: ceramic pot drop	12/22/2004	[e] Not evaluated/ Discretionarily eligible	Yes	No
36-021491	-	Æ-Topock-ISO-38	Isolate: two chert cortical flakes	2/25/2010	[f] Not evaluated/ Discretionarily eligible	Yes	No
36-021493	-	Æ-Topock-ISO-40	Isolate: ceramic vessel fragment	2/25/2010	[f] Not evaluated/ Discretionarily eligible	Yes	No
36-023218	-	Æ-Topock-ISO-35	Isolate: ceramic vessel fragment	3/16/2008	[f] Not evaluated/ Discretionarily eligible	Yes	No
36-027735	-	Æ-Topock-ISO-47	Isolate: one flake	8/6/2014	[f] Not evaluated/ Discretionarily eligible	Yes	No
36-027736	-	Æ-Topock-ISO-48	Isolate: one tertiary chert flake	9/12/2014	[f] Not evaluated/ Discretionarily eligible	Yes	No
36-027737	-	Æ-Topock-ISO-49	Isolate: one ceramic fragment	9/12/2014	[f] Not evaluated/ Discretionarily eligible	Yes	No
36-027738	-	Æ-Topock-ISO-50	Isolate: one ceramic fragment	9/12/2014	[f] Not evaluated/ Discretionarily eligible	Yes	No
36-027739	-	Æ-Topock-ISO-51	Isolate: one grayware ceramic fragment	9/12/2014	[f] Not evaluated/ Discretionarily eligible	Yes	No
36-027740	-	Æ-Topock-ISO-52	Isolate: one chert flake	9/13/2014	[f] Not evaluated/ Discretionarily eligible	Yes	No
36-027741	-	Æ-Topock-ISO-53	Isolate: one Colorado River buffware ceramic fragment	9/13/2014	[f] Not evaluated/ Discretionarily eligible	Yes	No
36-027742	-	Æ-Topock-ISO-54	Isolate: two Colorado River buffware ceramic fragments	9/13/2014	[f] Not evaluated/ Discretionarily eligible	Yes	No
36-027743	-	Æ-Topock-ISO-55	Isolate: one ceramic fragment	9/12/2014	[f] Not evaluated/ Discretionarily eligible	Yes	No
36-028970	-	Æ-Topock-ISO-59	Isolate: one quartzite core	6/26/2015	[f] Not evaluated/ Discretionarily eligible	Yes	No
36-028971	-	Æ-Topock-ISO-60	Isolate: one ground stone palette fragment	6/25/2015	[f] Not evaluated/ Discretionarily eligible	Yes	No
-	-	Æ-Topock-ISO-56	Isolate: lithic reduction	12/3/2014	[f] Not evaluated/ Discretionarily eligible	Yes	No
-	-	Æ-Topock-ISO-61	Isolate: quartzite uniface	9/24/2015	[f] Not evaluated/ Discretionarily eligible	Yes	No
-	-	Æ-Topock-ISO-64	Isolate: one ground stone pestle	10/4/16	[f] Not evaluated/ Discretionarily eligible	Yes	No

TABLE 4.4-2
ARCHAEOLOGICAL AND HISTORIC-PERIOD BUILT RESOURCES IN THE PROJECT AREA

Primary #	Trinomial	Other Identifier	Resource Description	Date Recorded/Updated	NRHP/CRHR Eligibility Status	Contributor to Topock TCP	Within Planned Component within Project Area
Historic-Period Archaeological Resources							
-	CA-SBR-11704H	-	Site: gravel processing site and refuse scatter	6/29/2004; 10/30/2013	[c] Recommended not eligible[3]	No	Yes
-	*CA-SBR-11861H	Æ-Topock-001H	Site: two refuse deposits associated with the National Old Trails Highway	9/8/2004; 5/14/2014	[f] Not evaluated/ Discretionarily eligible	No	No
-	*CA-SBR-11862H	Æ-Topock-002H	Site: remnants of the El Rancho Colorado Road House and Gas Station	9/15/2004; 9/20/2013	[d] Recommended eligible	No	Yes
-	*CA-SBR-11863H	Æ-Topock-003H	Site: remnants associated with Depression-era itinerant laborer camp known as "Camp J"	9/16/2004; 10/11/2007	[e] Not evaluated/ Discretionarily eligible	No	No
-	*CA-SBR-11865H	Æ-Topock-005H	Site: remains of a railroad segment or siding	11/17/2004	[e] Not evaluated/ Discretionarily eligible	No	No
-	*CA-SBR-11866H	Æ-Topock-006H	Site: two sedimentation ponds and a ditch associated with "Camp J"	9/23/2004; 10/1/2013	[e] Not evaluated/ Discretionarily eligible	No	No
-	*CA-SBR-11990H	Æ-Topock-130H	Site: semicircular cobble hunting blind with historic refuse	12/21/2004	[e] Not evaluated/ Discretionarily eligible	No	No
-	*CA-SBR-12642H	Æ-Topock-138H	Site: concrete bridge footing	9/27/2007	[e] Not evaluated/ Discretionarily eligible	No	No
36-021483	*CA-SBR-13791H	Æ-Topock-140H	Site: railroad-related refuse scatter	10/8/2008	[e] Not evaluated/ Discretionarily eligible	No	Yes
36-021484	*CA-SBR-13792H	Æ-Topock-141H	Site: series of rock retaining walls, trails, cement footings, and bedrock pits	3/31/2009	[e] Not evaluated/ Discretionarily eligible	No	No
36-021485	*CA-SBR-13793H	Æ-Topock-142H	Site: explosives storage area excavated into arroyo cut-bank	3/31/2009; 9/30/2013	[e] Not evaluated/ Discretionarily eligible	No	No
36-025888	*CA-SBR-16371H	Æ-Topock-182H	Site: large refuse dump	3/7/2013	[f] Not evaluated/ Discretionarily eligible	No	No
36-028964	*CA-SBR-28964H	Æ-Topock-195H	Site: refuse scatter	6/25/2015	[f] Not evaluated/ Discretionarily eligible	No	No
-	*AZ L:7:19	-	Site: cellar with an associated debris scatter	9/27/2007	[f] Not evaluated/ Discretionarily eligible	No	No
-	*AZ L:7:77	Æ-Topock-156H	Site: dirt road within AZ L:7:16	8/11/2012	[f] Not evaluated/ Discretionarily eligible	No	No
36-020379	-	Æ-Topock-ISO-02H	Isolate: truck body or hopper	9/29/2004	Not eligible[4]	No	No
36-023219	-	Æ-Topock-ISO-36	Isolate: two spheres of refractory material	9/29/2008	Not eligible[5]	No	No
36-023220	-	Æ-Topock-ISO-37	Isolate: six spherical fragments refractory material	3/31/2009	Not eligible[6]	No	No
Multicomponent Archaeological Resources							
-	*CA-SBR-11697/H	-	Site: prehistoric lithics with historic-period refuse	6/8/2004; 6/1/2014	[a] Recommended eligible	Prehistoric component only	No
36-011705	*CA-SBR-11705/H	Æ-Topock-143/H	Site: prehistoric lithic scatter and historic-period refuse with roads and quarries/tailings	4/1/2009; 12/20/2013	[a] Recommended not eligible for NRHP; [e] Not evaluated/ Discretionarily eligible	Prehistoric component only	No
-	*CA-SBR-11910/H	Æ-Topock-050	Site: prehistoric lithic scatter and features associated with military maneuvers	11/3/2004; 1/9/2014	[e] Not evaluated/ Discretionarily eligible	Prehistoric component only	No
-	*CA-SBR-11932/H	Æ-Topock-72	Site: lithic scatter, rock art features, and bedrock milling features	11/24/2004; 4/24/2014	[e] Not evaluated/ Discretionarily eligible	Prehistoric component only	No

3 Neither does this resource qualify as a unique archaeological resource pursuant to CEQA Section 21083.2(g)
4 *Ibid*
5 *Ibid*
6 *Ibid*

TABLE 4.4-2
ARCHAEOLOGICAL AND HISTORIC-PERIOD BUILT RESOURCES IN THE PROJECT AREA

Primary #	Trinomial	Other Identifier	Resource Description	Date Recorded/Updated	NRHP/CRHR Eligibility Status	Contributor to Topock TCP	Within Planned Component within Project Area
-	*CA-SBR-12641/H	Æ-Topock-137/H	Site: prehistoric lithic quarry and features associated with military maneuvers	9/26/2007; 12/9/2013	[e] Not evaluated/ Discretionarily eligible	Prehistoric component only	No
36-027682	*CA-SBR-17220/H	Æ-Topock-184/H	Site: prehistoric lithic scatter and glass insulator fragments	10/2/2013	[e] Not evaluated/ Discretionarily eligible	Prehistoric component only	No
-	*AZ L:7:16 (ASM)	Æ-Topock-150/H	Site: prehistoric lithics and historic-period refuse	8/24/1990; 9/8/2010; 12/9/2013	[e] Not evaluated/ Discretionarily eligible	Prehistoric component only	Yes
Historic-Period Built Resources							
-	*CA-SBR-2910H/ AZ I:15:156 (ASM)/ AZ L:7:72 (ASM)	Æ-Topock-152H	National Old Trails Highway/Route 66	9/19/2007; 9/8/2010	[a/j] Determined eligible (Segments A, J, L, U, X, and Y)	No	Yes
-	*CA-SBR-6693H/ AZ I:14:334 (ASM)	-	Atlantic and Pacific (A&P)/ Atchison Topeka and Santa Fe (AT&SF) Railroad/ Burlington Northern Santa Fe (BNSF) Railway	5/11/1999; 6/20/2006	[b] Determined eligible	No	Yes
-	*CA-SBR-11997H	Æ-Topock-135H	Rock and mortar masonry bridge	3/8/2005; 10/1/2013	[i] Not evaluated for individual listing/ Contributing element of CA-SBR-2910H	No	Yes
*36-021486	-	Æ-Topock-144H	Route 66 Welcome Sign	4/2/2009	[e] Not evaluated/ Discretionarily eligible	No	No
36-027648	-	-	Topock Compressor Station	8/23/2012	[g] Determined not eligible	No	Yes
*36-027678	-	NR #88001676	Old Trails Arch Bridge	5/6/2013	[h] Listed	No	Yes

NOTES:
[a] Davy et al. 2004
[b] BLM 2012
[c] Earle and Price 2014
[d] Earle and Price 2013
[e] denotes resource determined discretionarily eligible (DTSC 2011/DTSC 2013)
[f] denotes resource determined discretionarily eligible by DTSC for the purposes of this SEIR pursuant to CEQA Section 15064.5(a)(3)
[g] Polanco 2016
[h] Smallwood 2014
[i] Mead & Hunt 2015
[j] BLM 2015
*Denotes resource to be included in annual historical resource condition inspection (in accordance with Mitigation Measure CUL-1a-3a).

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Resources within Planned Project Components within the Project Area

A total of 11 resources (six archaeological sites and five historic-period built resources) are located within or overlap planned Project components within the Project Area (**Table 4.4-3**).

TABLE 4.4-3
ARCHAEOLOGICAL AND HISTORIC-PERIOD BUILT RESOURCES IN OR OVERLAPPING PLANNED PROJECT COMPONENTS WITHIN THE PROJECT AREA

Identifier	Resource Description	Project Component	NRHP/CRHR Eligibility Status
CA-SBR-2910H/ AZ I:15:156 (ASM)/ AZ L:7:72 (ASM)	Built: National Old Trails Highway/Route 66	Proposed underground pipe/conduit and wells; existing access routes and wells	Determined eligible (Segments A, J, L, U, X, and Y)
CA-SBR-6693H/ AZ I:14:334 (ASM)	Built: A&P/AT&SF/BNSF Railway	Proposed underground pipe/conduit and wells; existing access routes and wells	Determined eligible
CA-SBR-11704H	Site: gravel processing site and refuse scatter	Proposed staging areas, remedy monitoring wells; existing monitoring wells and access routes	Recommended not eligible
CA-SBR-11862H	Site: remnants of the El Rancho Colorado Road House and Gas Station	Proposed remedy monitoring well; existing access routes	Locus 3 and portions of Loci 1& 2 eligible
CA-SBR-11939	Site: lithic assay station and one ceramic fragment	Proposed underground pipe/conduit and existing access route	Discretionarily eligible
CA-SBR-11997H	Built: Rock and mortar masonry bridge	Existing access route	Contributing element of CA-SBR-2910H
CA-SBR-13791H	Site: railroad-related refuse scatter	Proposed underground pipe/conduit	Discretionarily eligible
AZ L:7:16 (ASM)	Site: prehistoric lithics and historic-period refuse	Existing water supply well and access route	Discretionarily eligible
P-36-027648	Built: Topock Compressor Station	Proposed underground pipe/conduit, wells, remedy structures; existing access routes and wells	Determined not eligible
P-36-027678	Built: Old Trails Arch Bridge	Proposed aboveground pipe	Listed
Æ-Topock-210	Site: trail and associated trail markers	Existing access road overlaps trail	Discretionarily eligible

CA-SBR-2910H/AZ I:15:156 (ASM)/AZ L:7:72 (ASM) consists of several active and inactive portions of National Old Trails Highway/Route 66. Portions of the resource were documented by CH2M Hill in 2004 and by Applied Earthworks, Inc. in 2007 (Davy et al. 2004; McDougall and Horne 2007), Mead & Hunt prepared an assessment of the eligibility and integrity of the resource in 2015 (Mead & Hunt 2015).

From 1911 to 1926 the route was known as the National Old Trails Highway and provided a roadway for automobiles in the southern California desert (McDougall and Horne 2007). In 1926 the highway was designated U.S. Route 66 and was one of the main routes from the Midwest to southern California. In 1932 portions of the route were realigned for road-straightening purposes and by 1938, the entire route was paved. In 1957, eight miles of the route was realigned to eliminate sharp curves and dips between Needles, CA and Topock, AZ (Davy et al. 2004).

In the Project Area, the National Old Trails Highway/Route 66 followed multiple alignments that are identified in Arizona as AZ I:15:156 (ASM) and AZ L:15:72 (ASM), and in California as CA-SBR-2910H (Davy et al. 2004; Earle 2007; Price et al. 2010). Road surface treatments vary among the alignments and include dirt, gravel, soil and oil mix, asphalt, and concrete. In addition to the physical characteristics of the roadway itself (e.g., dimensions, paving, etc.), there are road-related features associated with the roadway that contribute to its significance. These have been designated feature numbers under the existing site numbers (AZ I:15:156 (ASM)/AZ L:15:72 (ASM) in Arizona and CA-SBR-2910H in California). Road-related features include flagstone, wooden, and metal pipe culverts; concrete right-of-way markers; wooden guardrails and flumes; concrete bag revetments, rock piles and alignments; and refuse scatters (BLM 2012).

A total of 19 segments of the National Old Trails Highway/Route 66 have been documented within the Project Area (**Table 4.4-4**) (Mead & Hunt 2015; BLM 2015). Of these 19 segments, six (A, J, L, U, X, and Y) were determined eligible for the NRHP under Criteria A and C. Five of the six segments (A, J, L, U, and X) are located within California and are therefore listed in the CRHR. One of the six segments (Y) is located within Arizona and is listed in the Arizona Register of Historic Places (ARHP). All six of these segments are considered historical resources under CEQA for the purposes of this Project. The remaining 13 segments (B, C, D, E, F, G, H, I, K, M, N, O, and Z) were determined to lack sufficient integrity to be eligible for the NRHP and are not considered historical resources under CEQA.

The period of significance for this resource is 1914-1966. The overall character-defining features of the eligible segments have been identified as: 1) the historic roadbed structure and its engineered features; 2) associated features such as road-related structures; 3) the historic sense of the travel experience along particular continuous road segments (minimum 1,500 feet line-of-sight along pre-1926 road alignments and 1.5 mile line-of-sight for post-1926 road alignments); and 4) the viewshed representing the desert landscape at the time of historical road use. Each eligible segment within the Project Area and its character-defining features is described in more detail below.

TABLE 4.4-4
NATIONAL OLD TRAILS HIGHWAY/ROUTE 66 (CA-SBR-2910H) SEGMENTS IN THE PROJECT AREA

Segment	Length	Period of Use	Associated Features	Eligibility/Integrity Discussion	Character-Defining Features	Project Component
A	1,550 ft	1926-1947	Feature 13: metal pipe culvert N/A: timber guardrails 36-021486: Welcome Sign	Eligible as it embodies character-defining features and important aspects of integrity under Criteria A and C	Roadbed; Road-related features and erosion control structures	Proposed underground pipe/conduit
B	1,800 ft	1926-1974	Feature 23: erosion control Feature 24: wood post Feature 26: wooden sign	Not eligible due to multiple alterations and visual intrusions	N/A	Proposed underground pipe/conduit; existing access route
C	204 ft	1926-1974	None	Not eligible due to insufficient length and loss of essential physical features	N/A	Existing access route
D	N/A	1926-1942	None	Not eligible due to insufficient length and loss of the essential physical feature of an identifiable roadbed	N/A	None
E	200 ft	1926-1942	None	Not eligible due to insufficient length and loss of essential physical features	N/A	None
F	N/A	1943-1947	None	Not eligible due to insufficient length and loss of the essential physical feature of an identifiable roadbed	N/A	None
G	750 ft	1926-1942	Feature 17: concrete ROW marker	Not eligible due to insufficient length and loss of essential physical features	N/A	Proposed monitoring wells; existing access route
H	700 ft	1943-1947	None	Not eligible due to insufficient length and loss of essential physical features	N/A	Proposed area for IRL wells
I	200 ft	1926-1947	None	Not eligible due to insufficient length and loss of essential physical features	N/A	Existing access route
J	1.3 miles	1932-1947	Features 19-22, 27, 31, 39-41, 43, 44: concrete ROW markers Features 28 & 29: revetments Feature 30: rock-lined ditch Feature 32: sump well Features 33 & 34: flagstone culvert Feature 35: wooden flume Feature 36: metal culverts Features 37 & 38: refuse scatters	Previously determined eligible under Criteria A and C by consensus through the Section 106 process and was determined to retain integrity	Roadbed; Road-related features and erosion control structures	Proposed underground pipe/conduit, monitoring wells; existing access route

TABLE 4.4-4
NATIONAL OLD TRAILS HIGHWAY/ROUTE 66 (CA-SBR-2910H) SEGMENTS IN THE PROJECT AREA

Segment	Length	Period of Use	Associated Features	Eligibility/Integrity Discussion	Character-Defining Features	Project Component
K	N/A	1926-1931	None	Not eligible due to insufficient length and loss of the essential physical feature of an identifiable roadbed	N/A	Proposed underground pipe/conduit (bisects segment), monitoring wells, staging area; existing access route (bisects segment)
L	1,745 ft	1926-1931	Features 1 & 2: erosion control structures (rock berms) Feature 3: concrete ROW marker Locus 1 N/A: Banked curve	Eligible as it embodies character-defining features and important aspects of integrity under Criteria A and C	Roadbed; Road-related features and erosion control structures	Proposed underground pipe/conduit (bisects segment), monitoring well; existing access route
M	230 ft	1926-1931	Feature 4: drainage ditch	Not eligible due to insufficient length and loss of the essential physical feature of an identifiable roadbed	N/A	Proposed monitoring well; existing access route
N	N/A	1926-1931	None	Not eligible due to insufficient length and loss of the essential physical feature of an identifiable roadbed	N/A	Proposed access route (bisects segment); existing access route
O	1,362 ft	1926-1931	Features 5 & 6: wooden guardrail remnants Feature 7 & 9: refuse scatters Features 8 & 10: erosion control features Feature 11: cobble wall N/A: banked curve	Not eligible due to insufficient length and loss of the essential physical features	N/A	Proposed access route
U	1,050 ft	1943-1947	None	Previously determined eligible under Criteria A and C by consensus through the Section 106 process and was determined to retain integrity	Roadbed	Existing access route
X	2.06 miles	1947-1966	Features 15, 16, 18, & 45: concrete ROW markers Feature 14: retaining wall CA-SBR-11997H: masonry culvert N/A: masonry culvert NA/: banked curve 36-021486: Welcome Sign	Eligible as it embodies character-defining features and important aspects of integrity under Criteria A and C	Roadbed ; Road-related features and erosion control structures	Proposed wells, underground pipe/conduit; existing access route

TABLE 4.4-4
NATIONAL OLD TRAILS HIGHWAY/ROUTE 66 (CA-SBR-2910H) SEGMENTS IN THE PROJECT AREA

Segment	Length	Period of Use	Associated Features	Eligibility/Integrity Discussion	Character-Defining Features	Project Component
Y	3,660 ft	1921-ca. 1966	None	Eligible as it embodies character-defining features and important aspects of integrity under Criteria A and C	Roadbed	Proposed underground pipe/conduit
Z	2,580 ft	1912-1921	None	Not eligible due to insufficient length and loss of the essential physical features	N/A	Existing access route

NOTES:
ROW = right-of-way

SOURCE: Mead & Hunt 2015; BLM 2015.

Segment A

Segment A is a 1,550-foot long segment in California that is no longer in use. Character-defining features of Segment A include:

- Feature 13: rock-lined metal pipe culvert; and
- Timber guardrails: constructed from 8 by 8-inch wooden posts and 2-inch stringers; and
- 36-021486: Welcome Sign – Mission Revival style sign dating to ca. 1935.

Segment J

Segment J is a1.3-mile segment in California that is still in use. Character-defining features of Segment J include:

- Pavement surface: durable road mixture of local soils and oil;
- Features 19-22, 27, 31, 39-41, 43, 44: concrete right-of-way markers. The markers are square in plan, stand 14-16 inches tall aboveground surface, and are beveled on the top edges. The side of the marker facing the roadway is stamped with "C" just below the crown;
- Features 28 and 29: two cement-bag revetments;
- Feature 30: erosion control structure consisting of a 70-foot long cement retaining wall;
- Feature 32: sump well or cement-and-rock drainage pit/sink;
- Features 33 and 43: erosion control structures consisting of L-shaped or U-shaped roadside gutters or culverts constructed with flat slabs of native stone set in cement. The vertical portions measure 12-16 inches high and the horizontally sloping portions measure 25-27 inches wide. Feature 33 measure approximately 275 feet long and Feature 43 measures approximately 325 feet long;
- Features 35 and 36: erosion control structure consisting of a partially collapsed wooden flume (Feature 35) with an associated metal culvert pipe (Feature 36). The flume box was constructed using 2 by 12-inch lumber and 4-inch square posts and measures approximately 18-24 inches wide by 12-18 inches high by 30 feet long; and
- Features 37 and 38: two small refuse scatters containing historic-period debris;
    - Feature 37 includes a 1930s era metal truck canopy, a metal car door, flat window glass fragments, metal cans and white earthenware ceramics.
    - Feature 38 includes metal cans, ceramic sherds, glass fragments, and rubber tire tread from a 1930s era motorcycle.

Segment L

Segment L is a 1,745-foot long segment in California that is no longer in use. Character-defining features of Segment L include:

- Pavement surface: prepared gravel roadbed;
- Features 1 & 2: erosion control structures consisting of rock berms;

- Feature 3: concrete ROW marker (as described under Segment J);
- Locus 1: a series of seven rock-and-soil piles and three closely spaced rectilinear rock alignments; and
- Banked curve: hairpin turn.

Segment U

Segment U is a 1,050-foot long segment in California that is no longer in use. Character-defining features of Segment U include only the paved roadbed. No additional road-related features are known.

Segment X

Segment X is a 2.06-mile segment in California that is still in use. This segment alignment follows the abandoned grade of the historic A&P/AT&SF/BNSF (CA-SBR-6693H). Character-defining features of Segment X include:

- Pavement surface: road mixture of gravel and dirt with oils;
- Features 15, 16, 18 and 45: concrete ROW markers (as described under Segment J);
- Feature 14: retaining wall;
- Two masonry culverts (CA-SBR-11997H and one un-numbered);
- Banked curve; and
- 36-021486: Welcome Sign (as described under Segment A).

Segment Y

Segment Y is a 3,660-foot long segment in Arizona that is still in use. Character-defining features of Segment Y include only the paved roadbed. No additional road-related features are known.

CA-SBR-6693H is a historic-period built resource consisting of the A&P/AT&SF railroad alignment. This resource was documented by CH2M Hill in 2004 and by Applied Earthworks, Inc. in 2007. The alignment was the first railroad to cross the Colorado River in the Topock region when it was constructed in 1890 (McDougall and Horne 2007). The alignment was originally built as part of the A&P Railroad Company and was acquired by the AT&SF in 1890. The original alignment, which was used from 1890 through 1947, corresponds to the present route of the Park Moabi Road (Davy et al. 2004). In 1947, the AT&SF moved the alignment to its present location just north of, and generally parallel to, I-40. The current alignment is operated by BNSF. Resource CA-SBR-6693H was determined eligible for listing in the NRHP under Criterion A through consensus in 1994 (BLM 2012) and is therefore automatically listed in the CRHR. As a result, resource CA-SBR-6693H is considered a historical resource under CEQA.

CA-SBR-11704H is a historic-period archaeological site consisting of a historic gravel processing area and refuse dump. The site was originally recorded by CH2M Hill in 2004, who documented six features (Features 1-6). Features 1 through 4 are shaker screens locations. Feature 5 is a north-south oriented trench measuring approximately 70 feet long by 18 feet wide and 4 feet deep. It may have been used for loading of gravel and sand into haul trucks. A refuse dump is located in the trench. Artifacts in the trench include gray stoneware fragments, white hotel ware fragments, church-key opened beer cans, brown glass beverage bottles, condensed milk cans, paint or grease cans, and oil cans. Feature 6 consists of a scatter of steel plate, carriage spring fragment, carriage bolts, thick steel wire, brass machine fittings and valves, brass rivets, and unidentified steel fragments in an approximate 5-foot by 6-foot area. The site was interpreted as a gravel processing area for road construction during pipeline installations. The historic refuse dump was interpreted as a deposit related to the El Ranch Colorado Roadhouse and Gas Station (CA-SBR-11862H) (Davy et al. 2004). Part of the site was graded/bladed and used as a staging area during the construction of the IM-3 Facility and the Eastern Access Road (Hearth et al. 2013). This site was re-visited during the 2013 site condition assessment field visit and appears to have been disturbed since the time of its original recording. Part of the site had been cleared since its recordation, likely relating to the use of the site as a staging area during PG&E's construction of the IM-3 Facility and an access road. Resource CA-SBR-11704H was previously recommended not eligible for listing in the NRHP (Davy et al. 2004; Earle and Price 2014). The site is not eligible for listing in the CRHR and is not considered a historical resource or unique archaeological resource under CEQA.

CA-SBR-11862H is a historic-period archaeological site consisting of the remnants of the El Rancho Colorado Roadhouse and Gas Station associated with Historic Route 66. This resource was documented by CH2M Hill in 2004 and by Applied Earthworks, Inc. in 2007. The roadhouse and gas station were owned by Harold and Vera Workman, and was probably in operation from about 1947, when Route 66 was constructed, until about the 1960s, when Route 66 was replaced by I-40. The buildings and structures were demolished sometime in the 1970s (Davy et al. 2004). The site was documented by Applied Earthworks, Inc. in 2004 and measures 775 feet (NW-SE) by 460 feet (NE-SW) (McDougall and Gothar 2004). Applied Earthworks, Inc. documented three loci (Loci 1-3) and four features (Features 1-4). Locus 1 is located on an upper terrace and measures 165 feet (NW-SE) by 400 feet (NE-SW). This locus includes the poured cement foundation of the roadhouse/gas station (Feature 1) and erosion control ditch (Feature 2), as well as a flat graded parking area. Locus 2 is located on a lower terrace and measures 65 feet (N-S) by 120 feet (E-W). This locus consists of two poured cement foundations (Features 3 and 4). Locus 3 is located in a ravine and measures 65 feet (N-S) by 180 feet (E-W). This locus consists of the structural remains of the demolished roadhouse and a refuse scatter. Artifacts include thousands of glass bottles and cans, ceramics, car parts, oil drum, water heater, plumbing parts, electrical conduits, and oil filters. This site was re-visited during the 2013 site condition assessment field visit and appears to have been disturbed by recreational users and other visitors who have used the lower NE portions of the site for parking vehicles. Resource CA-SBR-11862H was previously recommended not eligible for listing in the NRHP (Davy et al. 2004); however, the site has recently been re-evaluated and recommended eligible for listing in the NRHP under Criterion D (Earle and Price 2013). The archaeologically significant portion of the site is restricted to the historic-period refuse deposit in Locus 3 and the immediately adjacent portions of Locus 1, and Locus 2. The lower NE portion of the site that has been previously disturbed by vehicle parking does not contribute to the eligibility of the site as a whole. Since the site was recommended eligible for the NRHP, it is also considered eligible for listing in the CRHR and is considered a historical resource under CEQA.

CA-SBR-11997H is a historic-period built resource originally recorded by Applied Earthworks, Inc. in 2005 consisting of a flagstone and masonry bridge and culvert located at the intersection of Park Moabi Road (National Old Trails Highway) and Bat Cave Wash (McDougall and Horne 2007). The bridge measures 90 feet by 80 feet and was originally constructed in 1890 to channel flood water under the A&P Railroad right-of-way. It was modified in 1947 by the addition of a concrete extension when the alignment was widened for conversion into a roadway for automobiles. This resource was re-visited during the 2015 site condition assessment and appeared unchanged (Moloney and Hanes 2015). Resource CA-SBR-11997H has not been evaluated for individual listing in the NRHP or the CRHR; however, it is a character-defining feature of NRHP-eligible/CRHR-listed CA-SBR-2910H (National Old Trails Highway/Route 66) and is considered a historical resource under CEQA.

CA-SBR-13791H is a historic-period archaeological site recorded by Applied Earthworks, Inc. in 2008 and consists of a diffuse scatter of railroad-related debris. The site is located immediately north of Park Moabi Road which was originally the alignment for the A&P/AT&SF railroads (CA-SBR-6693H) from 1890 to 1947. Artifacts within the site consist of approximately 1,000 fragments of broken locomotive firebox bricks, timbers, bolts, tie-plates, spikes, various metal cans, brown glass bottle fragments, cast-iron stanchions, wooden fence posts and white earthenware dinner plates. One intact firebox brick with a maker's mark of the "American Arch Security Co." was identified. A maker's mark of "O.P. Co. Syracuse China" was noted on the earthen ware dinner plates. The site likely represents a dump used by the AT&SF railroad, and may date to the late 19th and early 20th centuries based on the observed maker's marks (Moloney and McDougall 2008). This site was re-visited during the 2013 site condition assessment field visit and appeared largely unchanged, aside from some impacts from water erosion (Hearth et al. 2013). The resource was re-visited during the 2015 site condition assessment and appeared unchanged (Moloney and Hanes 2015). Resource CA-SBR-13791H has not been evaluated for listing in the NRHP or the CRHR; however, it was previously discretionarily determined to be historically significant by DTSC under CEQA Section 15064.5(a)(3) and is considered a historical resource under CEQA (DTSC 2011).

AZ L:7:16 (ASM) consists of a multicomponent archaeological site originally documented by MacNider and Pedro in 1990 and updated by Applied Earthworks, Inc. in 2010 and 2013 (McDougall and Moloney 2010). The site measures approximately 930 by 440 meters (NE-SW x NW-SE) and is located at the southern end of the Mohave Valley in Arizona. The site was recorded originally as two loci of historic-period debris. During a survey conducted by Applied EarthWorks, Inc. in 2010, six additional loci (Loci A-F) were identified. Loci A and F contain historic-period features and materials, while Loci B, C, D, and E contain prehistoric features and materials. In addition, 59 discrete features, both historic-period and prehistoric, were identified within and between loci.

A total of 13 historic-period features were documented, including: four cement foundations (Features 1-4); three sediment borrow pits (Features 6, 56, and 57); two previously identified refuse deposits (Features 18 and 39); two military-training foxholes (Features 58 and 59); one sediment/gravel stockpile area (Feature 5); and one dry-laid rock wall (Feature 49).

A total of 44 prehistoric features were documented, including: 26 lithic assay stations (Features 7, 8, 10, 14-17, 19-25, 27, 29, 33-37, 42, 43, 47, 51, and 52); eight lithic reduction stations (Features 9, 13, 26, 30-32, 44, and 53); three ground stone manufacturing stations (Features 40, 48, and 55); two ceramic concentrations (Features 11 and 12); two aboriginal trail segments (Features 46 and 50); one lithic assay/reduction station (Feature 41); one lithic (flaked stone) reduction/ground stone manufacturing station (Feature 28); and one rock ring (Feature 54). Other features include one rock cairn of unknown age and function (Feature 38), and one discrete concentration of water rounded quartzite cobbles of unknown age and function (Feature 45). Of these, Features 1-6 and 57 are within Locus A; Features 10-17 occur within Locus B; Features 19-26 are within Locus C; Features 30-37 occur within Locus D; Features 41-45 are within Locus E; and Feature 56 is within Locus F. The remaining features are outside loci boundaries.

A total of 122 prehistoric artifacts were observed outside of loci and features, including: 63 tested/assayed cobbles (51 quartzite, 12 crypto-crystalline silicate [CCS]); 10 quartzite cobble hammerstones; three multi-directional cores (2 quartzite, 1 CCS); approximately one-half of a portable, shaped, vesicular basalt mortar; one bifacial core of CCS; and 44 debitage items, including 36 quartzite flakes (26 primary, 10 secondary), five CCS flakes (4 primary, 1 secondary), and three flakes of fine-grained rhyolite (2 primary, 1 secondary).

Numerous historic-period artifacts were also observed outside of loci and features, including various types of metal cans (condensed milk cans, sanitary food and juice cans, motor oil cans, key-wind and rotary-opened fish and meat tins, hinged flat-oval tobacco tins); fragments of alcoholic and non-alcoholic colorless, brown, and aqua glass beverage bottles (all Automatic Bottle Machine-made); a few fragments of ceramic tableware (undecorated and decorated [polychrome decal transfer print] improved ironstone china); and miscellaneous items (beverage crown caps, wire nails, automotive parts, fragments of milled lumber, and segments of wire and braided metal cable). Overall, the materials appeared to date to between the 1920s and the 1960s, with the majority dating to the 1940s to the 1960s.

The site was re-visited during the 2015 site condition assessment and a new prehistoric feature (petroglyph) was documented (Moloney and Hanes 2015). Resource AZ L:7:16 (ASM) has not been evaluated for listing in the NRHP or the ARHP; however, it has been discretionarily determined to be historically significant by DTSC under CEQA Section 15064.5(a)(3) and is considered a historical resource under CEQA (DTSC 2011).

P-36-027648 consists of the historic-period Topock Gas Compressor Station, which was not analyzed in the Groundwater FEIR. This resource is an irregularly shaped compound of 33 structures located on approximately 12 acres of land and was documented by Applied Earthworks, Inc. in 2012 and subsequently evaluated for the National Register in 2013 (Smallwood 2013). The PG&E Topock Gas Compressor Station is one of the three original compressor stations constructed for PG&E's natural gas transportation and distribution system, which supplies natural gas to customers from Bakersfield to Portland (Smallwood 2013). The compound consists of 33 buildings and structures, 19 of which were constructed between 1951 and 1960. The other 14 structures have been installed within the past 30 years. The 19 buildings and structures dating to the 1950s include the main compressor building, the generator building, the former water conditioning building, the former chemical building, the maintenance supervisor's office, the parking structure, the district office, two water tanks, the A and B-side scrubbers, the old meter house, the odorant tank saddle and drain tank, the oil tank farm, the A and B-side valve nests, the cooling system power generator, the cooling system for the A and B-side compressors, the radio mast and control room, the PG&E Topock Gas Compressor Station sign, the blow-down stack, and the weather station box. The 19 buildings and structures constructed between 1950 and 1961 of the PG&E Topock Gas Compressor Station were evaluated and recommended eligible for listing in the NRHP under Criteria A and C (Smallwood 2013); however, SHPO did not concur with this finding and the Topock Compressor Station was determined not eligible for the NRHP by consensus through the Section 106 process and is not considered a historical resource under CEQA (Polanco 2016).

P-36-027678 consists of the Old Trails Arch Bridge, which was not analyzed in the Groundwater FEIR. The bridge was identified through a multiple property survey of vehicular bridges in Arizona and listed in the NRHP on September 30, 1988 (NRIS #88001676). The bridge measures 832-foot-long and 20-foot-wide and is a steel trussed, single-span, center-hinged, through-type arch bridge. Designed by San Bernardino County Surveyor, S.A. Sourwine, the Old Trails Arch Bridge was completed on February 20, 1916 as an automobile bridge along the newly formed National Old Trails Road. The bridge was a landmark feature for Dust Bowl emigrants arriving at the California border during the 1930s, as depicted in a scene from the 1940 movie, *The Grapes of Wrath*. The bridge was altered in 1948 when the roadbed was removed and the first pipeline was laid across the deck; however, the bridge still exhibits architectural features from its original construction and use as an automobile bridge (Smallwood 2014). The bridge was listed in the NRHP/CRHR under Criterion A/1 as a pivotal crossing on the transcontinental National Old Trails Highway, and Criterion C/3 as an outstanding example of steel arch construction and is therefore considered a historical resource under CEQA.

The period of significance for this resource is 1916-1948. The character-defining features or elements of the Old Trails Arch Bridge have been classified into three categories: primary, secondary, and non-contributing (Smallwood 2014). Each category is discussed below.

Primary

Primary character-defining features or elements are crucial in reflecting the resource's original design, appearance, and feeling during the period of significance, and should be preserved whenever possible. The primary character-defining features or elements of the bridge include:

- Through-type trussed arch construction: the trusses that comprise the arch exhibit a Pratt configuration of webbing;
- Rigid steel-framed deck;

- Steel suspension rods: high-tension steel rods suspend the central portion of the deck frame from the arch; and
- Width of the bridge: the bridge measures 20 feet wide, which reflects a period (early twentieth century) when automobile bridges were narrow, two-lane thoroughfares.

Secondary

Secondary character-defining features or elements contribute to the resource's overall historic appearance, but to a lesser degree, and therefore, are more amendable to change. The secondary character-defining features or elements of the bridge include:

- Concrete piers: support the arch thrust (both the upper and lower chords of the arch at ground level) and are currently obscured by soil and water;
- Concrete piers: the piers are plain and utilitarian with no special design characteristics. While they are necessary for supporting the weight and physical load of the bridge, and are therefore important aspects of the structural integrity, their physical appearance does not play a crucial role in the overall historical integrity of the resource;
- Metal posts embedded in concrete piers: these support both the north and south portals on opposite sides of the river. While they are also considered important aspects of the structural integrity, their physical appearance does not play a crucial role in the overall historical integrity of the resource; and
- Bridge color: the bridge is currently painted a bright white, but original color of the bridge is unknown. The preferable color scheme is white, unless the original color of the bridge can be ascertained.

Non-Contributing

Non-contributing elements do not contribute to the resource's significance and need not be retained. Non-contributing elements include:

- Natural gas pipelines, hangers, and supports: these are post-1947 additions to the bridge system and have not achieved historical significance in their own right. Removal or alteration of these elements would not impair the resource's historic integrity.

Æ-Topock-210 is a prehistoric archaeological site consisting of a trail and associated trail markers. The site was documented by Applied EarthWorks, Inc. in May 2016 Moloney and Hanes 2016b). The trail is an approximate 300-meter-long aboriginal trail segment whose destination or origin appears to be the Topock Maze (Moloney and Hanes 2016b). Resource Æ-Topock-210 has not been evaluated for listing in the NRHP or the CRHR; however, it has been discretionarily determined to be historically significant by DTSC under CEQA Section 15064.5(a)(3) and is considered a historical resource under CEQA.

Geoarchaeological Review

A desktop geoarchaeological analysis was previously conducted for the Soil Investigation Project EIR in 2014-15 to determine which landforms have the potential for surface and subsurface archaeological resources (Lockwood 2014). This analysis included an examination of available geologic maps (Bishop 1963; Howard et al. 2013; Miller et al. 1983; Stone and Howard 1979; USGS 2016) and review of *Geoarchaeological Assessment for the Topock Remediation Project, Mohave County, Arizona, and San Bernardino County, California*, prepared by Brady and Associates Geologic Services January 2013. The following analysis provides additional details for areas that were not included in the 2014 analysis; however, similar map scales were not available for the western (Whale Mountain quadrangle – 1:100,000 and 1:250,000) and eastern (Topock quadrangle – 1:24,000) (Lockwood 2016).

Overview

The Project Area is located within the Mojave Desert and Sonoran Desert spanning the banks of the Colorado River in southeastern San Bernardino County, California and western Mohave County, Arizona. The Project Area is situated within the Basin and Range physiographic province, in which crustal extension has caused widespread faulting and the formation of valleys or basins (Dickinson 2002). Elevation within the Project Area ranges between approximately 400 feet above mean sea level (amsl) along the Colorado River to approximately 600 feet amsl at the base of the Chemehuevi Mountains located at the southeastern edge of the Project Area. Surface topography consists of alluvial terrace deposits dissected by incised, ephemeral washes, including Bat Cave Wash and East Ravine. A low-lying floodplain, less than 40 feet above water level, lies along the Colorado River (DTSC 2011).

The effects of topographic variation, an arid climate with flashy precipitation, and sparse vegetation combine to create a landscape characterized by coalesced alluvial fans composed of coarse-grained sediments, including sand, gravel, and boulders, which fill valleys over time. Steeply sloped upper segments of alluvial fans tend to be less stable and more susceptible to erosion and debris flows when compared with flatter, lower fan segments. During intense episodes of rain, large quantities of runoff may flow violently down washes. Younger alluvial wash deposits are inset within fan surfaces.

In the vicinity of the Project Area, sediments comprising alluvial fans are eroded from the adjacent, uplifted mountain ranges, the Chemehuevi Mountains. Mountain bedrock in the area is a complex set of extremely old (> 1 billion to approximately 5 million years [my]) Paleoproterzoic, Cretaceous, and Tertiary (Miocene) intrusive igneous and metamorphic rocks (Miller et al. 1983; Howard et al. 2013). Alluvial processes have operated at least intermittently since the Miocene (23.0 to 5.3 my), and the oldest alluvial deposits have become lithified into fanglomerate or sedimentary rock.

Washes act as tributaries to the Colorado River, which has been evolving within this area since the Pliocene (5.3 to 2.6 my). Evidence of the river's earliest history is seen in the form of outcroppings of sandstone and conglomerate. Due to channel incision, elevated portions of the Project Area have not been subject to alluvial deposition from the Colorado River since the Pleistocene (2.6 my to 12,000 years ago), although the low-lying floodplain adjacent to the channel has continued to aggrade. A large area south of the Pirate Cove marina appears to have been subject to late Quaternary alluvial and lacustrine deposition.

The Project Area has been subject to extensive modification within the historic and recent period. The area is crossed by the A&P/AT&SF/BNSF railroads, construction of which in the late 1800s involved placement of ballast/rail bed material ostensibly collected locally (DTSC 2011). Roadways, including the historic National Old Trails Highway/Route 66 and I-40 corridors, traverse the area, and are easily discerned as anthropogenic fill. In 1938, the U.S. Bureau of Reclamation (BOR) completed Parker Dam approximately 40 river miles south of the Project Area, and the impoundment resulted not only in filling of Lake Havasu, but also the formation of Topock Marsh upstream. The area west of the Colorado River has been subject to development as the Station, and multiple pipelines have been installed across this area.

Eastern Project Area

The eastern Project Area as defined by the geological mapping scale includes areas within both California and Arizona. A total of 12 natural geological units have been mapped at 1:24,000 scale in the eastern Project Area (Howard et al. 2013; **Table 4.4-5**; **Figure 4.4-1)**. These units range from Paleoproterzoic bedrock south of I-40 and west of the Colorado River to Holocene/Recent deposits along active washes.

TABLE 4.4-5
1:24,000 SCALE GEOLOGIC UNITS

Unit Symbol	Unit Name	Age	Description	Sensitivity for Surface Archaeological Resources	Sensitivity for Subsurface Archaeological Resources
af	Artificial fill	Historic-Recent	Unconsolidated: Fill materials in highway and railway grades	**Moderate (historic only)** - may have historic resources at surface. No potential for prehistoric resources at surface.	**Moderate (prehistoric/historic)** - may contain disturbed prehistoric and/or historic, and in situ historic subsurface.
d	Disturbed ground	Historic-Recent	Original geology obscured	**Moderate (historic only)** - may have historic resources at surface. No potential for prehistoric resources at surface.	**Low to moderate (prehistoric/historic)** - depending on location, may contain isolated intact historic and/or prehistoric remnants subsurface.
ds	Dredged sand	Historic-Recent	Medium sand dumped on Colorado River banks from dredging of river channel.	**Moderate (historic only)** - may have historic resources at surface. No potential for prehistoric resources at surface.	**Moderate (prehistoric/historic)** - may contain disturbed prehistoric and/or historic, and in situ historic subsurface.
Qa4	Youngest piedmont alluvium	Holocene-Recent	Unconsolidated: Angular to subangular, poorly to moderately sorted, unconsolidated sand and gravel in active washes	**Moderate (prehistoric/historic)** - may have prehistoric and historic resources at surface.	**Low (prehistoric/historic)** - may contain prehistoric and historic resources subsurface.
Qa3	Younger piedmont alluvium	Holocene	Unconsolidated: Angular to subangular, poorly to moderately sorted, unconsolidated sand and gravel terraces above modern washes	**Moderate (prehistoric/historic)** - may have prehistoric and historic resources at surface.	**Moderate (prehistoric only)** - may contain prehistoric resources subsurface. No potential for historic resources.

TABLE 4.4-5
1:24,000 SCALE GEOLOGIC UNITS

Unit Symbol	Unit Name	Age	Description	Sensitivity for Surface Archaeological Resources	Sensitivity for Subsurface Archaeological Resources
Qa2	Intermediate-aged piedmont alluvium	Upper Pleistocene	Unconsolidated: Fan remnants dissected and isolated by modern washes; typically surfaced with varnished desert pavement	**High (prehistoric) to moderate (historic)** - contains a disproportionate percentage of prehistoric resources at surface. May contain historic resources at surface.	**Low (prehistoric only)** – unlikely to contain prehistoric resources subsurface, but cannot be discounted. No potential for historic resources subsurface.
Qtp	Pink silty sand	Upper Pleistocene	Moderately consolidated: Massive to bedded, pale-orange-gray, quartz-rich clayey silty sand	**Moderate (prehistoric/historic)** - may have prehistoric and historic resources at surface.	**Low (prehistoric only)** – unlikely to contain prehistoric resources subsurface, but cannot be discounted. No potential for historic resources subsurface.
Qta1	Older piedmont alluvium	Pleistocene to Pliocene	Poorly sorted, sandy cobble and boulder gravel and pebbly sandstone.	**Moderate (prehistoric/historic)** - may have prehistoric and historic resources at surface.	**None (prehistoric/historic)** – no potential to contain prehistoric or historic resources subsurface.
Qta1s	Deposits of ancestral Sacramento Wash	Pleistocene to Pliocene	Moderately well sorted, bedded, pale-brownish-gray, subrounded, fluvial gravel and feldspathic sand and poorly consolidated sandstone.	**Moderate (prehistoric/historic)** - may have prehistoric and historic resources at surface.	**None (prehistoric/historic)** – no potential to contain prehistoric or historic resources subsurface.
Trbb	Boulder conglomerate of Bat Cave Wash	Upper Pliocene(?)-Pleistocene	Moderately consolidated to cemented: Boulder and cobble conglomerate, containing rounded quartz pebbles	**High (prehistoric) to moderate (historic)** – likely source of lithic materials during prehistoric period. May have historic resources at surface.	**None (prehistoric/historic)** – no potential to contain prehistoric or historic resources subsurface.
Trbs	Sandstone and conglomerate	Lower Pliocene	Medium to coarse, moderately cemented, crossbedded, pale-gray quartz-rich sandstone, containing rounded pebbles of chert, quartzite, and other rocks, and layers of cemented roundstone and sharpstone pebble conglomerate.	**High (prehistoric) to moderate (historic)** – possible source of lithic materials during prehistoric period. May have historic resources at surface.	**None (prehistoric/historic)** – no potential to contain prehistoric or historic resources subsurface.
Tf	Fanglomerate	Pliocene-Miocene	Consolidated conglomerate: Poorly sorted sandy conglomerate of locally derived angular to subangular clasts	**High (prehistoric) to moderate (historic)** - likely source of lithic materials during prehistoric period. May contain historic resources at surface.	**None (prehistoric/historic)** – no potential to contain prehistoric or historic resources subsurface.

TABLE 4.4-5
1:24,000 SCALE GEOLOGIC UNITS

Unit Symbol	Unit Name	Age	Description	Sensitivity for Surface Archaeological Resources	Sensitivity for Subsurface Archaeological Resources
Tcgn	Gneiss-clast conglomerate	Middle Miocene	Consolidated conglomerate: Red/red-brown weathering, poorly sorted alluvial fan deposits; derived from rocks above the Chemehuevi Fault	**Moderate (prehistoric/historic)** - may have prehistoric and historic resources at surface.	**None (prehistoric/historic)** – no potential to contain prehistoric or historic resources subsurface.
TKwq	Quartz monzonite	Cretaceous(?)-Miocene	Bedrock: Horneblend-biotite quartz monzonite, granodiorite, and granite rocks	**Moderate (prehistoric/historic)** - may have prehistoric and historic resources at surface.	**None (prehistoric/historic)** – no potential to contain prehistoric or historic resources subsurface.
Xgm	Mylonitic gneiss and migmatite	Paleoproter-zoic	Bedrock: mylonitic, heterogeneous rocks including migmatite, granite, and amphipolite-facies orthogneiss and paragneiss	**Moderate (prehistoric/historic)** - may have prehistoric and historic resources at surface.	**None (prehistoric/historic)** – no potential to contain prehistoric or historic resources subsurface.

SOURCE: Adapted from Howard et al. 2013.

Three geological units formed by humans (anthropogenic) are also identified within eastern Project Area, including those where artificial fill (af) has been placed along railways and roadways, areas disturbed as result of the Station and other development (d), and areas containing dredged sand (ds). Anthropogenic units have all been formed since the historic period, and while these units lack the potential to contain in situ prehistoric archaeological resources, they might contain disturbed prehistoric archaeological resources. They may also be covering other geological units that have the potential to contain prehistoric archaeological resources. Furthermore, anthropogenic units may contain historic-period archeological resources associated with construction, use, and maintenance of roads, railbeds, and other developments.

Based solely on age, geological units formed during the Holocene (Qa3 and Qa4), have the potential to contain subsurface prehistoric archaeological resources. However, high-energy environments, such as washes dominated by coarse-grained gravel and sand, are often too dynamic to bury and preserve archaeological resources very well. These geomorphic processes have continued into the historic and recent period. Younger piedmont alluvium (Qa3) was formed in the pre-contact period and therefore has the potential to contain buried prehistoric resources, but not historic-period resources. Deposition of recent Holocene youngest piedmont alluvium (Qa4) began in the pre-contact period and extended into the historic period; it therefore has the potential to contain both subsurface prehistoric and historic-period resources. The Holocene piedmont alluvial units (Qa3 and Qa4) exhibit virtually no surface prehistoric archaeological resources, particularly toward the south. A possible explanation is that fluvial processes discouraged significant cultural use of the washes and/or destroyed or buried whatever cultural residues were deposited.

Western Project Area

Geology of the western Project Area, as defined by the geological mapping scale and which is only within California has been mapped at smaller scales (USGS 2016, Bishop 1963; Stone and Howard 1979) than the eastern half. The area is covered primarily by Pliocene to Holocene alluvium (Q1) while a very small segment of haul road crosses early Proterozoic to Miocene gneiss (**Table 4.4-6**; Figure 4.4-1). As noted above, road alignments are likely composed of fill and have been subject to previous disturbances. Similarly, areas containing settling ponds and other built elements are likely previously disturbed. Bishop (1963) mapped the low-lying portions of Moabi Regional Park as containing recent alluvium, primarily along large fans building out of the hills to the south. This area is considered to have archaeological sensitivity similar to geological units Qa3 and Qa4 that has been mapped in the eastern Project Area.

TABLE 4.4-6
1:100,000 SCALE GEOLOGIC UNITS

Unit Symbol	Unit Name	Age	Description	Sensitivity for Surface Archaeological Resources	Sensitivity for Subsurface Archaeological Resources
Q1	Alluvium	Holocene to Pliocene	Unconsolidated: Angular to subangular, poorly to moderately sorted, unconsolidated sand and gravel	**Moderate (prehistoric/historic)** - may have prehistoric and historic resources at surface.	**High to low (prehistoric)** - may contain prehistoric depending on actual age of deposit.
pCc	Gneiss	Early Proterozoic to Miocene	Granitic gneiss	**Moderate (prehistoric/historic)** - may have prehistoric and historic resources at surface.	**None (prehistoric/historic)** – no potential to contain prehistoric or historic resources subsurface.

SOURCE: Adapted from Howard et al. 2013.

Conclusions

All natural geological units within the Project Area have the potential to contain surface archaeological resources. Five natural units (Qa2, Qf, Tf, Trbb, and Trbs) are considered highly sensitive for prehistoric resources at surface and moderately sensitive for historic-period resources at surface. The remaining natural units (Q1, Qa4, Qa3, Qtp, QTa1, QTa1s, pCc, Tcgn, TKwq, and Xgm) are considered moderately sensitive for both prehistoric and historic-period resources at surface. Anthropogenic geological units (af, d, and ds) are considered moderately sensitive for historic resources at surface, but are highly unlikely to contain prehistoric resources at surface.

In addition, some units have a higher potential for subsurface archaeological resources. Artificial fill (af) may contain subsurface disturbed prehistoric/historic-period resources or intact historic-period resources and this unit should be considered moderately sensitive. Although disturbed (d) areas have been subject to ground-disturbing alterations, the depths of the disturbances may vary and therefore would not completely preclude the presence of prehistoric/historic-period archaeological materials; this unit is considered low to moderately sensitive depending on nature of previous disturbances. Youngest piedmont alluvium (Qa4), younger piedmont alluvium (Qa3), and Colorado River-related deposits (Qf) may contain subsurface prehistoric and/or historic-period resources and should be considered moderately sensitive. Old piedmont deposits (QTa1 and QTa1s), intermediate-aged piedmont alluvium (Qa2), and pink silty sand (Qtp) are unlikely to contain subsurface prehistoric resources and no potential for subsurface historic-period resources. Trbb, Trbs, Tf, Tcgn, Tkwq, pCc and Xgm do not have the possibility to contain subsurface prehistoric or historic-period resources and are not considered sensitive for archaeological resources. The subsurface sensitivity of undifferentiated unit Q1is highly variable, ranging from negligible to moderate; portions mapped by Bishop (1963) as recent alluvium appear to be most sensitive.

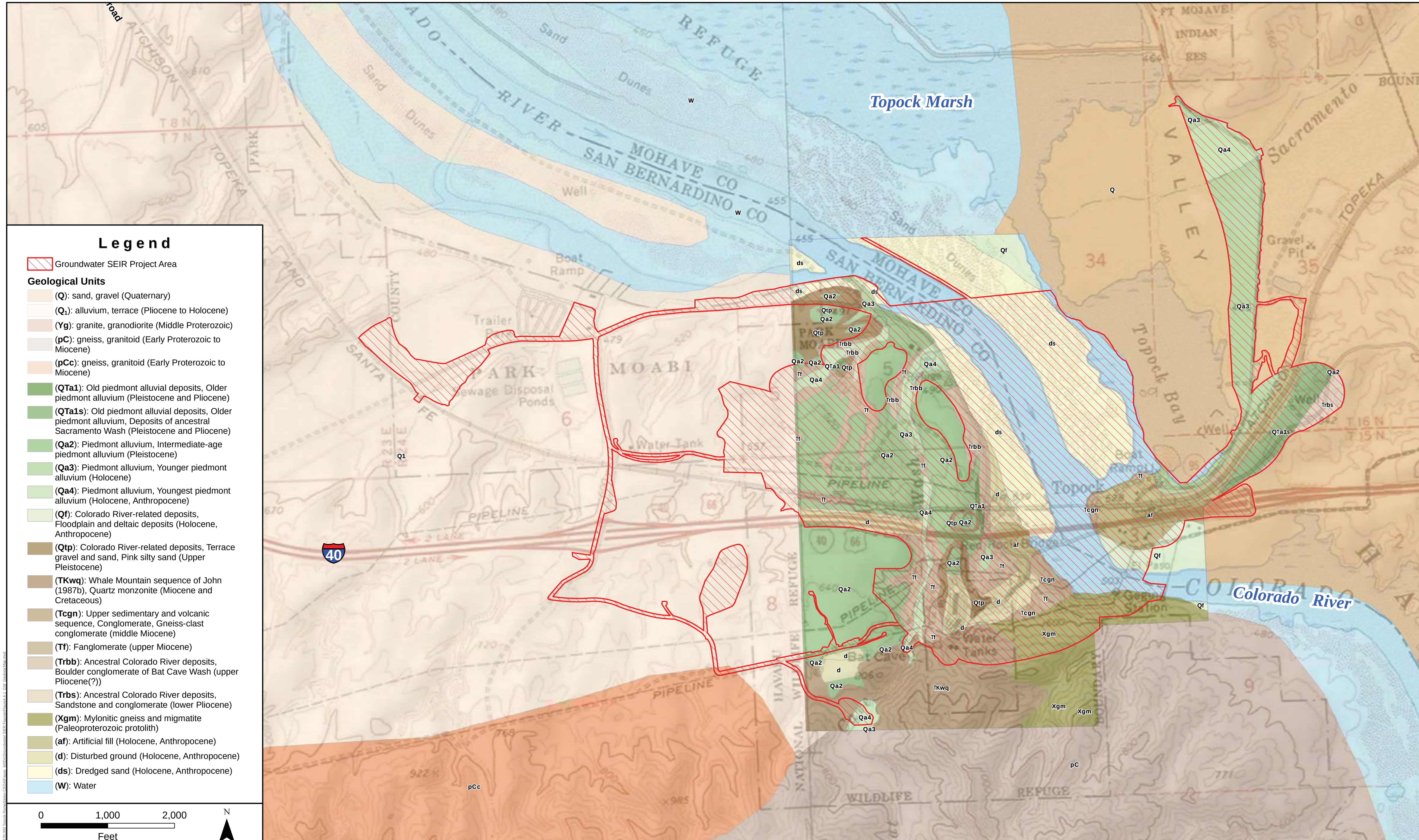
4.4.3.2 Native American Heritage Resources

Methods and Sources of Information

The following section includes a discussion of the Native American scoping efforts conducted during the environmental review process for this SEIR. Scoping involving Native American Tribes with affiliation to the Project Area began with a search of the NAHC SLF. The NAHC was contacted on July 31, 2015 to request a search of the SLF. The NAHC responded to the request in a letter dated August 26, 2015. The letter did not indicate the presence of Native American cultural resources within the Project Area. The letter also included an attached list of Native American contacts.

On August 6, 2015, DTSC sent letters to the six Tribes that have traditionally been involved with the Topock Remediation Project, including the Chemehuevi Indian Tribe, Cocopah Indian Tribe, CRIT, FMIT, Hualapai Indian Tribe, and Fort-Yuma Quechan. The letters described the proposed Project and asked that all participants reply by October 9, 2015 if they had concerns regarding the Project. Five tribes, including the Chemehuevi, Cocopah, CRIT, FMIT, and Hualapai, have provided formal written and/or informal responses during subsequent meetings. Based on this response and recent engagement on the Soil Investigation Project, the Tribes that are actively participating in the Groundwater Remedy Project are hereafter referred to as “Interested Tribes.” The first five Tribes mentioned are considered “Interested Tribes,” as the Fort-Yuma Quechan Indian Tribe is no longer actively participating in the process. A summary of responses is provided below.

On August 26, 2015, DTSC sent a letter to one additional tribe that had not yet been contacted but was identified by the NAHC as culturally and traditionally affiliated with the Project Area, the Twenty-Nine Palms Band of Mission Indians. The letter described the proposed Project and asked that the Tribe reply by September 30, 2015 if the Tribe had concerns regarding the Project. To date, the Twenty-Nine Palms Band of Mission Indians has not responded.



Final Groundwater Remediation Project SEIR

Background Source:
Geologic map of the Topock 7.5' quadrangle, Arizona and California, Scientific Investigations Map 3236
By: Keith A. Howard, Barbara E. John, Jane E. Nielson, Julia M.G. Miller, and Joseph L. Wooden
Available at http://pubs.usgs.gov/sim/3236/

Geological Units

Figure 4.4-1

ESA | North State Resources

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The SEIR for the proposed Project was initiated with release of the NOP on May 5, 2015. DTSC provided a 32-day comment period on the NOP that concluded on June 4, 2015. DTSC convened public scoping meetings on May 19 and 20, 2015 to inform interested parties and seek input on the proposed Project and associated potential environmental impacts. A Tribal-focused scoping meeting was also held on May 19, 2015.

A total of three formal Tribal scoping meetings were held by DTSC (including the above-mentioned Tribal-focused scoping meeting):

- DTSC presented information on the Project and requested input from the Chemehuevi, Cocopah, FMIT, and Hualapai Tribes at the FMIT Tribal council office on May 19, 2015.
- DTSC met with representatives from the Chemehuevi, Cocopah, CRIT, FMIT, and Hualapai Tribes on October 5, 2015 to garner input regarding the SEIR.
- DTSC met with representative from the Chemehuevi, CRIT, FMIT, and Hualapai Tribes on October 20, 2105 at the FMIT Tribal council office to discuss general consultation policy development. Attendees at the October 20, 2015 DTSC/Tribal Meeting included: DTSC representatives Director Barbara Lee, Assistant Director Ana Mascarenas, Karen Baker, and Yolanda Garza; FMIT Tribal representatives Janice Hinkle and Chris Harper; Chemehuevi Tribal representatives Steven Escobar and Amanda Sansouci; Hualapai Tribal representative Dawn Hubbs; and CRIT Tribal representatives Howard Magill and Doug Bonamici.
- DTSC met with representatives from the FMIT on October 21, 2015 to garner input regarding the SEIR and Settlement Agreement. Attendees at the October 21, 2105 DTSC/FMIT Meeting included: DTSC representatives Director Barbara Lee, Assistant Director Ana Mascarenas, Karen Baker, Isabella Alasti, and Yolanda Garza; FMIT Tribal representatives Chairman Timothy Williams, Vice- Chairman Shan Lewis, Linda Otero, and Janice Hinkle.
- DTSC met with representatives from the Chemehuevi, Cocopah, CRIT, FMIT, and Hualapai Tribes on July 19, 2016 and August 5, 2016 to discuss conceptual mitigation options that could be included in the SEIR.

In addition to these formal scoping meetings, DTSC has conducted other meetings and field visits with Tribal members and representatives, and have solicited written comments. Information obtained through the scoping meetings, informal meetings and field visits has been incorporated into this SEIR. Additionally, DTSC has consulted with Tribes since certification of the Groundwater FEIR during the 30, 60, and 90 percent design. The complete index of outreach conducted between DTSC and Tribes for all Topock-related efforts is included as Appendix COM, PG&E Topock Tribal Communications Summary Table, to this SEIR.

Cocopah Indian Tribe

The Cocopah provided a comment letter on October 9, 2015 regarding the Addendum to the 90% Basis of Design. In the letter the Tribe indicated that the Project Area is an active religious and ceremonial use area that falls outside the confines of regular noise protocol that is applied to religious use (i.e., temples, churches) and requested that a site- or Project-specific noise protocol be established. The Tribe also requested input and participation on any and all cultural resources studies and investigation and reiterated the need for the TRC to be extended at least 10 years into the remedy start-up (Castillo 2015). In response to a request for input regarding the SEIR, the Cocopah provided comments via a letter dated March 11, 2016. In the letter the Cocopah indicated that "much has changed with the groundwater remediation design since 2011, and there are many additional consequences of the remediation that were not previously addressed in the 2011 FEIR." In particular, the letter requested that the SEIR analyze impacts from: multiple injection wells at one location; the Dissolved Metal Removal System; production well drawdown and the cone of depression from the freshwater source well; arsenic monitoring wells, roads, paths, and increased vehicular/personnel traffic; increased volume of displaced soil; the final/full well count; pumping from fractured aquifers of the East Ravine; unwanted remediation byproducts (arsenic, barium, iron, manganese, and sulfide); and noise and vibration impacts. The letter also requested that the SEIR consider Assembly Bill (AB) 52 guidelines and provided suggested mitigation measures (Castillo 2016). In a letter dated May 13, 2016, the Tribe also provided recommendations for an additional noise analysis (Castillo 2016). Comment letters are on file at DTSC.

Fort Mojave Indian Tribe

On June 4, 2015, the Chairman of the FMIT provided written comments on the NOP. The letter stated that the Tribe's preferences remain unchanged and requested avoidance of impacts, consideration of the setting, minimization of intrusions, that the Tribe be fully included in decision making and field activities, and that Tribal beliefs and preferences be accommodated whenever possible. The Tribe also asked that DTSC review and consider all of the Tribe's prior comment letters and materials related to the Groundwater FEIR. The Tribe expressed concerns regarding changes to the Project design during the SEIR process, the siting of monitoring well (MW) MW-X and MW-Y in a sacred area (*Amut ahar*), and archaeological and cultural site delineations, which they expressed should be finalized with the Tribes prior to the release of the draft SEIR to ensure avoidance/no direct impacts taking into account the Tribal Cultural Values Assessment (TCVA). The Tribe requested clarification on the decision to proceed with an SEIR, the severity of potentially significant effects, the consideration of alternatives to reduce any new significant environmental effects, the increase in amount of ground disturbance, and several Project components. The Tribe also requested an independent cultural resources survey, to review the administrative draft SEIR, and copies of PG&E comments in the public record or DTSC's possession (Williams 2015).

On June 4, 2015, FMIT Tribal Members provided a second written comment on the NOP. The letter expressed the sacredness of the Topock area to the Tribe, Tribal concerns about the Project, and asked DTSC to consider the religious, spiritual, and cultural values that would be adversely affected by the direct, indirect, and cumulative impacts associated with the final groundwater remedy over the life of the Project (Fort Mojave Tribal Members 2015) (see Tribal Perspectives Section for additional details).

The FMIT provided a comment letter on October 9, 2015 regarding the SEIR. In the letter the Tribe requested to be consulted pursuant to AB 52; objected to the siting of the MW-X and MW-Y monitor wells on the *Amut ahar* area, which is culturally sensitive; requested study of alternate staging areas; requested that site and use-specific noise standards be developed; and requested clarification on how Tribal input was used in the design process, including which specific factors were weighted against the cultural/religious issues identified by the Tribe(s) (Hinkle 2015).

In a letter dated May 13, 2016, the FMIT also provided recommendations for an additional noise analysis (McDowell 2016). Comment letters are on file at DTSC.

Hualapai Indian Tribe

On May 29, 2015, the Hualapai provided written comments on the NOP. The letter expressed the importance of the Topock Maze and surrounding landscape and indicated that the Tribe would prefer that there be no more drilling or intrusions into the landscape. If this work could not be avoided, then the Tribe requested monitoring of cultural sites, recognition/emphasis of the importance of the cultural sites, and that the landscape be returned to its original condition. The Tribe also asked for clarification on the significant effects not discussed in the previous Groundwater FEIR and feasible mitigation measures that were not in the certified FEIR, as well as the basis of analysis. The Tribe also requested that the TCVA be finalized prior to the release of the SEIR and asked if Tribes would have the opportunity to provide input on determinations of significance. The letter also provided a list of suggested mitigation measures (Jackson-Kelly 2015).

The Hualapai provided a comment letter on March 8, 2016 regarding the SEIR. In the letter the Tribe reiterated that the Topock Cultural Landscape is culturally significant to the Tribe. The Hualapai also indicated that the Project had changed significantly since 2011 and there were many additional consequences that were not previously addressed in the Groundwater FEIR, including: multiple injection wells at one location; the Dissolved Metal Removal System; production well drawdown and the cone of depression from the freshwater source well; arsenic monitoring wells in culturally sensitive areas; increase in volume of displaced soil; the final/full well count; pumping from fractured aquifers of the East Ravine; unwanted remediation byproducts (arsenic, barium, iron, manganese, and sulfide); and noise and vibration impacts. The letter also requested that the SEIR consider AB 52 guidelines and provided suggested mitigation measures (Hubbs 2016). Comment letters are on file at DTSC.

Summary of DTSC Response to Native American Concerns

Since January 2011, the DOI, DTSC, PG&E, key stakeholders, and the Tribes, as part of the Consultative Workgroup (CWG) and Technical Work Group (TWG), have worked diligently to advance the selected design through the preliminary (30%), intermediary (60%) and the pre-final (90%) design stages. To accommodate diverse CWG/TWG member concerns, the design was scrutinized by the CWG/TWG through a review and comment period before advancing to the next design stage. Up until the pre-final design, each member's comment on the design was carefully reviewed and responded to by the Agencies and PG&E, then deliberated openly with CWG members in striving for comment resolution. In response to the Tribes, DTSC has made the following modifications to the Project design:

- Removed the eastern portion of the Topock Compressor Station Evaporation Ponds (TCS Evaporation Ponds) from Staging Area 11;

- Removed the quarry and former evaporation pond area from consideration as staging and soil storage;
- Removed Staging Areas 15, 16, 19, and 20;
- Limited uses of Staging Areas 6, 7, 12, 13, and 25;
- Restricted practices regarding backfill of monitoring wells;
- Moved access road to Well CW-01;
- Monitoring well IRL-1 moved south;
- MW-P moved east;
- Two alternative freshwater source locations removed from consideration; and
- Revised modeling regarding the installation of monitoring wells MW-X and MW-Y in Arizona

Individual Tribal Perspectives

The Topock area and adjacent lands along the Colorado River, beginning in the Hoover Dam area and extending to the Mexican border, are the ancestral home of a number of Native American Tribes, including the Cahuilla, Chemehuevi, Cocopah, Halchidoma, Havasupai, Hualapai, Maricopa, Mojave (or Mohave), Quechan, Serrano, and Yavapai peoples. As discussed above, the Chemehuevi Indian Tribe, Cocopah Indian Tribe, CRIT, FMIT, and the Hualapai Indian Tribe currently actively participate in the Topock project over the years and are referred to as "Interested Tribes." Each of the Interested Tribes has been, and continues to be, economically and culturally reliant on the Colorado River, and all are historically and spiritually rooted in the Colorado River region. Although each Interested Tribe has its own history and belief system tied to the region and the river, the Interested Tribes share an interest in the health and welfare of all people, the land, wildlife, things above and below ground, and natural resources. As indicated in the *Topock Compressor Station Tribal Cultural Values Assessment* (McDowell et al. 2014), several of the Interested Tribes feel that:

> Plants, animals, minerals, artifacts, rock arrangements, view-sheds, the Colorado River, and many other tangible and intangible elements are interwoven into the very fabric of tribal cultures. Topock, in being such a significant religious and spiritual "place," involves a dynamic understanding of traditions, religion, ceremonies, oral histories, and a plethora of other social-communal aspects, that is difficult for non-tribal entities to grasp with its many different layers of existence (McDowell et al. 2014).

During the June 22 technical workgroup meeting, several Interested Tribes provided specific statements (McDowell et al. 2016) of Tribal Values in regards to the proposed Project (in the voice of Tribal members):

- Tribes have more than a "vested" interest in this Project as it significantly affects their cultural and religious reality;

- The Colorado River is a gift from the Creator and the Tribes have a responsibility to use it wisely and protect it from harm;
- Many of the affected Interested Tribes hold first priority rights to water in the Colorado River and exercise those rights for the welfare of their people, lands and future generations – it is a cultural responsibility. These water rights are considered trust assets of the Tribes and DOI has a Trust Responsibility to protect these Trust assets for and on behalf of the Tribes and their memberships;
- The land as well is sacred and this Project has grown far beyond expectations in terms of the disturbances it has and will continue to create and has been further determined in the Final Basis of Design, November 2015 and the reason for the SEIR;
- Much of the Project damage is irreparable, even according to admissions in the Groundwater EIR; and
- Tribes will be here for generations to come. Need to understand long-term operation of remediation systems and potential future scenarios of operation and be assured that tribal concerns will be addressed throughout the life of the Project. This information must be passed on to future generations to monitor the direct, indirect and cumulative impacts and eventual decommissioning of the Project. Consideration of long term operation and management oversight by the affected Tribes as a long term impact be evaluated in the SEIR as this aspect of the Project will become a long term burden to the impacted Tribes for the duration of the cleanup and in their fulfillment of their stewardship responsibility.

The following Tribal perspectives were initially compiled during the Soil Investigation Project, and some were further updated through coordination with the respective Tribe during the development of this SEIR. Each section provides an overview of the comments and information provided to date by each of the five Interested Tribes. In an effort to provide a meaningful account of each Interested Tribe's input, the following includes a summary of information provided by each since certification of the Groundwater FEIR. Concerns expressed by the Tribes prior to certification are described in the Groundwater FEIR Section 4.4.1.3, "Native American Heritage Resources," Methods and Sources of Information.

Chemehuevi Indian Tribe

On April 26, 2013, DTSC met with the Chemehuevi Tribal Council regarding the Soil Investigation Project. Chairman Tito Smith indicated that moving dirt is a sensitive subject for some of the tribes up north and the Chemehuevi are cognizant of this and respect the religious values and cultures of the tribes located upriver.

Specific concerns and sentiments expressed by the Tribe during a meeting on October 5, 2015 include:

- The Tribe is concerned that the chemical reduction of hexavalent chromium to chromium-3 in groundwater may revert back to hexavalent chromium.
- The Tribe is concerned about what would be done if the contaminated water breaks though and gets into the river.

Cocopah Indian Tribe

The Cocopah Indian Tribe feels strongly in the belief that the Topock area embodies significant cultural importance for Native American Tribes of the region. According to the Cocopah, “[o]nce, this was all our land; it belonged to all Indian people. The entire Colorado River corridor was home to many Tribes, and the river is the life blood of these people. The river and the surrounding landscape is a sacred place. Its reverence is shown through the Creation Story, and the many songs of the Tribes. These stories and songs commemorate the significant events and places that make the river sacred to all Indian people of the region” (BLM 2012).

The Cocopah have expressed concern about the lack of conceptual understanding of the region as a landscape and encourage that it be treated as a whole. Jill McCormick, Cocopah Cultural Resources Manager, indicated at a meeting on October 28, 2013, that looking at individual key views is contradictory to the way that Native American Tribes view the relationships amongst landscape features and the significance of the landscape and its associated viewshed. During a site visit on September 30, 2013, Ms. McCormick expressed concern that, although archaeological resources only comprise one aspect of the cultural significance of the area, many of the resources require more detailed documentation and that undocumented resources such as trails be documented.

During the Groundwater FEIR process, the vice chairman of the Cocopah Indian Tribe expressed that the Colorado River is an important cultural element to all Native American Tribes along the river, and the region has been occupied and utilized by Yuman-speaking tribes throughout history (DTSC 2011). The Cocopah creation story tells how the twin creators, Sipa and Komat, after creating the earth, traced a line through the desert—the Colorado River (Cocopah, n.d.(a)). The Colorado River provides “physical and spiritual nourishment” for the Tribe and the plants that grow along the river, such as arrow weed, creosote, mesquite, cottonwood, and wild rice, are considered culturally significant as well. Arrow weed was traditionally used to construct homes, and its smoke was used in spiritual cleansing and sacred death ceremonies. Cottonwood, creosote, and longleaf ephedra had many medicinal uses. Honey and screwbean mesquite pods were an important source of food, and their wood provided fuel. Tule was used for food, pigment, basketry, and to make rafts (Cocopah, n.d.(b)). In addition to the wild plants found along the river, the Cocopah also practiced agriculture in the river’s floodplain, growing maize, squash, beans, and gourds.

Colorado River Indian Tribes

The CRIT have numerous enrolled members who are identified as being of Mohave and Chemehuevi cultural descent, as well as Navajo, Hopi, and other cultural groups. The following statement was provided to DTSC by the CRIT (Patch 2016):

> The Mohave people are religiously and spiritually connected to the area known as Topock, and therefore, the area is significant to the Mohave people and their religious perspective. The Mohave people came from Avi Kwame, a pinnacle point that is seen to the north of the Topock area. The spiritual and religious landscape is a pivotal point of interest for all Mohave people and their creation story.

> The area known just north of Topock, is a birthing area for the Mohave people. David Harper, a Mohave tribal member, was told his grandmothers were born in the river, amongst the tullies.
>
> The area in Topock is referred to as the entry way into the next world of the Mohave people. Just north in the mountain range of Topock sits the entry into the next world, through the rat hole or through the next entry that takes you to our "happy hunting ground".
>
> These areas, Topock and surrounding areas, all have significant and direct links into the next world, making these areas sacred and connected to each other. Each is not greater than the next, while each has significant spiritual power.

The CRIT have expressed significant concern over the impacts to the resources in the Topock area. Howard Magill, CRIT representative, indicated on October 28, 2013 the feeling that the area was very special, and that the landscape should be viewed as contiguous.

During the Groundwater FEIR process, some Tribal members suggested that the Topock Maze is of relatively recent origin and do not believe that it is highly significant culturally. It was also noted by this representative that the Topock Maze area has been repeatedly disturbed over the past 100 years by transportation corridors, hydrographic changes, and other linear infrastructure (DTSC 2011). Subsequent statements from the CRIT Tribal Council during meetings with DTSC suggested that the Topock Maze area continues to be of cultural concern for some members of CRIT.

In a meeting on October 5, 2015 regarding the SEIR, Howard McGill stated that "the creator tells us the place is special" and expressed that when at Topock he is conscious of the fact that souls of kin are crossing where he is at and that one really has to be in a constant state of prayer when monitoring. Specific concerns and sentiments expressed by the Tribe during this meeting include:

- The Tribe objects to the siting of MW-X and MW-Y;
- The Tribe has concerns about the overall increase in soil removal from what was analyzed in the Groundwater FEIR;
- The Tribe has concerns about the increase in number of wells;
- The Tribe suggested that maybe the pump and treat program should be reconsidered since it is less invasive;
- The Tribe is concerned about the increase in electricity will dramatically increase noise; and
- The TCVA includes a full assessment of cultural values on how to approach protection, avoidance, and preservation.

Fort Mojave Indian Tribe

The following statement was provided to DTSC by the FMIT (Aha Makav Cultural Society 2016 comments to DTSC on Tribal Perspectives July 8, 2016 document):

The Fort Mojave Indian Tribe is a sovereign Tribal Government established by the Fort Mojave Constitution and By Laws, in May 1957, formed under the Indian Reorganization Act of 1934 and as stipulated in the Constitution and By-Laws under Article V – Rights of the Members, Section 2.

"*The Members of the Fort Mojave Tribe shall continue undisturbed in their customs, culture, and their religious beliefs including but not limited to, the customs of cremation, ceremonial dancing and singing, and no one shall interfere with these practices, recognizing that we have been a people and shall continue to be a people whose way of life has been different.*"

Under the Constitutions and By-Laws, Preamble it states – "*We, the members of the Fort Mojave Tribe, in order to establish a more effective form of tribal government and better exercise the privileges and powers of self-government, in order to use and restore out ancient home in the Mojave Valley of the Colorado River, and rehabilitate ourselves and fortune after being dislocated by the changed conditions resulting from the construction of Hoover Dam and by the overflows and backwater from Parker Dam and Lake Havasu and in general to improve our welfare, and enjoy and maintain our rights and privileges as citizens under the Constitution and laws of the United States of America, do establish this Constitution and By-Laws for the members of the Fort Mojave Indian Tribe.* (Constitution and By-Laws of the Fort Mojave Indian Tribe, January 7, 1977)

The Fort Mojave Indian Tribe and its membership officially became aware of the Topock Project in September 2004. For 12 years now the Tribe and Mojave people have been participating in the Topock Project process and focusing on educating the regulatory agencies and making them aware of the Religious and Spiritual values that the Mojave people have in the immediate project cleanup area.

Our efforts have been to educate, develop approaches, plans, and advise and foster transparent and effective communication in how this sacred land should be treated in the State and Federal processes. This has been a tremendous undertaking for the Mojave people and at times a spiritual drain on the Tribal membership who up until 2004 had only known this way of life. The Mojave people are the ones who are physically, mentally, emotionally, and spiritually impacted day in and out, but the knowledge they have learned over the 12 years of active participation in the project and how the Final 100% BOD remedy will be implemented and constructed in the near future. It is about the Mojave people and our way of life, our birthright. The direct, indirect and cumulative impacts and adverse effects of the Topock project will forever change our Holy Place and sacredness as we know it. Prior historical impacts i.e., such as the siting of the Topock Compressor Station placement in our Ancestral homelands and the taking of other tribal lands for different uses also exacerbated that loss of self-worth, identity, and self-respect as part of the historical trauma associated with past actions. Although forcibly removed from a majority of our ancestral homelands the Mojave people still preserved and overcame the events of the past.

> The Mojave culture is still thriving and alive, and a testament to the harsh treatment the Mojave endured over the years of cultural change. That Mojave Ancestral spirit is still the same yesterday, today and into the future as the Mojave people never give up in the protection of their natural world environment. The Mojave will continue to have a direct presence at Topock to oversee this project cleanup to a proper State standard. A standard that doesn't measure up to the natural chemical clean up that Mother Earth has undertaken since this dumping of contaminants first occurred. The Mojave people intend to see that this cleanup takes place and in accordance with Tribal input for the term of the cleanup. That the regulatory State agency continues enforcement of the 2011 FEIR requirements and consideration of the new impacts that weren't identified in the original document. This also means addressing Tribal concerns about lessees, induced access and impacts, and cumulative impacts/effects from the project combined with other nearby uses and projects. And remembering that "previously disturbed areas" can have tribal values, even if they lack archaeological integrity.
>
> The Topock project has become a long term tribal stewardship responsibility which will be ongoing for decades until the cleanup is achieved and the agencies meet their state standard measurement. Once that is complete then restoration and decommissioning begins another step in the long term healing of the sacred land at Topock for the Mojave people. Part of that restoration and healing associated with the responsibilities of the Ahamakav Cultural Society to monitor the activities of the project. In order for the Ahamakav Cultural Society to continue to oversee the stewardship of Topock, it will have to develop a long term plan to educate our members and future staff of what took place at Topock. This effort will need to provide cultural programs that support the cultural health and wellbeing of our people and to continue to educate the project stakeholders through effective cultural sensitivity training, cultural competence of regulatory agencies, project and field staff.
>
> Other department priorities for tribal members, such as Mojave Language revitalization, Tribal Monitoring Training, Development of Mojave Educational Materials, Traditional Arts, Cultural Center exhibits, Cultural staff support, and the planned Fort Mojave School K-8th grade where Mojave Language Immersion program will be developed and taught. These are just some of the Ahamakav Cultural Spciety program priorities that support continued Mpjave Heritage and ensuring the oral and traditional teachings of the Mojave continue strong, healthy and vibrant for the next generations of Mojave people who will oversee and one day witness the competed cleanup of our sacred site at Topock. (Ahamakav Cultural Society 2016 comments to DTSC on Tribal Perspectives July 8, 2016 document).

Specific concerns and sentiments expressed by Tribal members during the SEIR the process, including comments provided during meetings on October 5, 2015 and in a comment letter dated October 9, 2015, are stated below (in the voice of Tribal members):

- No more disturbances to our Sacred/Spiritual grounds;

- No small amount of water can wash the Chromium out; it will take millions, even billions of gallons of water over the project lifetime;
- We the Mojave people will be here forever for this is our home and we do not want disturbance on our lands or the surrounding area at the Topock site;
- I work with children and I want them to be around to pass on our culture;
- Concern regarding the number of existing and proposed wells and locations;
- What happens if the contaminated water breaks through into the river?;
- We do not want our Spiritual and Cultural Lands disturbed, but to be avoided in the design implementation;
- Putting in new Mesquite trees at the Topock site would not be useable for FMIT;
- Our Culture is our life, who we are, and what this area is, "AhaMakav;"
- Our land is who we are, the clay we eat, the water we drink, and our travel into the next life. Our spiritual passing through the Maze areas;
- Tribal members ask that the State, Federal agencies, Land Owners and Lessees consult and communicate with the FMIT before any proposed ground disturbing activities take place and to have FMIT monitors present;
- We revere the area at Topock, we value the quiet setting and solitude, the viewscape of the area from our Natural world view of the land, from our beginning a: Avi Kwa Ame – Spirit Mountain to the end of our life's journey at Topock. The sense of place we know and are connected to our sacred area;
- The need to restore the area of past, current and future disturbances to the land to natural conditions as soon as possible. Removal of the ground disturbing foreign elements that can't co-exist with the spiritual place of eternal rest and harmony;
- That promises and conditions of the final remedy need to be enforceable until the project is complete, then our sacred area can begin the process of healing for the next generations of the Mojave People;
- Consideration for the Mojave people, who will be in the area forever;
- Concerns about plants and animals in the area;
- Concerns about arsenic in the water and also contaminating fresh water through the flushing process;
- Concerns that the final remedy won't work;
- The Tribe is concerned about impacts to the land due to changes in the remedy as it is constructed;
- The Tribe would like to continue to have review and dialogue for the life of the remedy;
- The TCVA need to be addressed so that the Tribal voice is heard and intangibles are considered;

- Documents need to emphasize avoidance;
- The Tribe emphasizes a landscape approach given the specialness and spirituality of the area, and an approach to address that needs to be developed;
- Topock is an elevated place and a physical manifestation of something bigger;
- The Tribe has a responsibility to speak out for the land even if it is now under different ownership;
- Certain landowners will allow removal of infrastructure, some will not, so the infrastructure left in place will forever scar the earth whether it is above or below ground. Removal of all infrastructure is required to restore the land to its prior undisturbed state;
- The Tribe requests an independent survey prior to the SEIR;
- The Tribe remains opposed to the siting of MW-X and MW-Y due to the cultural sensitive area and its [potential] nomination as a TCP as directed by AZ SHPO to BLM;
- The Tribe is opposed to staging/laydown areas 6 & 7 in the TCVA exclusion zone; and
- The Tribe requests that the most restrictive noise standards be used or that a project-specific standard for outdoor worship be developed.

The sentiments and concerns of the Mojave people are no different than what was expressed during the 2011 FEIR and are still important and relevant to the 2016 SEIR.

The Mojave people are affiliated deeply with the land, plants and animals, air, and water of the region and has a responsibility to be stewards of its historical land and the environment. The Tribe respects the land and the spirit of the place, and traditional knowledge tells us were put here by the Creator for a purpose. They have never severed their relationship with the land and the entire environment. In a comment letter on the SEIR NOP dated June 4, 2105, FMIT Tribal members expressed that the Project area and the Colorado River are a large part of the sacred area known as Topock, and stated:

> We have lived here at this area since time immemorial. We, the Fort Mojave people grew up in Needles, CA, and Mohave Valley, AZ areas. We have witnessed the many changes to the environment due to Western migration and development. We have witnessed the land once known to us and our ancestors as ours, be slowly taken from under our ownership/stewardship and reverted to the States of California, Arizona and special interest groups. The traditional homeland and landscape so unique to our spiritual and religious cultural values and our way of life forever will be changed by the contamination and remedy clean up now present at Topock.
>
> This Cultural Landscape and Sacred area is known only to us and can never be replicated anywhere else, this is our spiritual connection area and the effects of the remedy project will have profound and significant impacts to the land, plants and wildlife who call Topock their home, we are all connected to them and them to us, we speak for the

> wildlife, plants, birds, tortoises, bighorn sheep, coyote and all things present within the Area of Potential Effect at Topock (Fort Mojave Tribal Members 2015).

Speaking at a public scoping meeting, Tribal member Linda Otero (2015) expressed:

> It is important to understand that we still maintain that response in relationship to a higher power and that our role and responsibility to maintain the placement of this area is important for us. It speaks of a higher order, versus what we have to do and identify it through a scoping meeting and a project Subsequent EIR process. No – there is no level in which we can address fully in the capacity which identifies through this effort in some of these topics that relay that, but we have to interject in a level that tries to convey that importance of this area. So in the higher order of our level of religious aspects to this place, it does not meet this level in which we can respond fully in an EIR document process.

Other comments made in the Groundwater FEIR 2011 that are still integral and relevant to the SEIR are again reiterated as follows:

The Mojave people know that the Project Area footprint is within a larger part of the Tribal cultural landscape that should be considered within the CEQA process. They also know that cultural resources studies are not just limited to tangible aspects, such as archaeological sites. Additional studies should include the identification of intangible resources to determine the full protection of the cultural landscape. Many Tribal members know that they have been entrusted with serious and weighty responsibilities as caretakers of the natural and cultural resources within their traditional territories, as has been traditionally known and passed down for generations to its membership since time immemorial (Coyle 2013; McDowell-Antone 2010a; McDowell 2014).

For Tribal members, the Topock Maze is representative of a larger, intangible cultural belief. An example given by one Tribal member likened the Topock Maze to Arlington National Cemetery, with both areas serving as a symbolic image of honor, sacrifice, and shared history associated with those who have passed on from this world. The Topock Maze area is a place for purification, for example, after engaging in warfare or, in more modern times, for other types of spiritual healing and strength. It is also a teaching area for Tribal youth.

To the Mojave people, the Topock Maze is more than just the site as it has been defined by archaeologists. Rather, it is a larger area that includes the spaces between the loci, the areas where the Maze physically once was, and associated intaglios, both those still visible and those no longer present. In addition, there is a belief that the remaining parts of the Topock Maze are part of a larger system of cultural sites that once existed that were important areas for rituals and celebrations. To the FMIT, these areas within the larger landscape are interconnected and spiritually linked and therefore "[i]f you impact or sever one area, that affects the whole. Like cutting off a limb, it can affect your well-being and cannot be recreated" (McDowell-Antone 2010b).

FMIT members express strong emotional ties to the area because of its association with Mojave culture and tradition:

> For centuries we lived and enjoyed the natural setting, the River our namesake 'Aha Makav' people of the river, the Mountains we revere as the place of creation known as 'Avi Kwa Ame' Spirit Mountain, all things the air, the sky, things above and below ground. These named places in Mojave are the cornerstones of our existence and demark the footprints of our ancestors upon this birthplace of the Mojave people…This is our home. This is the nation in which our people spoke about. We're still a part of this, and no one has the right to take that feeling from us in our heart. Creator gave this for us… Old people talked about it that way. Teachers talk about it that way. …That's our tradition to pass on. That tradition is out there in the landscape. That tradition is the river. That tradition is that holiness that area presents. No one has a right to take that feeling away (Otero 2010).

In a comment letter on the Draft EIR for the Topock Compressor Station Groundwater Remediation Project, Nora McDowell-Antone stated:

> Our continuous occupation of this area is based on the fact that *Matavilya* (the Creator) placed us here and this is where we have remained since recorded time. This is our only homeland, this is where our beginning is and where our end transitions, this area holds the footprints of our ancestors and attests to our past, present, and future generations, who cannot and will not ever leave this place, until our time ends here at this place, our Sacred area called Topock (McDowell-Antone 2010b).

The Topock area is critical to FMIT cultural beliefs about the afterlife. According to FMIT representatives, the Topock Maze area is where spirits of the deceased go to pass on to the next world (McDowell 2013a). The Maze, which is an array of windrows, is not considered to be a true Maze with an entrance and exit, but is represented as a place where a final test of character for a spirit of the deceased occurs (Montoya 2010).

To the FMIT, the Topock area is an important, integral part of a much larger cultural landscape along the Colorado River. This landscape includes important named places such as *Avi Kwa Ame* (Spirit Mountain), *Avi Vas Qui* (Boundary Cone), and *Huqueamp-Avi* (The Needles Peaks). The FMIT's traditional beliefs about the Topock area are tied to Tribal history and identity and are integral to FMIT's traditional culture. "[T]raditional songs are tied to the land on and surrounding the project site. The songs describe the Tribe's creation and history and provide guidance about the Creator's commandments about how to live life" (McDowell-Antone 2010a). FMIT Tribal members hold "the Topock landscape within their minds—knowledge of a place of peace, a place of holiness, a place that is inscribed within our hearts, a place specific to our natural being, a holy place of existence for the Mojave people, atonement for the soul of our people, past, present, and the future" (McDowell-Antone 2010a).

The FMIT also maintains a deep cultural connection to the Colorado River. It is widely noted and recognized that the Mojave term for themselves, the Aha Makav, means "People of the Water," which suggests a strong connection by itself, this name was given from the Creator Matavilya. This is an important distinction because it suggests a more nuanced connection between the Mojave people and the Colorado River. Aside from being a people in close proximity to the river, the Mojave believe that they are protected and secured by the river, as it provides everything for them and is a constant, reliable source in the Mojave culture as a source of water and nourishment (McDowell-Antone 2010b). As Nora McDowell-Antone described:

> For us water is everything. It is all of who we are and what we endure and what we try to impose on the lands and our own people to preserve and protect it for all people…Our home sites were all up and down the river corridor here…. [I]n the summertime we'd be at the river because that's the coolest place...the water was a source of maintaining control of our temperatures and everything else that we associated within our fishing, our food, our habitats, you know. That's where we lived (McDowell-Antone 2010b).

Today, the Colorado River remains an important natural resource and aspect of the Topock Cultural Landscape, as well as a social link for several Native American Tribes. As described by Ms. McDowell of the FMIT on October 28, 2013, each year, many Native American Tribes associated with the Colorado River meet on the river to socialize and engage in traditional cultural education (McDowell 2013a). Key activities involve camping along the River and teaching of traditional moral codes.

Also considered sacred by the FMIT is the soil itself, as it is part of the cultural landscape. Physical alterations or removal of the earth are considered to be an impact to the cultural landscape. Each boring, sample, well is an adverse effect with growing cumulative effects. The Tribe has been concerned that cumulative effects have never been fully assessed for the area. The *Amut ahar* area is considered particularly culturally sensitive for its association with clay materials important to Tribes and is a sacred area. What has DTSC learned since the FEIR to better address such tribal concerns in the SEIR?

As pointed out by some Tribal representatives, they are sensitive not only to permanent intrusions but also to those that may be characterized by some as "temporary." They feel that even those activities or physical intrusions characterized as "temporary" result in spiritual disturbances that remain for long periods of time and although these disturbances may not be visible to the physical eye, they can still be seen from the "mind's eye" (McDowell 2013a). According to Tribal members, the knowledge of alterations to the landscape remain in the collective consciousness of those who associate deep spiritual beliefs and values with the area long after the landscape has been restored and the evidence of destruction is no longer physically visible. In other instances, physical evidence of disturbance lasts long after the project and "restoration" have concluded. The desert is easily scarred and slow to heal, such as the old pond area where trails were altered and the scarring of the land use remains (McDowell 2013b). The perspective of the Tribe remains the same regarding what is characterized as "temporary," that this also needs to be defined and assessed in the SEIR as to what is short and long term versus permanent impacts and effects. FMIR made comments to this effect in the 30%, 60%, and 90% BOD (2016) and (SEIR 2016). Although some of the lands had been disrupted and disturbed through prior interim measures, it doesn't mean the area have lost its tribal and/or cultural integrity, it is still sacred land to us. What has DTSC leaned since the FEIR to better address each tribal concern in the SEIR?

Because the Topock area is sacred, excessive noise is considered to be disruptive to those who use the area for religious or ceremonial purposes. FMIT representatives have generally voiced concerns over noise in the vicinity of the Topock Maze and consider Tribal users as sensitive noise receptors. The FMIT is also concerned about inappropriate land uses and behavior in and near this sacred area. This can include use of recreational machinery, alcohol, loud music, inappropriate language, firearms, and alarms. These uses conflict with Tribal values and uses. The position of the Tribe regarding excessive noise also includes non-auditory noise, i.e., vibration, equipment, and people also contribute to lack of privacy for tribal practitioners and practice. The FEIR's use of the noise in a Church building as an example isn't the same as a tribal practitioners' church (out-of-doors on a known spiritual ground place). The natural setting and serenity of the open space to the natural world elements is the traditional way of worshipping and offering prayers. So we reiterate that this noise concern remains an open issue that needs to be assessed in the SEIR and as commented on the 30%, 60%, and 90% BOD. The treatment of noise during the construction period is well developed in the CIMP (CUL-1a-8h in Appendix H of the C/RAWP), but this may be at odds with language regarding exemption for San Bernardino County noise regulations stated in Appendix C-11 of the 100% BOD Report. The Appendix C-11 criteria should be removed from the 100% BOD Report.

Also, noise impacts, audible and inaudible and vibration impacts, from equipment to be installed and used at the TCS Evaporation Ponds will have long term, cumulative, negative impacts due to their proximity to the Maze and long-term Tribal uses, and should be considered as part of the SEIR. The Tribe provided comments on these items in a letter to Aaron Yue, DTSC on July 18, 2016.

Finally, the Tribe is concerned that Tribal perspectives be fully integrated into Project Design, construction methodology and analysis.

Hualapai Indian Tribe

The Hualapai provided comments on the SEIR NOP in a letter dated May 29, 2014. The Hualapai indicated that the Topock Maze and surrounding landscape is of great importation to the Tribe, and the air, earth's surface, and subsurface are all part of a "sacred continuum." The Tribe believes that wells, buried pipes, and soil samples are intrusions and desecrations, particularly those near the Maze. The letter stated that the "Hualapai have deep connections with the Colorado River and recognize that it is important to keep the river clean" (Jackson-Kelly 2015).The Hualapai Department of Cultural Resources has been actively engaged with PG&E at Topock since the mid-1990s through consultations, monitoring and participating in government-to-government meetings. During interviews, several Hualapai Elders who were asked to discuss Topock and Needles, stated that regarding Topock, "…there is a common history that all River Tribes shared at one time," while another Elder also said that, "years ago all the River Tribes use to gather and meet at different places along the River. This is probably one of those places because the roads now days follow some of the old trails. Today we still try to keep up those kinds of things with the other Tribes" (HDCR 2014). On February 4, 2014, Ms. Hubbs told of an important annual event that the Hualapai practice. Tribal members gather and spend 1 to 2 weeks traveling down the river, stopping at significant and extremely meaningful cultural sites where they pay reverence, teach children, and engage Tribal elders ensuring Tribal values and beliefs are transferred to future generations.

The Colorado River and its associated canyons are central to Hualapai cultural history and Tribal identity. The northern and western boundaries of the Hualapai's territory traditionally are considered by the Tribe to be the middle of the Colorado River, referred to as the *Ha' yidt ta*, or the "Backbone of the River" (BLM 2012: 38). "The long expanse of the River through the canyon and the riparian eco-systems makes a life-way connection that flows through the hearts of the Hualapai people. The Hualapai maintain this connection through ties of sacredness to the Colorado River" (HDCR 2010). Hualapai tradition holds that they were created from the sediment clay, and reeds found along the river's banks (Jackson 2008). A sacred spring called *Ha'thi-el*, meaning "Salty Spring," flows from a side canyon, and petrogylphs there tell the story of Creation (HDCR 2010).

According to the late Hualapai Elder Auggie Smith, prior to European contact, Hualapai occupied lands in the area of Topock (The Needles, or Kwiđ-Kwiđ) and Boundary Cone, or Wi Veskwiya, at the base of the Black Mountains. Wi kwiđ-kwiđ is the south-western most boundary. Today all of these areas are tied to Hualapai's place of creation, Wikame. When the world was covered in flood waters, all the Yuman people were created on Wikame. In the Hualapai's Creation Story, depicted in the petroglyphs at *Wikahme*, which is located 20 miles north of the point where Arizona, Nevada, and California meet, (and visible from the Station as are the Needles) the Hualapai originated from 'Wikahme', also known as Spirit Mountain and Newberry Mountain. According to the Hualapai creation story, a spirit prayed life into canes cut from along the Colorado River near Spirit Mountain. "The Creator…made two more beings. These ones He made and called Land Older Brother and Land Younger Brother. He placed them at 'Wikahme' and they lived there," (HDCR 2014[7]). Wi Veskwiya is mentioned in Hualapai Oral Traditional Stories including traditional songs, and is an important land marker for the Hualapai Band who traversed in the southernmost ancestral territories delineated by this butte known in English as Boundary Cone Butte. The Gods (the two brothers) at *Wik- ame*' (Spirit Mountain) specified this Butte to be the traditional marker for Hualapai territory therefore reinforcing the Butte as a Sacred Site. Since traditional practitioners limited secular activities on the mountain, the absence of indigenous material other than the sacred petroglyphs, highlights the significance of Spirit Mountain for Yuman-speaking people. It also suggests that the area was used exclusively for religious purposes. Another oral account tells of a huge flood covering the world. All the Pai fled to Spirit Mountain. Once the waters receded, the Needles, or Wi kwiđ-kwiđ were formed, therefore Needles and the locality of Topock are considered sacred landscapes, or TCPs by the Hualapai Tribe (HDCR 2014).

[7] *Kathad Ganavj*, Transcribed and transliterated by Lucille J. Whatahomigie, Malinda Powskey, Jorigine Bender, and Josephine Manakaja, 1981, Hualapai Bilingual Program, Peach Springs School District, Peach Springs, AZ, as quoted in HDRC 2014.

To the Hualapai Tribe, the land, water, plants, and animals are seen as inherently connected and are all valued: "The air, the earth's surface, and the subsurface of the landscape are all part of a sacred continuum" (DTSC 2011). The Hualapai see the water and springs, rocks, plant and animal life, and material culture within the Topock and Colorado River region, without temporal limits, as a traditional cultural place. The Hualapai people regard their traditional lands in the Topock and Colorado River Region with "the highest esteem and most profound respect" (BLM 2012: 39).

The Hualapai consider many of the natural features in the Topock area to be important. These include the Needles (Wi kwiđ-kwiđ), Boundary Cone (Wi Veskwiya), and Spirit Mountain (Wikame), the Hualapai's place of creation, all of which are visible from the Project Area (BLM 2012). Dawn Hubbs indicated on a site visit on April 19, 2013, that smaller natural features, such as rock alignments or cleared areas, are interconnected or have meaning across the landscape—they often line up with larger features like Boundary Cone and Spirit Mountain. The Topock area is also where the Tribe used to collect arrow weed (Hubbs 2013).

Because of the connected nature of the cultural landscape, impacts to one part of the landscape inevitably are felt throughout the rest. The notion that holes are being punctured into such a sacred space brings on hurt and pain for the Tribe. The collective pain the Tribe feels is inexpressible.

To the Tribe, the best practice related to places of spiritual or cultural importance is to respect it and not to disturb it. Physical impacts to these important places, including to the Topock area, represent an irreparable destruction and desecration of the land. The Hualapai believe strongly that reparation for destruction to the land and larger environment rests on the Tribe and presents an enormous personal and spiritual burden to Tribal members. These impacts also disrupt traditional and religious practices. The Hualapai have always sought to protect their ancestral lands, and feel a strong sense of responsibility to do so. As spoken by Delbert Havatone (as quoted in BLM 2012:44):

> If these sites are defiled, it becomes impossible to practice Hualapai traditional and religious thought…"thought," being essential because it comes from within each individual spirit. This is an abstraction to many people, but it is real to the Hualapai. At an archaeological site, or cultural landscapes, we pray to the land to everything in the cultural environment…we talk in Hualapai language to the spirits that are there, letting them know that our visit is not meant to be disrespectful; we are there to insure that the Hualapai are working to protect the home site of our ancestors. Essential to Hualapai traditional thought is the knowledge that if you don't talk in that manner, these things come back on you to harm your family or yourself. Without fulfilling Hualapai responsibility for the protection of these sites and the opportunity to express respect for these sites, great harm can come to the Tribe. That is what Hualapai religion means. That is what Wikahme means.

For the Tribe, the puncturing of the land represents much more than visual scars. While the action of digging the hole is short lived, the impact of soil borings will be felt long after the action has taken place. The sensitive nature and values of the Topock area are such that it may never be possible to return it to its former, whole, state.

Specific concerns and sentiments expressed by Tribal members during the SEIR process, including a meeting on October 5, 2015, are stated below (in the voice of Tribal members):

- The Tribe has objections to activities east of the TCS Evaporation Ponds and staging across from the IM-3 Facility;
- The Tribe has concerns about the overall increase in soil removal from what was analyzed in the Groundwater FEIR;
- The Tribes have a different perspective when looking at archaeological resources;
- Who will make the determination that something is going to be a more significant impact?;
- The TCVA needs to be completed prior to the remediation so the Tribes can document their resources to allow us to understand impacts that haven't been considered before;
- There are new resources, like paint on the Colorado River;
- The Tribe suggests that maybe pump and treat should be considered;
- The Tribe objects to the siting of MW-X and MW-Y; and
- The Tribe concurs with the FMIT regarding developing a project-specific standard for outdoor worship.

Inventory of Resources

Topock Maze

The Topock Maze (CA-SBR-219) is an archaeological resource associated with the California Desert region. The Maze, as described by McDougall and Inoway (2005:1), is "a very large desert intaglio or geoglyph consisting of parallel windrows of dark, patinated desert pavement gravels 'raked' from the desert pavement surface, exposing the white-to-buff colored calcareous silts underlying the desert pavement between the windrows. This creates a maze-like scene of alternating dark rock lines separated by light-colored bands devoid of gravels." As documented archaeologically, the Topock Maze comprises three distinct locations (or "loci"), designated as Loci A, B, and C (McDougall and Inoway 2005). Locus A is the largest (17.7 acres) and is west of the Station, south of I-40. Locus B (9 acres) and Locus C (6 acres) are north of I-40 on the east and west sides of Bat Cave Wash, respectively. Locus A is the most pristine archaeological manifestation of the Topock Maze, having the most well-preserved rows. The physical manifestation of the Topock Maze (CA-SBR-219, Loci A, B and C) is adjacent to but outside of the Project Area.

The Topock Maze as understood and documented by archaeologists is limited to the physical manifestation or modifications visible on the landscape. For local Native American Tribes, however, the Topock Maze represents only one, albeit an integral, component to a complex traditional cultural landscape of indescribable significance to the belief systems, values, and personal and group identity of Tribal people. Some Native American Tribes view the archaeological interpretation of the Topock Maze (three distinct loci) as limited to that which meets definitions of value in the scientific community, whereas some Native American Tribes' value of the Topock Maze includes both physical and intangible aspects, with the Topock Maze extending to disturbed inter-locus areas, as well as surrounding lands, all of which are linked conceptually and spiritually to other landforms in the area as a single "whole."

The origin of the Topock Maze has been disputed. Some support a Native American origin, while others have suggested that it is a byproduct of railroad construction, which occurred between 1888 and 1893. On the assumption that the Topock Maze is of Native American origin, there is also little agreement as to its age or how it was created. The Topock Maze holds religious, mythological, and ceremonial significance to some Native American Tribes who associate the Topock Maze with the transition to the afterlife. The interpretive plaque at the southern boundary of Locus A refers to the Topock Maze as a place where warriors "cleansed themselves" after battle before returning to their home villages (McDougall and Inoway 2005). According to the Mojave people, the Topock Maze has always been there, and they disclaim that the Topock Maze was built. Those who consider its origin related to the construction of the railroad typically cite a memo from a railroad engineer in 1891 that describes the collection of gravel into windrows by Mojave workers prior to the gravel being hauled and used to support a bridge caisson (Haenszel 1978; Musser-Lopez 2011). Photographic evidence of the bridge construction, interviews with railroad workers from that time, and statements from Needles residents present at the time of the bridge construction all suggest, however, that the Topock Maze was present prior to bridge construction, even if portions of it were later collected for ballast or support material (DTSC 2011).

Topock Traditional Cultural Property

Since certification of the Groundwater FEIR, the Topock Cultural Area (TCA) was formally designated a TCP as a result of Section 106 consultation for the Topock Remediation Project (defined by the U.S. Bureau of Land Management [BLM] to include remedial investigations and groundwater and soil removal and response actions pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act [CERCLA]). Through the Section 106 process, a Programmatic Agreement (PA) (BLM et al. 2010) and a Cultural and Historical Properties Management Plan (CHPMP) (BLM 2012) were prepared and the BLM determined that there was a TCP of religious and cultural significance to several Interested Tribes within the Area of Potential Effects (APE) for the Groundwater Remediation Project, a larger area of approximately 1,600 acres that surrounds and encompasses the Project Area. The BLM defined the boundaries of the TCP as corresponding to the then identified APE. However, the BLM also acknowledged that "Tribal members believe that the area known as the Topock TCP is part of a broader cultural landscape that includes the Colorado River, extending beyond the limits of the currently designed APE, and should not be understood as a discrete or detached site, but as part of a larger area of cultural significance" (BLM 2012).

The BLM determined that the TCP was eligible for inclusion in the NRHP under Criterion A (BLM et al. 2010). Because the TCP has been determined eligible for inclusion in the NRHP, it is automatically listed in the CRHR (Public Resources Code Section 5024.1(d)(1)) and is considered a historical resource per CEQA Guidelines Section 15064.5(a). The resource identified in the Groundwater FEIR (DTSC 2011) as the TCA is within and part of the TCP defined by the BLM.

The BLM did not identify the contributing elements of the Topock TCP with the exception of prehistoric archaeological sites, which were identified as "contributing properties" to the TCP (BLM 2012). During the Soil Investigation Project, DTSC, through coordination with Interested Tribes, identified additional physical characteristics that convey the significance of the Topock TCP, which include land (including landforms, soil, minerals, and clays), water, plants (particularly indigenous plants of traditional cultural significance), animals, and the viewshed. These physical characteristics, including prehistoric archaeological sites previously identified by the BLM as "contributing properties," are described hereinafter as "contributing elements."

Land

Because the land itself is essential to the significance of the TCP, disturbance and removal of soil is considered a profound disruption in the belief system of some Interested Tribes. The land includes the landforms, soil, minerals, and clays.

Animals

Animal are essential to the significance of the TCP and activities related to the Project are considered disruptive to the natural environment of the Topock TCP.

Plants

Native vegetation, particularly those indigenous species of ethnobotanical importance, is significant to some Interested Tribes as an integral part of the Topock TCP. Pruning or alteration of the natural growth of native and traditional plant species for reasons other than traditional uses is considered disruptive to the natural environment of the Topock TCP.

Prehistoric Archaeological Resources

Some Interested Tribes view prehistoric archaeological resources, including archaeological sites and isolated artifacts, as an integral part of the TCP Any damage, destruction, or alteration to such an archaeological resource would negatively affect the TCP.

Viewshed

Some Interested Tribes have expressed that the viewshed, comprising a panoramic 360-degree view of the Project Site and vicinity is more important than individual line-of-sight views. The viewshed of the Topock TCP is not limited to a view in a particular direction, or even to a 360-degree view, but includes a three-dimensional perspective that extends below ground surface. As noted above in Section 4.4.1.4, for some Interested Tribes disturbances can still be seen from the "mind's eye" even after restoration and the knowledge of physical alterations to the landscape remain in the collective consciousness long after the landscape has been restored and evidence of destruction is no longer physically visible.

Tribal Cultural Values Assessment

Tribal representatives from FMIT, Cocopah, CRIT, Chemehuevi, and Hualapai conducted a Tribal Cultural Values Assessment (TCVA) of the Topock Maze (CA-SBR-219 – Loci A, B, and C) between April and September 2013 (McDowell et al. 2014). The assessment focused on the exterior boundaries of the Topock Maze and close environs. The goals of the TCVA were to: 1) identify tribal cultural values associated with the areas known as the Topock Maze Loci A, B & C that may not have been recorded during archaeological surveys; 2) to inform agencies with how specific sites are integrated within the larger area of significance at Topock; 3) to ensure that Tribal perspectives and cultural values are adequately represented; 4) to present the cultural, spiritual, and religious nature of the Topock area and tie them to the surrounding landscape; and 5) to contribute crucial traditional knowledge regarding site use, material use, and a landscape-level perspective. The TCVA aimed to ascertain individual sites and objects in the context of examining the network of “places,” to reveal interconnections reflecting movement of people and materials around the Topock landscape, which also inter-relate to spiritual-ceremonial space and time and are not necessarily bound to specific tangible sites or objects. Rather, intangible and tangible elements overlap within spiritual, religious, natural, and cultural values. These values relate to minerals, resource areas, artifacts and features, visual landscapes and teaching areas.

The TCVA concluded that the entire area is associated with spiritual and religious beliefs and traditional cultural practices. Maze loci A, B and C were found to have extensive materials, tangible and intangible places, trails, mineral resource gathering areas, rock alignments, rock circles, rock cairns, and numerous other objects and features. The Tribes recommended that a TCVA be completed for the entire area (McDowell et al., 2014).

The TCVA resulted in the documentation of approximately 99 physical or tangible resources, including lithics (flakes and tools) (n=28), stones (n=12), stone/rock circle features (n=14), lithic scatters (n=6), Topock Maze windrows/features (n=6[8]), stone/rock clusters and cairns (n=3), lithic reduction stations (n=2), trail segments (n=2), pottery (n=1), quarry features (n=1), rock drawing (n=1), spokes rocks (n=1), isolate (no description) (n=1), can (n=1), white features (n=1); and rock drawing (historic) (n=1). A number of other resources were documented, but descriptions were not provided (n=18) (**Table 4.4-7**). All TCVA resources are considered contributing elements to the Topock TCP.

TABLE 4.4-7
TCVA RESOURCES

TCVA Resource Number	Description	2016 Update	Within Project Area	Within a Planned Component in Project Area
30	Lithic	Not re-visited (within boundary of site CA-SBR-11994)	Yes	No
31	None	None	No	No
32	Lithic (flake)	Documented as part of site CA-SBR-11932/H	Yes	No

[8] Estimated

TCVA Resource Number	Description	2016 Update	Within Project Area	Within a Planned Component in Project Area
33	Lithic (core)	Documented as part of site CA-SBR-11932/H	Yes	No
34	Lithic	Documented as part of site CA-SBR-11932/H	Yes	No
35	None	Documented as part of site CA-SBR-11932/H	Yes	No
36	None	Not re-located (within parking area)	Yes	No
37	None	Not re-located (within parking area)	Yes	No
38	Foxhole (possible Maze windrows?)	Re-located within boundary of site CA-SBR-12641/H	Yes	No
39	Lithic	Re-located within boundary of site CA-SBR-12641/H	Yes	No
40	Lithic (chert nodule)	Re-located within boundary of site CA-SBR-12641/H	Yes	No
41	Quarry feature	Re-located within boundary of site CA-SBR-12641/H	Yes	No
42	Lithic	Re-located within boundary of site CA-SBR-12641/H	Yes	No
43	Lithic (tool)	Re-located within boundary of site CA-SBR-12641/H	Yes	No
44	Stone	Documented as part of site CA-SBR-11929; site boundary updated	No	No
45	Stone	Documented as part of site CA-SBR-11929; site boundary updated	No	No
46	Stone	Documented as part of site CA-SBR-11929; site boundary updated	No	No
47	Lithic scatter	Documented as site Æ-Topock-207	Yes	No
49	None	Not re-visited (coordinates did not plot within the vicinity of the Project Area)	No	No
50	None	Not re-visited (within boundary of site CA-SBR-219A)	No	No
52	Maze feature	Not re-visited (within boundary of site CA-SBR-219A)	No	No
55	Pottery (pot drop)	Re-located within boundary of site CA-SBR-13797	No	No
56	Stone circle	Not re-located	No	No
57	Maze windrows	Determined to be off-road vehicle tracks after an examination of historic aerial photograph	No	No
58	Stone circle (left portion)	Not re-located	No	No
59	Maze windrows	Not re-located	No	No
60	Stone circle	Non-archaeological feature	No	No
61	Stone circle	Non-archaeological feature	No	No
62	Rock circle	Non-archaeological feature	No	No
63	Rock circle	Non-archaeological feature	No	No
64	Rock circle	Non-archaeological feature	No	No
65	Rock circle	Non-archaeological feature	No	No

TCVA Resource Number	Description	2016 Update	Within Project Area	Within a Planned Component in Project Area
66	Rock circle	Non-archaeological feature	No	No
67	Rock circle (right portion)	Non-archaeological feature	No	No
68	Lithic (tool)	Not re-located	No	No
69	Rock drawing (historic)	Documented as part of site Æ-Topock-205	No	No
70	Lithic (tool)	Documented as part of site Æ-Topock-205	No	No
71	Lithic (tool)	Documented as part of site Æ-Topock-205	No	No
72	Lithic (tools)	Documented as part of site Æ-Topock-205	No	No
73	Stone cluster	Documented as part of site Æ-Topock-205	No	No
75	None	Not re-visited	Yes	No
76	None	Not re-visited	No	No
78	None	Not re-visited	Yes	No
81	Maze windrows	Determined to be off-road vehicle tracks after an examination of historic aerial photograph	No	No
82	Maze windrows	Determined to be off-road vehicle tracks after an examination of historic aerial photograph	No	No
83	Rock circle	Documented as part of site Æ-Topock-210	No	No
84, 85, 86, 91, 92, 93, & 98	Trail	Documented as part of site Æ-Topock-210	Yes	Yes
88	Lithic reduction station	Not re-located	No	No
89	Lithic (flakes)	Not re-located	No	No
90	Lithic reduction station	Documented as part of site Æ-Topock-206	No	No
94	None	Documented as part of site Æ-Topock-210	No	No
95	None	Documented as part of site Æ-Topock-210	No	No
96	Rock cairn	Documented as part of site Æ-Topock-210	No	No
97	Spokes rocks	Documented as part of site Æ-Topock-210	No	No
99	Rock cluster	Determined to be modern	No	No
108	Lithic scatter	Re-located within boundary of site CA-SBR-11983	No	No
109	Lithic scatter	Re-located within boundary of site CA-SBR-11983	No	No
110	Lithic scatter	Re-located within boundary of site CA-SBR-11983	No	No
111	Lithic (tool)	Re-located within boundary of site CA-SBR-11983	No	No
112	Lithic (tool)	Re-located within boundary of site CA-SBR-11983	No	No
113	Can	Re-located within boundary of site CA-SBR-11983	No	No
114	Lithic scatter	Re-located within boundary of site CA-SBR-11983	No	No
115	Lithic (tool)	Re-located within boundary of site CA-SBR-11983	No	No
115(a), 116, & 117	Trail	Documented as site Æ-Topock-212	No	No
118	Lithic (tool)	Not re-located	No	No

TCVA Resource Number	Description	2016 Update	Within Project Area	Within a Planned Component in Project Area
118(a)	Lithic (tool)	Documented as part of site Æ-Topock-212	No	No
118(b)	Lithic (tool)	Not re-located	No	No
119	Lithic (tool)	Not re-located	No	No
119(a)	Lithic (tool)	Not re-located	No	No
120	Lithic (tool)	Documented as part of site CA-SBR-11981	No	No
120(a)	Lithic (tool)	Not re-located	No	No
122	Lithic (tool)	Documented as part of site CA-SBR-11981	No	No
123	Stone circle	Not re-located	No	No
124	Lithic (tool)	Re-located within boundary of site CA-SBR-5523	No	No
126	White features	Not re-located	No	No
127	Stone circle	Not re-located	No	No
132	Stone	Re-located within boundary of site CA-SBR-12641/H	Yes	No
133	Stone	Re-located within boundary of site CA-SBR-12641/H	Yes	No
134	Stone	Re-located within boundary of site CA-SBR-12641/H	Yes	No
135	Stone	Re-located within boundary of site CA-SBR-12641/H	Yes	No
136	Stone	Re-located within boundary of site CA-SBR-12641/H	Yes	No
137	Lithic (flake)	Re-located within boundary of site CA-SBR-12641/H	Yes	No
138	Isolate	Re-located within boundary of site CA-SBR-12641/H	Yes	No
139	Stone	Re-located within boundary of site CA-SBR-12641/H	Yes	No
140	Stone	Re-located within boundary of site CA-SBR-12641/H	Yes	No
141	Stone	Re-located within boundary of site CA-SBR-12641/H	Yes	No
142	Stone	Re-located within boundary of site CA-SBR-12641/H	Yes	No
143	Lithic (flake)	Not re-visited (within boundary of site CA-SBR-11994)	Yes	No
144	Lithic scatter	Documented as part of site CA-SBR-11932/H	Yes	No
145	None	Re-located within boundary of site CA-SBR-11929	Yes	No
146	None	Re-located within boundary of site CA-SBR-11929	No	No
147	None	Re-located within boundary of site CA-SBR-11929	No	No
148	None	Re-located within boundary of site CA-SBR-11929	No	No
149	None	Re-located within boundary of site CA-SBR-11929	No	No
150	None	Not re-visited	Yes	No

TCVA Resource Number	Description	2016 Update	Within Project Area	Within a Planned Component in Project Area
151	None	Not re-visited	Yes	No
156	Lithic	Not re-visited	No	No
160	Rock circle	Not re-visited	No	No
N/A	Lithic (flake)	Documented as part of site CA-SBR-11983	No	No
N/A	Lithics (flakes)	Documented as site Æ-Topock-208	No	No
N/A	Lithic (tool and flakes)	Documented as part of site Æ-Topock-211	No	No
N/A	Lithics (flakes)	Documented as site Æ-Topock-209	No	No
N/A	Trail	Documented as Æ-Topock-211	No	No
N/A	Trail	Documented as part of site CA-SBR-11922	Yes	No

SOURCE: McDowell et al, 2014; Applied EarthWorks, Inc. 2016; Moloney and Hanes 2016b.

Subsequent to the completion of the TCVA, the BLM directed PG&E to conduct a field review of the TCVA waypoints and document any previously unrecorded archaeological and historical materials identified by the Interested Tribes. The field review was conducted by representatives from the Interested Tribes, BLM, PG&E, and Applied EarthWorks, Inc. in March and May 2016 (Moloney and Hanes, 2016b) (see Table 4.4-7). The following list provides a summary of the results of the TCVA field reviews. Of the 99 resources identified during the TCVA:

- 17 resources (#38-43 and 132-142) were re-located with the boundary of site CA-SBR-12641/H;
- 16 resources (#36, 37, 56, 58, 59, 68, 88, 89, 118, 118(b), 119, 119(a), 120(a), 123, 126, and 127) could not be re-located;
- 13 resources (#30, 31, 49, 50, 52, 75, 76, 78, 143, 150, 151, 156, and 160) were not re-visited or updated;
- 8 resources (#60-67) were documented as non-archaeological features;
- 8 resources (#108-115) were re-located within the boundary of site CA-SBR-11983;
- 8 resources (#44-46 and 145-149) were re-located or documented within the boundary of site CA-SBR-11929;
  - 6 resources (#83, 84-86 and 91-93, 94, 95, 96 and 97) were documented as site Æ-Topock-210;
- 5 resources (#32-35 and 144) were documented as part of site CA-SBR-11932/H;
  - 5 resources (#69 [historic] and 70-73) were documented as site Æ-Topock-205;

- 3 resources (#57, 81, and 82) were determined to be off-road vehicle tracks, and not Maze windrows, after an examination of historic aerial photographs;
    - 2 resources (#115(a), 116 and 117, and 118(a)) were documented as site Æ-Topock-212;
- 2 resources (#120 and 122) were documented as part of site CA-SBR-11981;
- 2 resources (#69 and 99) were determined to be modern;
- 1 resource (#55) was re-located with the boundary of site CA-SBR-13797;
- 1 resource (#124) was re-located with the boundary of site CA-SBR-5523;
- 1 resource (#90) was documented as site Æ-Topock-206; and
- 1 resource (#47) was documented as site Æ-Topock-207.

In addition to the resources described above, three new resources (sites Æ-Topock-208 [lithics], Æ-Topock-209 [lithics], and Æ-Topock-211 [lithics and trail]) were identified and documented, and two sites were updated (CA-SBR-11922 [trail] and CA-SBR-11983 [flake]) during the field review (see Table 4.4-7). Of the documented TCVA resources, 34 are within the Project Area (#30, 32-43, 47, 75, 78, 84-86, 91-93 and 98, 132-145, 150, and 151). Resource 84-86, 91-93, and 98 is a grouping of waypoints that document one trail segment and was documented as part of site Æ-Topock-210. Two resources (#30 and 143) are within the boundary of site CA-SBR-11994. Five resources (#32-35 and 144) were documented as part of site CA-SBR-11932/H Two resources (#36 and #37) are in a parking area and could not be re-located. Seventeen resources (#38-43 and 132-142) are within the boundary of site CA-SBR-12641/H. One resource (#47) was documented as site Æ-Topock-207. Four resources (#75, 78, 150, and 151) are adjacent to access roads. Of the 34 TCVA resources in the Project Area, one (Æ-Topock-210 [trail]) overlaps an existing access road that will be used during implementation of the Final Remedy Design.

4.4.3.3 Paleontological Resources

Methods and Sources of Information

A Paleontological Resources Management Plan (PRMP) was prepared for the Project by Arcadis in October 2015 (Appendix J of the C/RAWP). This plan included a paleontological literature review, results of records checks, a review of online databases, and a field survey of portions of the Project Area. The paleontological records check included a records check conducted by Dr. Samuel McLeod, Vertebrate Paleontology Division of the Natural History Museum of Los Angeles County and a records check by Eric Scott, Curator of Paleontology Division of Geological Sciences Museum of San Bernardino County (SBCM), Review of online databases included the Natural History Museum of Los Angeles County Invertebrate Paleontology Section and of the University of California Museum of Paleontology database (Arcadis 2015).

Inventory of Resources and Formations

Fossil localities in the vicinity of the Project Area are described in Section 4.4.2.1. On January 29, 2016 a fossil was discovered within the Project Area during a field verification survey for the Soil Investigation Project (Clifford 2016). The fossil is a highly re-mineralized and/or internal mold of an invertebrate within a yellow-tan alluvial carbonate clast. Brachiopod, bryozoan, or bivalve fragments also appeared to be within the clast. The age of the clast is unknown, though it may have originated from nearby geologic units (e.g., the Chemehuevi Formation) and appeared to be out of primary context. Since the clast was not in situ and appeared to be highly re-crystallized, it was determined not to meet the BLM (2008) or Society for Vertebrate Paleontology (2010) criteria for significance (Clifford 2016).

The PRMP identified the following formations within the Project Area and assigned each a paleontological sensitivity rating based on the federal Potential Fossil Yield Classification (PFYC) system (Arcadis 2015) (**Table 4.4-8**).

TABLE 4.4-8
POTENTIAL FOSSIL YIELD OF TOPOCK GEOLOGICAL DEPOSITS

		PFYC Ranking			
Geologic Deposit	**Age**	**3a (Moderate with uneven distribution)**	**3b (Unknown with undemonstrated yield)**	**2 (Low)**	**1 (Very Low)**
Holocene alluvium and sands (Qal, Qya, Qs)	<0.011 my			X	
Chemehuevi Formation (Qrg, Qrs)	~ 0.011 to 2.6 my	X			
Pleistocene Older Alluvium (Qc)	~ 0.011 to 2.6 my	X			
Bouse Formation (Tb)	~ 2.6 to 23.3 my				
Miocene fanglomerate (Tf)	~ 5 to 23 my			X	
Cretaceous or Jurassic Whale Mountains quartx monozites (KJqm, KJqd)	~ 65 to 190 my				X
Early Proterozoic gneiss (pЄg)	1.6 to 2.5 by				X
Precambrian igneous and metamorphic rocks (pЄc)	542 my to 4.6 b				X

NOTES:
my = million years
by = billion years

SOURCE: Arcadis 2015.

Holocene Deposits

Holocene alluvial deposits (Qal, Qs, Qya) (<0.011 million years [my]), which include silts, sands, and conglomerates, exist in the form of drainage fill, alluvial fans, and dunes (Qs). The character of River deposits (Qal) differs depending on stream flow energy and distance from the source. In the Colorado River area, River deposits consist of poorly to moderately sorted sands and gravels having angular to subangular clasts composed of igneous and metamorphic rock. The younger alluvial fan deposits (Qya) may overlie older deposits. Available borehole data indicates that recent alluvium is present at depths up to 10 to 25 feet across the Project Area. Holocene alluvial deposits (Qal, Qs, Qya) are assigned a PFYC ranking of 2 (Low) because they are too young to contain fossils. However, they may overlie older, more paleontologically sensitive formations.

Chemehuevi Formation

Sediments of the Pleistocene Chemehuevi Formation (Qrg, Qrs) (~ 0.011 to 2.6 my) consist of about 800 feet of sands (Qrs) and gravels (Qrg) from the ancestral Colorado River that form terraces along the river valleys. Chemehuevi Formation gravels are interbedded with Chemehuevi Formation sands. The Chemehuevi Formation gravels consist of well-sorted sands and gravels composed of well-rounded clasts of limestone, quartzite, and chert, much of which is derived as erosional debris from the Colorado Plateau. Locally derived clasts of gneiss and volcanic rocks are also present and include boulders up to 3 feet in diameter. The Chemehuevi Formation sands consist of pink to tan, weakly to moderately indurated clays, silts, and sands interbedded with well-sorted, well-rounded pebble conglomerates.

According to the records check results from the SBCM, the Chemehuevi Formation has "high potential to contain significant nonrenewable paleontologic resources subject to adverse impact by development-related excavation." Two localities (SBCM 1.39.1 and SBCM 1.39.3) within the vicinity of the Project consist of root casts, animal burrows, and mollusk shells of the presumed Pleistocene-age Chemehuevi Formation. Locality SBCM 1.39.2, located within one-half mile of the southern portion of the Project Area, yielded fossil root casts and microvertebrate bones. Exposures of the Chemehuevi Formation are located on the western and eastern shores of the Colorado River. No borehole data is available for depth of the Chemehuevi Formation. The Chemehuevi Formation (Qrg, Qrs) has been assigned a PFYC ranking of 3a (Moderate with uneven distribution) because it is known to produce vertebrate fossils or scientifically significant nonvertebrate fossils, but only as unpredictable scatters or isolates.

Pleistocene Older Alluvium

The Pleistocene (~0.011 to 2.6 my) older alluvium (Qc) are undifferentiated sediments of the Chemehuevi Formation. This unit is up to tens-of-meters thick, and consists of poorly sorted sands to boulder conglomerates, dissected by younger stream channels. The Pleistocene fan deposits can be distinguished from similar Holocene deposits by the Pleistocene fans' deep dissection, varnishing, terracing, thickness, and presence of clasts of basalt from the Black Mountains and gneiss from the Hualapai Mountains. Boreholes in the part of Bat Cave Wash south of I-40 indicate that contact between recent and older alluvium is at between 10.5 to 12 feet in that area. The Pleistocene older alluvium (Qc) is also ranked as PFYC 3a (Moderate with uneven distribution) because it is essentially similar to the Chemehuevi Formation, but has not been formally described.

Bouse Formation

The Bouse Formation (Tb) of Pliocene (~2.6 to 5.3 my) to Miocene (~5.3 to 23.3 my) occurs at the base of the Colorado River deposits. This 10 to 250-foot thick, green to tan to pinkish, limey claystone to siltstone contains green nodules and yellowish-brown to white concentrations. The

Bouse Formation is known to produce vertebrate fossils, but only as unpredictable scatters or isolates, resulting in a ranking of 3a (Moderate with uneven distribution).

Miocene Fanglomerate

Miocene (~5 to 23 my) nonmarine deposits within the Project Area consist of a gneiss-rich fanglomerate (Tf). These are dark-red to brown, poorly sorted alluvial fan deposits having subangular to subrounded clasts of Proterozoic gneiss, granite, and amphibolite from the Chemehuevi Mountains. Exposures of Miocene conglomerate are present in Bat Cave Wash and along the Colorado River corridor. Available borehole data indicates that contact between alluvium and Miocene sediments varies from 23 to 200 feet across the Project Area. The Miocene Fanglomerate (Tf) has been assigned a PFYC ranking of 2 (Low) because it is too coarse-grained to contain fossils.

Cretaceous or Jurassic Whale Mountain Quartz Monzonites

A Cretaceous (~65 to 145 my) or Jurassic (145 to 190 my) granitoid bodies of the Whale Mountain sequence occurs within the Project Area. It consists of a porphyritic hornblende-biotite monzogranite and quartz monzonite (KJqm), and is tan to pale-pink, medium- to coarse-grained with feldspar crystals of up to 1.25 inches long. Exposures of Cretaceous or Jurassic Whale Mountain quartz monzonite are present in a couple of shallow caves in Bat Cave Wash. No borehole data is available for depth of the Cretaceous or Jurassic Whale Mountain quartz monzonite. Because it consists of igneous and metamorphic rocks the Jurassic Whale Mountain Quartz Monzonites (KJqm) are ranked PFYC 1 (Very Low) due to heat and pressure of their formation.

Early Proterzoic Gneiss

Early Proterozoic (1.6 to 2.5 billion years [by]) gneiss (p€g) is composed of highly metamorphosed rocks including augen gneiss, granitic to dioritic gneiss, and several named gneisses. No exposures of Early Proterzoic Gneiss were noted during the paleontological survey. No borehole data is available for depth of the Early Proterzoic Gneiss. Because it consists of igneous and metamorphic rocks Early Proterzoic Gneiss (p€g) is ranked PFYC 1 (Very Low) due to heat and pressure of formation.

Precambrian Igneous and Metamorphic Rocks

Precambrian igneous and metamorphic rocks (p€c) (542 my to 4.6 by) include granite to diorite igneous rocks mixed with gneisses. Because it consists of igneous and metamorphic rocks Precambrian igneous and metamorphic rocks (p€c) is ranked PFYC 1 (Very Low) due to heat and pressure of formation.

4.4.4 Regulatory Background

4.4.4.1 Federal

Section 106 of the National Historic Preservation Act

Resources that qualify as historic properties under the National Historic Preservation Act (NHPA) are considered historical resources under CEQA. Therefore, the NHPA is relevant to the identification and management of cultural resources under CEQA. Section 106 of the NHPA requires federal agencies to consider the effect of their undertakings on historic properties, to provide the Advisory Council on Historic Preservation an opportunity to comment, and to resolve any adverse effects on historic properties through the process provided in the Section 106 regulations (36 CFR Part 800 et seq.). Historic properties consist of resources listed in or eligible for listing in the NRHP. Because DTSC is not a federal agency and is not responsible for compliance with the NHPA, DTSC cannot make a determination of what resources in the Project Area constitute historic properties or the effect that federal undertakings necessary to implement the remediation would have on these resources. This section, however, reviews the process for determining if cultural resources qualify as historic properties under the Section 106 implementing regulations because it is relevant to the identification of historical resources under CEQA. This is because Public Resources Code Section 5024.1(d), provides that the CRHR includes California properties determined eligible for the NRHP. Similarly, Public Resources Code Section 21084.1 provides that a historical resource includes CRHR-eligible properties based on the NRHP. Given this, properties potentially eligible for the NRHP are also potentially historical resources under CEQA.

To be eligible for listing in the NRHP, a property must possess both significance and integrity, as defined at 36 CFR Section 60.4:

> The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and,
>
> (a) that are associated with events that have made a significant contribution to the broad patterns of our history; or
>
> (b) that are associated with the lives of persons significant in our past; or
>
> (c) that embody 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; or
>
> (d) that have yielded, or may be likely to yield, information important in prehistory or history.

Ordinarily, cemeteries, birthplaces, or graves of historical figures; properties owned by religious institutions or used for religious purposes; structures that have been moved from their original locations; reconstructed historic buildings; properties primarily commemorative in nature; and properties that have achieved significance within the past 50 years shall not be considered eligible for the NRHP, unless certain limited exceptions apply (none of which are relevant on the Project Area).

National Register Bulletin 38

The NHPA provides that historic properties may include TCPs of religious and cultural significance to Native American Tribes. National Register Bulletin 38, *Guidelines for Evaluating and Documenting Traditional Cultural Properties* (NPS 1998), outlines in more detail how to evaluate and document these types of historic properties. TCPs are resources eligible for the NRHP based on traditional cultural significance derived from the “role the property plays in a community's historically rooted beliefs, customs, and practices” (NPS 1998:1). National Register Bulletin 38 defines a TCP as “one that is eligible for inclusion in the National Register because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community” (NPS 1998:1). TCPs can embrace a wide range of historic properties, such as the location associated with a Native American group’s origin or the origin of the world (cosmogony), or an urban neighborhood that is the traditional home of a particular cultural group and that still reflects and is associated with their beliefs and practices. Other examples of TCPs include places where traditional people historically have gone and continue to visit for ceremonial practices. These examples are not intended to be exhaustive, but instead to illustrate the range of possible TCPs. The identification and evaluation of TCPs can be conducted only by consultation with members of the relevant group of people that ascribe value to the resource, or through other forms of ethnographic research. TCPs retain an essential importance to the communities who value them. “Traditional cultural values are often central to the way a community or group defines itself, and maintaining such values is often vital to maintaining the group's sense of identity and self respect. Properties to which traditional cultural value is ascribed often take on this kind of vital significance, so that any damage to or infringement upon them is perceived to be deeply offensive to, and even destructive of, the group that values them” (Parker and King 1998:2).

Evaluation of Traditional Cultural Properties for NRHP Eligibility

Evaluation of a TCP requires that it be identified as such by the community which recognizes its traditional and cultural value. TCPs may be evaluated for their eligibility to the NRHP, in the same way that other types of resources are evaluated, considering the four NRHP criteria as set forth in 36 CFR Section 60.4 (criteria [a]–[d]).

As with any resource that is evaluated for listing on the NRHP, the TCP must be a tangible district, site, building, structure, or object (NPS 1998). These terms are not meant to limit or exclude places from evaluation as a TCP; for instance, a bare grassy expanse at Mt. Tonaachaw on Truk, an island that is part of the Federated States of Micronesia, has been evaluated as a component of a TCP (NPS 1998) because it is associated with at least two different spirits who reside on or are represented by the mountain. This consideration requires merely that the TCP be a tangible property, rather than the intangible beliefs or values alone.

Integrity

The TCP must have integrity, like any property eligible for listing on the NRHP. For traditional cultural resources this means that they must have “integrity of relationship” and “integrity of condition” (NPS 1998). Integrity of relationship means simply that the specific place is integral and necessary to a traditional cultural group's beliefs or specific practices (NPS 1998). National Register Bulletin 38 gives the example of two different cultures, one that believes that baptism at a specific river is necessary to accept individuals as members, and another that simply requires baptism in any body of water. For the first example, the river is integrated into beliefs and practices of a traditional culture and thus has integrity of relationship.

Integrity of condition requires simply that the TCP has not been altered in such a way that it no longer can serve its function for the traditional cultural group. For example, a pilgrimage route to a sacred site would no longer have integrity of condition if modern construction had physically interrupted the route and thus made it unusable. This requirement does not mean that the TCP must be completely intact without any changes to the setting or features of the resource; rather, the test is whether or not the resource can still function for traditional cultural purposes or whether the presence of new elements disrupts the function. National Register Bulletin 38 offers an example of a resource that has integrity despite changes to the setting. One reach of the Klamath River in Northern California is within the ancestral and present territory of the Karuk people, and is the place where they carry out world renewal ceremonies and other rituals despite the presence of a modern highway, a U.S. Forest Service ranger station, and modern residences (NPS 1998).

If the TCP has integrity of relationship and integrity of condition, evaluation progresses to the second step of evaluating the resource for eligibility for listing on the NRHP applying the criteria set forth in 36 CFR Section 60.4, as described above.

National Park Service Preservation Brief 36: Protecting Cultural Landscapes

The NPS defines cultural landscapes as an additional category of resources that can qualify as historic properties. Cultural landscapes consist of (NPS 1994):

> a geographic area, including both cultural and natural resources and the wildlife or domestic animals therein, associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values.

The NPS defines four general types of cultural landscapes, which are not mutually exclusive: historic sites, historic designed landscapes, historic vernacular landscapes, and ethnographic landscapes (NPS 1994):

1. A historic site is a landscape significant for its association with a historic event, activity, or person. Examples include battlefields and president's house properties.
2. A historic designed landscape is significant as a design or work of art; was consciously designed and laid out either by a master gardener, landscape architect, architect, or horticulturist to a design principle, or by an owner or other amateur according to a recognized style or tradition; has a historical association with a significant person, trend, or movement in landscape gardening or architecture, or a significant relationship to the theory or practice of landscape architecture. Examples include parks, campuses, and estates.

3. A historic vernacular landscape is one whose use, construction, or physical layout reflects endemic traditions, customs, beliefs, or values; expresses cultural values, social behavior, and individual actions over time; is manifested in physical features and materials and their interrelationships, including patterns of spatial organization, land use, circulation, vegetation, structures, and objects. Examples include rural villages, industrial complexes, and agricultural landscapes.
4. An ethnographic landscape contains a variety of natural and cultural resources that associated people define as heritage resources, including plant and animal communities, geographic features, and structures, each with their own special local names. Examples include contemporary settlements, religious sacred sites, and massive geological structures. Small plant communities, animals, and subsistence and ceremonial grounds are often components [of the landscape].

Antiquities Act of 1906

The Antiquities Act of 1906 (U.S. Code, Title 16, Sections 431–433) is meant to protect cultural resources by requiring a fine and/or imprisonment be leveled upon any person "who shall appropriate, excavate, injure, or destroy any historic or prehistoric ruin or monument, or any object of antiquity, situated on lands owned or controlled by the Government of the United States."

Historic Sites Act of 1935

The Historic Sites Act of 1935 sets forth as a national policy that the United States should "preserve for public use historic sites, buildings and objects of national significance for the inspiration and benefit of the people of the United States." The act also sets forth duties by the National Park Service related to the preservation and interpretation of historic sites.

American Indian Religious Freedom Act of 1978

The American Indian Religious Freedom Act of 1978 makes it the policy of the United States to "protect and preserve for the American Indians their inherent right to freedom to believe, express, and exercise the traditional religions of the American Indian, Eskimo, Aleut, and Native Hawaiians, including but not limited to access to sites, use and possession of sacred objects, and the freedom to worship through ceremonials and traditional rites."

Archaeological Resources Protection Act of 1979

The Archaeological Resources Protection Act is meant to secure the protection of archaeological resources on public and Tribal land for the present and future benefit of the American people. It is designed to prevent looting and the destruction of archeological resources and provides for civil and criminal penalties. It is also meant to increase information exchange between professional archaeologists, governmental officials, and private individuals concerning collections and archaeological resources. Under the Act, "archaeological resources" are defined as items: (1) of archaeological interest over 100 years old; and (2) found in an archaeological context on federal or Indian lands. The Act requires finders of such resources to obtain a federal permit before excavating, and potentially recovering these objects, consistent with the standards and requirements of the Federal Archaeology Program.

Native American Graves Protection and Repatriation Act of 1990

The Native American Graves Protection and Repatriation Act provides for the protection of Native American graves, including human remains, funerary objects, and “objects of cultural patrimony” throughout the United States and its territories. It outlines the procedures for determining ownership for Native American human remains, funerary objects, and other sacred objects that may be discovered intentionally or unintentionally on federal land.

Religious Freedom Restoration Act of 1993

The Religious Freedom Restoration Act prohibits the government from substantially burdening religious exercise without demonstrating a compelling governmental interest as a justification for the burden. The government must also demonstrate that the action contemplated is the least restrictive means of furthering the demonstrated compelling governmental interest.

Paleontological Resources Preservation Act

The Paleontological Resources Preservation Act (PRPA) requires the Secretaries of the Interior and Agriculture to manage and protect paleontological resources on federal land using scientific principles and expertise (BLM 2013). The PRPA provides authority for the protection of paleontological resources including criminal and civil penalties for fossil theft and vandalism. The PRPA affirms the authority for many of the policies the federal land managing agencies, including the BLM, already have in place for the management of paleontological resources, such as issuing permits for collecting paleontological resources, curation of paleontological resources, and confidentiality of locational data (BLM 2013).

Executive Order 11593

Executive Order 11593, entitled Protection and Enhancement of the Cultural Environment, mandates that the federal government preserve, restore, and maintain the “historic and cultural environment” of the United States for future generations. It requires the federal government to initiate measures that protect federally owned, and nonfederally owned, “sites, structures, and objects of historical, architectural or archaeological significance.”

Executive Order 12875

Executive Order 12875, entitled Enhancing the Intergovernmental Partnership, establishes regular and meaningful consultation and collaboration with state, local, and Tribal governments on federal matters that significantly or uniquely affect their communities.

Executive Order 13007

Executive Order 13007, entitled Indian Sacred Sites, mandates that agencies managing federal lands shall, to the extent feasible, permitted by law, and not clearly inconsistent with essential agency functions “(1) accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners and (2) avoid adversely affecting the physical integrity of such sacred sites." For the purposes of this executive order, sacred sites are considered to be any specific, discrete, narrowly delineated location on federal land that is identified by an Indian Tribe or associated Native American individual to be representative of the Native American religion in discussion.

Executive Order 13175

Executive Order 13175, entitled Consultation and Coordination with Indian Tribal Governments, mandates that federal agencies conduct "regular and meaningful consultation and collaboration with Tribal officials in the development of federal policies that have Tribal implications…." It also requires agencies to participate in these consultation processes to strengthen government-to-government relations with Native American Tribal entities. Consultation guidance from the BLM is also discussed specifically in Manual Section 8120 and BLM Handbook 8120-1. Further, on November 5, 2009 President Obama issued a Presidential Memorandum For the Heads of Executive Departments and Agencies Re: Tribal Consultation. This memorandum reaffirms the federal government's commitment to regular and meaningful consultation and collaboration with Tribal officials in policy decisions that have Tribal implications. All federal agencies are required to complete a detailed plan of actions the agency will take to implement the policies and directives of Executive Order 13175, after consultation by the agency with Native American Tribes and Tribal officials.

Executive Order 13287

Executive Order 13287, entitled Preserve America, is meant to outline the role of the federal government in creating partnerships between governmental entities in the preservation and reuse of historic properties. It actively advances the protection, enhancement, and contemporary use of the historic properties owned by the federal government and promotes intergovernmental cooperation and partnerships for the preservation and use of historic properties. It advocates that each federal agency seek partnerships with state and local governments, Native American Tribes, and the private sector to promote local economic development. Specifically, by pursing these partnerships, the federal government can "promote the preservation of the unique cultural heritage of communities and of the Nation and to realize the economic benefit that these properties can provide."

Executive Order 13352

Executive Order 13352, entitled Facilitation of Cooperative Conservation, is meant to ensure that the Department of Interior (as well as other federal departments) implements laws relating to the environment and natural resources in a manner that promotes cooperative conservation. According to the executive order, the term cooperative conservation means, "actions that relate to use, enhancement, and enjoyment of natural resources, protection of the environment, or both, and that involve collaborative activity among federal, state, local, and Tribal governments, private for-profit and nonprofit institutions, other nongovernmental entities and individuals."

Presidential Memorandum on Government-to-Government Relationship with Tribal Governments (September 23, 2004)

This presidential memorandum reaffirms the existence and durability of the unique government-to-government relationship and commitment to working with federally recognized Tribal governments on a government-to-government basis. It advocates that all departments and agencies adhere to these principles and work with Tribal governments in a manner that cultivates mutual respect and fosters greater understanding to reinforce these principles.

Bureau of Land Management Manual 8100, Handbook 8120-1

Sections 8110 through 8140 of this BLM Manual provide specific guidance for the BLM concerning cultural resources, which may include TCPs. Section 8100 provides a general summary of the framework for managing cultural resources. Specific objectives include, among others, the recognition of the public uses and values attributed to cultural resources on public lands, the preservation of cultural resources on public lands for current and future generations, and the assurance that proposed land uses would avoid inadvertent damage to cultural resources. Section 8110 outlines the procedures recommended for the identification and description of cultural resources. Specific objectives of Section 8120 include the assurance that Tribal issues and concerns are given consideration during the planning and decision-making process. Objectives of consultation should also include input from Native American Tribes as to proper collection, evaluation, and protection methodologies employed during the consultation process. Guidelines for this process are specifically outlined in BLM Handbook 8120-1. BLM Handbook 8120-1 also outlines the process for determining NRHP eligibility for a TCP and states that eligibility must be based on application of the NRHP criteria, that only places fulfilling one or more of the criteria may be found eligible, and that no type of property is automatically eligible for the NRHP, including TCPs. Section 8130 provides planning guidance for the BLM that considers the current and future use of cultural resources with the aim to resolve use allocation conflicts that have the potential to affect cultural properties. Finally, Section 8140 outlines objectives for the preservation of cultural resources, including the safeguarding of cultural resources from improper use and responsibly maintained in the public interest. Section 8140 also outlines the BLM's responsibility to adequately consider the effects on cultural properties from land use decisions.

Bureau of Land Management Manual 8270 and Handbook H-8270-1

BLM Manual 8270 and BLM Handbook H-8270-1 (General Procedural Guidance for Paleontological Resource Management) contain the agency's guidance for the management of paleontological resources on public land. The Manual has information on the federal authorities and regulations related to these resources. The handbook gives procedures for permit issuance, requirements for qualified applicants, information on paleontology and planning, and a classification system for potential fossil-bearing geologic formations on public lands (BLM 2013).

In October 2007, BLM formalized the use of the new classification system for identifying fossil potential on public lands with the release of instruction memorandum 2008-2009. The classification system is based on the potential for the occurrence of significant paleontological resources in a geologic unit, and the associated risk for impacts to the resource based on federal management actions. It is intended to be applied in a broad approach for planning efforts, and as an intermediate step in evaluating specific projects. This IM is part of a larger effort to update the Handbook H-8270-1.

In October 2008, the BLM introduced guidelines for assessing potential impacts on paleontological resources in order to determine mitigation steps for federal actions on public lands under the Federal Land Policy and Management Act (FLPMA) and the National Environmental Policy Act (NEPA) in IM 2009-011. In addition, this IM provides field survey and monitoring procedures to help minimize impacts to paleontological resources from federal actions cases where it is determined that significant paleontological resources would be adversely affected by a federal action.

Bureau of Land Management Lake Havasu Field Office Resource Management Plan

In 2007, BLM approved the Lake Havasu Field Office Resource Management Plan (RMP), which outlined the BLM's plan for managing approximately 1.3 million acres of public land, including the Beale Slough Areas of Critical Environmental Concern (ACECs) that overlap in part with the Project Area. The RMP requires that "Beale Slough Riparian and Cultural ACEC will be managed to protect and prevent irreparable damage to the relevant characteristics and important values," acknowledging that the ACEC contains "significant cultural resources [and] cultural sites within part of a regional cultural complex." The RMP also notes that "the area's fragile and irreplaceable prehistoric sites are eligible for inclusion on the NRHP." The RMP designates an area near Topock as part of the Topock-Needles Special Cultural Resource Management Area (SCRMA), which is categorized as an area for "Conservation for Future Use" and as an area for "Traditional Use" (BLM 2007). As an area categorized as allocated for Traditional Use, the Topock-Needles SCRMA is considered a site that is "important for maintaining [Native American] cultural identity, heritage, or wellbeing." The final environmental impact statement for the RMP addresses these designations in the context of the Project, stating, "ACEC designation or SCRMA allocation is meant to protect significant cultural resources. Management decisions relating to Chromium VI remediation will take into account the special status of these lands but will not preclude necessary actions to protect the Colorado River from contamination" (BLM 2006:5-117).

4.4.4.2 State of California

California Environmental Quality Act

CEQA requires lead agencies to determine if a proposed project would have a significant effect on the environment, including significant effects on historical or archaeological resources.

Under CEQA (Section 21084.1), a project that may cause a substantial adverse change in the significance of a historical resource is a project that may have a significant effect on the environment. The CEQA Guidelines (Title 14 California Code of Regulations [CCR] Section 15064.5) recognize that an historical resource includes: (1) a resource listed in, or determined to be eligible by the State Historical Resources Commission for listing in, the CRHR; (2) a resource included in a local register of historical resources, as defined in Public Resources Code (PRC) Section 5020.1(k) or identified as significant in a historical resource survey meeting the requirements of PRC Section 5024.1(g); and (3) any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California by the lead agency, provided the lead agency's determination is supported by substantial evidence in light of the whole record. The fact that a resource does not meet the three criteria outlined above does not preclude the lead agency from determining that the resource may be an historical resource as defined in PRC Sections 5020.1(j) or 5024.1. PRC Section 21084.1 and CEQA Guidelines Section 15064.5(a) establish three analytical categories for use in determining whether a historical resource exists for purposes of CEQA. These are (1) mandatory historical resources; (2) presumptive historical resources; and (3) discretionary historical resources. A mandatory historical resource is one that has been listed in, or determined to be eligible by the State Historical Resources Commission, for listing in the CRHR). Only an official determination by the State Historical Resources Commission triggers this mandatory determination.

Resources presumed to be historically or culturally significant include those that have been listed in a local register of historical resources, as defined in Section 5020.1(k) of the PRC, or identified as significant in an a historical resources survey that meets specified criteria (e.g., PRC 5024.1[g]), unless the preponderance of evidence demonstrates otherwise.

A discretionary historical resource is a resource that does not fit within the mandatory or presumptive categories, but that is determined to be a historical resource in the exercise of the lead agency's discretion. This includes, in relevant part, "[a]ny object . . . site, area, place . . . . which a lead agency determines to be historically significant or significant in the . . . cultural annals of California may be considered to be an historical resource, provided the lead agency's determination is supported by substantial evidence in light of the whole record." (CEQA Guidelines Section 15064.5, subd. (a)(3)). A lead agency evaluating potential project impacts under CEQA therefore has broad discretion to determine whether a particular resource that may be affected by a proposed project is a historical resource for purposes of CEQA. When such a determination is made, the criteria to be applied include the criteria for listing on the CRHR.

If a lead agency determines that an archaeological site is an historical resource, the provisions of Section 21084.1 of CEQA and Section 15064.5 of the CEQA Guidelines apply. If a project may cause a substantial adverse change (defined as physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired) in the significance of an historical resource, the lead agency must identify potentially feasible measures to mitigate these effects (CEQA Guidelines Sections 15064.5(b)(1), 15064.5(b)(4)).

If an archaeological site does not meet the criteria for a historical resource contained in the CEQA Guidelines, then the site may be treated in accordance with the provisions of Section 21083, which is a unique archaeological resource. As defined in Section 21083.2 of CEQA a "unique" archaeological resource is an archaeological artifact, object, or site, about which it can be clearly demonstrated that without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

- Contains information needed to answer important scientific research questions and there is a demonstrable public interest in that information;
- Has a special and particular quality such as being the oldest of its type or the best available example of its type; or,
- Is directly associated with a scientifically recognized important prehistoric or historic event or person.

If an archaeological site meets the criteria for a unique archaeological resource as defined in Section 21083.2, then the site is to be treated in accordance with the provisions of Section 21083.2, which state that if the lead agency determines that a project would have a significant effect on unique archaeological resources, the lead agency may require reasonable efforts be made to permit any or all of these resources to be preserved in place (Section 21083.1(a)). If preservation in place is not feasible, mitigation measures shall be required.

The CEQA Guidelines note that if an archaeological resource is neither a unique archaeological nor a historical resource, the effects of the project on those resources shall not be considered a significant effect on the environment (CEQA Guidelines Section 15064.5(c)(4)).

California Register of Historical Resources

The CRHR is “an authoritative listing and guide 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” (PRC Section 5024.1[a]). The criteria for eligibility for the CRHR are based upon NRHP criteria (PRC Section 5024.1[b]). Certain resources are determined by the statute to be automatically included in the CRHR, including California properties formally determined eligible for, or listed in, the NRHP.

To be eligible for the CRHR, a resource must be significant at the local, state, and/or federal level under one or more of the following criteria:

1. Is associated with events that have made a significant contribution to the broad patterns of California’s history and cultural heritage;
2. Is associated with the lives of persons important in our past;
3. Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
4. Has yielded, or may be likely to yield, information important in prehistory or history.

A resource eligible for the CRHR must meet one of the criteria of significance described above, and retain enough of its historic character or appearance (integrity) to be recognizable as a historical resource and to convey the reason for its significance. It is possible that a resource may not retain sufficient integrity to meet the criteria for listing in the NRHP, but it may still be eligible for listing in the CRHR.

Additionally, the CRHR consists of resources that are listed automatically and those that must be nominated through an application and public hearing process. The CRHR automatically includes the following:

- California properties listed on the NRHP and those formally determined eligible for the NRHP;
- California Registered Historical Landmarks from No. 770 onward; and,
- Those California Points of Historical Interest that have been evaluated by the California Office of Historic Preservation (OHP) and have been recommended to the State Historical Commission for inclusion on the CRHR.

Other resources that may be nominated to the CRHR include:

- Historical resources with an NRHP code of 3 through 5 (those properties identified as eligible for listing in the NRHP, the CRHR, and/or a local jurisdiction register);
- Individual historical resources;
- Historical resources contributing to historic districts; and,
- Historical resources designated or listed as local landmarks, or designated under any local ordinance, such as an historic preservation overlay zone.

Another category of "historical resources" are those "deemed significant pursuant to criteria set forth in PRC Section 5024.1(g), which states that "[a] resource identified as significant in an historical survey may be listed in the CRHR if the survey meets all of the following criteria:

(1) The survey has been or will be included in the State Historic Resources Inventory.

(2) The survey and the survey documentation were prepared in accordance with…procedures and requirements [of the (California) Office of Historic Preservation OHP].

(3) The resource is evaluated and determined [by the OHP] to have a significance rating of Category 1 to 5 on [the Department of Parks and Recreation Historic Resources Inventory Form].

(4) If the survey is 5 years or more old at the time of its nomination for inclusion in the CRHR, the survey is updated to identify historic resources which have become eligible or ineligible due to changed circumstances or further documentation and those which have been demolished or altered in a manner that substantially diminished the significance of the resource.

Resources identified by such surveys are presumed to be historically or culturally significant unless the preponderance of evidence demonstrates otherwise.

TCPs may also be eligible for the CRHR under CEQA Guidelines Section 15064.5(a)(3). Section 15064.5 provides that, in general, a resource not listed in state or local registers of historical resources shall be considered by the lead agency to be historically significant if the resource meets the criteria for listing in the CRHR.

Section 15064.5(e) of the CEQA Guidelines requires that excavation activities be stopped whenever human remains are uncovered and that the county coroner be called in to assess the remains. If the county coroner determines that the remains are those of Native Americans, the NAHC must be contacted within 24 hours. At that time, CCR Section 15064.5(d) of the CEQA Guidelines directs the lead agency to consult with an appropriate Native American as identified by the NAHC and directs the lead agency (or applicant), under certain circumstances, to develop an agreement with the Native Americans for the treatment and disposition of the remains.

Public Resources Code 5020.7

PRC Section 5020.7 directs public agencies to carry out their responsibilities in a manner that encourages owners of identified (and unidentified) historical resources to preserve and enhance these historical resources for the general public.

Public Resources Code 5097.9

PRC Section 5097.9 requires that no public agency (or private party using or occupying public property) interfere with “the free expression or exercise of Native American religion as provided in the United States Constitution and the California Constitution.” Specifically, no part shall cause, “severe or irreparable damage to any Native American sanctified cemetery, place of worship, religious or ceremonial site, or sacred shrine located on public property, except on a clear and convincing showing that the public interest and necessity so require.”

Public Resources Code 5097.91

PRC Section 5097.91, as amended by Assembly Bill 2641, establishes the NAHC, “consisting of nine members appointed by the Governor with the advice and consent of the Senate.”

Public Resource Code 5097.98

PRC Section 5097.98, as amended by Assembly Bill 2641, provides procedures in the event human remains of Native American origin are discovered during project implementation. PRC Section 5097.98 requires that no further disturbances occur in the immediate vicinity of the discovery, that the discovery is adequately protected according to generally accepted cultural and archaeological standards, and that further activities take into account the possibility of multiple burials. PRC Section 5097.98 also requires the NAHC, upon notification by a County Coroner, designate and notify a Most Likely Descendant (MLD) regarding the discovery of Native American human remains. Once the MLD has been granted access to the site by the landowner and inspected the discovery, the MLD then has 48 hours to provide recommendations to the landowner for the treatment of the human remains and any associated grave goods. In the event that no descendant is identified, or the descendant fails to make a recommendation for disposition, or if the land owner rejects the recommendation of the descendant, the landowner may, with appropriate dignity, reinter the remains and burial items on the property in a location that will not be subject to further disturbance.

Public Resources Code 5097.99

PRC Section 5097.99 prohibits acquisition or possession of Native American artifacts or human remains taken from a Native American grave or cairn after January 1, 1984, except in accordance with an agreement with the NAHC.

Public Resources Code 5097.991

PRC Section 5097.991 states that it is the policy of California that Native American remains (and associated grave artifacts) shall be repatriated.

Public Resources Code 5097.993 and 5097.994

This section establishes as a misdemeanor the unlawful and malicious excavation, injury, destruction, or defacement of any property eligible for listing in the CRHP, including, "any historic or prehistoric ruins, any burial ground, any archaeological or historic site, any inscriptions made by Native Americans at such site, any archaeological or historic feature of a Native American historic, cultural, or sacred site" located on public land or on private land, by a person, other than the landowner.

Health and Safety Code 7050.5-7055

Health and Safety Code Sections 7050.5-7055 provide for punishment relating to the intentional disturbance, mutilation, or removal of interred human remains as a misdemeanor. In some cases, this intention disturbance, mutilation, or removal can be considered a felony. The Health and Safety Code Section 7050.55 requires that in the event human remains are discovered, the County Coroner be contacted to determine the nature of the remains. In the event the remains are determined to be Native American in origin, the Coroner is required to contact the NAHC within 24 hours to relinquish jurisdiction.

California Executive Order W-26-92

California Executive Order W-26-92 affirms that all state agencies shall recognize, preserve, and maintain the significant heritage resources of the state.

California Executive Order B-10-11

California Executive Order B-10-11 affirms that all state agencies shall encourage communication and consultation with California Indian Tribes.

California Environmental Protection Agency (EPA) Policy Memorandum CIT-09-01: EPA for Working with California Indian Tribes

EPA Policy Memorandum CIT-09-01 is meant to provide "a framework for EPA and its Boards, Departments and Offices (BDOs) to improve and maintain communication and collaboration between EPA, its BDOs, and California Indian Tribes to further the mission of EPA." The memorandum puts forth a number of guidance principles for EPA and its BDOs, including, but not limited to; the acknowledgement of Tribal sovereignty; to identify, include, and communicate with California Native American Tribes in decision-making processes that may affect Tribal lands and/or cultural resources; and consider the potential impact of activities on Tribal lands and cultural resources. The memorandum includes 10 actions that are identified to help EPA achieve its guiding principles, with many focusing on increasing and/or improving communication between EPA and Native American Tribes (EPA 2009).

4.4.4.3 State of Arizona

State Historic Preservation Act of 1982

The State Historic Preservation Act (SHPA) of 1982 (Title 41, Arizona Revised Statutes [ARS] Sections 41-862 through 41-864) mandates that state land-managing governmental bodies consider the effects their activities may have on significant cultural properties at all levels of planning and development and provides for the preservation and protection of historic or prehistoric properties that are significant at the local, regional, or state level. Significant properties are defined as those eligible for listing in or listed in the NRHP or those eligible for listing are listed in the Arizona Register of Historic Place (ARHP). The SHPA is administered by the SHPO on behalf of the Arizona State Parks Board (APSB) (Title 41, ASR Sections 41-511 et seq.), and mandates that all state agencies consults with the SHPO regarding potential effects to significant properties.

Arizona Register of Historic Places

The ARHP is a comprehensive register of significant cultural resources including districts, sites, buildings, structures, and objects worthy of preservation. To be eligible for listing in the ARHP, a resource must be significant at the local, state, and/or federal level under NRHP Criteria A through D. Resources listed in or eligible for listing in the NRHP are automatically eligible for listing in the ARHP. The register is maintained by the SHPO and requires SHPO concurrence before a resource is determined eligible for listing or is listed in the ARHP.

Arizona Revised Statutes

The following ARS sections mandate the protection of cultural resources, paleontological resources, and Native American human remains and are applicable to the project.

ARS 41-841: Archaeological and Vertebrate Paleontological Discoveries

A. On lands owned or controlled by this state or any agency of this state a person shall not knowingly excavate in or upon any historic or prehistoric ruin, burial ground, archaeological or vertebrate paleontological site, or site including fossilized footprints, inscriptions made by human agency or any other archaeological, paleontological or historical feature, except when acting as a duly authorized agent of an institution or corporation referred to in section 41-842.

B. On lands owned or controlled by this state or any agency of this state a person shall not knowingly collect any archaeological specimen or vertebrate paleontological specimen without obtaining a permit authorizing the activity as provided under section 41-842. For the purpose of this subsection, "archaeological specimen" means any item resulting from past human life or activities which is at least one hundred years old including petroglyphs, pictographs, paintings, pottery, tools, ornaments, jewelry, textiles, ceremonial objects, weapons, armaments, vessels, ships, vehicles and human skeletal remains. Archaeological specimen does not include arrowheads, coins or bottles.

ARS 41-842: Permits to Explore

A. Only institutions, organizations or corporations organized for scientific, research or land use planning purposes may pursue any activity prescribed in section 41-841.

B. No such activity may be undertaken until a permit is first secured therefor from the director of the Arizona state museum.

C. Permits shall be granted by the director for such periods of time and under such regulations as he may from time to time determine to institutions, organizations or corporations which are qualified to conduct such activities and which shall undertake to propagate the knowledge to be gained and to preserve permanently all objects, photographs and records in public repositories under their own supervision or control, or the supervision or control of other similar institutions, organizations or corporations.

ARS 41-843: Prohibiting Unnecessary Defacing of Site or Object

No person, institution or corporation shall deface or otherwise alter any site or object embraced within the terms of sections 41-841 and 41-842, except in the course of activities pursued under the authority of a permit granted by the director of the Arizona state museum.

ARS 41-844: Duty to Report Discoveries; Disposition of Discoveries; Definitions

A. A person in charge of any survey, excavation, construction or other like activity on any lands owned or controlled by this state, by any public agency or institution of the state, or by any county or municipal corporation within the state shall report promptly to the director of the Arizona state museum the existence of any archaeological, paleontological or historical site or object that is at least fifty years old and that is discovered in the course of such survey, excavation, construction or other like activity and, in consultation with the director, shall immediately take all reasonable steps to secure and maintain its preservation. If it is necessary to move the object before completion of the proceedings prescribed by this section to permit the continuation of work on a construction project or similar project, the director shall require that the move be accomplished in the manner that will least disturb and best preserve the object.

B. If the objects discovered are human remains, funerary objects, sacred ceremonial objects or objects of national or tribal patrimony, the director of the Arizona state museum shall, to the best of his ability, give notice of the discovery to:

    1. All individuals that may have a direct kinship relationship to the human remains.

    2. All groups that it is reasonable to believe may have a cultural or religious affinity to the remains or objects.

    3. Appropriate members of the curatorial staff of the Arizona state museum.

4. Faculty members of the state universities who have a significant scholarly interest in the remains or objects.
5. The state historic preservation officer.

C. American Indian tribal governments that wish to be notified pursuant to this section shall keep on file with the director lists of the cultural groups and geographical area with which they claim affinity.

D. If American Indian human remains, funerary objects, sacred ceremonial objects or objects of cultural patrimony are involved, the director, in addition to giving notice as required in subsection B, shall give notice to the tribes that occupy or have occupied the land on which the discovery is made and to the Arizona commission on Indian affairs and the intertribal council of Arizona.

E. The director shall respond to every report of a discovery in a timely fashion and within six months of being notified of the discovery, the director shall convene a meeting of notified persons and representatives of notified groups to discuss the most appropriate disposition of the discovered materials. At this meeting, the director shall encourage agreement among all participants regarding the most appropriate disposition and treatment of the materials. An agreement may include a decision to curate or rebury materials subject to conditions or limitations, a decision to engage in scientific analysis before repatriation or reburial or any other appropriate disposition. If an agreement is reached, it shall determine the disposition and treatment of the materials and the director shall oversee its implementation.

F. If no agreement is reached within six months of the meeting required by subsection E, the human remains or funerary objects shall be disposed and treated in accordance with the wishes of the nearest relative with a direct kinship relationship, or with the wishes of the governing body of the group with cultural or religious affinity to the remains or objects if no relative exists. If sacred ceremonial objects or objects of national or tribal patrimony are concerned, disposition and treatment shall be in accordance with the wishes of the governing body of the group with cultural or religious affinity to the objects. The authority to determine the disposition and treatment of remains or objects pursuant to this subsection shall not be exercised in a manner that would prevent timely completion of a construction project or other project.

G. If there is no person with a direct kinship relationship or a group with a cultural or religious affinity to human remains or funerary objects and the remains have no scientific value, the remains or funerary objects shall remain undisturbed. If it is necessary to move them in order to permit completion of a construction or similar project, the remains or funerary objects shall be reburied under the supervision of the director in a place as similar and close as possible to their original burial site. If the remains or funerary objects have scientific value, they may be curated by the Arizona state museum or other authorized repository for a period of one year, after which they shall be reinterred. If remains of American Indians are involved, reburial pursuant to this subsection shall be undertaken with the cooperation of the Indian tribe located nearest to the place where the remains were discovered. Reburial may, with that tribe's consent, take place on that tribe's reservation. The one-year period for scientific curation may be extended with that tribe's consent. If there is no group with a cultural or religious affinity to sacred ceremonial objects or objects of national or tribal patrimony, the director shall decide on the most appropriate disposition and treatment. Where American Indian materials are involved, the determination shall be made in consultation with appropriate tribal representatives.

H. A repository charged with the care or custody of human remains, funerary objects, sacred ceremonial objects or objects of national or tribal patrimony pursuant to this section shall maintain them with appropriate dignity and respect and with consideration for the specific applicable cultural or religious traditions applicable to the remains or objects. When materials are returned to relatives or affiliated groups, the relatives or groups shall accept and undertake responsibility for the protection and security of the materials.

I. The expense of any curation or reburial pursuant to this section that is required as the result of a construction project or similar project shall be borne by that project. Reburials made in order to satisfy the wishes of a relative or affinal group shall be by and at the expense of the relative or group.

J. If a person believes that the provisions of this section have not been properly applied he shall give written notice of this claim to all other parties entitled to notice under subsections B and C. The parties shall meet within fifteen days of receiving the notice and attempt to agree on the designation of a third party to assist in the resolution of the dispute. If the parties cannot agree within fifteen days on a third party, the state historic preservation officer shall serve in that capacity. The adverse parties shall attempt to reach a resolution with the assistance of the third party. If a resolution cannot be reached within ninety days of the designation of the third party, the third party shall resolve the dispute. Either party may appeal a decision within thirty days to the superior court in the county in which the subject of the dispute is located.

K. If a written request for the reburial or repatriation of human remains, funerary objects, sacred ceremonial objects or objects of national or tribal patrimony in the possession and ownership or control of an agency of this state, as of the effective date of this section, is made by the government of an American Indian tribe, the requirements of this section apply as if the remains or objects had been discovered after the effective date of this section.

L. Whenever two or more groups or tribes have affinity to the same human remains, funerary object, sacred ceremonial object or object of national or tribal patrimony and they do not agree on the disposition or treatment of such remains or object, the question of which group or tribe shall be deemed to have affinity shall be resolved pursuant to subsection J. In making the determination, consideration shall be given to all the relevant evidence of affinity.

M. For the purposes of this section:

   1. "Funerary object" means an object discovered in proximity to human remains and intentionally buried or interred with the remains.

   2. "Group with a cultural or religious affinity" means any of the following:

      (a) In the case of human remains or funerary objects, any tribe that has submitted a written claim of affinity pursuant to subsection C or any other group or tribe that has cultural affinity in light of all the relevant evidence.

      (b) In the case of a sacred ceremonial object, a group whose religious observances traditionally have utilized such object.

      (c) In the case of an object of national or tribal patrimony, a group whose past or present government or traditional cultural organization was or is associated with the object.

   3. “Group” includes American Indian tribes.

   4. “Human remains” means any remains of a human being who died more than fifty years before the remains are discovered.

   5. “Objects of national or tribal patrimony” means inalienable items of historical or cultural significance to tribal groups.

   6. “Sacred ceremonial object” means an object traditionally utilized in religious observances.

   7. “Tribe” means any federally recognized tribal government.

ARS 41-865: Disturbing Human Remains or Funerary Objects; Rules; Violation; Classification; Definitions

A. A person shall not intentionally disturb human remains or funerary objects on lands, other than lands owned or controlled by this state, any agency or institution of this state or any county or municipal corporations within this state, without obtaining the written permission of the director of the Arizona state museum.

B. A person who unintentionally disturbs human remains or funerary objects on lands, other than lands owned or controlled by this state, any agency or institution of this state or any county or municipal corporations within this state, shall report the disturbance to the director and shall not further disturb the remains or objects without obtaining the written permission of the director.

C. Within one year after the effective date of this section, the director shall adopt rules relating to reporting procedures, procedures to request permission to disturb human remains and funerary objects and the standards to be used for granting permission to disturb human remains and funerary objects. These rules shall:

   1. Require the director to respond within ten working days to all requests for permission to disturb. During this ten working day period the director or his designee shall inspect, if appropriate, the site of the proposed disturbance. If the

director does not respond to a request to disturb within ten working days, his failure to respond to the request is deemed permission to proceed

2. Require the respectful treatment of all human remains and funerary objects.
3. Minimize the disturbance of human remains and funerary objects and, if disturbance is necessary, provide for reburial at an appropriate site or provide for other appropriate relocation.
4. Require consultation with representatives from the scientific community and groups with a cultural affinity regarding the treatment and protection of human remains and funerary objects.
5. If Native American human remains or funerary objects are involved, give the governing body of the group with a cultural affinity the authority to take responsibility for the remains or objects and to determine the most appropriate treatment or disposition of them pursuant to subsection E. In no event shall this state or any group, individual or entity benefit financially from the sale of any human remains or funerary objects removed from private property.
6. Fully protect the constitutional rights of property owners.

A. Before the adoption of rules pursuant to subsection C, the director shall respond to such requests within ten working days.

B. If the director or a group with a cultural affinity in consultation with the landowner determines that human remains or funerary objects shall be preserved in place, moved or reburied, any costs required by these actions may be borne either wholly or partially by the landowner. If the landowner is unwilling or unable to bear the costs required, the acquisition and preservation fund shall bear the full cost of removal. A group or institution taking responsibility for these remains or objects shall bear the cost of their preservation or reburial. If there are insufficient monies in the acquisition and preservation fund, or if the director is unable or unwilling to allocate monies for the removal and no other source is available to pay for removal within the ten working day period, the landowner, the lessee or the landowner's or lessee's agent may proceed with work on a construction project or similar project without violating the provisions of subsection A or B. The removal of all remains and objects under this subsection shall take place within ten working days of the request for the permission to disturb unless the owner of the property where the remains or objects are located agrees to an extension of this period.

C. If it is necessary to move the object before completion of the proceedings prescribed by this section in order to permit the continuation of work on a construction project or similar project, the director shall require that the move be accomplished in the manner that will least disturb and best preserve the remains or the objects.

D. A person who intentionally possesses, sells or transfers any human remains or funerary objects that are excavated or removed in violation of subsection A or B is guilty of a class 5 felony. On conviction the person forfeits to the Arizona state museum all human remains, funerary objects and other artifacts removed in connection with the violation of subsection A or B and all proceeds from the sale of these remains, objects or artifacts.

E. A person who otherwise intentionally violates subsection A or B is guilty of a class 1 misdemeanor. On conviction the person forfeits to the Arizona state museum all human remains, funerary objects and other artifacts removed in connection with the violation of subsection A or B.

F. The state agrees to indemnify and hold harmless landowners, lessees or their agents who seek permission under this section from any accidents, injuries or losses caused by state employees or their designees as a result of this section.

G. For the purposes of this section:

1. “Director” means the director of the Arizona state museum.
2. “Funerary object” means an object discovered in close proximity to human remains and interred with the remains.
3. “Group” includes American Indian tribes.
4. “Group with cultural affinity” means any group that has cultural affinity with the human remains or funerary objects in light of all of the relevant evidence.
5. “Human remains” means any remains of a human being who died more than fifty years before the remains are discovered.
6. “Tribe” means any federally recognized tribal government.

Arizona Antiquities Act

The Arizona Antiquities Act (AAA) of 1960 (Title 41, ARS Sections 41-841 through 41-845) is administered by the Arizona State Museum (ASM) on behalf of the Arizona Board of Regents (ABOR). The act contains regulations for the protection of archaeological and paleontological resources on property owned or controlled by the state. This is accomplished through the issuance of AAA permits by ASM to qualified individuals or entities that would conduct archaeological or paleontological research on state-owned or controlled land. The ASM evaluates the professional qualification of permit applicants, reviews the appropriateness of treatment plans and research proposals, reviews and approves survey and excavation results and reports and is the state repository for collections acquired under permit. Amendments to ARS 41-844 (B) 1990 further protect human remains and associated funerary objects 50 years old or older, sacred objects, and objects of national or tribal patrimony.

Arizona Native Plant Law of 1991

The Arizona Native Plant Law of 1991 is administered by the Arizona Department of Agriculture (AZDA) and contains statutes that protect certain native vegetation and promote native plant conservation to bring threatened and endangered plants to the point of recovery. Protected native plants are a component of the nation's natural heritage and cannot be disposed of from any lands without the owner’s permission and an AZDA permit. The AZDA has additional enforcement authority to protect archaeological and paleontological resources under Title 3 ARS 3-931 (E), as well as Title 13, ARS 13-3702 and 13-3702.01. Title 3 ARS 3-931 states that an officer, employee or agent of AZDA may make an arrest without warrant for violations witnessed by the officer, employee or agent and may confiscate archaeological and other specimens or objects if unlawfully excavated or collected. Title 13, ARS-3702 protects petroglyphs, pictographs, caves, and caverns from damage or defacing by making such actions a class 2 misdemeanor, which has a penalty of prison sentence with a maximum limitation of four months. Similarly, Title 13, ASR 3702.1 protects archaeological resources by making such actions as unpermitted excavation within archaeological sites or the collection of archaeological specimens a Class 5 felony (up to 2 years of imprisonment) and a Class 1 misdemeanor (up to six months of imprisonment), respectively.

Executive Order 2006-14

Executive Order 2006-14 requires that all executive branch agencies develop and implement tribal consultation policies with federally-recognized tribes in Arizona. Consultation requires that state agencies and offices seek input from appropriate elected or appointed tribal officials before undertaking any action or policy that will have the potential to affect a tribal community or its members. Furthermore, the order requires that agencies and offices integrate the input provided during tribal consultation into their decision-making processes and requires all executive branch agencies to designate a member of their staff to assume responsibility for the agency's implementation of the tribal consultation policy and to act as the principle point of contact for tribal issues.

4.4.4.4 Local

County of San Bernardino (California) 2007 General Plan

According to the *County of San Bernardino 2007 General Plan*, nearly 12,000 cultural resources have been recorded in the San Bernardino County. This includes 122 properties within the county on the California Point of Historic Interest list, 39 on the California Historical Landmarks list, 413 properties eligible for the NRHP, and 49 properties that are listed on the NRHP. A goal of the County General Plan is the preservation and promotion of San Bernardino County's historic and prehistoric cultural heritage. Policies related to cultural resources include:

> **Policy CO 3.1:** Identify and protect important archaeological and historic cultural resources in areas of the County that have been determined to have known cultural resource sensitivity.
>
> **Policy CO 3.2:** Identify and protect important archaeological and historic cultural resources in all lands that involve disturbance of previously undisturbed ground.
>
> **Policy CO 3.3:** Establish programs to preserve the information and heritage value of cultural and historical resources.
>
> **Policy CO 3.4:** The County will comply with Government Code Section 65352.2 (SB 18) by consulting with Tribes as identified by the California Native American Heritage Commission on all General Plan and specific plan actions.
>
> **Policy CO 3.5:** Ensure that important cultural resources are avoided or minimized to protect Native American beliefs and traditions.

Programs identified in the County General Plan with specific application to this Project include two programs related to Policy CO 3.5:

> **Program 1:** Consistent with SB 18, as well as possible mitigation measures identified through the CEQA process, the County will work and consult with local Tribes to identify, protect and preserve TCPs. TCPs include both manmade sites and resources as well as natural landscapes that contribute to the cultural significance of areas.
>
> **Program 3:** The County will work in good faith with the local Tribes, developers/applicants and other parties of the local affected Tribes request the return of certain Native American artifacts from private development projects. The developer is expected to act in good faith when considering the local Tribe's request for artifacts. Artifacts not desired by the local Tribe will be placed in a qualified repository as established by the California State Historical Resources Commission. If no facility is available, then all artifacts will be donated to the local Tribe.

In the event that archaeological sites are affected by a project, the following actions related to Policy CO 3.5 are required by the County regarding the disposition of archaeological sites and cultural remains (including human remains):

(a) The NAHC and local reservation, museum, and other concerned Native American leaders will be notified in writing of any proposed evaluation or mitigation activities that involve excavation of Native American archaeological sites, and their comments and concerns solicited.

(b) The concerns of the Native American community will be fully considered in the planning process.

(c) If human remains are encountered during grading and other construction excavation, work in the immediate vicinity will cease and the County Coroner will be contracted pursuant to the state Health and Safety Code.

(d) In the event that Native American cultural resources are discovered during project development and/or construction, all work in the immediate vicinity of the find will cease and a qualified archaeologist meeting U.S. Secretary of the Interior standards will be hired to assess the find. Work on the overall project may continue during this assessment period.

(e) If Native American cultural resources are discovered, the County will contact the local Tribe. If requested by the Tribe, the County will, in good faith, consult on the discovery and its disposition with the Tribe.

County of Mohave (Arizona) 2005 General Plan

The *Mohave County 2005 General Plan* acknowledges that its cultural heritage, including historic built and archaeological resources, require protection and preservation. Key historic preservation issues identified by the County include the protection of significant buildings, sites, and natural features that are important contributors to the character of the County, as well as the identification, protection, and maintenance of the County's natural historic resources to ensure that they are not lost to neglect, oversight, or abuse. To this end, the County has established the following historic preservation goal, policies, and implementation measures:

Historic Preservation Goals and Policies

Goal 28: To preserve Mohave County's historic resources as physical reminders of the County's past and as unique focal points to shape its identity, now and in the future.

> **Policy 28.1** The County should promote the preservation of sufficient historic resources, in number and type, to evoke the distinctive character of the County at significant stages in its history for the enjoyment of residents and visitors.
>
> **Policy 28.2** The County should work with other public and private groups to identify and perpetuate buildings and sites of historical, cultural, archaeological and aesthetic value.
>
> **Policy 28.3** Mohave County shall encourage preparation of informational materials to educate County residents and visitors about historic, cultural and archaeological resources.
>
> **Policy 28.4** Mohave County should participate in efforts to secure State, Federal or other funding directed toward revitalizing historic areas or maintaining historic buildings and sites.

Historic Preservation Implementation Measures (HP)

> **HP 1:** Meet with groups, such as the Route 66 Historic Association, interested in historic preservation to determine how the County can support the efforts of these groups to preserve and promote the County's historic resources.
>
> **HP 2:** Seek grants from the National Park Service, State Historic Preservation Office for corridor preservation.
>
> **HP 3:** Establish Historic Preservation Overlay Zones, as appropriate, to preserve areas with historical significance.

4.4.5 Environmental Impacts

4.4.5.1 Thresholds of Significance

Based on the current (2016) California Environmental Quality Act (CEQA) Guidelines, Appendix G, a project may be deemed to have a significant effect on the environment with respect to cultural resources if it would:

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

On September 25, 2014, Governor Brown signed Assembly Bill 52 (AB 52) which requires lead agencies undertaking projects with a Notice of Preparation released on or after July 1, 2015 (AB 52 Section 11) to consider project-related impacts on "tribal cultural resources" as defined in PRC Section 21074 and to conduct consultation as prescribed in PRC Section 21080.3.1. The Notice of Preparation for this Project was released on May 5, 2015 and the Project is therefore not subject to provisions of AB 52. Nonetheless, the following cultural resources impacts analysis addresses Native American resources in the context of "historical resources" as defined by PRC Section 15064.5 and considers the extensive information gleaned through consultation between DTSC and Interested Tribes.

4.4.5.2 Approach to Analysis

This section presents a revised analysis per Public Resources Code section 21166 and CEQA Guidelines sections 15162 governing conditions required for preparation of a SEIR, including substantial changes to the Project or circumstances under which the Project is taken that result in major revisions to the original FEIR. Subsequent to certification of the Groundwater FEIR, the Final Remedy Design was prepared to include design details not available in 2011. This section outlines the approach to the potential cultural resources impacts based on the Project-specific information now available, as well as the additional information obtained regarding the existing environmental setting (see Section 4.4.3 summarizing the additional information included in the Final Remedy Design).

Generally, the analysis of impacts on cultural resources is based on consideration of Project activities and the anticipated disturbance footprint, the larger cultural context in which disturbances would occur, the presence of known cultural resources in the Project Area, and the potential for the Project to encounter as-yet-undiscovered cultural resources in the Project Area. The analysis of impacts considers all phases of the Project (i.e., construction, operation and maintenance, and decommissioning), as well as direct impacts resulting from destruction, damage, or alteration of cultural resources or indirect impacts resulting from alteration of the cultural resources setting.

Some of the mitigation measures in this section refer to various plans or other documents that have been prepared and included in the Final Remedy Design for the groundwater remedy or are part of the Project's federal requirements. Many of these plans and documents included in the Final Remedy Design were prepared to implement mitigation measures previously adopted as part of DTSC's January 31, 2011 decision approving Alternative E as the groundwater remedy (DTSC 2011). Appendix GWMM to this SEIR presents a comparison between the mitigation measures included in the Groundwater FEIR as reflected in the Mitigation Monitoring and Reporting Program approved by DTSC on January 31, 2011, and those presented in this SEIR for the Final Groundwater Remedy Project.

All plans and documents included in the Final Remedy Design and references in this SEIR are appended to this SEIR as Appendix BOD. In addition, the documents are available online at the following link: http://dtsc-topock.com/documents/cleanup-implementation/groundwater/remedy-design/remedial-design-documents.

Construction Impact Methodology

Subsequent to certification of the Groundwater FEIR, additional details were developed regarding new or modified infrastructure needed to support the remedy, which resulted in additional soil disturbance and augmented facility footprints from what was analyzed in the Groundwater FEIR. In addition, the Final Groundwater Remedy Project includes a Future Activity Allowance for all Project infrastructure to be constructed (wells, pipelines, structures, etc.). Generally, the Future Activity Allowance includes two components: (1) an additional allowance for all Project infrastructure, established at up to 25 percent of the parameter set forth in the Final Remedy Design, and (2) up to 10 additional monitoring well boreholes to be installed in Arizona as part of the monitoring program. In terms of location, the Future Activity Allowance would include construction of pipelines and electrical power underground throughout the Project Area, boreholes potentially located in the floodplain area and generally in the vicinity of existing/planned boreholes, monitoring well boreholes in Arizona, and additional structures near existing/planned structures and facilities (like at the Station, Transwestern Bench, and Construction Headquarters, etc.). **Table 4.4-9** includes a summary of wells, lengths of piping and roads, and footprints of treatment infrastructure above what was analyzed in the Groundwater FEIR. Each new or modified structural component that has the potential to impact cultural resources during construction is summarized in detail below.

Freshwater supply for the Final Groundwater Remedy Project would be from freshwater wells in Arizona (instead of a freshwater intake structure along the Colorado River as proposed in the Groundwater FEIR). Although well HNWR-1A was already installed as part of the 2013 Addendum to the Groundwater FEIR, pipelines are needed as part of this SEIR to connect the wells to infrastructure in California. Other supporting infrastructure for Well HNWR-1A include an approximate 350 square feet concrete well pad, 165 square feet sand collection system, and 100 square feet electrical pad and foundation. Additionally, although freshwater sourcing was addressed in the Groundwater FEIR, an analysis of the potential impacts to aspects of the Topock TCP associated with the contributing element of water resulting from the importing of groundwater to California from Arizona containing concentrations of arsenic above the California and Federal Maximum Contaminant Levels (MCLs), was not considered in the Groundwater FEIR. Also, impacts to the Old Trails Arch Bridge from the addition of pipelines to the structure were not analyzed in the Groundwater FEIR.

TABLE 4.4-9
SUMMARY OF INFRASTRUCTURE

Component	Groundwater FEIR Estimate	Final Remedy Design	Future Activity Allowance	Total	Difference Between FEIR Limit and Total New SEIR Features [b]
Boreholes[a]	170	191	58	249	61
Disturbed Ground (cubic yards)	13,400	45,200	11,300	56,500	43,100
Fluid Conveyance Piping (linear feet, underground)	50,000	127,500 [c]	31,875	159,375	109,375
Electrical/ Communications Conduits (linear feet, underground)	50,000	124,000 [c]	31,000	155,000	105,000
Buildings and Structures (square feet)	100,000	42,000	10,500	52,500	(57,500)
Roadway Improvements (linear feet)	6,000	8,150 linear feet (new) and 4,060 linear feet (improvements to existing)	2,038 linear feet (new) and 1,015 linear feet (improvements to existing)	10,188 (new) 5,075 (improvements to existing)	9,263

NOTES:
[a] Each borehole may contain multiple wells; inclusive of both remediation and monitoring wells.
[b] Difference equals Total SEIR Boreholes (249) minus Groundwater FEIR Limit boreholes (170) minus Installed Boreholes (18).
[c] 124,000 linear feet of piping and/or conduits in 43,200 linear feet of trenches.

SOURCE: CH2M Hill 2015a, 2015b.

The Final Groundwater Remedy Project includes construction of a Construction Headquarters (approximately 1.85 acres) and a Soil Processing/Clean-Soil Storage Area (approximately 2.68 acres) near Moabi Regional Park, which were not included or analyzed in the Groundwater FEIR. The Construction Headquarters would serve as the primary location for contractor site offices and for the mobilization and management of equipment, supplies, and site workers/contractors to/from the Project Area throughout the duration of construction activities. The Soil Processing/Clean-Soil Storage Area includes staging areas for multiple phases of soil staging, as well as a truck waiting area. This area would also include a 20-foot by 20-foot shade structure and elevated water tank. An Informational Outreach Center, which would consist of a trailer of similar size to existing trailers in the area, would also be situated within Moabi Regional Park. Additionally, although up to 100,000 square feet of buildings and structures was considered in the Groundwater FEIR, an analysis of potential impacts to aspects of the Topock TCP associated with the contributing element of viewhshed and to the historical setting of National Old Trails Highway/Route 66 were not analyzed in the Groundwater FEIR.

Improvements on or near the Station as part of the Project include the construction of infrastructure associated with the TCS Recirculation Loop, the Remedy-Produced Water Conditioning System, and the Dissolved Metals Removal System. This infrastructure includes aboveground and belowground components including storage tanks, Building 12, a pad, retaining wall, conveyance piping, pumps, and wells, along with a variety of other equipment. Additionally, all of these components were designed as part of the Final Remedy Design and analysis of potential impacts to the Topock Compressor Station Historic District, which has since been identified as a historical resource under CEQA, was not analyzed in the Groundwater FEIR.

Improvements at the Transwestern Bench as part of the Project include construction of an Operations Building (approximately 2,200 square feet), a 10,000 gallon underground septic waste tank, an electrical equipment concrete pad (approximately 240 square feet), stormwater catch basins, and security equipment and fencing. These components were designed as part of the Final Remedy Design and analysis of potential impacts on National Old Trails Highway/Route 66 was not analyzed in the Groundwater FEIR.

A Carbon Amendment Building and Carbon Storage Tank would be constructed as part of the Final Groundwater Remedy Project at the MW-20 Bench, which is an area that has been used to support various field and IM activities since 2004. In addition, a truck loading/unloading station and security equipment and fencing would be constructed. These components were designed as part of the Final Remedy Design and analysis of potential impacts on National Old Trails Highway/Route 66 was not analyzed in the Groundwater FEIR.

The TCS Evaporation Ponds would be used in the Final Groundwater Remedy Project to dispose of some of the remedy-produced water generated by the proposed Project. The ponds would be upgraded to include a one-story 430-square foot masonry utility building to house a new natural gas fueled generator, which would include fencing. Additionally, a containment area for truck loading would be constructed (approximately 800 square feet) and cameras installed. Other equipment improvements to the ponds would not affect cultural resources.

Project modifications have resulted in an increase in the number of boreholes from 170 in the Groundwater FEIR to 191 in the Final Remedy Design. The Final Remedy Design includes a Future Activity Allowance, which provides for an additional 25 Percent Potential Future Activity Allowance of components included in the Final Remedy Design plus up to 10 additional monitoring boreholes, or 58 additional boreholes, amounting in a total of 249 potential boreholes. An analysis of potential impacts to the Topock TCP resulting from the use of certain areas for boreholes was not analyzed in the Groundwater FEIR. Of particular concern to some Interested Tribes are the areas surrounding Wells MW-X and MW-Y in Arizona. While the Groundwater FEIR anticipated that some ground disturbance could occur within National Old Trails Highway/Route 66, specific impacts from installation of wells within and adjacent to the roadbed were not analyzed, nor were impacts to the underlying A&P/AT&SF railroad bed.

Project modifications have resulted in an increase in soil disturbance from 13,400 cubic yards in the Groundwater FEIR to 45,200 cubic yards in the Final Remedy Design, which is more than three times that amount analyzed in the Groundwater FEIR. In addition, accounting for the Future

Activity Allowance, the total amount of soil disturbance analyzed in this SEIR is 56,500 cubic yards (See Table 3-4 in Chapter 3, “Project Description”), or four times the amount analyzed in the Groundwater FEIR. This results primarily from additional roadways and facility footprints (described above), and the fact that remedy pipelines are to be constructed underground (versus aboveground which was assumed in the Groundwater FEIR). Additionally, while some limited subsurface trenching was envisioned in the Groundwater FEIR, an analysis of potential impacts resulting from subsurface trenching to aspects of the Topock TCP associated with the contributing elements of land, plants, animals, and TCVA resources was not analyzed in the Groundwater FEIR, nor were impacts of installation of belowground pipelines in National Old Trails Highway/Route 66 and the underlying A&P/AT&SF railroad bed.

With the exception of security lighting in the Construction Headquarters area, temporary lighting would be supplied by portable generators and lights, as needed. While night work is not planned as part of routine construction activities, it may be determined that limited circumstances require the continuation of work into the nighttime periods because it cannot be disrupted or suspended (for example, special conditions during drilling or concrete pouring) or work may require an early morning start to ensure completion within 1 day or because of heat constraints. For these special circumstances, nighttime construction lighting would be limited to active construction areas during nighttime or early-morning operations. To minimize lighting impacts, lighting would include shrouding or shielding for portable lights, the use of the lowest allowable height and fewest feasible numbers of lights consisting of downward-facing fixtures fitted with cutoff shields to reduce light diffusion. No permanent light poles would be installed. Additionally, while nighttime lighting on a limited basis specific to lighting on construction equipment was envisioned in the Groundwater FEIR, an analysis of potential impacts resulting from the limited use of nighttime lighting including portable generators and lights to the Topock TCP were not analyzed in the Groundwater FEIR.

There are a total of 23 proposed staging areas to be used in the Final Remedy Design. Some of the previously proposed staging areas are no longer being considered for use. In addition, the previously proposed Staging Area #15 would now be used for mitigation planting. DTSC has detailed conditions PG&E must follow when using Staging Areas 6, 7, 12, 13, and 25, in order to minimize impacts on the areas and surrounding areas. See Table 3-6 in Chapter 3, “Project Description” for a list and Figure 3-8 for a map of staging areas. Additionally, while staging areas were envisioned as part of the Groundwater FEIR, specific potential impacts to the Topock TCP resulting from the use of certain areas for staging was not analyzed in the Groundwater FEIR. Of particular concern to some Interested Tribes are Staging Areas 6 and 7. The Final Remedy Design provides particular limitations in the use of Staging Areas 6 and 7. The impact to the setting of the National Old Trails Highway/Route 66 resulting from the staging areas was also not analyzed in the Groundwater FEIR.

Operation & Maintenance Impact Methodology

Normal operation of the groundwater remedy would include groundwater extraction and recirculation, carbon substrate storage and deliveries; carbon substrate injections, and monitoring and control of the system. There would also be activities associated with freshwater supply, conveyance, and storage; remedy-produced water management; pre-injection water treatment (if required); power supply and distribution; and the Remedy SCADA system. All of these systems would require regularly scheduled maintenance to keep the systems functioning in an efficient and optimal manner.

Key operation and maintenance activities include routine or preventative maintenance used to mitigate performance losses at injection and extraction wells and is generally conducted without intrusive modifications to the wellhead or well and do not require removing existing equipment from the well for access. Well maintenance may also involve removal of existing well equipment, and in some instance wells may need to be replaced and would follow similar methods used to construct wells and other associated infrastructure.

After construction and use of the Construction Headquarters during the construction phase, the area would become the Long-Term Remedy Support Area, which would function as PG&E's support area for the lifetime of the groundwater remedy. Operation and maintenance activities at the Long-Term Remedy Support Area would include on-site sample processing, and vehicle and equipment storage, decontamination, and maintenance. Routine and non-routine operation and maintenance activities would include inspection and preventative maintenance of the generator and solar panels; water delivery to the potable water tank; inspection and maintenance of the booster pump; removal and off-site disposal of sewage; decontamination of vehicles and equipment; management of rainwater collected in the secondary containment; inspection and maintenance of the sump pump; and off-site hauling of wastewater from the decontamination water storage tank.

Operation and maintenance activities at the TCS Evaporation Ponds would include ongoing maintenance of the power system and remote sensing equipment.

As described in Section 3.6 of the Project Description, the Final Groundwater Remedy Project includes a Future Activity Allowance for all Project infrastructure, which could occur during the construction or operation and maintenance phase. In terms of location, the Future Activity Allowance could include construction of replacement/ additional pipelines and electrical power underground throughout the Project Area, and would primarily be situated in proximity to existing infrastructure. For example, additional boreholes could be located in the floodplain and in the vicinity of existing/planned boreholes, and additional buildings/structures would likely be situated near other existing/planned structures and facilities (i.e., at the Station, Transwestern Bench, and Long-Term Remedy Support Area, etc.). Up to ten monitoring well boreholes could also be constructed in Arizona.

Operation & Maintenance activities for the proposed Project would occur during the entire period in which cleanup activities would be ongoing and until the cleanup goals and objectives of the Final Groundwater Remedy Project have been met. Depending on the performance of the Final Remedy Design, the anticipated remedial timeframe is estimated to be about 30 years, followed by up to 10 years of long-term monitoring and concurrently up to 20 years of arsenic monitoring.

Decommissioning Impact Methodology

The steps and schedule for decommissioning and restoration may occur during multiple mobilizations and would be affected by the specific infrastructure to be decommissioned. Decommissioning activities would occur within the same footprints of locations where remedy infrastructure was previously installed. Decommissioning and restoration of remedy components is largely projected to occur decades in the future and would be affected by information and conditions that become available prior to and at the time of decommissioning and restoration. However, some restoration activities would begin during Phase 1 Construction, e.g., restoration of disturbed areas after well installation activities have been completed, revegetation to offset habitat loss that could not be avoided during construction.

4.4.5.3 Impact Analysis

IMPACT CUL-1 **Cause Substantial Adverse Change in the Significance of a Historical Resource as Defined in CEQA Guidelines Section 15064.5.** Construction, operation and maintenance, and decommissioning activities of the proposed Project could result in substantial adverse changes to historical resources in the Project Area, including: (1) the Topock TCP; (2) other historical resources listed in Table 4.4-2; and (3) historical resources that could be identified during construction. Impacts could occur through ground disturbance and other Project-related activities or through the introduction of out-of-character visual or auditory intrusions to historical resources that gain their significance in part because historical associations or aesthetic values. This impact would be **potentially significant**, as previously identified in the Groundwater FEIR.

Topock TCP

Construction and Operation & Maintenance

The Groundwater FEIR determined that Project activities could result in a potentially significant impact to the Topock TCP[9], which is a historical resource of importance to local Tribes. The following requirements would be employed as defined in the C/RAWP (CH2M Hill 2015b) and apply to impacts to the historical resource identified as the Topock TCP:

- Standard Operating Procedures (Appendix B) SOP-A16 – Access Routes outlines procedures to be used when accessing wells or other sampling stations and stipulates that access by vehicles is restricted to established roads or tracks and access by low-impact utility vehicles (UTVs) and by foot will follow consistent routes or paths.
- Cultural Impact Mitigation Program (CIMP) (Appendix H) includes protocols for continued tribal communication (CUL-1a-8a); appropriate treatment of archaeological materials (CUL-1a-8b); the review of cultural resource-related documents (CUL-1a-8c); the review of project design documents (CUL-1a-8d); repatriation of clean soils during construction (CUL-1a-8g); noise (CUL-1a-8h); the appropriate methods, consistent with mitigation measures AES-1 and AES-2, to reduce visual intrusions (CUL-1a-8i); tribal notification in advance of project-related activities (CUL-1a-8j); accommodating tribal ceremonies or activities involving the

[9] Referred to as the Topock Cultural Area (or TCA) in the Groundwater FEIR.

Topock TCP (CUL-1a-8k); tribal monitoring (cul-1a-8l); reasonable compensation for tribal monitors (CUL-1a-8m); protective measures for archaeological/ historical sites during construction (CUL-1a-8n); reporting discoveries of cultural importance (CUL-1a-8o); and inspecting remediation facilities and/or staging areas during construction (CUL-1a-8p).

- Cultural and Historic Properties Management Plan (CHPMP) (Appendix I) includes measures for continued communication and consultation with Tribes (CHPMP Sections 5.3, 7.1.6, and 8.3); Tribal notification of project-related activities that may cause adverse impacts to sensitive cultural resources (CHPMP Section 6.8.3); avoidance of resources to the maximum extent possible (CHPMP Sections 5.1.2, 6.6, 6.6.3; 7.1.1, 7.1.2, and 7.3); physical avoidance of the Topock Maze and prehistoric resources associated with the Topock TCP to the maximum extent feasible (CHPMP Section 7.1); review of Project-related design documents (CHPMP Section 6.7); inviting Tribal representatives to a pre-disturbance Project initiation meeting (CHPMP Section 7.1.2); placement of new facilities in previously disturbed areas (CHPMP Sections 6.2.1.2 and 7.1.7); placement of barriers, such as temporary fencing, to ensure avoidance of sensitive areas (CHPMP Section 6.6.3); minimizing the number of wells through reuse of previously disturbed areas and existing monitoring wells and related facilities (CHPMP Sections 6.2.1.2 and 7.1.5); implementation of monitoring of ground-disturbing activities (CHPMP Section 6.6.4); archaeological and tribal monitoring of the implementation of mitigation actions, if any should be determined necessary (CHPMP Section6.8); treatment of archaeological materials disturbed or discovered during implementation of the final remedy (CHPMP Section 8.1 and Appendix C(6)); reporting discoveries of cultural importance (CHPMP Section C.7); review of cultural resources-related documents (CHPMP Section 3.1 and Section 6.7); accommodating access for Tribal activities and ceremonies (CHPMP Section 7.2 and Appendix B); tribal access (CHPMP Section 6.6.6 and Appendix B); Tribal consultation on vegetation removal and encourage natural regeneration (CHPMP Section 7.1.4); reduction of visual intrusions (CHPMP Section 7.1.4); undertaking remediation activities that propose the removal or introduction of vegetation on public lands after coordination with Tribes to assess if culturally significant native plant species are being impacted and if there could be potential visual impacts to the Topock TCP (CHPMP Section 7.1.4); consideration of an NRHP nomination package for the Topock TCP and updating associated site records (CHPMP Section 6.6.1); educational initiatives through public outreach (CHPMP Section 6.10); development of a brochure describing cultural resource concerns with actions within the vicinity of the Topock Remediation Project and the Topock Maze (CHPMP Section 6.2.1.2); and notification to the Hualapai Tribe and any other Tribes who ascribe importance to clay deposits when clay deposits are discovered (CHPMP Section 7.1.8).
- C/RAWP Section 4.6.4 – Lighting includes protocols for nighttime construction lighting and lighting standards.
- Soil Management Plan (Appendix L) includes protocols for soils screening and characterization; handling, stockpiling, and storage; security; emergency response; off-site disposal.

- Cultural Resources Protocols (Appendix P) includes protocols related to tribal access, visitor outreach, off-road vehicle use signage, nighttime lighting, and the construction worker cultural resources sensitivity education program.
- Site Security Plan (Appendix Q) includes protocols for physical security measures, inspections to identify potential intrusions during construction and operations, notification and reporting of disturbances to the environment, worker training and access, and demarcation of work areas.

Although the Groundwater FEIR assumed direct impacts to known prehistoric archaeological resources, including the Topock Maze (CA-SBR-219, Loci A, B, and C), which is a contributor to the significance of the Topock TCP, would be avoided, the Groundwater FEIR concluded that the construction of wells, pipelines, access roads and other facilities, associated noise and visual intrusions, and increased activity in the area would result in changes to the character, nature, and use of the area that would be inconsistent with the setting and could affect the cultural functionality of the Topock TCP. At the time of certification of the Groundwater FEIR, the exact locations of infrastructure, number of wells, amount of underground piping, and overall amount of soil disturbance was not known, nor had the full extent of the Topock TCP contributing elements been identified. Since then, in addition to the Topock Maze and other prehistoric archaeological resources, the land, water, plants, animals, and viewshed have been identified as contributing elements of the Topock TCP. Furthermore, since that time additional prehistoric archaeological resources and TCVA resources have been identified, which are also considered contributing elements of the Topock TCP.

The construction and operation and maintenance phases of the Final Remedy Design would occur within the area considered the Topock TCP. Potential direct impacts to the Topock TCP could occur as a result of: the importing of groundwater potentially containing increased levels of arsenic from Arizona to California, not previously considered by the Groundwater FEIR; construction and operation of the Construction Headquarters/Long-Term Remedy Support Area and Soil Processing Area/Clean-Soil Storage Area near Moabi Regional Park, not previously considered in the Groundwater FEIR; a three-fold increase in soil disturbance from that previously considered in the Groundwater FEIR, as well as a Future Activity Allowance; an approximately 12 percent increase in the number of boreholes from that previously considered in the Groundwater FEIR, as well as the Future Activity Allowance for boreholes; the use of portable generators and lighting to accommodate limited nighttime work activities, not previously considered in the Groundwater FEIR; and the use of staging areas, not previously analyzed in detail in the Groundwater FEIR.

The Final Remedy Design, as well as the Future Activity Allowance, has the potential to directly impact all seven of the contributing elements to the Topock TCP including land, water, plants, animals, viewshed, prehistoric archaeological resources, and TCVA resources. Direct impacts to each of these contributing elements are considered below.

Land

Activities involving ground disturbance and the installation of belowground infrastructure would directly and adversely affect the soil and landforms identified by some Interested Tribes as contributing elements of the Topock TCP. Because the land itself is essential to the significance of the Topock TCP, the disturbance of soil is considered a profound disruption in the belief system of some Interested Tribes and would affect the Topock TCP long after the Project is completed. Likewise, disturbances in areas of Tribal importance for their association with clay materials are also considered a significant intrusion of the Tribal values associated with the Topock TCP.

Water

The importing of millions of gallons of groundwater to California from Arizona could alter the groundwater dynamics of the area. In addition, the groundwater may potentially contain concentrations of arsenic above the California and Federal Maximum Contaminant Levels (MCLs). Importing groundwater could directly and adversely affect the water identified by some Interested Tribes as a contributing element of the Topock TCP. Because the water itself is integral to the significance of the Topock TCP and some Interested Tribes feel a deep cultural connection to the Colorado River and the water of the region, the importing of water to California is considered a significant intrusion on the Tribal values associated with the Topock TCP.

Plants

Activities involving ground disturbance (e.g., installation of wells, construction of roadways, and installation of aboveground and belowground infrastructure) could result in the removal or pruning of vegetation native to the area and would directly and adversely affect plants identified by some Interested Tribes as a contributing element of the Topock TCP. Native vegetation, particularly those indigenous species of ethnobotanical importance, is significant to some Interested Tribes as an integral part of the Topock TCP. Removal or alteration of the natural growth of native and traditional plant species for reasons other than traditional uses is considered disruptive to the natural environment of the Topock TCP.

Animals

Heightened human presence, construction activities, and increased infrastructure could result in disruption to the natural habitat of the area and would directly and adversely affect animals identified by some Interested Tribes as a contributing element of the Topock TCP. Some Interested Tribes feel a deep responsibility to ensure the natural habitat of the Topock TCP is free from disturbances to fauna and feel. Disturbances that would alter the natural patterns of animals are considered disruptive to the Topock TCP.

Viewshed

Some Interested Tribes have expressed that the viewshed, comprising a panoramic 360-degree view of the Project Area and vicinity, is more important than individual line-of-sight views. The construction and operation of aboveground infrastructure such as the Construction Headquarters/Long-Term Remedy Support Area, Soil Processing Area/Clean-Soil Storage Area, roads, wells, and pipelines would result in significant intrusion to the viewshed aspect of the

Topock TCP. Additionally, because some Interested Tribes have broad conception of visual intrusions to the Topock TCP, impacts to the viewshed go beyond visible physical disturbances and extend into the metaphysical plane in the opinion of the some Interested Tribes. The viewshed of the Topock TCP is not limited to a view in a particular direction, or even to a 360-degree view, but includes a three-dimensional perspective that extends below ground surface. The Final Groundwater Remedy Project proposes the installation of belowground infrastructure which, although not visible once installation is completed, would constitute a disruption in the three-dimensional perspective that some Interested Tribes hold in esteem. Tribes have expressed that these disturbances can still be seen from the “mind’s eye” and that the knowledge of physical alterations to the landscape remain in the collective consciousness of those Interested Tribes who associate deep spiritual beliefs and values with the area long after the landscape has been restored and evidence of destruction is no longer physically visible.

Prehistoric Archaeological Resources

Some Interested Tribes view prehistoric archaeological resources as an integral part of the Topock TCP (see Table 4.4-2 for list of 105 known prehistoric archaeological resources [98 prehistoric archaeological resources and the prehistoric component of seven multicomponent archaeological resources] in the Project Area that contribute to the Topock TCP). The Final Remedy Design has been specifically designed to avoid known prehistoric archaeological resources, to the extent possible, and the Topock Maze. Although prehistoric archaeological resources CA-SBR-11939 (lithic scatter), , Æ-Topock-210 (trail and associated markers), and AZ L:7:16(ASM) (multi-component site containing a lithic scatter) are bisected by existing roads or access routes, Project activities associated with the roads/access routes overlap the documented boundaries of sites Æ-Topock-210 and AZ L:7:16(ASM) are limited to use of the roads/access routes for access and no direct impacts to these resources are anticipated. The Project proposes the installation of pipeline within the existing roadway alignment that bisects CA-SBR-11939, however, pipeline installation would be limited to within the previously disturbed road bed and no direct impacts to intact portions of the resources are anticipated. For these reasons, no direct impacts to known prehistoric archaeological resources are anticipated. However, Project construction involves significant ground disturbance (e.g., installation of wells, construction of roadways, and installation of aboveground and belowground infrastructure) which includes associated noise and visual intrusions, and increased activity in the area that would result in changes to the character, nature, and use of the area and would be inconsistent with the setting of these resources. These actions could also inadvertently unearth as-yet-undiscovered prehistoric archaeological resources. The Project also provides for a Future Activity Allowance, which would involve additional construction of new wells, roads, pipelines, and other associated infrastructure at locations currently unknown. The extent of these potential additional impacts cannot be quantified as exact locations of additional infrastructure is not currently known. These activities could potentially impact prehistoric archaeological resources. Any damage, destruction, or alteration to prehistoric archaeological resources would directly and adversely impact the prehistoric archaeological resources associated with the Topock TCP.

TCVA Resources

TCVA resources have been identified by some Interested Tribes as an integral part of the Topock TCP (see Table 4.4-8 for list of 34 identified TCVA resources in the Project Area that contribute to the Topock TCP). Of the 34 TCVA resources in the Project Area, one (Æ-Topock-210 [trail]) overlaps an existing access road that would be used during implementation of the Final Remedy Design; however, as discussed above, Project activities associated with the road would be limited to use of the road for access and no impacts to this resource is anticipated. The remaining 33 TCVA resources will be avoided. However, Project construction involves significant ground disturbance (e.g., installation of wells, construction of roadways, and installation of aboveground and belowground infrastructure) which could inadvertently unearth as-yet-undiscovered TCVA resources. The Project also provides for a Future Activity Allowance, which would involve additional construction of new wells, roads, pipelines, and other associated infrastructure at locations currently unknown. The extent of these potential additional impacts cannot be quantified as exact locations of additional infrastructure is not currently known. These activities could potentially impact TCVA resources. Any damage, destruction, or alteration to TCVA resources would directly and adversely impact the TCVA resources associated with the Topock TCP.

Of particular concern to some Interested Tribes is the siting of monitoring wells MW-X and MW-Y in Arizona on the *Amut ahar* area. The area is considered culturally sensitive for its association with clay materials important to Tribes a particularly sacred area within the Topock TCP. The introduction of construction activities, increased human presence, and soil disturbances in this area is considered a significant disturbance to the contributing element of land associated with the Topock TCP.

Also of particular concern to some Interested Tribes is the use of Staging Areas 6 and 7 during construction activities. These areas are considered culturally sensitive and the use of these areas for storage and staging is considered a significant intrusion to the Topock TCP.

Additionally, increased human presence and construction activity during construction and long-term operation and maintenance in general would introduce visual and auditory elements inconsistent with the natural setting of the Topock TCP. Specifically, the use of heavy equipment, increased construction personnel, and the presence of construction materials would alter the setting of the Topock TCP. These activities are considered by some Interested Tribes to represent a disruption in the fundamental character and setting of the Topock TCP.

Direct impacts resulting from the long-term construction and operation and maintenance of the Final Remedy Design to each of the seven contributing elements and the overall setting of the Topock TCP as described above would constitute a substantial adverse change in the significance of the Topock TCP. These impacts are also described in the Groundwater FEIR, albeit at the time, the contributing elements of the TCP, aside from prehistoric archaeological resources including the Topock Maze, had not been defined. Implementation of **Mitigation Measure CUL-1a-1** through **CUL-1a-19** would be required to reduce significant impacts to the Topock TCP resulting from Project construction and operation and maintenance.

Implementation of Mitigation Measures CUL-1a-1, CUL-1a-2a, CUL-1a-3, CUL-1a-4, CUL-1a-5, CUL-1a-6, CUL-1a-7, CUL-1a-q, CUL-1a-9, CUL-1a-10, CUL-1a-11, CUL-1a-12, CUL-1a-13a, CUL-1a-14, CUL-1a-15, CUL-1a-16, CUL-1a-17, CUL-1a-18, and CUL-1a-19, in conjunction with CUL-1b/c1, CUL-1b/c-2 through CUL-1b/c-4, and CUL-4, as well as AES-1, AES-2, BIO-1a, NOISE-1, and NOISE-2, would avoid, minimize, rectify, reduce, or compensate for the impact of the overall Project. The plans described below in some of the mitigation measures were drafted with input from the Interested Tribes and draft and final documents were provided to them for review and comment. Mitigation Measure CUL-1a-1 requires avoiding, minimizing, or mitigating significant impacts to resources within the Topock TCP. Mitigation Measure CUL-1a-2a requires providing Tribal access to the Project Area in accordance with governing documents (CIMP, Appendix P of the C/RAWP, and CHPMP). Mitigation Measure CUL-1a-3 requires enhancing existing measures to prevent and reduce incursions from recreation and/or other outside users. Mitigation Measure CUL-1a-4 requires convening a multidisciplinary panel of independent scientific and engineering experts to review Project-related documents and attend Project-related meetings with the objective of advising Interested Tribes on technical matters relating to the Final Remedy Design and its construction. Mitigation Measure CUL-1a-5 requires avoiding and protecting indigenous plants of traditional cultural significance, and implementation of *Plan for Culturally Significant Plants* (Appendix A of the CIMP) for any plants that cannot be avoided and are displaced, which includes provisions for transplantation, salving top soil, collecting seeds, replacement plantings, and future monitoring of transplants. Mitigation Measure CUL-1a-6 and CUL-1a-7 require measures to reduce the introduction of additional noise and nighttime lighting to the Project Area, respectively. Mitigation Measure CUL-1a-8q requires implementation of the CIMP, which includes protocols to for continued tribal communication, treatment of archaeological materials, tribal review of cultural resources-related and project design documents, restoration of the Project area to its preconstruction conditions, a plan for the decommissioning of the IM-3 Facility, repatriation of clean soils, noise and visual intrusion reduction, tribal notification of Project-related activities, accommodating tribal ceremonies, tribal monitoring of ground disturbance, compensating tribal monitors, protecting cultural sites, reporting cultural discoveries, and periodic inspection of remediation facilities and staging areas for cultural resources. Mitigation Measure CUL-1a-9 requires use of previously disturbed areas, if possible. Mitigation Measure CUL-1a-10 requires physical avoidance of the Topock Maze as it is manifested archaeologically. Mitigation Measure CUL-1a-11 requires funding for part-time cultural resource specialist/project manager positions for each of the five Interested Tribes for timely review of Project documents, participating in project-related meetings, coordinating and managing input and interests for the Tribe on the Project, and to act as a Tribal liaison with PG&E and regulatory agencies. Mitigation Measure CUL-1a-12 requires providing Interested Tribes with the opportunity to conduct traditional healing/cleansing ceremonies before and after the construction phase. Mitigation Measure CUL-1a-13a requires implementing the worker education training program to ensure Project personnel area aware of the significance and sensitivity of the Topock TCP and the proper procedures and protocols that must be followed when working on the Project. Mitigation Measure CUL-1a-14 requires notifying Interested Tribes and affording then the opportunity to provide input on Future Activity Allowance work plans. Mitigation Measure CUL-1a-15 requires survey of areas for any designed Future Activity Allowance that have not been surveyed in the past 5 years, or pre-construction inspection of areas where an expedited action will be carried out, or coordination with archaeological and Tribal monitors on the ground when there is a need for immediate deviation from a planned activity due to unforeseen circumstances. Mitigation Measure CUL-1a-16 requires implementation of the restoration plan to restore the Project Area to its preconstruction condition. Mitigation Measure CUL-1a-17 requires handling of displaced soils in accordance with the CIMP and the Soil Management Plan (Appendix L of the C/RAWP), which outlines those soils that can be stored on-site for potential return, re-use, and/or restoration and the options for return, re-use, and/or restoration. Mitigation Measure CUL-1a-18 requires reducing visual intrusions consistent with the CIMP and Mitigation Measures AES-1 and AES-2 of this SEIR. Mitigation Measure CUL-1a-19 requires implementation of a Treatment Plan for the Topock TCP, which would include an informational kiosk to educate the public on the importance of the area, inclusion of Tribal perspectives on documentation (site records) for prehistoric archaeological resources to ensure that Tribal values and interpretation of those resources is considered beyond that which is scientifically important, an updated NRHP nomination package for the Topock Maze (CA-SBR-219, Loci A, B, and C) that considers the Tribal perspective of the Topock TCP and that captures the intrinsic value of the TCP to Interested Tribes such that this resource is preserved in posterity through documentation, updated site documentation for sites that have not been updated in over 10 years to assess the current condition, support for a site stewardship program to help protect and monitor the Topock Maze and other sensitive sites that contribute to the significance of the Topock TCP, and protective measures for site Æ-Topock-210 (prehistoric trail). However, even with the implementation of these measures, impacts to the historical resource identified as the Topock TCP would remain significant and unavoidable.

Decommissioning

The requirements in the C/RAWP (CH2M Hill 2015b) described above also apply to decommissioning activities. In addition, the following requirements of the C/RAWP also apply to impacts to the historical resource identified as the Topock TCP during decommissioning:

- Cultural Impact Mitigation Program (CIMP) (Appendix H) includes protocols for restoring the environment to its preconstruction conditions upon decommissioning (CUL-1a-8e); decommissioning of the IM-3 Facility (CUL-1a-8f).
- Cultural and Historic Properties Management Plan (CHPMP) (Appendix I) includes measure for restoration of the environment to preconstruction condition (CHPMP Sections 6.3 and 7.1.3).

Decommissioning of the Final Design Remedy would generally be beneficial to the Topock TCP in the long-term as infrastructure installed during the initial construction phase as well as any additional infrastructure needed through the long-term operation and maintenance phase (through the Future Activity Allowance) would be removed, areas impacted would be restored to native habitats, and the importing of water from Arizona would cease thereby effectively restoring those aspects of the Topock TCP related to viewshed, plants, animals, and water, although in the eyes of the Tribes the damage will have already been done and the landscape will never be the same. The nature of potential decommissioning impacts would be similar to those described above for construction and operation and maintenance. Specifically, decommissioning would require increased human activity, use of heavy equipment, and ground disturbance (e.g., removal and capping of wellheads, restoration of roadways, and removal of pipelines) resulting in potentially significant impacts to the setting and contributing elements of the Topock TCP. Implementation of Mitigation Measure CUL-1a-1 through CUL-1a-8q, CUL-1a-10, CUL-1a-11, CUL-1a-13a, CUL-1a-16 through CUL-1a-19 would be required to reduce significant impacts to the Topock TCP resulting from decommissioning activities. As described above under Construction and Operation and Maintenance, these mitigation measures would avoid, minimize, rectify, reduce, or compensate for the impact of the overall Project. However, even with the implementation of these measures, impacts to the historical resource identified as the Topock TCP would remain significant and unavoidable.

Comparison of Impact CUL-1a Impacts (Revised) to Groundwater FEIR Impact Analysis

The Groundwater FEIR considered impacts to the general setting, character, and landscape of the Topock TCP, since specific contributors had not been defined yet, and determined that impacts to this historical resource would be significant and unavoidable. To mitigate the impacts, the Groundwater FEIR required Mitigation Measure CUL-1a, which required provisions for avoidance of impacts to historical resources (CUL-1a-1), preparation of a Tribal Access Plan (CUL-1a-2), provisions for site security (CUL-1a-3), retention of Technical Review Committee (CUL-1a-4), requirements for the protection of indigenous plants (CUL-1a-5), noise restrictions (CUL-1a-6), nighttime lighting restrictions (CUL-1a-7), preparation of a Cultural Impact Monitoring Program (CIMP) (CUL-1a-8), preference for previously disturbed areas (CUL-1a-9), restriction on impacts to the Topock Maze (CUL-1a-10), requirements for open grant positions (CUL-1a-11), access for healing ceremonies (CUL-1a-12), and construction worker training (CUL-1a-13). Of the Groundwater FEIR mitigation measures, CUL-1a-2, CUL-1a-3b, CUL-1a-8 (a-p), and CUL-1a-13 have been implemented and completed since the certification of the Groundwater FEIR and are included as appendices to the C/RAWP. Other Groundwater FEIR measures (CUL-1a-1, CUL-1a-3, CUL-1a-3a, CUL-1a-3c, CUL-1a-3d, CUL-1a-4, CUL-1a-5, CUL-1a-6, CUL-1a-7, CUL-1a-9, CUL-1a-10, CUL-1a-11, and CUL-1a-12) have been implemented but remain pertinent to the Final Remedy Design with revisions. Since certification of the Groundwater FEIR, several Project components have changed including: the importing of groundwater potentially containing increased levels of arsenic from Arizona to California, not previously considered by the Groundwater FEIR; construction and operation of the Construction Headquarters/Long-Term Remedy Support Area, and Soil Processing Area/Clean-Soil Storage Area near Moabi Regional Park, not previously considered in the Groundwater FEIR; a three-fold increase in soil disturbance from that previously considered in the Groundwater FEIR, as well as a Future Activity Allowance; an approximately 12 percent increase in the number of boreholes from that previously considered in the Groundwater FEIR, as well as a Future Activity Allowance for boreholes; the use of portable generators and lighting to accommodate limited nighttime work activities, not previously considered in the Groundwater FEIR; and the use of staging areas, not previously analyzed in detail in the Groundwater FEIR, all of which would result in a substantially more severe significant impact on the historical resource identified as the Topock TCP than was previously identified in the Groundwater FEIR. This SEIR would also require implementation of Mitigation Measures CUL-1a-2a, CUL-1a-3e, CUL-1a-8q, CUL-1a-13a, CUL-1a-14, CUL-1a-15, CUL-1a-16, CUL-1a-17, CUL-1a-18, and CUL-1a-19 to reduce potentially significant impacts to the historical resource identified as the Topock TCP. However, even after implementation this impact would be significant and unavoidable.

Mitigation Measures

CUL-1a-1: Avoidance and Preservation in Place (Groundwater FEIR Measure with Revisions). During the construction, operation and maintenance, and decommissioning phases of the Project, PG&E shall carry out and require all subcontractors to carry out all Project activities in ways that avoid, minimize, and mitigate significant impacts resources associated with the Topock TCP, consistent with the CEQA Guidelines and with Stipulation I.B of the PA and Section 7.1 of the CHPMP, and to the maximum extent feasible as determined by DTSC, in coordination with PG&E, Interested Tribes, and respective landowners.

CUL-1a-2: Develop Tribal Access Plan (Measure Completed – Tribal Access Plan attached as Appendix P of the C/RAWP).

CUL-1a-2a: Implement Tribal Access Plans (New Measure). During the construction, operation and maintenance, and decommissioning phases of the Project, on non-federal land, Tribal access shall be permitted in a manner consistent with Section 2.1 "*Protocols for Continued Tribal Coordination*" of the CIMP (as described below in Mitigation Measure CUL-1a-8q) and "*Protocol to Preserve Tribal Member's Access to, and Use of, the Project Area*" as included in Appendix P of the C/RAWP, and on federal land, Tribal access will be governed by the provisions of Appendix B "*Tribal Access Plan*" of the CHPMP.

Procedures required by Appendix P of the C/RAWP include protocols and timelines for requesting access for religious, spiritual, or other cultural purposes and notification procedures (for additional details on requirements of the CIMP see below Mitigation Measure CUL-1a-8q, Section 2.11).

Procedures required by Appendix B of the CHPMP include allowing Interested Tribes to access federal lands without specific authorization for the purposes of collecting materials (such as plants and minerals) or for traditional or ceremonial noncommercial uses; protocols for obtaining access permission for other purposes (such as larger or overnight gatherings); privacy measures that prohibit recording Tribal activities; and closure of some areas and roads to public access.

CUL-1a-3: Site Security (Groundwater FEIR Measures with Revisions). During construction, operation and maintenance, and decommissioning of the Project, PG&E shall enhance existing measures to prevent and reduce incursions from recreational and/or other outside users from affecting unique archeological and historically significant resources, including resources within the Topock TCP, by implementing Measures CUL-1a-3a, -3c, -3d, and -3e:

> **CUL-1a-3a: Professional Qualifications and Annual Historical Resource Condition Inspection (Groundwater FEIR Measure with Revisions).** PG&E's approved Qualified Cultural Resource Consultant shall carry out all cultural resources work associated with the Project and implement the Mitigation Monitoring and Reporting Program (MMRP). Cultural resources consulting staff shall meet, or be under the direct

supervision of individuals meeting, the minimum professional qualifications standards set forth by the Secretary of the Interior (codified in 36 CFR Part 61; 48 FR 44739), as provided in Stipulation XI.A of the PA. In the event that PG&E needs to retain a new Qualified Cultural Resource Consultant, or additional cultural consultants, DTSC shall have approval authority over PG&E's selection of cultural resources consultants.

During construction, operation and maintenance, and decommissioning of the Project, the Qualified Cultural Resources Consultant shall conduct yearly condition inspections of documented historical resources (as identified in Table 4.4-2 of this SEIR, as well as any future resources identified within the Project Area, and any additional resources that the BLM requests be included in the annual condition inspections), including inspections of the Topock TCP, to determine if substantial adverse changes have occurred relative to the condition of the historical resources during the past year. Inspections may occur less frequently or may be limited in geographic scope upon approval by DTSC and in coordination with PG&E, Interested Tribes, and BLM. PG&E shall offer to retain a Tribal monitor at historic rates of compensation or Tribal representatives designated by the Tribal Council or chairperson, if so requested, to accompany the Qualified Cultural Resources Consultant during the condition inspections. Historical resources condition inspection reports in the established format shall be prepared documenting the results of the inspection. PG&E shall provide reports to DTSC and the Interested Tribes for review and comment in accordance with Section 6.6.5 "*Periodic Site Monitoring*" of the CHPMP. Based on the results of the report, DTSC may request that PG&E initiate a meeting with agencies and Interested Tribes to discuss the findings within 30 days of submittal of the reports.

CUL-1a-3b: Develop Site Security Plan (Measure Completed – Site Security Plan attached as Appendix Q of the C/RAWP).

CUL-1a-3c: Coordination with BLM and San Bernardino County (Groundwater FEIR Measure with Revisions). PG&E shall continue to coordinate with BLM and San Bernardino County to facilitate outreach to the staff at Moabi Regional Park, requesting that they communicate to visitors the parts of the Project Area that are off limits to off-road vehicle usage because of health and safety concerns, public lands management plans, or landowner requests. PG&E shall make a good faith effort to involve Interested Tribes in this outreach effort, providing Interested Tribes with the opportunity to comment on outreach materials or provide a Tribal representative the opportunity to participate in the outreach activities. As part of this outreach effort, PG&E shall work with Moabi Regional Park and offer to design, develop, and fund the installation of an informational display (e.g., bulletin board, kiosk) within Moabi Regional Park that informs visitors of the work being done in connection with the Project.

As provided in Appendix P of the C/RAWP, PG&E shall use information gathered during previous meetings with BLM, San Bernardino Regional Parks Department, Moabi Regional Park concessionaires, and Interested Tribes to facilitate the execution of visitor outreach materials. PG&E shall develop draft visitor outreach materials; develop a draft training session for Moabi Regional Park visitor-contact employees; develop display design concepts and draft informational content; and develop a draft plan for executing other outreach ideas identified during meetings. Once initial materials and plans are drafted, PG&E shall consult with the BLM, San Bernardino Regional Parks Department, Moabi Regional Park concessionaires, and Interested Tribes and provide these stakeholders an opportunity to review and comment on any outreach plan prior to its implementation. PG&E shall initiate conversations with key stakeholders (i.e., BLM, San Bernardino County, Moabi Regional Park, and Interested Tribes) within six months of approval of the Final Remedy Design.

In addition to Appendix P of the C/RAWP, PG&E shall complete and implement outreach materials and plans prior to the start of construction. Materials shall be reviewed by PG&E at each phase of the Project and may be updated with input from Interested Tribes and with approval by DTSC, as the Project progresses.

CUL-1a-3d: Signage (Groundwater FEIR Measure with Revisions). PG&E shall post signage to indicate those parts of the Project Area that are off limits to off-road vehicle usage due to possible health and safety concerns and to reduce potential damage to environmental resources. If agreed to by land owners and/or local, state, or federal management entities within the Project Area, PG&E shall work with the relevant land owner or land management entity to develop, design, and fund the installation of easily visible and clear signage. This may include coordination with BLM to install signage noting the designation of the area as an Area of Critical Environmental Concern owing to its biological and cultural resources, while ensuring that signs are placed in a way that does not draw unwanted attention to specific resources.

As provided in Appendix P of the C/RAWP, PG&E shall initiate conversations with key stakeholders (i.e., BLM, San Bernardino County, Park Moabi) within six months of the final approval of the Final Remedy Design.

In addition to requirements set forth in Appendix P of the C/RAWP, PG&E shall install signage prior to the start of construction, if possible, dependent on cooperation and input from land owners and land management entities.

CUL-1a-3e: Site Security (New Measure). Site security procedures shall be implemented in a manner consistent with the Site Security Plan (C/RAWP Appendix Q). The Site Security Plan includes, but is not limited to, protocols for regular inspections of the Project Area during working and non-working hours; ensuring construction zones and protective measures are being maintained; ensuring personnel use designated travel routes and parking areas; notification and reporting of outside disturbances to the environment; worker cultural resources sensitivity training; and visitor access controls.

CUL-1a-4: Technical Review Committee (Groundwater FEIR Measure with Revisions). PG&E shall work with representative members of the Interested Tribes to convene and retain a multidisciplinary panel of independent scientific and engineering experts as part of a Technical Review Committee (TRC). TRC may be called upon by the Interested Tribes to review Project-related documents and attend Project-related meetings. TRC efforts must be specific to that person's area of expertise and with the objective of advising interested tribal members on technical matters relating to the remedy design and its construction. The TRC shall be made up of not more than five multidisciplinary experts. The TRC shall include only persons with technical expertise limited to geology, hydrology, water quality, engineering, paleontology, toxicology, chemistry, or biology. TRC members shall be retained at rates comparable to those paid historically to tribal experts by PG&E. TRC members shall be selected by majority vote amongst participants from the Interested Tribes. For the purposes of contracting, this grant may be awarded to one tribal government to manage or, alternatively, PG&E may reimburse the tribe or TRC members directly. The entirety of the monies shall be used to fund the scientific and engineering team exclusively, and shall not be used to fund other tribal government expenses or used to support legal counsel. A stipulation of the contract shall be that the scientific and engineering team shall provide all deliverables and results to all involved tribes, despite a possible contract agreement with only one tribe or with PG&E. Activities shall be reported to DTSC for review and to ensure PG&E is in compliance at least annually. Upon conclusion of the construction phase of the Project, the necessity of the TRC shall be assessed by DTSC, at which time the provision of the TRC may be extended, reduced, or terminated. During the operation and maintenance and decommissioning phases, the necessity of the TRC shall be periodically evaluated by DTSC. This is the same committee referenced by CR-1e-8 in the Topock Soil Investigation Project EIR and MMRP.

CUL-1a-5: Avoidance of Indigenous Plants of Biological and Cultural Significance (Groundwater FEIR Measure with Revisions). During construction, operation and maintenance, and decommissioning of the Project, should any indigenous plants of traditional cultural significance and listed in Appendix PLA of the Groundwater FEIR be identified within the Project Area, PG&E shall avoid, protect, and encourage the natural regeneration of the identified plants. In the event that impacts to the identified plants cannot be avoided and such plants are displaced, provisions included in the *Plan for Culturally Significant Plants* (Appendix A of the CIMP) shall be implemented. This mitigation measure is not meant to replace or subsume any actions required by state or federal entities with regard to the protection of species listed as rare, threatened, or endangered. Appendix A of the CIMP requires preconstruction surveys of works areas, staging areas, and access routes to identify and demarcate culturally significant plants; protocols for transplanting culturally significant trees and plants; protocols for salvaging topsoil for re-use during site rehabilitation to encourage regrowth of desert annuals; collecting seeds for future planting; protocols for replacement planting by container grown plants/trees; and future monitoring of transplanted trees and shrubs.

CUL-1a-6: Noise (Groundwater FEIR Measure with Revisions). During construction, operation and maintenance, and decommissioning of the Project, all phone calls and alarms associated with remediation activities or facilities shall not be routed through PG&E's existing alarm system utilized at the Station. The notification system for remediation-related alerts and/or phone calls shall not introduce additional noise to the Project Area, to the maximum extent feasible, provided there is ongoing compliance with applicable safety regulations or standards of the Federal Energy Regulatory Commission, Occupational Safety and Health Administration, and other agencies.

CUL-1a-7: Nighttime Lighting (Groundwater FEIR Measure with Revisions). During construction, operation and maintenance, and decommissioning of the Project, nighttime construction-related activities shall be limited to circumstances that require the continuation of work into the nighttime periods because it cannot be disrupted or suspended (including but not limited to conditions during drilling or concrete pouring) or work may require an early morning start to ensure completion within 1 day or because of heat constraints including with regard to personnel health and safety. To minimize lighting impacts, lighting shall include shrouding or shielding for portable lights, the use of the lowest allowable height and fewest feasible numbers of lights consisting of downward-facing fixtures fitted with cutoff shields to reduce light diffusion. No permanent light poles shall be installed. However, lighting would also be required to comply with the minimum county, state, and federal security and safety standards (as described in Appendix P – Cultural Resources Protocols).

CUL-1a-8 (a through p): Develop Cultural Impact Mitigation Program (CIMP) (Measure Completed – Cultural Impact Mitigation Program attached as Appendix H of the C/RAWP).

CUL-1a-8q: Implement Cultural Impact Mitigation Program (New Mitigation Measure). All activities related to the Final Remedy Design, as well as implementing the Future Activity Allowance, long-term operation and maintenance, and future decommissioning activities, shall be implemented consistent with provisions of the Cultural Impact Mitigation Program (CIMP). In addition to the parties listed in Section 2.15 of the CIMP as requiring consultation regarding discoveries and review of draft documents, DTSC shall also be included in these processes. PG&E, in consultation with the Interested Tribes, may amend the CIMP if protocols or procedures require modification due to unforeseen circumstances, as deemed necessary by DTSC. The CIMP, which is based upon Groundwater FEIR measures CUL-1a-8 (a through p), is summarized below. The text below is intended to provide a brief summary of the primary impact-reducing components of the CIMP, some of which reference the federal requirements of the PA and CHPMP (the CIMP, PA, and CHPMP may be amended or revised from time to time). Where this summary text differs from the CIMP (or the PA or CHPMP) or subsequent revision, the language of the CIMP (or PA or CHPMP) shall govern.

Section 2.1- Protocols for Continued Tribal Communication: This provides methods for facilitating open communication with Interested Tribes; documenting the Interested Tribes' preferences for method of open communication; and reporting Tribal outreach to DTSC. This protocol incorporates reference to Section 6.7 "*Protocols for Tribal Notification and Consultation in Advance of Certain Activities*" of the CHPMP, which requires the BLM to establish email and mail distribution lists for all Points of Contact (POCs) and distribution of documents in accordance with Appendix B of the PA.

Section 2.2 - Protocols for Appropriate Treatment of Archaeological Materials: This describes how PG&E will continue to collaborate with Interested Tribes, respecting their preferences for avoidance and other treatment of archaeological discoveries; pre-construction field verifications; implementing procedures in Section IX of the PA and Section 8.1 and Appendix C of the CHPMP (i.e., cease work measures, notification protocols, inspecting and evaluating significance of discoveries, avoiding discoveries if possible and establishing protective measures, and treatment of discoveries that cannot be avoided). This section also outlines collection and curation protocols and data recovery procedures.

Section 2.3 - Protocols for the Review of Cultural Resource-Related Documents: This describes the dissemination and review of cultural resource-related documents; outlines types of documents available for review and comment; provides a timeframe for review and comment; and provides an opportunity for Interested Tribes to present their unique perspectives on cultural significance of the area, including natural and cultural resources, Tribal beliefs, religions, customs, and current practices. This protocol incorporates reference to Section XI of the PA.

Section 2.4 - Protocols for the Review of Project Design Documents: This documents the procedures for dissemination and Tribal review and comment on the completed groundwater remedy design documents prior to the beginning of construction. The Final Remedy Design document was completed and submitted to DTSC on November 18, 2015.

Section 2.5 - Protocols for Restoring the Environment to Its Preconstruction Conditions Upon Decommissioning: This protocol includes a description of the general approach to restoring areas affected by the Final Remedy Design (e.g., backfill and compaction; grading and contouring; habitat restoration and revegetation; and consideration/accommodating requests for Tribal ceremonies); completion of a restoration plan within 120 days of the Department of the Interior's (DOI's) certification of the completion of the remedy; development of the restoration plan in consultation with land owners and managers; and consultation with Signatories, Interested Tribes, and Invited Signatories to the PA. (Mitigation Measure CUL-1a-17, described below, requires implementation of the restoration plan.)

Section 2.6 - IM-3 Decommissioning Plan (Appendix B of the CIMP): The IM-3 Decommissioning Plan includes procedures for IM-3 system lay-up; procedures for decommissioning and removing the IM-3 system; waste management procedures; best management practices and mitigation measures compliance; soil confirmation sampling; a general approach for restoring areas originally affected by IM-3 operations; approvals and reporting requirements during the phases of IM-3 system closure; and a proposed work schedule.

Section 2.7 - Protocols for Repatriation of Clean Soils During Construction: The approach and management to soil displacement was documented in "Revised Management Protocol for Handling and Disposition of Displaced Site Material" (Appendix B of the Soil Management Plan) and outlines the procedures and measures to minimize the amount of displaced material that leaves the Project Area and to provide for the eventual return, reuse, or restoration of the material onto the lands from which it was displaced. The management protocol was incorporated into the Soil Management Plan (Appendix L of the C/RAWP) – see Mitigation Measure CUL-1a-18 below for additional details on the procedures in the Soil Management Plan.

Section 2.8 - Noise Protocol: This protocol includes establishing a disturbance coordinator for Project-related noise concerns; implementing engineering controls to minimize construction-related noise (e.g., install temporary noise barriers such as berms, stockpiles, dumpsters, bins, and/or engineered acoustical barriers) within identified noise buffers; selecting noise monitoring locations in coordination with Interested Tribes; maintaining all construction equipment according to manufacturer guidelines and fitting equipment with the best available noise suppression devices; shrouding or shielding impact tools; muffling or shielding exhaust ports on power equipment; limiting idling of construction equipment; procedures for addressing Project-related noise concerns; and communication/notification with Interested Tribes.

Section 2.9 - Protocols for the Appropriate Methods, Consistent with Mitigation Measures AES-1 and AES-2, to Reduce Visual Intrusions: This protocol includes the measures listed in SEIR Mitigation Measures AES-1 and AES-2, including a minimum setback of 20 feet from the water to prevent substantial vegetation removal along the riverbank; protecting mature plants; revegetation of disturbed areas within the riparian vegetation along the Colorado River; using plant material consistent with surrounding native vegetation; construction wells, pipeline, and utilities in muted, earth-tone colors consistent with the surrounding natural color palette. The protocol also summarizes the design concepts that PG&E incorporated into the Project, including locating final aboveground facilities within existing facilities when appropriate; building designs that are harmonious with existing buildings and nearby landforms; flush-mount or below-ground installations whenever feasible; construction within existing transportation corridors; working within previously disturbed sites whenever possible; placing aboveground facilities away from traffic where feasible; and designing lighting to minimize glare. The protocol also describes the opportunities afforded to agencies, Interested Tribes, and other stakeholders to provide their input on visual aspects of the Project design, such as providing visuals in design packages and allowing reviewing parties to request additional visualizations or key views. The protocol also provides notification procedures to address temporary visual intrusions during Project implementation.

Section 2.10 - Protocols for Tribal Notification in Advance of Project-Related Activities: Whenever possible, PG&E will notify Interested Tribes at least two weeks in advance of project-related ground-disturbing activities (such as grading, trenching, boring, drilling, or other excavation). Methods of notification may include, but are not limited to: through workplans and Project schedules; formal presentation or announcements at meetings; posting schedules online; email; telephone when advance notification was not possible; monthly schedules of field activities; weekly look-ahead schedules; and/or daily information sheets during times of intensive Project activity.

Section 2.11 - Protocols to Accommodate Tribal Ceremonies or Activities Involving Topock Cultural Area: The first step in the protocol is a request for access by Interested Tribes to conduct Tribal ceremonies by phoning, emailing, or writing to PG&E's Site Manager. PG&E will consider the request and decide if the request can be accommodated as is, with modifications, or not at all, and will notify the requestor by phone or in person as soon as possible. PG&E staff, consultants, contractors or subcontractors will conduct themselves appropriately and, if invited to participate, will be respectful, turn off cell phones, and refrain from photography without permission. PG&E will maintain confidentiality of documents and sensitive information to the maximum extent allowed by the law.

Section 2.12 - Protocols for Tribal Monitors to Observe Ground-Disturbing Activities: PG&E will notify Interested Tribes of planned ground-disturbing activities and other scientific surveying within a minimum of one week and in the event of schedule changes. Tribal monitors will prepare and submit Daily Monitoring Logs. This protocol references Section 6.6.4 "*Construction Monitoring*" of the CHPMP, which requires advance notification and inviting Tribal monitors to observe ground-disturbing activities in accordance with Appendix C of the PA.

Section 2.13 - Provision of Reasonable Compensation for Tribal Monitors: PG&E will provide reasonable compensation for Tribal monitors who work on the Project consistent with historic rates.

Section 2.14 - Protocols for Protective Measures for Archaeological/Historical Sites During Construction: This protocol provides for identifying protective measures cultural sites, to the extent feasible, prior to construction; modifying construction zones to avoid discoveries identified during construction; implementing protective measures (such as covering, flagging, or fencing); if needed, modifying exclusion zones in consultation with the parties in the field; providing for archaeological and Tribal monitoring of implementation and removal of protective measures; periodic inspection of protective measures during construction; inspection, documentation, evaluation, and protection of discoveries; notification to Tribal monitors of discoveries; and restoration of areas to pre-constructions conditions after removal protective measures.

Section 2.15 - Protocols for Reporting Discoveries of Cultural Importance: This protocol outlines how PG&E will notify DTSC and BLM of discoveries of previously unidentified or suspected historic or archaeological resources (including human remains and/or associated funerary objects or graves), as well as Interested Tribes if the resource is Native American in origin; will cease work within the vicinity of the discovery until the discovery has been evaluated and treatment developed; implement protective measures, if necessary; choose avoidance as the preferred method for the treatment of cultural resources, particularly for human remains, items of cultural patrimony, or funerary objects; and document discoveries in a culturally sensitive manner, and invite Interested Tribes to assist with documentation to identify Tribal cultural values. If further studies are required for any discovery, PG&E will consult with BLM, who will consult with Interested Tribes. Documentation will be provided to BLM and Interested Tribes (for Native American resources) for review and comment and final documents will be distributed to DTSC, BLM, Interested Tribes, and PG&E, and to ASM or CHRIS as appropriate.

Section 2.16 - Protocols for Inspecting Remediation Facilities and/or Staging Areas During Construction: The locations of remediation facilities and staging area will be examined for cultural resources throughout the construction phase. Interested Tribes will receive notice at least 2 weeks in advance whenever possible. Previously impacted land will be selected wherever feasible for re-use as staging areas and/or the siting of remediation facilities and direct physical impacts to the Topock Maze as it is manifested archaeologically will be completely avoided when siting any staging area or remediation facility. Any resources present will be avoided to the extent feasible. This protocol also provides for archaeological and Tribal monitoring of earth-disturbing activities at remediation facilities and/or staging areas during construction, and states that these monitors will at all times comply with Project-wide and job site-specific safety requirements.

CUL-1a-9: Preference for Previously Disturbed Areas (Groundwater FEIR Measure with Revisions). During the design of areas to be used as part of the Future Activity Allowance, PG&E shall, in communication with the Interested Tribes (and subject to their review), and to the maximum extent feasible, as determined by DTSC, give: (1) priority to previously disturbed areas for the placement of new physical improvements; and (2) priority to re-use of existing physical improvements, such as but not limited to wells and pipelines, but not including the IM-3 Facility. “Disturbed” areas in this context means those areas outside of documented archaeological site boundaries that have experienced ground disturbance in the last 50 years.

CUL-1a-10: Avoidance of Topock Maze (Groundwater FEIR Measure with Revisions). During construction, and operation and maintenance, and decommissioning activities, as well as activities associated with the Future Activity Allowance, PG&E shall consider the location of Loci A, B, and C of the Topock Maze during the design of Project components and is prohibited from creating any direct physical impact on the Topock Maze, as it is manifested archaeologically. The design of facilities as part of the Future Activity Allowance shall also prevent all indirect (e.g. noise, aesthetics) impacts on the Topock Maze, to the maximum extent feasible as determined by DTSC.

CUL-1a-11: Open Grant Funding (Groundwater FEIR Measure with Revisions). During the construction phase of the Project, PG&E shall provide an open grant for one part-time cultural resource specialist/project manager position for each of the five Interested Tribes: Chemehuevi, Cocopah, CRIT, FMIT, and Hualapai. The award of the grants is for the timely review of Project documents, participating in project-related meetings, coordinating and managing input and interests for the Tribe on the Project, and to act as a Tribal liaison with PG&E and regulatory agencies. The part-time cultural resources specialist/project manager shall be compensated at rates of historic compensation. The payment of grant monies shall be timed to the awarded tribes' fiscal cycles so that the tribes are not forced to front funds for long periods of time. These positions shall act as cultural resources contacts and project managers for interactions between the tribes, PG&E, and DTSC to ensure coordination during construction of the remedy to avoid, reduce, or otherwise mitigate impacts on resources qualifying as historical resources under CEQA. This funding is separate from provisions for tribal monitor positions and shall not be used for routine tribal business or legal counsel. For review and approval, PG&E shall provide DTSC with the names of the selected grant recipients and a report that summarizes activities associated with the grant program, at least annually. Upon conclusion of the construction phase of the Project, the necessity of the cultural resource specialist/project manager positions shall be assessed by DTSC, at which time the positions may be extended, reduced, or terminated. During the operation and maintenance and decommissioning phases, the necessity of the positions shall be periodically evaluated by DTSC. These positions shall be inclusive of those referenced by CR-1e-9 in the Topock Soil Investigation Project EIR and MMRP.

CUL-1a-12: Tribal Ceremonies (Groundwater FEIR Measure with Revisions). PG&E shall provide reasonable opportunity, as determined by DTSC, for Interested Tribes to conduct a traditional healing/cleansing ceremony (or ceremonies) before and after the construction phase. Accommodations for Tribal ceremonies shall be implemented consistent with Section 2.11 "*Protocols to Accommodate Tribal Ceremonies or Activities Involving Topock TCP*" of the CIMP (as described above in Mitigation Measure CUL-1a-8q) and Section 7.2 "*Accommodation of Tribal Activities and Ceremonies Involving the Topock Maze/TCP*" (see below) and Appendix B of the CHPMP (as described above in Mitigation Measure CUL-1a-2a).

As described in Section 7.2 of the CHPMP, the BLM will continue to work with the Interested Tribes to identify Tribal activities and ceremonies that are associated with the Topock TCP and to consult with the Interested Tribes and PG&E to develop treatment measures to accommodate them.

CUL-1a-13: Develop Worker Education Training Program (Measure Completed – Worker Education Training Program is attached in Appendix P of the C/RAWP).

CUL-1a-13a: Implement Worker Education Training (New Measure). During construction, operation and maintenance, and decommissioning of the Project, worker education training procedures shall be implemented consistent with the protocols identified in Appendix P of the C/RAWP. The following provides a summary of the worker education training procedures as identified in Appendix P of the C/RAWP. The worker education program will be implemented prior to commencement of any ground-disturbing activities and as personnel are added. The program includes, but is not limited to: mandatory training for PG&E employees, consultants, contractors, and subcontractors who are involved with construction or ground disturbing activities (including decommissioning and restoration); cultural sensitivity training to familiarize personnel with the sacred nature of the area; providing for participation of Interested Tribes, Tribal monitors, archaeological monitors, and Federal agency staff as appropriate; and non-tolerance of any disrespectful behavior in the field and removal of any staff, workers, or contractors who do not comply. Personnel engaged in field activities will be trained prior to conducting fieldwork and personnel engaged in design work will be trained as soon as practicable after being assigned to the Project. Training will be conducted at each Field Project Orientation meeting prior to each substantial Project work phase and at additional opportunities as identified by PG&E in collaboration with the Interested Tribes. Training will include, but is not limited to discussion topics such as: the significance and sensitivity of the Topock TCP; appropriate on-site behavior; protection of significant cultural resources; worker responsibilities (avoidance of sensitive areas, staying on designated routes and work areas, etc.); and consequences of noncompliance. Presentation materials that may be developed will be shared with Interested Tribes for their input. PG&E will maintain training records that will be dated and signed by the trainee and trainer.

CUL-1a-14: Tribal Notification of Potential Future Activities (New Measure). For any potential future activities that the agencies will require PG&E to prepare a work plan, interested Tribes shall be notified and afforded the opportunity to provide input consistent with the general process described in Section 2.3 and Section 2.4 of the CIMP as defined in CUL-1a-8q. In circumstances where only one design cycle is deemed necessary by DTSC for the potential future work, steps A through H of Figure 2-1 MMRP CUL-1a-8d Design Review Protocol Flow Chart will be followed. PG&E shall, likewise, notify Interested Tribes at least two weeks in advance of project related ground-disturbing activities whenever possible in accordance with Section 2.10 of the CIMP.

CUL-1a-15: Future Activity Allowance Cultural Resources Survey (New Measure). During the planning phase of any designed Future Activity Allowance activities, all areas that may be subject to construction or operation and maintenance activities as part of the Future Activity Allowance, plus a 50-foot buffer, and have not been surveyed in the past 5 years, shall be subject to archaeological resources survey prior to any ground disturbing activity. The survey shall be conducted by the Qualified Cultural Resources Consultant and shall document resources potentially qualifying as historical resources under CEQA (both as contributors to the Topock TCP and as individual historical resources). Tribal monitors shall be invited to participate in the survey. PG&E's Qualified Cultural Resources Consultant shall document the results of the survey in a *Future Activity Allowance Cultural Resources Survey Report* that follows the "*Archaeological Resource Management Reports guidelines and Department of Parks and*

Recreation" guidelines. PG&E's Qualified Cultural Resources Consultant shall also prepare Department of Parks and Recreation 523 forms and file them with the South Central Coastal Information Center (for resources in California) and Arizona State Museum site cards shall be prepared and filed with the Arizona State Museum (for resources in Arizona). PG&E shall distribute draft reports to DTSC, BLM, and the Interested Tribes for review and comment consistent with Section 2.3 "*Protocols for the Review of Cultural Resources-Related Documents*" of the CIMP and Section 6.7 "*Protocols for Tribal Notification and Consultation in Advance of Certain Activities*" of the CHPMP (as described above in Mitigation Measure CUL-1a-8q). PG&E shall submit final reports to DTSC, BLM, and the Interested Tribes no less than 2 weeks prior to the start of ground disturbance in an area.

In the event that resources potentially qualifying as historical resources under CEQA (either as contributors to the Topock TCP or as individual historical resources) are identified during the survey, avoidance and preservation in place shall be the preferred manner of mitigating impacts to the resources. If avoidance of the identified resources is determined by DTSC, in coordination with respective landowners, Interested Tribes, and PG&E, to be infeasible because, for example, it would impede the fundamental Project objective of implementing the Final Remedy Design, procedures provided in Section 2.2 "*Protocols for the Appropriate Treatment of Archaeological Materials*" of the CIMP, Section 8 "*Discoveries*" and Appendix C "*Discovery Plan*" of the CHPMP (as described above in Mitigation Measure CUL-1a-8q), and Appendix D "*Plan of Action*" of the CHPMP (as described below in Mitigation Measure CUL-4) shall be implemented.

If DTSC determines that an expedited action is necessary in order to respond to the changing needs of the remedy, pre-construction inspection protocols identified in Section 2.16, "*Protocols for Inspecting Remediation Facilities and or Staging Areas During Construction*" of the CIMP shall then be followed. This section requires tribal notification in advance of the pre-construction inspection, archaeological and tribal inspection of the area, avoidance of identified resources if possible, or treatment if necessary, and monitoring of any ground disturbance.

In instances where Future Activity Allowance activities are proposed in the field due to the need for immediate deviation from a planned activity from unforeseen circumstances, PG&E shall conduct the activity in consultation with an archaeological monitor and Tribal Monitor on the ground, and notify DTSC and the appropriate DOI agency of the activity within 24 hours.

CUL-1a-16: Implement Restoration Plan (New Measure). Restoration following decommissioning of the Project shall be implemented in a manner consistent with Section 2.5 "*Protocols for Restoring the Environment to its Preconstruction Conditions Upon Decommissioning*" of the CIMP (as described above in Mitigation Measure CUL-1a-8q) and the Havasu National Wildlife Refuge Restoration Plan (C/RAWP Appendix G; see Mitigation Measure BIO-1a in this SEIR). Additionally, consistent with requirements of Section 6.3 "*Environmental Restoration*" of the CHPMP, a Remedy Decommissioning Plan will be submitted by PG&E to DOI within 120 days of DOI's certification of completion of the CERCLA Remedial Action and determination by DOI that removal of such facilities is protective of human health and the environment. The Remedy Restoration Plan shall be provided to DTSC and Interested Tribes for review and comment.

CUL-1a-17: Displaced Soil Procedures (New Measure). Procedures for the management and handling of displaced soils resulting from activities associated with construction, operation and maintenance, and decommissioning of the Project shall be treated in a manner consistent Section 2.7 "*Protocols for Repatriation of Clean Soils Cuttings Generated During Construction*" of the CIMP (as described above in Mitigation Measure CUL-1a-8q) and the Soil Management Plan (C/RAWP Appendix L). The following provides a summary of the Soil Management Plan procedures as identified in Appendix L of the C/RAWP. Where this summary text differs from the Soil Management Plan or subsequent revision, the language of the Soil Management Plan shall govern. As indicated in the Soil Management Plan, clean soil (material that is determined to have a representative concentration that is equal to or less than the interim screening level or project-specific cleanup goal) will be labeled and stored on-site in 55-gallon drums/small containers, roll-off bins, and/or stockpiles for return, re-use, and/or restoration. Soil classified as RCRA and non-RCRA hazardous waste, and non-hazardous soil that is unsuitable for final disposition on-site because contaminants are present above the interim screening level or Project-specific cleanup goal, will be labeled and stored temporarily on-site and transported off-site for disposal. Options for return, re-use, and/or restoration on-site that have been identified include: replacement of original material into original or other borings, trenches, or excavations; creation of topographical or landscape barriers to protect sensitive areas; creation of berms or other structures to prevent erosion; on-site road maintenance; and stockpiling in designated areas.

CUL-1a-18: Aesthetics (New Measure). During construction, operation and maintenance, and decommissioning, protocols for the protection of visual resources shall be implemented in a manner consistent with Section 2.9 "*Protocols for the Appropriate Methods, Consistent with Measures AES-1 and AES-2 [of the Groundwater FEIR] to Reduce Visual Intrusions*" of the CIMP (see also Mitigation Measures AES-1 and AES-2 of this SEIR).

CUL-1a-19: Implement Treatment Plan for the Topock TCP (New Measure). All activities associated with construction, operation and maintenance, and decommissioning of the Final Remedy Design shall be implemented consistent with provisions of the *Cultural and Historical Property Treatment Plan for the Topock Compressor Station* (Hanes and Price *in progress*), which is being prepared pursuant to requirements of the Stipulation VII.B and Appendix B of the PA and mitigation measure CUL-1b/c-3 of the Groundwater FEIR. The Treatment Plan shall address treatment to the Topock TCP and its contributors, in addition to historical resources other than the Topock TCP (this is the same Treatment Plan referenced in Section 7 "*Cultural Property-Specific Treatment Measures*" of the CHPMP, which can be used to satisfy the requirements of this mitigation measure). PG&E shall submit the Treatment Plan to DTSC for review and approval. PG&E shall submit the Treatment Plan to DTSC for review and approval. PG&E shall also distribute the Treatment Plan to the Interested Tribes for tribal review consistent with Section 2.3 "*Protocols for the Review of Cultural Resources-Related Documents*" of the CIMP and Section 6.7 "*Protocols for Tribal Notification and Consultation in Advance of Certain Activities*" of the CHPMP (as described above in Mitigation Measure CUL-1a-8q). The

Treatment Plan may be amended in the future in the event of new discoveries or greater than anticipated impacts. Treatment Plan amendments shall be required in instances where the current content of the Treatment Plan is insufficient to address necessary treatment measures and shall be determined in coordination amongst PG&E, BLM, DTSC, and Interested Tribes.

Historical Resources Other Than the Topock TCP

Construction, Operation & Maintenance

The Groundwater FEIR determined that Project activities could result in a potentially significant impact to historical resources other than the Topock TCP. Since the certification of the Groundwater FEIR, the Project Area has been modified and additional studies conducted. As a result, a total of 124[10] known historical resources (i.e., resources recommended eligible, determined eligible, or listed in the CRHR, or discretionarily determined to be eligible for the CRHR by DTSC) other than the Topock TCP are within the Project Area (see Table 4.4-2). In addition, the Groundwater FEIR determined that Project activities could result in a potentially significant impact to unknown resources that could qualify as historical resources under CEQA, which could be encountered during ground disturbance. The following requirements would be employed as defined in the C/RAWP (CH2M Hill 2015b) and apply to impacts to historical resources other than the Topock TCP:

- Standard Operating Procedures (Appendix B) SOP-A16 – Access Routes outlines procedures to be used when accessing wells or other sampling stations and stipulates that access by vehicles is restricted to established roads or tracks and access by low-impact utility vehicles (UTVs) and by foot will follow consistent routes or paths. All vehicles are to observe a 10-mph speed limit on Historic Route 66, drive in the center to avoid wear on the shoulders, and not cut corners when exiting the roadway.
- Cultural Impact Mitigation Program (Appendix H) includes protocols for the appropriate treatment of archaeological materials (Section 2.2, CUL-1a-8b); protective measures for archaeological/historical sites during construction (Section 2.14, CUL-1a-8n); and reporting discoveries of cultural importance (Section 2.15, CUL-1a-8o).
- Cultural and Historic Properties Management Plan (CHPMP) (Appendix I) includes measures for avoidance of resources to the maximum extent possible (CHPMP Sections 5.1.2, 6.6, 6.6.3; and 7.3); placement of barriers, such as temporary fencing, to ensure avoidance of sensitive areas (CHPMP Section 6.6.3); archaeological and tribal monitoring of ground-disturbing activities (CHPMP Sections 6.6.4 and 6.8); periodic site monitoring (CHPMP Section 6.6.5); treatment of archaeological materials disturbed or discovered during implementation of the final remedy (CHPMP Section 8.1 and Appendix C.6); reporting discoveries of cultural importance (CHPMP Section Appendix C.7); curation of cultural materials (CHPMP Section 6.11); educational initiatives through public outreach (CHPMP Section 6.10); development of a brochure describing cultural resource concerns with actions within the vicinity of the Topock Remediation Project and the Topock Maze (CHPMP Section 6.2.1.2). Detailed treatment of unknown resources discovered during Project implementation is outlined in the CHPMP, Appendix C – Discovery Plan. The Discovery

[10] There are 119 archaeological resources and 5 historic-period built resources

Plan includes cease work measures (C.2 and C.3); site delineation and documentation (C.3); evaluation of resources (C.4); assessment and treatment if avoidance is not possible (C.5); artifact processing and curation (C.6); and reporting (C.7).

- Cultural Resources Protocols (Appendix P) includes protocols related to visitor outreach, off-road vehicle use signage, and the construction worker cultural resources sensitivity education program.
- Technical Memorandum: Proposed Use of Certain Areas for Construction, Staging, and Soil Storage at PG&E Topock Compressor Station (Appendix W) requires that working areas be demarcated and protective barriers used to safeguard the Route 66 Welcome Sign during use of Staging Area 25.

Known Historical Resources

The Groundwater FEIR concluded that ground-disturbing work and the introduction of intrusive new features to the landscape could disturb or alter known historical resources other than the Topock TCP. At the time of certification of the Groundwater FEIR, the exact locations of infrastructure, number of wells, amount of underground piping, and overall amount of soil disturbance was not known and the level of disturbances to known historical resources other than the Topock TCP had not yet been identified. Direct and indirect impacts could occur as a result of: construction of pipelines to import groundwater from Arizona to California; construction of the Construction Headquarters/Long-Term Remedy Support Area and Soil Processing/Clean-Soil Storage Area near Moabi Regional Park; improvements on the Station; construction of an Operations Building and other improvements at the Transwestern Bench; construction of a Carbon Amendment Building and other improvements at the MW-20 Bench; and the construction of wells, underground pipelines, and roadway improvements, as well as part of the Future Activity Allowance.

There are nine historical resources (CA-SBR-2910H/AZ I:15:156 (ASM)/AZ L:7:72 (ASM), CA-SBR-6693H/AZ I:14:334 (ASM) (A&P/AT&SF/BNSF), CA-SBR-11862H, CA-SBR-11997H, CA-SBR-13791H, CA-SBR-11939, AZ L:7:16 (ASM), 36-027678, and Æ-Topock-210) other than the Topock TCP that overlap planned Project components within the Project Area and may be subject to additional disturbances (see Table 4.4-3).The construction and operation and maintenance phases of the Final Remedy Design have the potential to impact known historical resources other than the Topock TCP through ground disturbance, increased activity, and introduction of new visual intrusions to the landscape would alter the setting of these resources, and this impact is considered potentially significant. Implementation of **Mitigation Measures CUL-1b/c-1, CUL-1b/c-3, CUL-1b/c-4, CUL-1b/c-5, and CUL-1b/c-6** would be required to reduce significant impacts to known historical resources resulting from Project construction and operation and maintenance. Impacts and impact-reducing mitigation measures for each known historical resource that overlaps with planned Project components within the Project Area is considered below. However, even with implementation of Mitigation Measure CUL-1b/c-1, CUL-1b/c-3, CUL-1b/c-4, CUL-1b/c-5, and CUL-1b/c-6, overall construction-related and operation and maintenance-related impacts to known historical resources other than the Topock TCP would be significant and unavoidable.

CA-SBR-2910H/AZ I:15:156 (ASM)/AZ L:7:72 (ASM) (National Old Trails Highway/Route 66)

The Groundwater FEIR concluded that National Old Trails Highway/Route 66 could be subject to ground disturbance and out-of-character visual intrusions. At the time of certification of the Groundwater FEIR, the exact locations of infrastructure, number of wells, amount of underground piping, and overall amount of soil disturbance was not known, nor had the eligible segments or character-defining features of National Old Trails Highway/Route 66 within the Project Area been identified. Since then, the eligible segments of National Old Trails Highway/Route 66 that could be impacted by the Project were identified and include Segments A, J, L, U, X, and Y. The overall character-defining features of the eligible segments have been identified as: 1) the historic roadbed structure and its engineered features; 2) associated features such as road-related structures; 3) the historic sense of the travel experience along particular continuous road segments (minimum 1,500 feet line-of-sight along pre-1926 road alignments and 1.5 mile line-of-sight for post-1926 road alignments); and 4) the viewshed representing the desert landscape at the time of historical road use. In addition, road-related features have been identified for each eligible segment (see Table 4.4-4). Impacts to each segment from construction and operation and maintenance are discussed below followed by a summary of impacts to the entirety of the resource located within the Project Area.

Segment A

This segment would be impacted by installation of underground piping and wells. The entire length of this segment would be impacted by installation of underground piping. In addition, up to five wells (four planned and one provisional), as well as wells potentially associated with the Future Activity Allowance, would be installed in this segment. This segment would also continue to be used as an access road. None of the associated road-related features (Feature 13 – metal pipe culvert; timber guardrails; or 36-021486 – Welcome Sign) would be directly impacted by the Project, although Staging Area 25 would be situated near the Welcome Sign. The Operations Building would be constructed nearby at the Transwestern Bench and additional staging areas would be located adjacent to this segment. There may also be activities related to the Future Activity Allowance.

Segment J

This segment would be impacted by installation of underground piping and wells. The pipeline would be installed along the north roadbed shoulder and extend about 1,600 feet east of the approximate mid-point of this segment. Three new wells would be installed within this segment as well. In addition, one aboveground transformer and associated control panels would be installed near the northern edge of this segment, along with structures to protect the transformer from vehicular traffic. Portions of this segment (which has been covered as part of protective measures implemented as a result of a previous Memorandum of Agreement [MOA] regarding the IM-3 Facility) would also continue to be used as an access road. Associated road-related features that would be impacted by the Project include: Feature 20 – concrete ROW marker; Features 28 and 29 – cement revetments; Feature 35 – wooden flume; and Features 37 and 38 –

refuse scatters. If possible, these features would be avoided during construction, but the Project could remove or otherwise alter these features. Associated road-related features that would not be impacted by the Project include: Features 19, 21, 27, 31, 39-41, 43, 44 – concrete ROW markers; Feature 30 – rock-lined ditch; Feature 32 – sump well; Features 33 and 34 – flagstone culverts; and Feature 36 – metal culverts. Staging Areas 6, 7, 8, 12, and 13 would be located adjacent to this segment. There may also be activities related to the Future Activity Allowance.

Segment L

Impacts to this segment include three wells and road improvements at the southern end of the segment. The underground pipeline would also cross this segment in one location. In addition, this segment would continue to be used as an access road. None of the associated road-related features (Features 1 and 2 – rock berms; Feature 3 – concrete right-of-way marker; Locus 1; and the banked curve) would be directly impacted by the Project. Staging Areas 6 and 7 would be located adjacent to this segment. There may also be activities related to the Future Activity Allowance.

Segment U

Portions of Segment U are currently used as an access road (which has been covered as part of protective measures implemented as a result of a previous Memorandum of Agreement regarding the IM-3 Facility) (Mead and Hunt 2015). No ground disturbance or road improvements are planned for this segment (Hanes and Price *in progress*). There may be activities related to the Future Activity Allowance. No road-related features are associated with Segment U.

Segment X

Impacts to this segment include the installation of approximately 35 wells along a 2,000-foot long portion of the eastern part of Segment X. This would also impact the underlying railway bed (see CA-SBR-6693H/AZ I:14:334 (ASM) (A&P/AT&SF/BNSF) – discussed below). The underground pipeline would also cross this segment in three locations and improvements or construction of existing access roads related to the Soil Processing/ Clean-Soil Storage Area would impact this segment. In addition, this segment is an active road and would continue to be used to access Project components and the Station. None of the associated road-related features (Features 15, 16, 18, and 45 – concrete ROW markers; Feature 14 – retaining wall; CA-SBR-11997H – masonry culvert; 36-021486 – Welcome Sign; N/A – masonry culvert; and the banked curve) would be impacted by the Project. Other facilities that would be adjacent to this segment include the Operations Building at the Transwestern Bench, the Carbon Amendment Building at the MW-20 Bench, the Soil Processing/ Clean-Soil Storage Area near Moabi Regional Park, aboveground transformers, and Staging Areas 3, 14, 15, 16, 18, 23, 24, and 25. There may also be activities related to the Future Activity Allowance.

Segment Y

This segment would be impacted by installation of underground piping. The pipeline would be installed in the west shoulder of the road for a length of approximately 2,000 feet and a small section would be installed in the southbound traffic lane where the alignment crosses under the railroad. In addition, this segment is an active road and would continue to be used to access Project components. No road-related features are associated with Segment Y. Staging Areas 26, 27, and 28 would be located adjacent to this segment. There may also be activities related to the Future Activity Allowance.

Summary of National Old Trails Highway/Route 66 Impacts

Project construction and operation and maintenance activities would result in a substantial adverse change in the significance of this resource. The overall character-defining features of the eligible segments have been identified as: 1) the historic roadbed structure and its engineered features; 2) associated features such as road-related structures; 3) the historic sense of the travel experience along particular continuous road segments (minimum 1,500 feet line-of-sight along pre-1926 road alignments and 1.5 mile line-of-sight for post-1926 road alignments); and 4) the viewshed representing the desert landscape at the time of historical road use. The historic roadbed and a number of associated features would be directly impacted by construction of pipelines (Segments A, J, L, X, and Y) and wells (Segments A, J, L, and X). There may also be additional future impacts associated with the implementation of the Future Activity Allowance and continued use as access roads during operation and maintenance (all segments). In addition, the line-of-sight travel experience and viewshed representing the desert landscape at the time of historical road use (1914-1966) would be altered by the addition of the Operations Building at the Transwestern Bench (Segments A and X), the Carbon Amendment Building at the MW-20 Bench (Segment X), the Soil Processing/ Clean-Soil Storage Area near Moabi Regional Park (Segment X), aboveground transformers (Segments J and X), and staging areas (Segments A, J, X, and Y). Therefore, construction-related and operation and maintenance-related impacts to CA-SBR-2910H/AZ I:15:156 (ASM)/AZ L:7:72 (ASM) would be potentially significant. Mitigation Measures CUL-1b/c-1, -3, -4, -5, and -6, which require consideration of the locations of historical resources during design, preparation and implementation of a treatment plan (which includes an interpretive plan and public outreach program to educate visitors on the importance of NOTH/Route 66, additional documentation of some contributing elements to capture the condition of the resource such that it is preserved in posterity, and restoration of the Route 66 Sign), monitoring, avoidance where feasible, and additional protective measures (such as annual condition inspections, installation of temporary barriers, and worker training), would avoid, minimize, rectify, reduce, or compensate for the impact of the overall Project. However, even with implementation of Mitigation Measures CUL-1b/c-1, -3, -4, -5, and -6 this impact would be significant and unavoidable.

CA-SBR-6693H/AZ I:14:334 (ASM) (A&P/AT&SF/BNSF)

Similar to impacts described above for CA-SBR-2910H/AZ I:15:156 (ASM)/AZ L:7:72 (ASM), impacts to this resource would result from the installation of underground piping and wells, which would impact the railway bed underlying National Trails Highway/Route 66. There may also be additional future impacts associated with the Future Activity Allowance during operation and maintenance. Therefore, construction-related and operation and maintenance-related impacts to CA-SBR-6693H/AZ I:14:334 (ASM) (A&P/AT&SF/BNSF) would be potentially significant. Mitigation Measures CUL-1b/c-1, -3, -4, -5, and -6, which require consideration of the locations of historical resources during design, preparation and implementation of a treatment plan, monitoring, avoidance where feasible, and additional protective measures (such as annual condition inspections and worker training), would reduce this potentially significant impact. However, even with implementation of Mitigation Measures CUL-1b/c-1, -3, -4, -5, and -6 this impact would be significant and unavoidable.

CA-SBR-11862H

One well would be installed in a portion of site CA-SBR-11862H (remnants of El Rancho Colorado Road House and Gas Station) and existing access routes within the site boundary would continue to be used during construction and operation and maintenance. There may also be additional future impacts associated with implementation of the Future Activity Allowance. Although the significant (i.e., eligible) portion of this resource (Locus 3 and portions of Loci 1& 2) would be avoided, construction-related and operation and maintenance-related impacts to CA-SBR-11862H would be potentially significant. Mitigation Measures CUL-1b/c-1, -4, -5, and -6, which require consideration of the locations of historical resources during design, monitoring, avoidance where feasible, and additional protective measures (such as annual condition inspections and worker training), would safeguard the integrity of the eligible portion of the resource from impacts due to Project activities and personnel, ensuring that the resource would remain eligible for the NRHP/CRHR under Criterion D (data potential). Implementation of Mitigation Measures CUL-1b/c-1, -4, -5, and -6 would reduce impacts to this resource to less than significant.

CA-SBR-11997H

This resource, which is also a contributing element to CA-SBR-2910H/AZ I:15:156 (ASM)/AZ L:7:72 (ASM), consists of a rock and mortar masonry bridge that carries National Old Trails Highway/Route 66 (present-day Park Moabi Road) over Bat Cave Wash. This portion of the road is actively in use as a San Bernardino county road and would continue to be used to access Project components and the Station during construction, operation and maintenance, and decommissioning. Construction-related and operation and maintenance-related impacts to CA-SBR-11997H would be potentially significant. Mitigation Measures CUL-1b/c-1, -4, -5, and -6, which require consideration of the locations of historical resources during design, monitoring, avoidance where feasible, and additional protective measures (such as annual condition inspections and worker training), would safeguard the integrity of the this resource from impacts due to Project activities and personnel, ensuring that it would remain a contributing element to CA-SBR-2910H/AZ I:15:156 (ASM)/AZ L:7:72 (ASM) and that none of the essential physical features of CA-SBR-2910H/AZ I:15:156 (ASM)/AZ L:7:72 (ASM) would be materially impaired such that it would no longer be eligible for the NRHP/CRHR. Implementation of Mitigation Measures CUL-1b/c-1, -4, -5 and -6 would reduce impacts to this resource to less than significant.

CA-SBR-13791H

This resource is consists of a surface scatter of railroad-related refuse. The pipeline alignment would cross this resource; however, the pipeline would be installed underground using directional drilling or boring construction techniques to avoid the refuse scatter. Construction and operation and maintenance-related impacts to CA-SBR-13791H would be potentially significant. Mitigation Measures CUL-1b/c-1, -4, -5, and -6, which require consideration of the locations of historical resources during design, monitoring, avoidance where feasible, and additional protective measures (such as annual condition inspections and worker training), would ensure that impacts to the resource from Project activities and personnel would be avoided. Implementation of Mitigation Measures CUL-1b/c-1, -4, -5 and -6 would reduce impacts to this resource to less than significant.

CA-SBR-11939

This resource consists of a lithic scatter. An existing bulldozed dirt road bisects the site and this area has been bladed well below the current ground surface. Any archaeological deposits have been removed from the road prism. A pipeline would be installed along the centerline of the disturbed roadway bed to connect with a nearby injection well. The pipeline alignment has been designed to avoid remaining portions of the resource. The road would also be used for as an access route during construction and operation and maintenance. Construction-related and operation and maintenance-related impacts to CA-SBR-11939 would be potentially significant. Mitigation Measures CUL-1b/c-1, -4, -5, and -6, which require consideration of the locations of historical resources during design, monitoring, avoidance where feasible, and additional protective measures (such as annual condition inspections and worker training), would reduce impacts to this resource. However, as described under Impact CUL-1a, since prehistoric resources are considered contributors to the Topock TCP, even with implementation of Mitigation Measures CUL-1b/c-1, -4, -5, and -6 this impact would be significant and unavoidable.

AZ L:7:16 (ASM)

This resource consists of prehistoric lithics and historic-period refuse. The site is bisected by an existing access road that would be used to access an existing water supply well during construction and operation and maintenance. Construction-related and operation and maintenance-related impacts to AZ L:7:16 (ASM) would be potentially significant. Mitigation Measures CUL-1b/c-1, -4, -5, and -6, which require consideration of the locations of historical resources during design, monitoring, avoidance where feasible, and additional protective measures (such as annual condition inspections and worker training), would reduce impacts to this resource. However, as described under Impact CUL-1a, since prehistoric resources are considered contributors to the Topock TCP, even with implementation of Mitigation Measures CUL-1b/c-1, -4, -5, and -6 this impact would be significant and unavoidable.

36-027678

This resource is the Old Trails Arch Bridge. Impacts to this resource were assessed in *Finding of No Adverse Effect: Alterations to the National Old Trails Arch Bridge Spanning the Colorado River at Topock* (Smallwood 2014). The Project would add a new 12-inch-diameter water line along the deck of the bridge. According to Project plans, the new construction would be in-kind to facilities that already exist on the bridge deck, and would not impact any character-defining elements of the resource. The new construction would be relatively minor in nature, and no physical destruction or damage would occur in a manner that would diminish the historical integrity of the bridge. The Project meet the Secretary of the Interior's Standards for Rehabilitation (SOI Standards) (Weeks and Grimmer 1995) and the construction and operation and maintenance phases of the Project would result in less than significant impacts to the bridge. No mitigation is required.

Æ-Topock-210

This resource consists of a prehistoric trail and associated markers. The Project proposes to use an existing access road that bisects the trail. Construction-related and operation and maintenance-related impacts to Æ-Topock-210 would be potentially significant. Mitigation Measures CUL-1b/c-1, -4, -5, and -6, which require consideration of the locations of historical resources during design, monitoring, avoidance where feasible, and additional protective measures (such as annual condition inspections and worker training), would reduce impacts to this resource. However, as described under Impact CUL-1a, since prehistoric resources are considered contributors to the Topock TCP, even with implementation of Mitigation Measures CUL-1b/c-1, -4, -5, and -6 this impact would be significant and unavoidable.

Unknown Historical Resources

The Groundwater FEIR concluded that unknown historical resources may be encountered during ground disturbance and that they could be inadvertently damaged resulting in a potential to cause a substantial adverse change in the significance of undocumented or buried historical resources. At the time of certification of the Groundwater FEIR, the exact locations of infrastructure, number of wells, amount of underground piping, and overall amount of soil disturbance was not known. Direct impacts to the unknown historical resources could occur as a result of: construction of the Construction Headquarters/Long-Term Remedy Support Area and Soil Processing Area/ Clean-Soil Storage Area near Moabi Regional Park; construction of an Operations Building and other improvements at the Transwestern Bench; construction of a Carbon Amendment Building and other improvements at the MW-20 Bench; and the construction of wells, underground pipelines, and roadway improvements, as well as part of the Future Activity Allowance.

Therefore, Project construction and operation and maintenance has the potential to result in a substantial adverse change in the significance unknown historical resources, and this impact would be potentially significant. Implementation of Mitigation Measures CUL-1b/c-3, CUL-1b/c-4, CUL-1b/c-5, and CUL-1b/c-6 would be required to reduce significant impacts to unknown historical resources resulting from Project construction and operation and maintenance. Mitigation

Measures CUL-1b/c-3, CUL-1b/c-4, CUL-1b/c-5, and CUL-1b/c-6, would avoid, minimize, reduce, or compensate for potential impacts to historical resources in the event of inadvertent discovery. Mitigation Measure CUL-1b/c-3 would require preparation of a Treatment Plan amendment for any newly discovered historical resources that cannot be avoided. Mitigation Measure CUL-1b/c-4 requires archaeological and Tribal monitoring during all ground disturbing activities, and documentation, evaluation, and treatment of discoveries. Mitigation Measure CUL-1b/c-5 requires avoiding, minimizing, or mitigating significant impacts to historical resources. Mitigation Measure CUL-1b/c-6 requires the implementation of protective measures (such as annual condition inspections and worker education). In some circumstances, documentation and data recovery as mitigation for impacts to an individual historical resource of an archaeological nature (as required by Mitigation Measure CUL-1b/c-4 (Inadvertent Discoveries) may not mitigate the effects to a point where no significant effect on the environment would occur. Data recovery as mitigation for historical resources that are eligible for the NRHP/CRHR under Criterion D/4, or that derive their significance from their scientific value or data potential, may effectively mitigate impacts to a less than significant level. However, for historical resources that are eligible to the NRHP/CRHR under Criteria A/1, B/2, or C/3 (or as a contributor to the Topock TCP) data recovery may not adequately mitigate impacts to those aspects of the resource that convey its significance and make it eligible for listing in the NRHP/CRHR, and even with the implementation of these mitigation measures, impacts to such resources from the Project may not be mitigated to a less than significant level. Therefore, even after implementation of Mitigation Measures CUL-1b/c-3, -4, 5, and -6, construction-related and operation and maintenance-related impacts to unknown historical resources other than the Topock TCP would be significant and unavoidable.

Decommissioning

The requirements described above as part of the C/RAWP (CH2M Hill 2015b) are applicable to the decommissioning phase of the Project. In addition, the following requirements of the C/RAWP also apply to impacts to historical resources other than the Topock TCP during decommissioning:

- Cultural Impact Mitigation Program (Appendix H) includes protocols for restoring the environment to its preconstruction conditions upon decommissioning (Section 2.5, CUL-1a-8e).
- Cultural and Historic Properties Management Plan (CHPMP) (Appendix I) includes measures for restoration of the environment to preconstruction condition (CHPMP Section 6.3).

Known Historical Resources

Decommissioning of the Final Design Remedy would generally be beneficial in the long-term to known historical resources other than the Topock TCP in the long-term as infrastructure would be removed and areas impacted would be restored to pre-construction conditions thereby effectively restoring those aspects of the setting/landscape that contribute to the resources’ eligibility. The nature of potential decommissioning impacts would, however, be similar to those described above for construction, while it would be limited to areas where construction/installation had already occurred (i.e., no activity in new areas). Specifically, decommissioning would require increased human activity, use of heavy equipment, and general ground disturbance (e.g., removal and capping of wellheads, restoration of roadways, and removal of pipelines) resulting in potentially significant impacts to known historical resources other than the Topock TCP. As described above under Construction and Operation and Maintenance, since resources CA-SBR-11939, AZ L:7:16 (ASM), and Æ-Topock-210 are prehistoric resources that are considered contributors to the Topock TCP, even with implementation of Mitigation Measures CUL-1b/c-1, -3, -4, -5, and -6, which require consideration of the locations of historical resources during design, monitoring, avoidance where feasible, and additional protective measures (such as annual condition inspections and worker training), impacts to these two resources would be significant and unavoidable. For resource 36-027678 (Old Trails Arch Bridge), decommissioning of the Project could include removal of the pipeline from the bridge. Mitigation Measure CUL-1b/c-7, which requires review of the decommissioning plan to ensure that removal of the pipeline from bridge, if proposed, would not materially impair the bridge such that it would no longer be eligible for the NRHP/CRHR, would ensure that decommissioning-related impacts would result in a less than significant impact to resource 32-027678. However, even with the implementation of CUL-1b/c-1, -3, -4, -5, and -6, decommissioning-related impacts to known historical resources other than the Topock TCP would remain significant and unavoidable.

Unknown Historical Resources

Decommissioning of the Final Design Remedy would be similar to those described above for construction. Specifically, decommissioning would require increased human activity, use of heavy equipment, and general ground disturbance (e.g., removal and capping of wellheads, restoration of roadways, and removal of pipelines) resulting in potentially significant impacts to unknown historical resources. As described above under Construction and Operation and Maintenance, for historical resources that are eligible to the NRHP/CRHR under Criteria A/1, B/2, or C/3 (or as a contributor to the Topock TCP), data recovery may not adequately mitigate impacts to those aspects of the resource that convey its significance and make it eligible for listing in the NRHP/CRHR, and even with the implementation of mitigation, impacts to such resources from the Project may not be mitigated to a less than significant level. Therefore, even with the implementation of CUL-1b/c-3, -4, -5, and -6, decommissioning-related impacts to unknown historical resources other than the Topock TCP would remain significant and unavoidable.

Comparison of Impact CUL-1b/c Impacts (Revised) to Groundwater FEIR Impact Analysis

Known Historical Resources

The Groundwater FEIR determined that impacts to known historical resources other than the Topock TCP through ground disturbance and alteration of the setting/landscape would be significant and unavoidable. To mitigate the impacts, the Groundwater FEIR required Mitigation Measure CUL-1b/c-1, which required the consideration of the locations of known historical resources during design, Mitigation Measure CUL-1b/c-2, which required a Qualified Cultural Resources Consultant prepare a cultural resources study that assessed the potential for significant impacts as a result of the final design, and Mitigation Measure CUL-1b/c-3, which included preparation of a treatment plan to reduce significant impacts. Of these, CUL-1b/c-2 has since been completed. Mitigation Measures CUL-1b/c-1 and CUL-1b/c-3 have been implemented but remain pertinent to the Final Remedy Design with revisions. Since the Groundwater FEIR, several Project components have changed including: pipelines to import groundwater from Arizona to California, not previously considered by the Groundwater FEIR; construction of the Construction Headquarters/Long-Term Remedy Support Area and Soil Processing/Clean-Soil Storage Area near Moabi Regional Park, not previously considered in the Groundwater FEIR; improvements on the Station, not previously considered in the Groundwater FEIR; construction of an Operations Building and other improvements at the Transwestern Bench, not previously considered in the Groundwater FEIR; construction of a Carbon Amendment Building and other facilities at the MW-20 Bench, not previously considered in the Groundwater FEIR; increased disturbance resulting from the fact that remedy pipelines are to be constructed underground (versus aboveground which was generally assumed in the Groundwater FEIR); and the use of staging areas, not previously analyzed in detail in the Groundwater FEIR, all of which would result in a substantially more severe significant impact on known historical resources other than the Topock TCP than was previously identified in the Groundwater FEIR. This SEIR would require implementation of Mitigation Measures CUL-1b/c-1, -3, -5, -6, and -7 to reduce potentially significant impacts to known historical resources other than the Topock TCP. However, even after implementation of these measures, this impact would remain significant and unavoidable.

Unknown Historical Resources

The Groundwater FEIR determined that impacts to unknown historical resources through ground disturbance would be significant and unavoidable even with the implementation of mitigation. To mitigate the impacts, the Groundwater FEIR required Mitigation Measure CUL-1b/c-4, which required archaeological and tribal monitoring, construction worker training, cease work measures, and the evaluation and treatment of inadvertent discoveries. This mitigation measure has been implemented but remains pertinent to the Final Remedy Design with revisions. Since the Groundwater FEIR, several Project components have changed including: construction of the Construction Headquarters/Long-Term Remedy Support Area and Soil Processing/Clean-Soil Storage Area near Moabi Regional Park, not previously considered in the Groundwater FEIR; construction of an Operations Building and other improvements at the Transwestern Bench, not previously considered in the Groundwater FEIR; construction of a Carbon Amendment Building and other improvements at the MW-20 Bench, not previously considered in the Groundwater FEIR; an approximately 12 percent increase in the number of boreholes from that previously considered in the Groundwater FEIR, as well as Future Activity Allowance; an approximately 50 percent increase in roadway improvements from that previously considered in the Groundwater FEIR, as well as a Future Activity Allowance; and increased disturbance resulting from the fact that remedy pipelines are to be constructed underground (versus aboveground which was assumed in the Groundwater FEIR), which will result in approximately 127,500 linear feet of underground piping, plus a Future Activity Allowance, all of which would result in a substantially more severe significant impact on unknown historical resources than was previously identified in the Groundwater FEIR. This SEIR would require implementation of Mitigation Measures CUL-1b/c-3, -4, -5, and -6 to reduce potentially significant impacts to unknown historical resources. However, even after implementation of these measures, this impact would remain significant and unavoidable.

Mitigation Measures

CUL-1b/c-1: Consider Locations of Historical Resources during Design (Groundwater FEIR Measure with revisions). PG&E shall consider the locations of the identified historical resources during the design of the physical improvements necessary for the proposed Project and avoid, minimize, or mitigate impacts on historical and archaeological resources to the maximum extent feasible, as determined by DTSC. Future design plans for the Project, in relation to known cultural resources, shall be submitted to DTSC for review and approval.

CUL-1b/c-2: Prepare a Cultural Resources Study (Measure Completed – several cultural resources studies were completed, including "*Geoarchaeological Assessment for the Topock Remediation Project*" [Appendix T of the C/RAWP] and "*Results of Pre-Construction Field Verification Inspections for the Topock Compressor Station Groundwater Remedy*" [Moloney and Price 2014, confidential report on file at DTSC]).

CUL-1b/c-3: Prepare and Implement a Treatment Plan for Historical Resources other than the Topock TCP (Groundwater FEIR Measure with Revisions). Prior to the start of construction, PG&E shall prepare and implement a Treatment Plan that identifies measures to lessen impacts to historical resources other than the Topock TCP that cannot be avoided by the Project and that will be subject to significant impacts (this is the same Treatment Plan - *Cultural and Historical Property Treatment Plan for the Topock Compressor Station* [Hanes and Price *in progress*] - described above in Mitigation Measure CUL-1a-19 and is currently being prepared). The Treatment Plan shall identify which criteria for listing on the NRHP/CRHR contribute to the affected resource's significance and which aspects of significance would be materially altered by construction, operation and maintenance, or decommissioning and shall provide for reasonable efforts to be made to permit the resource to be preserved in place or left in an undisturbed state consistent with the CEQA Guidelines and with Stipulation I.B of the PA and Section 7 of the CHPMP, and to the maximum extent feasible as determined by DTSC, in coordination with PG&E, Interested Tribes, and respective landowners. PG&E shall submit the Treatment Plan to DTSC for review and approval. PG&E shall also distribute the Treatment Plan to the Interested Tribes for tribal review consistent with Section 2.3 "*Protocols for the Review of Cultural Resources-Related Documents*" of the CIMP and Section 6.7 "*Protocols for Tribal Notification and Consultation in Advance of Certain Activities*" of the CHPMP (as described above in Mitigation Measure CUL-1a-8q). The Treatment Plan may be amended in the future in the event of new discoveries or greater than anticipated impacts. Treatment Plan amendments shall be required in instances where the current content of the Treatment Plan is insufficient to address necessary treatment measures and shall be determined in coordination amongst PG&E, BLM, DTSC, and Interested Tribes.

CUL-1b/c-4: Cultural Resources Monitoring Program and Inadvertent Discovery Measures (Groundwater FEIR Measure with Revisions).

> **CUL-1b/c-4a: Cultural Resources Monitoring Program.** All ground-disturbing activities associated with construction, operation and maintenance, and decommissioning phases of the Project, including the Potential Future Activities, shall require

archaeological monitoring and PG&E shall invite Native American monitors to participate. The Cultural Resources Monitoring Program shall be implemented in a manner consistent with Sections 2.10 “*Protocols for Tribal Notification in Advance of Project-Related Activities*” and 2.12 “*Protocols for Tribal Monitors to Observe Ground Disturbing Activities*” of the CIMP, Appendix C “*Topock Remediation Project Programmatic Agreement Tribal and Archaeological Monitoring Protocol*” of the PA, and Section 6.6.4, “*Construction Monitoring*,” of the CHPMP (as described above in Mitigation Measure CUL-1a-8q). In addition to the parties that require notification and coordination as listed in Appendix C of the PA, PG&E shall also notify DTSC.

During construction, PG&E shall document monitoring activities in the monthly progress reports or quarterly compliance reports described in Section 2.6.3.3 “*Additional Reporting During Remedy Construction*” and Table 2.3-1 “*Communication Framework During Construction and Startup*” of the C/RAWP. During operation and maintenance, PG&E shall document monitoring activities in the quarterly progress reports or annual compliance reports described in Section L2.2 “*Summary of Communication Procedures and Protocols*” and Table L2.2-1 “*Communication Framework During Operation and Maintenance.*” During decommissioning, PG&E shall document monitoring activities in monthly progress reports or quarterly monitoring compliance reports consistent with those described in Section 2.6.3.3 “*Additional Reporting During Remedy Construction*” and Table 2.3-1 “*Communication Framework During Construction and Startup*” of the C/RAWP. Documentation of monitoring shall generally include dates of monitoring, monitoring participants, activities observed, and descriptions of any archaeological resources encountered (resource location information shall be kept separate and confidential). Department of Parks and Recreation 523 forms, following the Office of Historic Preservation’s *Instructions for Recording Historical Resources*, shall be prepared and filed with the South Central Coastal Information Center (for resources in California) and Arizona State Museum site cards shall be prepared and filed with the Arizona State Museum (for resources in Arizona) for all newly identified and updated resources, and shall be compiled and provided to DTSC as they become available.

CUL-1b/c-4b: Inadvertent Discoveries. During construction, operation and maintenance, and decommissioning phases of the Project, procedures for the treatment of inadvertent discoveries of resources potentially qualifying as historical resources under CEQA shall be implemented in a manner consistent with Section 2.2 “*Protocols for the Appropriate Treatment of Archaeological Materials*” of the CIMP, and Section 8 “*Discoveries*” and Appendix C “*Discovery Plan*” of the CHPMP (as described above in Mitigation Measure CUL-1a-8q), and Appendix D “*Plan of Action*” of the CHPMP (as described below in Mitigation measure CUL-4). In addition to the parties listed in Section 2.15 of the CIMP as requiring consultation regarding discoveries and review of draft documents, DTSC shall also be included in these processes.

CUL-1b/c-5: Avoidance and Preservation in Place (New Measure). During the construction, operation and maintenance, and decommissioning phases of the Project, PG&E shall carry out and require all subcontractors to carry out all activities in ways that avoid, minimize, and mitigate significant impacts to historical resources other than the Topock TCP and unique archaeological resources consistent with the CEQA Guidelines and with Stipulation I.B of the PA and Section 7.3 of the CHPMP, and to the maximum extent feasible as determined by DTSC, in coordination with PG&E, Interested Tribes, and respective landowners.

CUL-1b/c-6: Implementation of Additional Protective Measures (New Measure). Mitigation Measures CUL-1a-3 (Site Security); CUL-1a-3a (Professional Qualifications and Annual Historical Resource Condition Inspection); CUL-1a-3c (Coordination with BLM and San Bernardino County); CUL-1a-3d (Signage) CUL-1a-3e (Site Security); CUL-1a-8q (Implement Cultural Impact Mitigation Program); CUL-1a-9 (Preference for Previously Disturbed Areas); CUL-1a-13a (Implement Worker Education Training Program); and CUL-1a-15 (Future Activity Allowance Cultural Resources Survey) shall be implemented to further reduce impacts to historical resources other than the Topock TCP and/or unique archaeological resources prior to and during construction, operation and maintenance, and decommissioning, as prescribed in each measure which are described in detail above.

CUL-1b/c-7: Compliance with SOI Standards (New Measure). Prior to the start of decommissioning activities, PG&E shall retain a qualified architectural historian who meets the Secretary of the Interior's professional qualification standards for architectural history. The qualified architectural historian shall review the decommissioning plan to ensure that removal of the pipeline from the Old Trails Arch Bridge (36-027678), if proposed, would not materially impair the bridge. The architectural historian shall prepare a technical memorandum documenting the results of the review, and provide any recommendations to reduce impacts to less than significant, if necessary, prior to start of decommissioning activities.

Timing:	Prior to and during construction, operation and maintenance, and decommissioning activities, as detailed in the individual Mitigation Measures CUL-1b/c-1, and CUL-1b/c-3 through CUL-1b/c-7.
Responsibility:	PG&E would be responsible for the implementation of these measures. DTSC would be responsible for ensuring compliance.
Significance after Mitigation:	The impact would be **significant and unavoidable** after implementation of the measures detailed above.

IMPACT CUL-2 **Cause a Substantial Adverse Change in the Significance of a Unique Archaeological Resource.** Many of the cultural resources listed in Table 4.4-3 may meet the CEQA criteria for a unique archaeological resource. Construction, operation and maintenance, and decommissioning activities of the proposed Project could result in substantial adverse changes to one or more unique archaeological resource in the Project Area through ground disturbance and other project-related activities. This impact would be **potentially significant**, as previously identified in the Groundwater FEIR.

Construction, Operation & Maintenance

The Groundwater FEIR determined that Project activities could result in a potentially significant impact to unique archaeological resources. Since the certification of the Groundwater FEIR, the Project Area has been modified and additional studies conducted. As a result, a total of 117 known archaeological resources that could potentially qualify as unique archaeological resources under CEQA are located within the Project Area (see Table 4.4-2). In addition, the Groundwater FEIR determined that Project activities could result in a potentially significant impact to unknown resources that could qualify as unique archaeological resources under CEQA, which could be encountered during ground disturbance. The requirements for unique archaeological resources would be employed as defined in the C/RAWP (CH2M Hill 2015b) as described above under construction and operation and maintenance for historical resources other than the Topock TCP. The Groundwater FEIR concluded that ground disturbance related to construction and operation and maintenance could physically destroy archaeological resources that could qualify as unique archaeological resources under CEQA. In addition, the setting could be altered in a manner inconsistent with the resource(s) through the introduction of new facilities, and the significance of the resource(s) could be diminished. At the time of certification of the Groundwater FEIR, the exact locations of infrastructure, number of wells, amount of underground piping, and overall amount of soil disturbance was not known.

As discussed under Impact-CUL-1b/c above, there are five archaeological resources that are considered historical resources under CEQA that may also qualify as unique archaeological resources (CA-SBR-11862H, CA-SBR-13791H, CA-SBR-11939, AZ L:7:16 (ASM), and Æ-Topock-210) and that overlap planned Project components within the Project Area (see Table 4.4-3). As discussed, impacts to CA-SBR-11862H and CA-SBR-13791H would be less than significant with implementation of mitigation and impacts to CA-SBR-11939, AZ L:7:16 (ASM), and Æ-Topock-210, which are prehistoric resources and contributors to the Topock TCP, would be significant and unavoidable even after implementation of mitigation. In addition, impacts to unknown unique archaeological could occur as a result of: construction of the Construction Headquarters/Long-Term Remedy Support Area and Soil Processing/Clean-Soil Storage Area near Moabi Regional Park; construction of an Operations Building and other improvements at the Transwestern Bench; construction of a Carbon Amendment Building and other improvements at the MW-20 Bench; and the construction of wells, underground pipelines, and roadway improvements, as well as part of the Future Activity Allowance. Therefore, Project construction and operation and maintenance has the potential to result in a substantial adverse change in the significance unique archaeological resources, and this impact would be potentially significant. For the same reasons as described above under Impact-CUL-1b/c, even after implementation of

Mitigation Measures CUL-1b/c-1, -3, -4, -5, and -6, construction-related and operation and maintenance-related impacts to unique archaeological resources would remain significant and unavoidable.

Decommissioning

The requirements for unique archaeological resources would be employed as defined in the C/RAWP (CH2M Hill 2015b) as described above under decommissioning for historical resources other than the Topock TCP. Decommissioning of the Final Design Remedy would generally be beneficial to unique archaeological resources in the long-term as infrastructure would be removed and areas impacted would be restored to pre-construction conditions thereby effectively restoring those aspects of the setting/landscape that contribute to the resources' eligibility. The nature of potential decommissioning impacts would, however, be similar to those described above for construction and operation and maintenance. Specifically, decommissioning would require increased human activity, use of heavy equipment, and general ground disturbance (e.g., removal and capping of wellheads, restoration of roadways, and removal of pipelines) resulting in potentially significant impacts to unique archaeological resources. For the same reasons as described above under Impact-CUL-1b/c, even with the implementation of Mitigation Measures CUL-1b/c-1, -3, -4, -5, and -6 decommissioning-related impacts to unique archaeological resources would remain significant and unavoidable.

Comparison of Impact CUL-2 Impacts (Revised) to Groundwater FEIR Impact Analysis

The Groundwater FEIR determined that impacts to unique archaeological resources through ground disturbance and alteration of the setting/landscape would be significant and unavoidable. To mitigate the impacts, the Groundwater FEIR required Mitigation Measure CUL-1b/c-1, which required the consideration of the locations of known historical resources during design, Mitigation Measure CUL-1b/c-2, which required a Qualified Cultural Resources Consultant prepare a cultural resources study that assessed the potential for significant impacts as a result of the final design, Mitigation Measure CUL-1b/c-3, which included preparation of a treatment plan to reduce significant impacts, and Mitigation Measure CUL-1b/c-4, which required archaeological and tribal monitoring, construction worker training, cease work measures, and the evaluation and treatment of inadvertent discoveries. Of these, CUL-1b/c-2 has since been completed. Mitigation Measures CUL-1b/c-1, CUL-1b/c-3, and CUL-1b/c-4 have been implemented but remain pertinent to the Final Remedy Design with revisions. Since the Groundwater FEIR, several Project components have changed including: pipelines to import groundwater from Arizona to California, not previously considered by the Groundwater FEIR; construction of the Construction Headquarters/Long-Term Remedy Support Area and Soil Processing/Clean-Soil Storage Area near Moabi Regional Park, not previously considered in the Groundwater FEIR; construction of an Operations Building and other improvements at the Transwestern Bench, not previously considered in the Groundwater FEIR; construction of a Carbon Amendment Building and other facilities at the MW-20 Bench, not previously considered in the Groundwater FEIR; an approximately 12 percent increase in the number of boreholes from that previously considered in the Groundwater FEIR, as well as a Future Activity Allowance; an approximately 50 percent increase in roadway improvements from that previously considered in the Groundwater FEIR, as well as a Future Activity Allowance; and increased disturbance resulting from the fact that remedy pipelines are to be constructed underground (versus aboveground which was assumed in the Groundwater FEIR), which will result in approximately 127,500 linear feet of underground piping, plus a Future Activity Allowance, and the use of staging areas, not previously analyzed in detail in the Groundwater FEIR, all of which would result in a substantially more severe significant impact on unique archaeological resources than was previously identified in the Groundwater FEIR. This SEIR would require implementation of Mitigation Measures CUL-1b/c-1, -3, -4, -5, and -6 to reduce potentially significant impacts to unique archaeological resources. However, even after implementation this impact would remain significant and unavoidable.

IMPACT CUL-3 **Directly or Indirectly Destroy a Unique Paleontological Resource or Site or Unique Geologic Feature.** Construction, operation and maintenance, and decommissioning activities of the proposed Project could result in substantial adverse changes to a unique paleontological resource or unique geologic feature in the Project Area through ground disturbance and other project-related activities. This impact would be **potentially significant**, as previously identified in the Groundwater FEIR**.**

Construction and Operation & Maintenance

The Groundwater FEIR determined that Project activities could result in a potentially significant impact to unique paleontological resources or sites or unique geologic features. While excavations in the igneous and metamorphic rocks of the more elevated terrain in the southern portion of the Project Area and shallow excavations in the active and recent fluvial deposits around the Colorado River and Sacramento Wash were determined to have no or low potential to encounter significant fossil resources, the Pleistocene Quaternary alluvium, Bouse Formation, and Chemehuevi Formation were determined to have the potential to contain fossils, some of which could be considered significant under CEQA. Therefore, the Project Area was deemed highly sensitive for paleontological resources. The following requirements would be employed as defined in the C/RAWP (CH2M Hill 2015b) and apply to impacts to paleontological resources:

- Paleontological Resources Management Plan (PRMP): MMRP CUL-3 (Appendix J) includes retention of a qualified principal paleontologist (11.2); communications protocols for discoveries (11.3); paleontological awareness training for all Project personnel involved with ground disturbance (11.4); survey of any un-surveyed areas ranked PYFC 3a or above if future activities are planned in these areas (11.5); monitoring of sensitive areas and monitoring protocols (11.5); protocols for fossil discoveries (11.7, 11.8, 11.9, 11.10, 11.11); curation of fossils (11.12); and reporting requirements (11.13).

The PRMP prepared for the Project confirmed that Pleistocene older alluvium (Qc), Chemehuevi Formation (Qrg, Qrd), and Bouse Formation (Tb) were located within the Project Area and have the potential to contain fossils, some of which could be considered significant under CEQA. A significant paleontological resource would include fossils that:

- Provide information on the evolutionary relationships and developmental trends among organisms, living or extinct;

- Provide data useful in determining the age(s) or the rock unit or sedimentary stratum, including data important in determining the depositional history of the region and the timing of geologic events therein;
- Provide data regarding the development of biological communities or interaction between paleobotanical and paleozoological biotas;
- Demonstrate unusual or spectacular circumstances in the history of life; or
- Are in short supply and/or in danger of being depleted or destroyed by the elements, vandalism, or commercial exploitation, and are not found in other geographic locations.

The PRMP concluded that shallow grading and shallow trenching are unlikely to impact sensitive geologic units. Drilling of boreholes could encounter sensitive geologic units; however, the potential to recover fossils that meet the criteria outlined above would be unlikely since the specimens would lack the requisite contextual data, such as formation of origin, depth, and exact location. Areas with higher sensitivity include the portions of the Project Area in the Chemehuevi Formation/Pleistocene older alluvium and the Bouse Formation. At the time of certification of the Groundwater FEIR, the exact locations of infrastructure, number and location of wells, and locations of underground piping, and overall amount of soil disturbance was not known. Impacts to unique paleontological resources could occur as a result of: construction of the Construction Headquarters/Long-Term Remedy Support Area and Soil Processing/Clean-Soil Storage Area near Moabi Regional Park and the construction of underground pipelines, as well as part of the Future Activity Allowance, that occur in the Chemehuevi Formation/Pleistocene older alluvium and the Bouse Formation. Therefore, Project construction and operation and maintenance has the potential to result in a substantial adverse change in the significance of unique paleontological resources or sites, and this impact would be potentially significant. No known unique geologic features are in the Project Area. Under CEQA, documentation and recovery of the scientific information contained in “significant” fossils (i.e., fossils that are unique, unusual, rare, uncommon, or diagnostically important) is considered to reduce the impact to paleontological resources to less than significant. Implementation of **Mitigation Measure CUL-3**, which requires paleontological resources awareness training, monitoring in sensitive formations, and the identification, documentation, recovery, and curation of significant fossils, would reduce this potentially significant impact to less than significant by ensuring that the scientific data potential of discovered fossils is recovered.

Decommissioning

The requirements of the C/RAWP (CH2M Hill 2015b) described above would also apply to decommissioning.

The nature of potential decommissioning impacts would be similar to those described above for construction and operation and maintenance. Specifically, decommissioning would require increased human activity, use of heavy equipment, and general ground disturbance (e.g., removal and capping of wellheads, restoration of roadways, and removal of pipelines) resulting in potentially significant impacts to unique paleontological resources. Under CEQA, documentation and recovery of the scientific information contained in “significant” fossils (i.e., fossils that are unique, unusual, rare, uncommon, or diagnostically important) is considered to reduce the impact to paleontological resources to less than significant. Implementation of Mitigation Measure CUL-3 which requires paleontological resources awareness training, monitoring in sensitive formations, and the identification, documentation, recovery, and curation of significant fossils, would reduce this potentially significant impact to less than significant by ensuring that the scientific data potential of discovered fossils is recovered.

Comparison of Impact CUL-3 Impacts (Revised) to Groundwater FEIR Impact Analysis

The Groundwater FEIR determined that impacts to unique paleontological resources through ground disturbance would be potentially significant. To mitigate the impacts, the Groundwater FEIR required Mitigation Measure CUL-3, which required a paleontological resources investigation (later known as the PRMP) to assess the potential impacts on unique paleontological resources in the Project Area, and to determine if paleontological monitoring was warranted. The measure also required monitoring of any areas that were deemed to be sensitive for paleontological resources. Compliance with this mitigation measure would reduce the impact a less than significant level. The PRMP has since been completed and the areas that require monitoring have been identified. To address significant impacts on unique paleontological resources in this SEIR, Mitigation Measure CUL-3 would require implementation of the identification, monitoring, discovery, and treatment measures identified in the PRMP to reduce impacts to less than significant. The impact determination in this SEIR is the same as the conclusions in the Groundwater FEIR. Therefore, the Project would not result in any new significant impacts or substantially more severe impacts to unique paleontological resources than previously identified in the Groundwater FEIR.

Mitigation Measures

Mitigation Measure CUL-3: Implement the Paleontological Resources Management Plan (PRMP) and Paleontological Monitoring (Groundwater FEIR Measure with Revisions). PG&E shall comply with all requirements of the *Paleontological Resources Management Plan* (Arcadis 2015) related to paleontological resources prior to and during construction, operation and maintenance, and decommissioning. The following is a summary of the procedures in the PRMP, which includes: retention of a Principal Paleontologist to oversee paleontological monitoring and to be on-call in the event of discovery; paleontological resources awareness training; future survey of any areas ranked PYFC 3a or above if additional work is planned and they were not previously surveyed; paleontological monitoring of grading and trenching in known sensitives areas and also in the event that sensitive sediments are encountered elsewhere (monitoring of borings, regardless of depth or diameter, is not required); cease work measures and notification protocols in the event of a discovery; recovery of discovered fossils; documentation, preparation, identification, and analysis of recovered fossils; reporting; and curation of paleontological resources of scientific value at an accredited repository.

Timing:	Prior to and during construction, operation and maintenance, and decommissioning activities.

Responsibility: PG&E would be responsible for the implementation of this measure. DTSC would be responsible for ensuring compliance.

Significance after Mitigation: The impact would be **less than significant** after implementation of the measure detailed above.

IMPACT CUL-4 Disturb Any Human Remains, Including Those Interred Outside of Formal Cemeteries. Ground-disturbing activities required for all project phases may disturb as-yet undiscovered human remains, including Native American burial remains (i.e., human remains and grave goods). This impact would be **potentially significant,** as previously identified in the Groundwater FEIR.

Construction, Operation & Maintenance

The Groundwater FEIR determined that Project activities could result in a potentially significant impact to human remains. While no human remains were known to exist or had been documented in the Project Area, the density of cultural resources in the Project Area suggested that there was a potential to encounter human remains during ground disturbance. The following requirements would be employed as defined in the C/RAWP (CH2M Hill 2015b) and apply to impacts to human remains:

- Cultural Impact Mitigation Program (CIMP) (Appendix H) includes protocols for the treatment of human remains (Section 2.2, CUL-1a-8b) and reporting of discoveries of cultural importance (CUL-1a-8o).
- Cultural and Historic Properties Management Plan (CHPMP) (Appendix I) includes measures for the treatment of human remains and associated items (CHPMP Sections 8.2) and a detailed Plan of Action (POA) (CHPMP Appendix D), which includes procedures and treatment for the discovery of human remains on federal land (D3.2.1, D.3.3.1, and D3.9.1) and non-federal land (D.3.2.2, D3.2.3, D.3.3.2, D.3.3.3, D.3.9.2, and D.3.9.3).
- Cultural Resources Protocols (Appendix P) includes protocols related to construction worker cultural resources sensitivity education program and discovery of human remains.

The Groundwater FEIR concluded that ground disturbance related to construction and operation and maintenance could disturb as-yet undiscovered human remains or Native American burials and associated grave goods. At the time of certification of the Groundwater FEIR, the exact locations of infrastructure, number of wells, amount of underground piping, and overall amount of soil disturbance was not known. Impacts to human remains could occur as a result of: construction of the Construction Headquarters/Long-Term Remedy Support Area and Soil Processing/Clean-Soil Storage Area near Moabi Regional Park; construction of an Operations Building and other improvements at the Transwestern Bench; construction of a Carbon Amendment Building and other improvements at the MW-20 Bench; and the construction of wells, underground pipelines, and roadway improvements, as well as part of the Future Activity Allowance associated with all proposed Project components.

Therefore, Project construction and operation and maintenance have the potential to disturb human remains, and this impact would be potentially significant. Implementation of **Mitigation Measure CUL-4** would reduce this potentially significant impact. However, even after implementation of Mitigation Measure CUL-4, construction-related and operation and maintenance-related impacts to human remains would be significant and unavoidable.

Decommissioning

The requirements of the C/RAWP (CH2M Hill 2015b) described above would also apply to decommissioning.

The nature of potential decommissioning impacts would be similar to those described above for construction and operation and maintenance. Specifically, decommissioning would require increased human activity, use of heavy equipment, and general ground disturbance (e.g., removal and capping of wellheads, restoration of roadways, and removal of pipelines) resulting in potentially significant impacts to human remains. Implementation of Mitigation Measure CUL-4, Discovery of Human Remains, would reduce this potentially significant impact. However, even after implementation of Mitigation Measure CUL-4, construction-related and operation and maintenance-related impacts to human remains would be significant and unavoidable.

Comparison of Impact CUL-4 Impacts (Revised) to Groundwater FEIR Impact Analysis

The Groundwater FEIR determined that impacts to human remains through ground disturbance would be significant and unavoidable even with the implementation of mitigation. To mitigate the impacts, the Groundwater FEIR required Mitigation Measure CUL-4, which required training construction personnel in the identification of human remains, archaeological and tribal monitoring, cease works and identification measures, protection of human remains notification protocols, and compliance with all applicable local, state, and federal laws. Since the Groundwater FEIR, several Project components have changed including: construction of the Construction Headquarters/Long-Term Remedy Support Area and the Soil Processing/Clean-Soil Storage Area near Moabi Regional Park, not previously considered in the Groundwater FEIR; construction of an Operations Building and other improvements at the Transwestern Bench, not previously considered in the Groundwater FEIR; construction of a Carbon Amendment Building and other improvements at the MW-20 Bench, not previously considered in the Groundwater FEIR; an approximately 12 percent increase in the number of boreholes from that previously considered in the Groundwater FEIR, as well as a Future Activity Allowance; an approximately 50 percent increase in roadway improvements from that previously considered in the Groundwater FEIR, as well as a Future Activity Allowance; and increased disturbance resulting from the fact that remedy pipelines are to be constructed underground (versus aboveground which was assumed in the Groundwater FEIR), which will result in approximately 127,500 linear feet of underground piping, plus a Future Activity Allowance, all of which would result in a substantially more severe significant impact on human remains than was previously identified in the Groundwater FEIR. This SEIR would require implementation of Mitigation Measures CUL-4, Discovery of Human Remains, to reduce potentially significant impacts to human remains. However, even after implementation this impact would be significant and unavoidable.

Mitigation Measures

Mitigation Measure CUL-4: Discovery of Human Remains (Groundwater FEIR Measure with Revisions). In the event of the discovery of human remains, PG&E shall implement the requirements of Section 2.2 "*Protocols for Appropriate Treatment of Archaeological Materials*" and Section 2.15 "*Protocols for Reporting Discoveries of Cultural Importance*" the CIMP (as described above in Mitigation Measure CUL-1a-8q) and Section 8.2 "*Treatment of Any Human Remains, Funerary Objects, Ceremonial Objects, and Items of Cultural Patrimony"* and Appendix D "*Plan of Action*" of the CHPMP (see below). Consistent with Section D.4 of the CHPMP, the determination of whether remains are human or non-human will be made by qualified personnel, such as a physical or forensic anthropologist. In accordance with the CHPMP Appendix D (D.3.3), the BLM is responsible for notifying the appropriate Interested Tribes regardless of land ownership. Discoveries on federal land shall follow the procedures outlined in sections D.3.3.1 and D.3.9.1 of Appendix D of the CHPMP. Discoveries on non-federal land in Arizona shall follow the procedures outlined in Sections D.3.3.2 and D.3.9.2 of Appendix D CHPMP. Discoveries on non-federal land in California shall follow the procedures outlined in Sections D.3.3.3 and D.3.9.3 of Appendix D of the CHPMP. The following provides a summary of the plans, procedures, and requirements that govern actions to be taken in the event of the discovery of human remains.

CHPMP Section 8.2:

- Section VII.H of the PA stipulates that the CHPMP will include a Plan of Action to be implemented if human remains are discovered within the APE, and that the Plan of Action will address the roles of the PA Signatories, Tribes, and Invited Signatories;

- The PA stipulates further that the BLM will be the lead Federal Agency responsible for seeing that the terms of the Plan of Action are executed, and that human remains and funerary objects must be treated in a culturally appropriate and respectful manner.

CHPMP Appendix D – Section D.3.3:

This section requires that, in the event that human remains are discovered within the Project Area and without respect to land ownership, PG&E will cease work and establish a protective buffer; ensure that the remains are not disturbed further and are treated with appropriate respect and cultural sensitivity; notify BLM within 24 hours; and cooperate with parties responsible for responsible for carrying out the treatment measures described in CHPMP Subsections D.3.3.1-D.3.3.3 (see below).

CHPMP Appendix D – Sections D.3.3.1 and D.3.9.1 (discoveries on Federal land): Additional requirements of this section include:

- Complying with the Native American Graves Protection and Repatriation Act (NAGPRA) and its Federal implementing regulations outlined in 43 Code of Federal Regulations (CFR) Part 10, which requires establishing a chain of command for the remains, identifying and notifying lineal descendants, and consultation with the appropriate Tribe(s) to identify and implement appropriate treatment.

- Following California Health and Safety Code 7050.5 et seq., which includes notifying the San Bernardino County coroner for discoveries in California and contacting the California Native American Heritage Commission (NAHC).
- Following Public Resources Code 5097.98, which includes designation of a Most Likely Descendant by the NAHC and consultation with the MLD.

CHPMP Appendix D - Sections D.3.3.2 and D.3.9.2 (discoveries on non-Federal land in Arizona): Additional requirements of this section include:

- Contacting the Director of the Arizona State Museum (ASM) for discoveries in Arizona on "lands, other than lands owned or controlled by this state, any agency or institution of this state or any county or municipal corporations within this state."
- Complying with ARS 41-865, which includes consultation with the ASM, identifying the group with cultural affinity for the remains and/or objects, and consultation with the governing body of the group with cultural affinity to determine appropriate treatment and disposition of the remains and/or objects.

CHPMP Appendix D - Sections D.3.3.3 and D.3.9.3 (discoveries on non-Federal land in California): Additional requirements of this section include:

- Complying with California Health and Safety Code 7050.5 et seq., which requires notifying the San Bernardino County coroner for discoveries in California and contacting the NAHC.
- Complying with Public Resources Code 5097.98, which includes designation of a MLD by the NAHC and consultation between the landowner and MLD to identify and implement appropriate treatment.

Timing:	Prior to and during construction, operation and maintenance, and decommissioning activities.
Responsibility:	PG&E would be responsible for the implementation of these measures. DTSC would be responsible for ensuring compliance.
Significance after Mitigation:	The impact would be **significant and unavoidable** after implementation of the measure detailed above.

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4.5 Hazards and Hazardous Materials

4.5.1 Introduction

This section describes the reasonably foreseeable and potentially significant adverse environmental effects of the Pacific Gas and Electric Company (PG&E) Topock Compressor Station Final Groundwater Remediation Project (Final Groundwater Remedy Project, or proposed Project) as identified in the Project Description of this subsequent environmental impact report (SEIR) and related to hazardous materials in the Project Area. Specifically, this section considers the potentially significant adverse effects of the proposed Project during the construction, operation and maintenance, and decommissioning phases, as compared to those identified in the Topock Compressor Station Groundwater Remediation Project Final EIR (Groundwater FEIR; DTSC 2011), consistent with Public Resources Code Section 21166 and the California Environmental Quality Act (CEQA) Guidelines Sections 15162 and 15168, and including changes in impacts related to the routine transport, use, or disposal of hazardous materials and any reasonably foreseeable upset and accident conditions which could involve the release of hazardous materials.

The impact evaluation in the hazardous materials section of the Modified Initial Study (see Appendix IS) explains why the proposed Project would not result in new significant adverse impacts or a substantial increase in the severity of previously identified significant impacts relative to hazardous materials, including with respect to: (1) being located within one-quarter mile of an existing or proposed school; on a listed hazardous materials site; or within an airport land use plan or within 2 miles of a public airport, public use airport, or a private airstrip; (2) impairing or interfering with an adopted emergency response plan or emergency evacuation plan; or (3) exposing people or structures to wildland fires.

4.5.2 Summary of 2011 Groundwater FEIR Hazardous Materials Analysis

The Hazardous Materials section of the Groundwater FEIR included a detailed discussion of the environmental setting and potential effects of the proposed remedy on hazards. Although largely programmatic, the Groundwater FEIR provided a detailed analysis of the construction and operation of physical facilities anticipated at that time to be necessary to implement the groundwater remedy. The Groundwater FEIR also included a project-level analysis of the conceptual technical methods selected for the final remedy. This SEIR incorporates the analysis in the Groundwater FEIR by reference and evaluates, on a project-specific level, the potential effects associated with construction and operation of the *Basis of Design Report/Final (100%) Design Submittal for the Final Groundwater Remedy, PG&E Topock Compressor Station, Needles, California* (Final Remedy Design; CH2M Hill 2015a) and the *Construction/Remedial Action Work Plan for the Final Groundwater Remedy* (C/RAWP; CH2M Hill 2015b) that were unknown at the time the analysis was conducted for the Groundwater FEIR. The Final Remedy Design is included in its entirety as Appendix BOD to this SEIR. Information included in the hazardous materials analysis of the Groundwater FEIR is summarized throughout this section.

4.5.2.1 Setting Identified in the 2011 Groundwater FEIR

The following summarizes the setting relative to hazards and hazardous materials described in the Groundwater FEIR (DTSC 2011).

Operations-Related Materials and Wastes

The background section of the Groundwater FEIR explained how the use, handling, and spills or releases from existing and former processing units, pipes, or land disposal areas resulted in hazardous materials being released to soil and groundwater, both at the PG&E Topock Compressor Station (Station) and in the Project Area. Investigations conducted since 1996 identified specific chemicals of potential concern released to soil and groundwater which are summarized in the following subsections.

Groundwater Contamination

The Groundwater FEIR setting section provided an overview of site investigation and characterization activities conducted through 2011. The principal constituents of concern identified in groundwater included hexavalent chromium Cr(VI) and total chromium. The Cr(VI) groundwater plume was, and still is, defined as chromium-bearing groundwater exceeding a regional background (or naturally occurring) value of 32 micrograms per liter (μg/L). Plume interior concentrations of Cr(VI) exceeded 1,000 ug/l in the shallow and mid-depth zones and exceeded 10,000 ug/L in the deep zone. The current extent of the plume is discussed in Section 4.5.3.1 of this SEIR.

Selenium, molybdenum, and nitrate were also reported at concentrations that contribute to a hazard quotient greater than 1 at localized areas within the plume. It was anticipated that the concentrations of selenium and nitrate would decrease because selenium and nitrate would undergo a similar reduction process used to treat the Cr(VI) and the localized areas of impact lie within the plume. There would be little effect on the concentrations of molybdenum.

At the time of the Groundwater FEIR in 2011, the location of the freshwater source was still under investigation. The freshwater source evaluation was completed in 2014 after installation of wells in the Havasu National Wildlife Refuge (HNWR). The installation of wells in Arizona was analyzed by the Department of Toxic Substances Control (DTSC) under the CEQA in the adopted *Topock Compressor Station Groundwater Remediation Project Environmental Impact Report Addendum No. 1 for Alternative Freshwater Source Evaluation Activities* (DTSC 2013). Groundwater from the Arizona wells would provide a sufficient water quality for the remedy purpose; however, naturally occurring arsenic was found at levels above background levels in the Project Area in California. The nature, extent, and proposed contingent treatment of groundwater pumped from the Arizona are discussed in Section 4.10, "Water Supply," of this SEIR.

Hazardous Materials and Wastes Related to the IM-3 Groundwater Extraction System

The Groundwater FEIR noted that the operation of the Interim Measure 3 Groundwater Extraction and Treatment Facility (IM-3 Facility) resulted in the generation of chromium-enriched sludge. The chromium concentrations in the sludge material is not high enough to be classified under Resource Conservation and Recovery Act of 1976 (RCRA) as hazardous waste (Federal standard), but is categorized as a hazardous waste under the State of California standards. Thus, it is disposed as a California hazardous (non-RCRA) waste. The process also produces non-hazardous waste brine water. This waste was and still is transported to the permitted Liquid Environmental Solutions (LES) in Phoenix, Arizona. The description of the environmental setting in the Groundwater FEIR, and as it relates to hazards, remains unchanged.

Areas of Potential Soil Contamination

The Groundwater FEIR setting section provided an overview of site investigation and characterization activities conducted through 2011 to define the nature and extent of contamination in soil. Fifteen solid waste management units, twenty areas of concern, and two undesignated areas were identified as potential sources of contaminant releases. Consistent with the approved Soil Investigation Workplan (CH2M Hill 2013), these areas are currently being investigated for releases of chemicals based on historical use; the delineated areas are not necessarily entirely affected.

Soil within the Station fence line and in the vicinity of the Station has been affected by historical releases of chemicals of potential concern, including Cr(VI) and other metals, acids, petroleum hydrocarbons, polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), dioxins and furans, pesticides, and asbestos (CH2M Hill 2013). The nature and extent of soil contamination had not been completed at the time the Groundwater FEIR was certified in 2011. Investigation began in November 2015 and the agencies are waiting for analytical results to evaluate whether data gaps exist (see Section 4.5.3).

During initial soil investigation at the Station, dioxin was detected in a narrow, steep-sided arroyo that drains into Bat Cave Wash at the southwest corner of the Station. Over the years, fill material and debris were deposited down the northern slope and the bottom of the ravine. Elevated concentrations of dioxins were detected in historic burn ash at the site. Concerned about dioxin impacting the HNWR downstream of Bat Cave Wash, in June 2009, the U.S. Department of Interior (DOI) directed PG&E prepare a work plan and to initiate a Time Critical Removal Action to remove the contaminated soil and debris from Area of Concern (AOC) 4. Field activities concluded in December 2010 and included the removal of 11,800 tons of waste (PG&E 2011).

Hazardous Materials and Wastes Related to Other Uses Within or Near the Project Area

The Groundwater FEIR setting section noted the Project Area is crossed by several underground natural gas pipelines; major transportation corridors (Interstate 40 [I-40] and the Burlington Northern Santa Fe [BNSF] Railway line) along which hazardous materials would be transported;

various commercial activities on both sides of the Colorado River (a restaurant, a former gas station site); and a rock quarry operation [now inactive]. In addition, there are anecdotal accounts of past military-related operations in areas north of the Station. Any activities associated with the construction, usage, maintenance, and/or operation of such infrastructures could be potential sources of contamination to soils within the Project Area. This setting description generally has not changed since certification of the Groundwater FEIR, and any updates related to soil contamination are provided below in Section 4.5.3.2.

Listing on Government Code Section 65962.5 (Cortese List)

The Groundwater FEIR setting section noted that the Station is listed on the list of hazardous materials sites compiled pursuant to Government Code Section 65962.5, referred to as the Cortese list.

4.5.2.2 Impacts and Mitigation Measures Identified in the 2011 Groundwater FEIR

Impacts to hazardous materials were addressed in the Groundwater FEIR, Volume II, Section 4.6. Below is a summary of the analysis and associated mitigation measures for hazardous materials.

Groundwater FEIR Effects from Spills or Releases of Contaminants from Routine Transport, Use, and Disposal of Hazardous Materials

The Groundwater FEIR concluded that accidental spills or releases of hazardous materials and contaminants from routine transport, use, and disposal of hazardous materials would be a potentially significant impact. Hazardous materials would be used during the construction, operation and maintenance, and decommissioning activities. To reduce the potential impact to less than significant, the Groundwater FEIR proposed Mitigation Measures HAZ-1a and HAZ-1b.

Mitigation Measure HAZ-1a would require hazardous materials to be stored, handled, and transported in compliance with applicable local, state, and federal laws; and the preparation and implementation of a hazardous materials business plan, chemical standard operating procedures, and contingency plans for the management of hazardous materials.

Mitigation Measure HAZ-1b would require the construction of secondary containment for fueling and maintenance areas, and the development of standard operating procedures for fueling and spill response. It should be noted that the proposed actions are required by law.

The Groundwater FEIR concluded that disturbing and excavating contaminated soil could result in a potentially significant impact from the release of contaminants and an exposure to workers or the environment. To reduce the potential impact to less than significant, the Groundwater FEIR proposed Mitigation Measure HAZ-2. Mitigation Measure HAZ-2 would require the preparation and implementation of a health and safety plan that would describe the use of personal protective equipment, measures to provide protection from physical hazards, measures that provide protection from chemical hazards that may be present at the site, decontamination procedures, and worker and health and safety monitoring criteria to be implemented during construction. It should be noted that the proposed actions are also required by law. The Final Remedy Design has incorporated the Groundwater FEIR mitigation measures into the design (HAZ-1a, HAZ-1b, and HAZ-2), which would be implemented as part of the Project.

Groundwater FEIR Effects on Hazardous Materials Site

The Groundwater FEIR concluded that completion of the proposed Project would result in the removal of the Station from the Cortese list as an active hazardous materials release site and the site cleanup would eliminate the significant hazard to the public and the environment associated with the previous contamination remediated by the proposed Project. Note that this is incorrect. Upon completion of site cleanup activities for both soil and groundwater, the listing on the EnviroStor database (one of the several lists that comprise the Cortese List) would be changed by the DTSC from active to closed.

4.5.3 Existing Setting

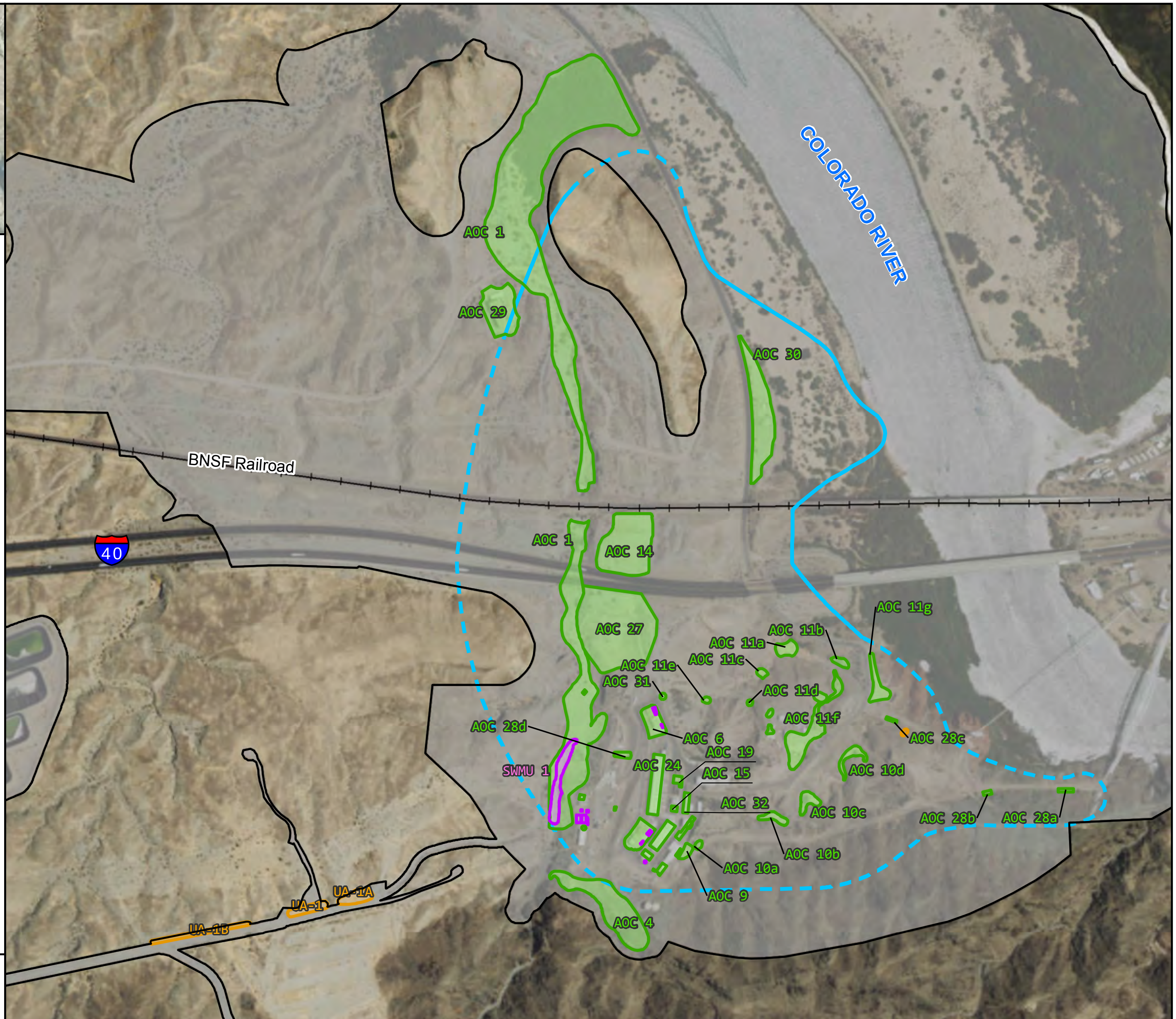
This section describes the physical hazardous materials characteristics and setting with regard to the Final Remedy Design, focusing on those areas where there have been changes made to the Project, changes in the circumstances surrounding the Project, or new information discovered since the Groundwater FEIR was certified (see Public Resources Code, Section 21166; CEQA Guidelines, Sections 15162 and 15168).

4.5.3.1 Extent of Groundwater Contamination

The ongoing groundwater monitoring program indicates that the overall extent of the groundwater plume is largely unchanged from the time of the Groundwater FEIR. The extent of Cr(VI) in groundwater at concentrations above 32 ug/l as of the Second Quarter of 2015 (CH2M Hill 2015c) is shown in **Figure 4.5-1**. The majority of the plume is located in the Alluvial Aquifer, which includes the fluvial sediments along the Colorado River. A small portion of the plume extends into the bedrock near the East Ravine. The depth to groundwater in the area of the plume ranges from approximately 28 to over 135 feet below ground surface, and the saturated thickness of the Alluvial Aquifer in the area of the plume ranges from less than 50 feet near the bedrock interface to over 300 feet near the northern end of National Trails Highway. As discussed in the Groundwater FEIR, the other chemicals of potential concern remain molybdenum, selenium, and nitrate. The location and extent of the other chemicals of potential concern are still in localized areas within the overall plume.

4.5.3.2 Areas of Potential Soil Contamination

There have been multiple phases of investigation to evaluate the nature and extent of soil contamination at the Station and within the Project Area. Certain groundwater remedy infrastructure, such as wells, pipeline corridors, buildings and other associated infrastructure would be located within or near soil investigation areas, such as within the Station fence line and at the Transwestern Bench. The most recent soil investigation work plan is the *Soil RCRA Facility Investigation/Remedial Investigation (RFI/RI) Work Plan* (Soil RFI/RI Work Plan or Soil Work Plan), which describes the ongoing investigation of the nature and extent of chemicals in soil in the Project Area (CH2M Hill 2013).



LEGEND

Groundwater SEIR Project Area

Work Areas

Area of Concern (AOC)

Undesignated Area (UA)

Solid Waste Management Unit (SWMU)

Approximate extent of hexavalent chromium [Cr(VI)] concentrations exceeding 32 micrograms per liter (μg/L) at any depth ingroundwater based on fourth quarter 2013 sampling events. Dashed where based on limited data.

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Final Groundwater Remediation Project SEIR

Map Creation Date: 12/16/2016 Sources: ESRI Aerial, PG&E 2015

Map of SWMUs, AOCs and Approximate Extent of Hexavalent Chromium Plume

Figure **4.5-1**

ESA

North State Resources

In 2015, DTSC certified the *PG&E Topock Compressor Station Soil Investigation Project FEIR* (SCH No. 2012111079) which was prepared to approve a soil sampling project as defined in the Soil RFI/RI Work Plan and its addendum for purposes of evaluating the nature and extent of soil contamination in the Project Area. The implementation of the initial fieldwork in the Soil Work Plan (CH2M Hill 2013) occurred from Fall 2015 through Spring 2016. During that time, 1,000 total soil samples were obtained. The initial fieldwork involved several activities, including installing trenches to evaluate geophysical anomalies, pore water samples, geophysical surveys, surface soil screening using x-ray fluorescence analyzer, installation of soil gas probes, and a survey of the storm drain system.

The areas to be investigated have not changed from those shown in Figure 4.5-1. It is also important to note the following:

1. Not all chemicals of potential concern would necessarily be present at elevated concentrations or at significant risk levels.
2. The soil investigation activities described in the Soil Work Plan began in Spring 2015 and are ongoing. The results would further define the investigation areas shown in Figure 4.5-1.

The locations and extent of contamination in soil are important because the installation of wells and construction of associated infrastructure for the Final Groundwater Remedy may encounter contaminated soil within these locations.

4.5.4 Regulatory Background

4.5.4.1 Federal

Resource Conservation and Recovery Act

The RCRA established a regulatory system to track hazardous wastes from the time of generation to final disposal, frequently described as “cradle-to-grave.” The law requires safe and secure procedures to be used in treating, transporting, storing, and disposing of hazardous wastes. RCRA’s provisions give state regulatory agencies authority to regulate solid and hazardous wastes. In California, the DTSC is authorized to implement RCRA in lieu of the U.S. Environmental Protection Agency (USEPA).

Hazardous waste generated during construction, operation and maintenance, and decommissioning of the proposed Project would be required to comply with all applicable hazardous waste laws and regulations, including RCRA. The goal of RCRA is to protect human health and the environment, reduce waste, conserve energy and natural resources, and eliminate generation of hazardous waste as expeditiously as possible. The Hazardous and Solid Waste Amendments of 1984 significantly expanded the scope of RCRA by adding new corrective action requirements, land disposal restrictions, and technical requirements. The Hazardous and Solid Waste Amendments also provided for more oversight by USEPA, related to the investigation and corrective action within certain facilities where hazardous materials may have been discharged. The corresponding regulations in Title 40 of the Code of Federal Regulations (CFR), Parts 260 through 279, provide the general framework for managing hazardous waste, including requirements for entities that generate, store, transport, treat, and dispose of hazardous waste.

Wastes generated during facility operations and investigation activities must be classified as either nonhazardous or hazardous waste, based on specific criteria, and must then be transported and disposed of in accordance with the classification. Transportation requirements for hazardous wastes include packaging for transport, generating a manifest, and displaying the placard required by the hazardous materials transportation regulations in 49 CFR Part 172, Subpart F.

Comprehensive Environmental Response, Compensation, and Liability Act

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), commonly known as Superfund, was enacted by Congress on December 11, 1980, and reauthorized and amended by the Superfund Amendments and Reauthorization Act on October 17, 1986. This law created a tax on the chemical and petroleum industries and provided broad federal authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health or the environment. CERCLA established prohibitions and requirements concerning closed and abandoned hazardous waste sites, provided for liability of persons responsible for releases of hazardous waste at these sites, and established a trust fund to provide for cleanup when no responsible party could be identified.

CERCLA authorizes appointed federal agencies, in this case the DOI for this Project, to respond directly to releases of hazardous substances that could endanger public health or the environment. CERCLA directs the federal agency to list national priorities among the known “releases or threatened releases” of hazardous substances.

The various on-site response and corrective actions required to investigate and clean up contamination are exempt from obtaining federal, state, and local permits pursuant to CERCLA Section 121(e)(1). See also 42 U.S.C. Section 9621(e). The intent behind this provision is that CERCLA actions should not be delayed by time-consuming and duplicative administrative requirements such as permitting; however, the substantive elements or conditions that would be required by a particular permit must still be attained after conferring with the applicable agency as appropriate, consistent with the requirements of CERCLA.

U.S. Department of Transportation Hazardous Materials Regulations (Title 49 CFR Parts 100–185)

The U.S. Department of Transportation (DOT) Hazardous Materials Regulations cover all aspects of hazardous materials packaging, handling, and transportation. Referred to as the Hazardous Materials Transportation Act, Parts 173 (“Packaging Requirements”), 177 (“Highway Transportation”), 178 (“Packaging Specifications”), and 180 (“Packaging Maintenance”) would apply to the proposed Project activities. Additional potentially applicable parts include Part 171 (“General Information, Regulations and Definitions”) and Part 172 (“Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, Training Requirements, and Security Plans”).

Under DOT regulations, a hazardous material is "a substance or material that the Secretary of Transportation has determined is capable of posing an unreasonable risk to health, safety, and property when transported in commerce, and has designated as hazardous under section 5103 of Federal hazardous materials transportation law (49 U.S.C. 5103)." The term includes hazardous substances, hazardous wastes, marine pollutants, elevated temperature materials, and materials designated as hazardous in the Hazardous Materials Table (49 CFR 172.101). DOT classifies hazardous materials into nine primary classes: explosives, gases, flammable liquids, other flammable substances, oxidizing substances and organic peroxides, toxic (poisonous) and infectious substances, radioactive materials, corrosives, and miscellaneous dangerous goods. Some have subclasses. For example, compressed gases are divided into subclasses for flammable, nonflammable, and poisonous gases. The Hazardous Materials Transportation Act provides requirements and procedures for labeling, packaging, and reporting of accidental releases of hazardous materials to DOT at the earliest practical moment.

Emergency Planning and Community Right-to-Know Act (42 U.S. Code 11001 et seq.)

Also known as Title III of the Superfund Amendments and Reauthorization Act, the Emergency Planning and Community Right-to-Know Act (EPCRA) was enacted by Congress as the national legislation on community safety. This law was designated to help local communities protect public health, safety, and the environment from chemical hazards. To implement EPCRA, Congress required each state to appoint a State Emergency Response Commission (SERC). SERCs are required to divide their states into Emergency Planning Districts and to name a Local Emergency Planning Committee for each district. EPCRA provides requirements for emergency release notification, chemical inventory reporting, and toxic release inventories for facilities that handle chemicals.

U.S. Department of Agriculture Standard for Spark Arresters for Internal Combustion Engines

The U.S. Department of Agriculture enforces standards establishing the minimum performance and maintenance requirements of spark arresters for single and multiposition small internal combustion engines used in proximity to grass, brush, timber, and similar cellulose materials. The regulations require installation of spark arresters and maintenance requirements of internal combustion engines.

4.5.4.2 State of California

Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65)

In 1986, California voters approved an initiative to address their growing concerns about exposure to toxic chemicals. That initiative became the Safe Drinking Water and Toxic Enforcement Act of 1986, better known by its original name of Proposition 65. Proposition 65 requires the State to publish a list of chemicals known to cause cancer or birth defects or other reproductive harm. This list, which must be updated at least once a year, has grown to include approximately 800 chemicals since it was first published in 1987.

Proposition 65 requires businesses to notify Californians about significant amounts of chemicals in the products they purchase, in their homes or workplaces, or that are released into the environment. By providing this information, Proposition 65 enables Californians to make informed decisions about protecting themselves from exposure to these chemicals. Proposition 65 also prohibits California businesses from knowingly discharging significant amounts of listed chemicals into sources of drinking water. The following section is relevant to this Project because the Colorado River is a source of drinking water.

> **Section 25249.5. Prohibition On Contaminating Drinking Water With Chemicals Known to Cause Cancer or Reproductive Toxicity.** No person in the course of doing business shall knowingly discharge or release a chemical known to the state to cause cancer or reproductive toxicity into water or onto or into land where such chemical passes or probably will pass into any source of drinking water, notwithstanding any other provision or authorization of law except as provided in Section 25249.9.

NPDES Construction General Permit

In accordance with the CERCLA exemption from permits (see Chapter 3, "Project Description," Section 3.10, and Section 4.5.4.1 of this SEIR), PG&E would not be required to submit a Notice of Intent (NOI) or a Stormwater Pollution Prevention Plan (SWPPP) to the Regional Water Quality Control Board (RWQCB) for their review and approval to comply with the requirement of the state Construction General Permit (CGP). This does not, however, remove the requirement to meet the substantive provisions of applicable laws. Therefore, as part of the Project, PG&E will develop and implement an erosion control plan that is in conformance with the substantive requirements of the CGP. Because the erosion control plan will fulfill the requirements of the CGP, it will have substantive components similar to those that would be included in an SWPPP. The general CGP requirements are summarized below.

The RWQCB administers the National Pollutant Discharge Elimination System (NPDES) stormwater permitting program in the Colorado River Basin region. Construction activities disturbing one acre or more of land are subject to the permitting requirements of the NPDES Construction General Permit for Discharges of Storm Water Runoff Associated with Construction Activity (CGP; Order 2009-0009-DWQ). Project activities such as clearing, grading, stockpiling, and excavation would be subject to the statewide general construction activity NPDES permit.

The CGP requires that the site be assigned a risk level of 1 (low), 2 (medium), or 3 (high) based on sediment and receiving waters risk. The sediment risk level is the relative amount of sediment that can be discharged given the project and location details. The receiving waters risk level reflects the risk sediment discharges pose to the receiving waters. A construction analysis provides a preliminary risk level assessment.

For non-exempt projects, the CGP requires the preparation and implementation of a SWPPP prior to construction commencement. At a minimum, the SWPPP includes the following:

- Description of construction materials, practices, and equipment storage maintenance

- List of pollutants likely to contact stormwater and site-specific erosion and sedimentation control practices
- List of provisions to eliminate or reduce discharge of materials to stormwater
- BMPs for fuel and equipment storage
- Non-stormwater management measures such as installing specific discharge controls during activities such as paving operations and vehicle and equipment washing and fueling
- Equipment, materials, and workers will be available for rapid response to spills and/or emergencies. All corrective maintenance or BMPs will be performed as soon as possible, depending upon worker safety

A SWPPP provides specific construction-related BMPs to prevent soil erosion and loss of topsoil. BMPs implemented could include, but would not be limited to, physical barriers to prevent erosion and sedimentation, construction of sedimentation basins, limitations on work periods during storm events, use of swales, protection of stockpiled materials, and a variety of other measures that would substantially reduce or prevent erosion from occurring during construction. Post-construction requirements require that construction sites match pre-project hydrology to ensure that the physical and biological integrity of aquatic ecosystems are sustained in their existing condition, unless the site is located within an area subject to the post-construction standards of an active Phase I or II municipal separate storm sewer system (MS4) permit that has an approved stormwater management plan. This Project Area is not within a MS4 area. The post-construction standards include structural and nonstructural control measures to replicate the pre-project water balance and pre-project drainage density, and reduce pollutants in storm water discharges.

Hazardous Waste Control Law (California Health and Safety Code, Division 20, Chapter 6.5)

This statute is the basic hazardous waste law for California. The Hazardous Waste Control Law implements the federal RCRA cradle-to-grave waste management system in California, although this program regulates more materials as hazardous wastes than the federal program. California hazardous waste regulations can be found in the CCR Title 22, Division 4.6, “Environmental Health Standards for the Management of Hazardous Wastes.” The program is administered by DTSC.

Hazardous Material Release Response Plans and Inventory Law (California Health and Safety Code, Division 20, Chapter 6.95)

This state law requires businesses to disclose the hazardous materials used in their businesses and to develop a Hazardous Material Management Plan or a “business plan” for hazardous materials emergencies if they handle, at any one time, more than 500 pounds, 55 gallons, or 200 cubic feet of hazardous materials. The business plan includes an inventory of all hazardous materials stored or handled at a facility above these thresholds. This law is designed to reduce the occurrence and severity of hazardous material releases and to promote emergency response preparedness by local agencies. The Hazardous Materials Management Plan must be submitted to the Certified Unified

Program Agency (CUPA), which for the Project vicinity is the San Bernardino County Fire Department, Hazardous Materials Division. The state has integrated the federal EPCRA reporting requirements into this law; once a facility is in compliance with the local administering agency requirements, submittals to other agencies are not required. The Hazardous Material Management Plan also defines response procedures and equipment for spills or releases of hazardous materials.

Cortese List (California Government Code, Section 65962.5)

The Hazardous Waste and Substances Sites List (Cortese List) is a planning document used by the state, local agencies, and developers to comply with requirements in providing information about the location of hazardous materials release sites. Government Code Section 65962.5 requires the California Environmental Protection Agency to develop an updated Cortese List at least annually. DTSC is responsible for a portion of the information contained in the Cortese List, as are other state and local government agencies. The Cortese List documents active and inactive landfills, underground pipelines, federal and state hazardous waste sites, Leaking Underground Storage Tank sites, and solid waste disposal facilities with known migration of hazardous waste. As noted above, the Station is listed on the DTSC EnviroStor website; however, no other listed sites are located near the Station.

California Well Standards, Bulletin 74-90

The state of California promulgated water well standards under Bulletin 74-90 to protect groundwater quality. The requirements address well construction techniques and materials, including appropriate locations, materials, annular seals, sealing off strata, well development, rehabilitation and repair, and well destruction. The well standards apply to all water wells, including extraction, injection, and monitoring wells.

California Vehicle Code Section 38366

The California Vehicle Code, Section 38366, requires spark arresting equipment on vehicles that travel off-road. The section is as follows.

(a) Notwithstanding Section 4442 of the Public Resources Code, and except for vehicles with mufflers as provided in Article 2 (commencing with Section 27150) of Chapter 5 of Division 12, no person shall use, operate, or allow to be used or operated, any off-highway motor vehicle, as defined in Section 38006, on any forest-covered land, brush-covered land, or grass-covered land unless the vehicle is equipped with a spark arrester maintained in effective working order.

(b) A spark arrester affixed to the exhaust system of a vehicle subject to this section shall not be placed or mounted in such a manner as to allow flames or heat from the exhaust system to ignite any flammable material.

(c) A spark arrester is a device constructed of nonflammable materials specifically for the purpose of removing and retaining carbon and other flammable particles over 0.0232 of an inch in size from the exhaust flow of an internal combustion engine or which is qualified and rated by the United States Forest Service.

(d) Subdivision (a) shall not be applicable to vehicles being operated off the highway in an organized racing or competitive event upon a closed course, which is conducted under the auspices of a recognized sanctioning body and by permit issued by the fire protection authority having jurisdiction.

California Emergency Services Act

The California Emergency Services Act provides the basic authority for conducting emergency operations following a proclamation of emergency by the governor and/or appropriate local authorities. Local government and district emergency plans are considered to be extensions of the California Emergency Plan, established in accordance with the California Emergency Services Act.

4.5.4.3 State of Arizona

Arizona Department of Water Resources

Well Construction and Abandonment Requirements

Well construction and abandonment standards in the State of Arizona are provided in *State of Arizona Department of Water Resources, Title 45 Waters, Chapter 2 Groundwater Code, Article 10 Wells*, dated 2011. Well construction requirements are provided in Section R12-15-811, Minimum Well Construction Requirements; well abandonment requirements are provided in Section R12-15-816, Well Abandonment. Further guidance on the abandonment of wells in Arizona is provided in their Well Abandonment Handbook, dated October 3, 2008. Both the installation and abandonment of water wells require permits. As discussed earlier in the Regulatory Setting section, CERCLA exempts response and corrective actions from obtaining permits providing the response action complies with the substantive requirements of the permit, in this case the well construction and abandonment requirements.

Arizona Department of Environmental Quality

Arizona Pollutant Discharge Elimination System Program for Construction and Land Disturbance Activities (General Permit) Order No. AZG2013-001

Similar to the California Construction General Permit, the State of Arizona also has a program to address controlling runoff from construction sites. The program requires acquiring coverage under the permit for projects that disturb more than one acre of area. The program requires the submittal of a Notice of Intent, the preparation and implementation a SWPPP with appropriate BMPs, fees, and reporting. The types of BMPs cited in the Arizona General Permit include scheduling of activities, prohibitions of practices, maintenance procedures; other BMPs to prevent or reduce discharge of pollutants to waters of the United States; and operating procedures and practice to control site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw materials storage. Some of the relevant BMPs include:

- Scheduling (SS-1): Proper scheduling assists in identifying ways to minimize disturbed areas, which allows for a reduction in the active Project Area requiring protection and also minimizes the length of time disturbed soils are exposed to erosive processes.

- Preservation of Existing Vegetation (SS-2): Preserving existing vegetation to the maximum extent practicable facilitates protection of surfaces from erosion and can also help to control sediments. Sensitive areas should also be clearly identified and protected.
- Geotextiles, Plastic Covers, and Erosion Control Blankets/Mats (SS-7): These erosion control methods can be used on flat or, usually, sloped surfaces, channels, and stockpiles.
- Stabilized Construction Entrance/Exit (TC-1): A graveled area or pad located at points where vehicles enter and leave a construction site can be built. This BMP provides a buffer area where vehicles can drop their mud and sediment to avoid transporting it onto public roads, to control erosion from surface runoff, and to help control dust.
- Runoff Control Measures (SS-9, SS-10, and SC-10): These include graded surfaces to redirect sheet flow, diversion dikes or berms that force sheet flow around a protected area
- Gravel Bag Berm (SC-6) and Sand/Gravel Bag Barrier (SC-8): A temporary sediment barrier consisting of gravel-filled fabric bags is designed to retain sediment from small disturbed areas by reducing the velocity of sheet flows.

Secondary concerns include potential pollutants from inappropriate material storage and handling procedures and non-stormwater discharges. These will be addressed through the following types of BMPs, which shall be incorporated into the stormwater BMP plan:

- Material Delivery and Storage (WM-1): Provide covered storage for materials, especially toxic or hazardous materials, to prevent exposure to stormwater. Store and transfer toxic or hazardous materials on impervious surfaces that will provide secondary containment for spills. Park vehicles and equipment used for material delivery and storage, as well as contractor vehicles, in designated areas.
- Spill Prevention and Control (WM-4): Ensure that spills and releases of materials are cleaned up immediately and thoroughly. Ensure that appropriate spill response equipment, preferably spill kits preloaded with absorbents in an overpack drum, is provided at convenient locations throughout the site. Spent absorbent material must be managed and disposed of in accordance with applicable regulations. In particular, absorbents used to clean up spills of hazardous materials or waste must be managed as hazardous waste unless characterized as nonhazardous.
- Solid Waste Management (WM-5): Provide a sufficient number of conveniently located trash and scrap receptacles to promote proper disposal of solid wastes. Ensure that the receptacles are provided with lids or covers to prevent windblown litter.
- Hazardous Waste Management (WM-6): Provide a sufficient number of proper receptacles to promote proper disposal of hazardous wastes.
- Concrete Waste Management (WM-8): Dispose of excess concrete in specific concrete washout facilities.
- Sanitary/Septic Waste Management (WM-9): Locate sanitary and septic waste facilities away from drainage courses and traffic areas. Maintain the facilities regularly.

- Vehicle and Equipment Cleaning (NS-8): Clean vehicles and equipment that regularly enter and leave the construction site.
- Vehicle and Equipment Fueling (NS-9): Fuel vehicles and equipment off-site whenever possible. If off-site fueling is not practical, establish a designated on-site fueling area with proper containment and spill cleanup materials.
- Vehicle and Equipment Maintenance (NS-10): Use off-site maintenance facilities whenever possible. Any on-site maintenance areas must be protected from stormwater runoff and on-site flooding.

4.5.4.4 Local

San Bernardino County Fire Department (California), Hazardous Materials Division

The purpose of the Hazardous Materials Division (HMD) is to protect the health and safety of the public and the environment of San Bernardino County by ensuring that hazardous materials are properly handled and stored. HMD accomplishes this through inspection, emergency response, site remediation, and hazardous waste management services. An overview of these services is provided below.

- Inspections: HMD inspects hazardous material handlers and hazardous waste generators to ensure full compliance with laws and regulations. HMD also implements CUPA programs for the development of accident prevention and emergency plans, proper installation, monitoring, and closure of underground tanks and for the handling, storage, transportation, and disposal of hazardous wastes.
- Emergency Response: HMD provides 24-hour response to emergency incidents involving hazardous materials or wastes to protect the public and the environment from accidental releases and illegal activities.
- Investigation/Remediation Oversight: HMD oversees the investigation and remediation of environmental contamination caused by releases from underground storage tanks, hazardous waste containers, chemical processes, or the transportation of hazardous materials. However, in cases where a site such as the Station was previously subject to DTSC oversight due to hazardous waste treatment, disposal, or other activities, DTSC usually continues to oversee the cleanup and remediation activities.
- Enforcement Actions: HMD conducts investigations and takes enforcement action as necessary against anyone who disposes of hazardous waste illegally or otherwise manages hazardous materials or wastes in violation of federal, state, or local laws and regulations.

San Bernardino County (California) Hazardous Waste Management Plan

California Assembly Bill 2948 authorized counties to prepare hazardous waste management plans designed to serve as the primary planning document for the management of hazardous waste within the counties. The *San Bernardino County Hazardous Waste Management Plan* identifies the types and amounts of wastes generated in the county; establishes programs for managing these wastes; identifies an application process for the siting of specified hazardous waste facilities; identifies mechanisms for reducing the amount of waste generated in the county; and identifies goals, policies, and actions for achieving effective hazardous waste management.

County of Mohave (Arizona)

The Arizona DWR has jurisdiction over the installation and abandonment of water supply wells.

4.5.5 Environmental Impacts

4.5.5.1 Thresholds of Significance

Based on the current (2016) CEQA Guidelines, Appendix G, a project may be deemed to have a significant effect on the environment with respect to hazardous materials if it would:

- Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials; or
- Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment.

The complete list of CEQA significance criteria used in the hazardous materials analysis is included in the Modified Initial Study (see Appendix IS), which also explains why the proposed Project would not result in new significant impacts or substantially increase the severity of impacts previously identified in the Groundwater FEIR (see Public Resources Code, Section 21166; CEQA Guidelines, Section 15162) on hazardous materials with respect to (1) being located within one-quarter mile of an existing or proposed school, on a listed hazardous materials site, within an airport land use plan, within two miles of a public airport, public use airport, or a private airstrip; (2) impairing or interfering with an adopted emergency response plan or emergency evacuation plan; (3) exposing people or structures to wildland fires. As a result, those impacts will not be addressed further in this SEIR and are summarized below and on the following page.

Location on a Listed Hazardous Materials Site

The Groundwater FEIR found that the Station is listed on the list of hazardous materials sites compiled pursuant to Government Code Section 65962.5, referred to as the Cortese list. This condition has not changed since certification of the Groundwater FEIR. The purpose of the Groundwater Remedy Project is to remediate the groundwater contamination condition that in part resulted in the listing. The Project would not result in new significant impacts or substantially increase the severity of impacts previously identified in the Groundwater FEIR on hazardous materials with respect to proximity to hazardous materials sites. Therefore, this issue is not evaluated further in this SEIR.

Proximity to Schools

The Groundwater FEIR stated that the nearest school is located 4 miles from the Project Area, outside of the quarter-mile threshold. This condition has not changed since certification of the

Groundwater FEIR. The Project would not result in new significant impacts or substantially increase the severity of impacts previously identified in the Groundwater FEIR on hazardous materials with respect to proximity to schools. Therefore, this issue is not evaluated further in this SEIR.

Proximity to Airports

The Groundwater FEIR stated that the nearest airport is located 6 miles from the Project Area, outside of the 2 mile threshold. This condition has not changed since certification of the Groundwater FEIR. The Project would not result in new significant impacts or substantially increase the severity of impacts previously identified in the Groundwater FEIR on hazardous materials with respect to proximity to airports. Therefore, this issue is not evaluated further in this SEIR.

Interference with Emergency Response Plans

The Groundwater FEIR noted that the proposed activities would utilize existing public roads for access and delivery purposes, similar to existing operations at the Station. Although new temporary and permanent access roads would be constructed as part of the Project, no significant increases in traffic volumes are anticipated that would conflict with an adopted emergency response plan or emergency evacuation plan. This condition has not changed since certification of the Groundwater FEIR. The Project would not result in new significant impacts or substantially increase the severity of impacts previously identified in the Groundwater FEIR on hazardous materials with respect to emergency response plans. Therefore, this issue is not evaluated further in this SEIR.

Wildland Fires

The Project Area is located within the Department of Forestry and Fire Protection's (CALFIRE's) lowest level of fire hazard severity zones, the lowest possible risk category, and within an area with sparsely vegetated to unvegetated desert. There was, however, a wildland fire that originated on April 6, 2016, 10 miles southeast of Needles and 2 miles west of Golden Shores (BLM 2016). The fire was fueled by riparian fuels including salt cedar. Although this fire demonstrates the ability for riparian areas within the Project Area to burn, no permanent residences are proposed as part of the Project that would result in loss, injury, or death. While workers would be on-site intermittently for the duration of construction, operation, and decommissioning activities, the proposed facilities would not pose an increase in threat due to wildland fires. The Project would not result in new significant impacts or substantially increase the severity of impacts previously identified in the Groundwater FEIR on hazardous materials with respect to wildland fires. Therefore, this issue is not evaluated further in this SEIR.

4.5.5.2 Approach to Analysis

This section presents a revised analysis per Public Resources Code Section 21166 and CEQA Guidelines Sections 15162 governing conditions required for preparation of a SEIR, including substantial changes to the Project or circumstances under which the Project is taken that result in major revisions to the original Groundwater FEIR. Subsequent to certification of the Groundwater

FEIR, the Final Remedy Design was prepared to include design details not available in 2011. This section outlines the approach to the potential hazardous materials impacts based on the Project-specific information now available, as well as the additional information obtained regarding the existing environmental setting (see Section 4.5.3 which summarizes the additional information included in the Final Remedy Design).

Some of the mitigation measures in this section refer to various plans or other documents that have been prepared and included in the Final Remedy Design for the groundwater remedy or are part of the Project's federal requirements. Many of these plans and documents included in the Final Remedy Design were prepared to implement mitigation measures previously adopted as part of DTSC's January 31, 2011 decision approving Alternative E as the groundwater remedy (DTSC 2011). Appendix GWMM to this SEIR presents a comparison between the mitigation measures included in the Groundwater FEIR as reflected in the Mitigation Monitoring and Reporting Program approved by DTSC on January 31, 2011, and those presented in this SEIR for the Final Groundwater Remedy Project.

All plans and documents included in the Final Remedy Design and references in this SEIR are appended to this SEIR as Appendix BOD. In addition, the documents are available online at the following link: http://dtsc-topock.com/documents/cleanup-implementation/groundwater/remedy-design/remedial-design-documents.

Construction Impact Methodology

Subsequent to certification of the Groundwater FEIR, additional details were developed in the Final Remedy Design regarding the number and location of wells, lengths of piping and roads, and footprints of treatment infrastructure that would be constructed to implement the Final Groundwater Remedy Project. The revisions, summarized below in Table 4.5-1, would result in an increased use of fuel, lubricants, paint, glue, and solvents, and an increase in the volume of disturbed soil, some of which may have chemicals at concentrations above hazardous waste levels. In addition, the Final Groundwater Remedy Project includes a Future Activity Allowance of all infrastructure to be constructed as part of the Project (wells, pipelines, roads, structures, etc.), as shown in **Table 4.5-1**. Generally, the Future Activity Allowance includes two components: (1) an additional allowance for all Project infrastructure, established at up to 25 percent of the parameter set forth in the Final Remedy Design, and (2) up to 10 additional monitoring well boreholes to be installed in Arizona as part of the monitoring program. The Future Activity Allowance could include construction of Project infrastructure at locations that are currently not known but are assumed to be located within the Project Area. Implementation of the Future Activity Allowance could occur during both the temporary construction and long-term operation and maintenance phases. Pipelines and electrical power would be located underground, consistent with the known Project elements. Additional boreholes could be located throughout the Project Area, depending on the overall performance of the remedy and the need for monitoring wells in Arizona. This SEIR therefore also includes in the impacts analysis the anticipated effects associated with the Future Activity Allowance.

TABLE 4.5-1
SUMMARY OF INFRASTRUCTURE

Component	Groundwater FEIR Estimate	Final Remedy De sign	Future Activity Allowance	Total	Difference Between FEIR Limit and Total New SEIR Features [b]
Boreholes[a]	170	191	58	249	61
Disturbed Ground (cubic yards)	13,400	45,200	11,300	56,500	43,100
Fluid Conveyance Piping (linear feet, underground)	50,000	127,500[c]	31,875	159,375	109,375
Electrical/Communications Conduits (linear feet, underground)	50,000	124,000	31,000	155,000	105,000
Buildings and Structures (square feet)	110,000	42,000	10,500	52,500	(57,500)
Roadway Improvements (linear feet)	6,000	8,150 linear feet (new) and 4,060 linear feet (improvements to existing)	2,038 linear feet (new) and 1,015 linear feet (improvements to existing)	10,188 (new) 5,075 (improvements to existing)	9,263

NOTES:
[a] Each borehole may contain multiple wells; inclusive of both remediation and monitoring wells.
[b] Difference equals Total SEIR Boreholes (249) minus Groundwater FEIR Limit boreholes (170) minus Installed Boreholes (18).
[c] 124,000 linear feet of piping and/or conduits in 43,200 linear feet of trenches.

SOURCE: CH2M Hill 2015a, 2015b.

This section considers whether implementation, construction, and operation of the Final Groundwater Remedy Project, in conjunction with the Future Activity Allowance, would result in new or substantially more severe significant adverse impacts related to hazards compared to those identified in the Groundwater FEIR certified in 2011, including with the increased potential to encounter contaminated soil based on the soil sampling and additional information gathered to date. The analysis assumes that construction activities, including the management of hazardous materials, would be conducted in compliance with all applicable regulations and work plans, and the impact would be considered less than significant if the activities would not create a significant hazard to workers, the public, or the environment. All other construction-related impacts of the proposed Project are unchanged from what is presented in the Groundwater FEIR.

Operation & Maintenance Impact Methodology

Subsequent to certification of the Groundwater FEIR, additional details were developed regarding the types, volumes, and locations of chemicals to be used and the types and amounts of waste that would be generated in implementing the Final Groundwater Remedy Project. For example, ethanol has been selected as the specific carbon substrate or reductant to be injected into the aquifer to reduce the soluble Cr(VI) to the less soluble Cr(III). The specific carbon substrate used may vary over the life of the Project depending on the response of the plume. In addition, PG&E developed a contingent freshwater pre-injection treatment system to reduce the concentration of arsenic in the freshwater source in Arizona. This treatment system would use chemicals that could expose workers to hazardous materials. Also, a Soil Processing/Storage Area would be located at the Construction Headquarters/Long-Term Remedy Support Area in the Moabi Regional Park. This area would be used to temporarily store excavated soil pending sampling to determine the appropriate management of that soil.

As described in Section 3.6 of the Project Description, the Final Groundwater Remedy Project includes a Future Activity Allowance for all Project infrastructure, which could occur during the construction or operation and maintenance phase. In terms of location, the Future Activity Allowance could include construction of replacement/ additional pipelines and electrical power underground throughout the Project Area, and would primarily be situated in proximity to existing infrastructure. For example, additional boreholes could be located in the floodplain and in the vicinity of existing/planned boreholes, and additional buildings/structures would likely be situated near other existing/planned structures and facilities (at the Station, Transwestern Bench, and Long-Term Remedy Support Area, etc.).

As described above, this section presents a revised analysis of the impacts associated with the routine use or reasonably foreseeable accidental releases of hazardous materials based on additional information made available after the Groundwater FEIR was certified in 2011. The analysis assumes that the use of hazardous materials would be conducted in compliance with all applicable regulations and work plans, and the impact would be considered less than significant if activities involving hazardous materials would not create a significant hazard to workers, the public, or the environment. All other operation-and-maintenance-related impacts of the proposed Project are unchanged from what is presented in the Groundwater FEIR.

Decommissioning Impact Methodology

Subsequent to certification of the Groundwater FEIR, additional details were developed regarding the decommissioning of the IM-3 Facility. The IM-3 Facility decommissioning details and procedures are provided in Appendix F of the C/RAWP (CH2M Hill 2015b). However, the additional information only provides details and procedures that do not result in a significant change in the hazardous materials that would be used or would be generated and therefore do not significantly change the impacts analyzed in the Groundwater FEIR. Therefore, the decommissioning of the IM-3 Facility is not addressed.

Subsequent to certification of the Groundwater FEIR, additional details were developed regarding the decommissioning of the Final Groundwater Remedy Project. As noted above, the number of wells, length of piping, electrical conduit, and roadways increased from the amounts estimated in the Groundwater FEIR. Consequently, the use of hazardous materials during decommissioning (e.g., fuel) and the volume of hazardous materials that could be generated for disposal (e.g., equipment that used hazardous materials for treatment) would both increase. Because the decommissioning of the Final Groundwater Remedy Project would occur decades in the future, the final decommissioning procedures would be prepared in a future work plan to account for regulatory and technological changes. However, using current regulatory requirements, the Final Remedy Design describes the overall decommissioning procedures and Appendix B of the

C/RAWP provides standard operating procedures for the decommissioning of wells; the sampling of demolition waste to identify the appropriate disposal methods; the shutdown of treatment systems; spill prevention, containment, and control; and waste disposal.

This section presents a revised analysis of the impacts associated with the routine use or reasonably foreseeable accidental releases of hazardous materials based on the additional information. The analysis assumes that the use of hazardous materials would be conducted in compliance with all applicable regulations and work plans, and the impact would be considered less than significant if activities involving hazardous materials would not create a significant hazard to workers, the public, or the environment. All other operation and maintenance related impacts of the proposed Project are unchanged from what is presented in the Groundwater FEIR.

4.5.5.3 Impact Analysis

IMPACT HAZ-1 **Spills or Releases of Contaminants during Construction, Operation and Maintenance, and Decommissioning Activities from Routine Transport, Use, and Disposal or the Reasonably Foreseeable Accidental Release of Hazardous Materials that could Expose Workers, the Public, or the Environment.** Construction, operation and maintenance, and decommissioning of the proposed Project could result in the potential release of hazardous materials during use or delivery of hazardous materials as a result of component failure (e.g., valve, flange, or pipe), tank failure, or human error (e.g., tank overfilling). This impact would be **potentially significant**, as previously identified in the Groundwater FEIR.

The potential for the exposure of workers, the public, or the environment to hazardous materials through routine use or accidental spills is similar during construction, operations and maintenance, and decommission activities, and are therefore collectively analyzed below. Additionally, the impacts associated with the Future Activity Allowance would be similar, and are addressed below.

As considered in the Groundwater FEIR certified in 2011, the Final Groundwater Remedy Project would require the use of equipment, such as trucks, excavators, drill rigs, and generators. Unless powered by on-site electrical power, the equipment would use fuels (gasoline or diesel) and lubricants (oils and greases) that would be transported to and used in the Project Area. The proposed Project would require the construction and eventual decommissioning of structures, such as wells, buildings, treatment systems, and piping between wells and treatment systems. The construction of structures would involve the use of paint, glues, solvents, thinners, or other chemicals. During decommissioning, as well as during construction and operations and maintenance, materials would be removed and transported from the Project Area to off-site disposal facilities and some of these materials could be hazardous. For example, the removed materials may include excavated soil with chemicals at concentrations above action levels (and therefore deemed "hazardous" under California law, if not RCRA), spent filters containing hazardous materials, or equipment that has become contaminated during its use.

As defined in the Groundwater FEIR, reasonably foreseeable spills and accident conditions could occur involving the release of hazardous materials during transport or handling, which could be an adverse effect on workers during construction, operation, maintenance, or decommissioning activities; potential visitors to the Project Area after construction is complete; the public and environment along off-site transportation routes; or the environment during construction, operation, maintenance, or decommissioning activities. As summarized on Table 4.5-1, the volumes of hazardous materials that would be used (construction of infrastructure) or potentially encountered (ground-disturbance activities of contaminated soil areas) during the construction of the Final Groundwater Remedy Project are a substantial increase over the volumes analyzed in the Groundwater FEIR, as discussed in Section 4.5.5.3 and in Chapter 3, "Project Description."

There are various federal, state, and local regulations, laws, and policies that regulate the use, transportation, storage, and disposal of hazardous materials, as summarized above in Section 4.5.4, "Regulatory Framework." Employees constructing and implementing the Project would be required to comply with all relevant regulations. To comply with the regulations, the Final Remedy Design includes plans and procedures as part of the Project to incorporate regulatory requirements and address Mitigation Measures HAZ-1a, HAZ-1-b, and HAZ-2, provided in the Groundwater FEIR. The Project implementation plans and procedures listed below are relevant to hazardous materials and are designed to reduce and minimize the potential hazards of the routine use, storage, disposal, or accidental spills to less than significant levels. Note that the list of items below is similar to, but slightly different from, those discussed in impact analysis in Section 4.6, "Hydrology and Water Quality" of this SEIR.

- Relevant plans and procedures regarding hazardous materials provided in the Final Remedy Design (CH2M Hill 2015a) and anticipated to be made conditions of approval of the Final Remedy Design include the following:
  - Design criteria, plans, and specifications are provided in Final Remedy Design Section 3.0 and Appendices C, D, and E, respectively. These specifications describe the storage and containment structures, including secondary containment, that would minimize the potential for spills and contain those spills that do occur.
  - Appendix L provides the Operation and Maintenance Manual, which includes the Operation and Maintenance Plan, Sampling and Monitoring Plan, Contingency Plan, Soil Management Plan, and Health and Safety Plan. These plans describe the procedures to be used by workers to operate systems, sample and monitor soils and groundwater from wells, manage soil, and conduct work in a safe manner. The procedures include the management of soils to be stored and processed at the Soil Processing Area. Note that the sampling of some of the soils may indicate that the soil would be considered a hazardous waste under RCRA or state law. The Soil Management Plan includes procedures for the classification, storage, and disposal of soil classified as hazardous waste.
  - The Remedy Decommissioning Process is described in the Final Remedy Design, Section ES.6, and describes some of the procedures in other sections and appendices of the Final Remedy Design and the C/RAWP. Collectively, the procedures described in the Final Remedy Design address site preparation and demarcation, utility survey and isolation, general strategy for system components decommissioning, soil confirmation sampling, as needed, and general strategy for post-decommissioning restoration. Collectively, the decommissioning procedures would be very similar to those described for the

decommissioning of the IM-3 Facility described in the C/RWAP, Appendix F, summarized below. However, as discussed further below, PG&E also recognizes that the decommissioning of the Final Groundwater Remedy would occur decades in the future and regulations and technologies may evolve with time.

- Relevant plans and procedures regarding hazardous materials management and handling during construction and remedy start up are provided in the C/RAWP (CH2M Hill 2015b), which include the following:
  - C/RAWP Section 4.0 describes the site management plan, including safety, air monitoring, and equipment decontamination procedures (Section 4.4), the waste management plan (Section 4.5), and the Best Management Practices (Section 4.6), including stormwater-related BMPs.
  - The Standard Operating Procedures (Appendix B) provide numerous detailed standard operating procedures, including procedures for the handling, sampling, and disposal of soil and water; decontamination of personnel and equipment; the operation of systems that use hazardous materials; and spill prevention, containment, and control measures.
  - The Construction Health and Safety Plan (Appendix D) describes procedures and training requirements to assess, monitor, control, and reduce hazards to workers, visitors, and the public during remedy construction and startup. This plan includes emergency response procedures in the event that a hazardous materials incident occurs. The Construction Health and Safety Plan meets the standards set by the United States OSHA (29 CFR 1910 and 1926), and the California Division of Occupational Safety and Health (Cal/OSHA), and Hazardous Waste Operations and Emergency Response (HAZWOPER) regulations found at Title 8 of the California Code of Regulations Section 5192 (8 CCR 5192).
  - The IM-3 Facility decommissioning plan (Appendix F) describes the procedures for decommissioning the IM-3 Facility. The facility may include hazardous materials that would need to be properly managed.
  - The Soil Management Plan (Appendix L) provides detailed procedures for screening and classifying, handling and storage, transportation, and disposal of soil, including soil with chemical concentrations that qualify the soil as hazardous waste. The procedures include the management of soils to be stored and processed at the Soil Processing Area. Note that the sampling of some of the soils may reveal that the soil would be considered a hazardous waste. The Soil Management Plan includes procedures for the classification, storage, and disposal of soil classified as hazardous waste.
  - The Best Management Practices Plan (Appendix M) describes measures to control and manage erosion, sediment, waste, and non-stormwater, and other good housekeeping practices.
  - The Waste Management Plan (Appendix R) provides detailed procedures to manage wastes generated during construction, remedy startup and IM-3 Facility decommissioning including wastewater, displaced soil, precipitated solids, sludge, spent solvents and filters, gas cylinders, surplus or partially used chemicals, contaminated concrete and asphalt

rubble, decontamination fluids, used oil and oily waste, general construction waste, and sanitary waste.

As summarized in Chapter 3, “Project Description” of this SEIR, the Final Remedy Design developed contingencies in the event that the conveyance pipelines do not convey fluids as designed. The Operation and Maintenance Manual, Volume 3, Contingency Plan (Final Remedy Design, Appendix L; CH2M Hill 2015a) itemizes potential causes and provides contingencies to address the possible causes. Potential causes and the contingencies to address the causes relevant to the release of hazardous materials are summarized below.

- Leaks or breaks: The pipeline system has leak and pressure drop detection alarms that would automatically shut the system down. The secondary containment and well head boxes would limit the volume of fluids released before automatic system shutdown. Repairs would then be made, the system tested, and system operations restored.

- Release of pipeline maintenance chemicals to wells: The clean-in-place system is programmed to require wellhead valves to be closed prior to clean-in-place operations. In the event that the wellhead valve is not closed, clean-in-place maintenance chemicals would be discharged to the well. This would require rehabilitation of the well, similar to well development, where groundwater and the well maintenance chemicals would be pumped out of the well.

The above-listed contingencies would be implemented as needed and would further ensure that the integrity of pipelines are monitored and that the pipelines would shut down in the event of leaks or breaks, minimizing the potential release volume.

Implementation of the plans listed above, as required by **Mitigation Measure HAZ-1a** and **Mitigation Measure HAZ-1b**, and **Mitigation Measure HAZ-2** would ensure compliance with applicable regulations regarding the safe transportation, storage, handling, and disposal of hazardous materials. In addition, the plans include procedures to respond to accidental spills and releases. Collectively, compliance with existing regulations and implementation of the above-listed plans (as required by Mitigation Measures HAZ-1a, HAZ-1b, and HAZ-2) would result in less than significant impacts related to the routine use or accidental release of hazardous materials.

The plans listed above include procedures for the decommissioning of the Final Groundwater Remedy (Final Remedy Design Section ES.6), wells (C/RAWP Appendices B and F), and the disposal of materials, including hazardous and non-hazardous materials (Final Remedy Design Appendix L; C/RAWP Appendices B, D, F, L, M, and R). However, decommissioning of the Final Groundwater Remedy would not occur for decades in the future and therefore regulations and technology may evolve over time. Consequently, although the Final Remedy Design provides plans and procedures for hazardous material and waste management during construction, operation, and decommissioning of the Final Groundwater Remedy, a Final Decommissioning Plan for the Groundwater Remedy would have to be prepared decades in the future to address regulatory and technological changes for the proposed decommissioning procedures. For example, waste disposal acceptance criteria may become more stringent, resulting in additional material requiring disposal as hazardous waste as opposed to recycling or disposal as non-hazardous waste. This would be a potentially significant impact. To address this, **Mitigation Measure HAZ-3** would require the preparation and implementation of this plan according to specific performance criteria, discussed further under the description of Mitigation Measure HAZ-3 later in this section.

Comparison of Hazardous Materials Routine Use or Accidental Release Impacts to Groundwater FEIR Impact Analysis

The Groundwater FEIR determined that hazardous materials impacts associated with construction, operation and maintenance, and decommissioning activities would result in a potentially significant impact. To mitigate the impacts, the Groundwater FEIR required implementation of Mitigation Measures HAZ-1a and 1b. These mitigation measures required compliance with applicable local, state, and federal laws; the preparation of BMPs, hazardous materials business plan, spill response plan, and standard operating procedures for the management of fuel; and the construction of secondary containment structures. The Final Remedy Design has incorporated the Groundwater FEIR mitigation measures into the design, which would be implemented as part of the Project. In addition, to mitigate for potential releases of chemicals from contaminated disturbed soil, the Groundwater FEIR proposed Mitigation Measure HAZ-2, which required the preparation of a health and safety plan, worker training, and various standard operating procedures to manage contaminated soil. Subsequent to the Groundwater FEIR, PG&E prepared the Final Remedy Design (CH2M Hill 2015a) and C/RAWP (CH2M Hill 2015b). As described above, these design and planning documents provide specifications and procedures that incorporate the items required by Mitigation Measures HAZ-1a, HAZ-1b, and HAZ-2, as well as other Project activities, and they will be implemented as required. Compliance with the law and implementation of the plans in the Final Remedy Design and C/RAWP have incorporated the mitigation measures into the Project. Therefore, after the incorporation of Mitigation Measure HAZ-3, the Project would not result in any new significant impacts or substantially more severe impacts relative to hazardous materials than previously identified in the Groundwater SEIR.

Mitigation Measures

Mitigation Measure HAZ-1a: Spills or Releases of Contaminants during Operation and Maintenance Activities (Groundwater FEIR Measure with Revisions)

a. PG&E shall store, handle, and transport hazardous materials in compliance with applicable local, state, and federal laws.

b. All chemical storage and loading areas shall be equipped with proper containment and spill response equipment. BMPs to be implemented may include, but are not limited to, use of secondary containment in mixing and storage areas, availability of spill kits and spill containment booms, and appropriate storage containers for containment of the materials generated during the spill response. The Final Remedy Design provides engineering drawings of chemical storage and loading areas in Appendix D, specifications in Appendix E, and the Contingency Plan in Appendix L (Operation and Maintenance Manual), Volume 3 (CH2M

Hill 2015a), which shall all be implemented during construction, and operation and maintenance, and decommissioning of the Project.

c. A project-specific Hazardous Materials Business Plan (HMBP), chemical standard operating procedure (SOP) protocols and contingency plans shall be developed to ensure that proper response procedures would be implemented in the event of spills or releases. Specifically, the HMBPs and SOPs shall describe the procedures for properly storing and handling fuel on-site, the required equipment and procedures for spill containment, required personal protective equipment, and the measures to be used to reduce the likelihood of releases or spills during fueling or vehicle maintenance activities. BMPs to be implemented may include, but are not limited to, use of secondary containment in mixing and storage areas; availability of spill kits and spill containment booms, and appropriate storage containers for containment of the materials generated during the spill response. The field manager in charge of operations and maintenance activities shall be responsible for ensuring that these procedures are followed at all times. SOPs are provided in Appendix B to the C/RAWP (CH2M Hill 2015b); the HMBP in Appendix L to the Final Remedy Design (Operation and Maintenance Manual), Volume 1, Appendix E; and the Contingency Plan in Appendix L (Operation and Maintenance Manual), Volume 3 (CH2M Hill 2015a), shall all be implemented during construction, and operation and maintenance, and decommissioning of the Project.

Timing:	Commence at construction and continue for life of the Project.
Responsibility:	PG&E would be responsible for the implementation of these measures. DTSC would be responsible for ensuring compliance.
Significance after Mitigation:	With mitigation, these impacts would be reduced to a **less than significant** level.

Mitigation Measure HAZ-1b: Spill or Release of Contaminants during Construction and Decommissioning Activities (Groundwater FEIR Measure with Revisions)

a) Fueling areas and maintenance areas would be supplied with proper secondary containment and spill response equipment. The Final Remedy Design provides engineering drawings of chemical storage and loading areas in Appendix D, specifications in Appendix E, and the Contingency Plan in Appendix L (Operation and Maintenance Manual), Volume 3 (CH2M Hill 2015a), which shall all be implemented during construction, and operation and maintenance, and decommissioning of the Project.

b) PG&E shall develop fueling SOP protocols and a contingency plan that would be implemented at all fueling areas on-site. The SOPs shall describe the procedures for properly storing and handling fuel on-site, the required equipment and procedures for spill containment, required PPE, and the measures to be used to reduce the likelihood of releases or spills during fueling or vehicle maintenance activities. Potential measures include but are not limited to, fuel storage in bermed areas, performing vehicle maintenance in paved and bermed areas, and availability of spill kits for containment and cleanup of petroleum releases.

The field manager in charge of construction and decommissioning activities shall be responsible for ensuring that these procedures are followed at all times. SOPs are provided in Appendix B (CH2M Hill 2015b); the HMBP in Appendix L (Operation and Maintenance Manual), Volume 1, Appendix E; and the Contingency Plan in Appendix L (Operation and Maintenance Manual), Volume 3 (CH2M Hill 2015a)), shall all be implemented during construction, and operation and maintenance, and decommissioning of the Project.

c) PG&E shall comply with local, state, and federal regulations related to the bulk storage and management of fuels. The Final Remedy Design provides engineering drawings of chemical storage and loading areas in Appendix D; specifications in Appendix E (Operation and Maintenance Manual), Volume 3; the HMBP in Appendix L (Operation and Maintenance Manual), Volume 1, Appendix E; and the Contingency Plan in Appendix L (Operation and Maintenance Manual), Volume 3 (CH2M Hill 2015a), which shall all be implemented during construction, and operation and maintenance, and decommissioning of the Project.

Timing:	Commence at construction and continue for life of the Project.
Responsibility:	PG&E would be responsible for the implementation of these measures. DTSC would be responsible for ensuring compliance.
Significance after Mitigation:	With mitigation, these impacts would be reduced to a **less than significant** level.

Mitigation Measure HAZ-2: Reasonably Foreseeable Releases of Chemicals from Excavated or Disturbed Soil (Groundwater FEIR Measure with Revisions)

Subsequent to the Groundwater FEIR and in compliance with Groundwater FEIR Mitigation Measure HAZ-2, PG&E developed a Final Construction Health and Safety Plan provided in C/RAWP, Appendix D, and a Draft Operation and Maintenance Health and Safety Plan in the Final Remedy Design, Appendix L, Volume 5. A final Operation and Maintenance Health and Safety Plan will be submitted to DTSC and DOI during the start-up phase of the remedy, and should include any separate plans provided by contractors. The health and safety plans include procedures to mitigate potential hazards, which include the use of PPE, measures that provide protection from physical and chemical hazards that may be present at the site, decontamination procedures, and worker and health and safety monitoring criteria to be implemented during construction. The worker health and safety plans includes protective measures and PPE that are specific to the conditions of concern and meet the requirements of the U.S. Occupational Safety and Health Administration's (OSHA's) construction safety requirements and Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120). In accordance with OSHA requirements, appropriate training and recordkeeping shall also be a part of the health and safety program. The health and safety plans shall be certified by a Certified Industrial Hygienist in accordance with OSHA regulations. The worker health and safety plan shall be provided to the construction workers for review and all workers shall be required to sign the plan, which will be kept on the construction site at all times. Contractors and subcontractors may also provide their own health and safety plans, providing the contractors and subcontractors health and safety plans are compliant with OSHA requirements and have been provided to PG&E and DTSC for review.

Worker safety training shall occur prior to initiation of ground-disturbing activities. Training shall include the review of all health and safety measures and procedures. All workers and engineering inspectors at the site shall provide written acknowledgement that the soils management plan (discussed below), worker health and safety plan, and any existing community health and safety plan were reviewed and training was received prior to commencement of construction activities.

The following are specific elements and directives that shall be included in the health and safety plan and implemented by PG&E during construction, operation and maintenance, and decommissioning of this project:

a. Vehicles traveling on unpaved roadways or surfaces would be directed to avoid traveling in areas where contaminated soils are known to be present; vehicle speeds shall be controlled (e.g., limited to 15 mph or slower) to limit generation of dust; measures, such as wetting of surfaces, will be employed to prevent dust generation by vehicular traffic or other dust-generating work activities.

b. Pre-mobilization planning shall occur during which the likelihood of encountering contaminated soils shall be reviewed along with the Hazardous Materials Business Plan, site-specific health and safety plan, and SOPs so that the procedures are followed and the contingencies for handling contaminated soils are in-place prior to implementing the field operations.

c. Should evidence of contaminated soil be identified during ground-disturbing activities (e.g., noxious odors, discolored soil), work in this area will immediately cease until soil samples can be collected and analyzed for the presence of contaminants as directed by the site supervisor or the site safety officer. Contaminated soil shall be managed and disposed of in accordance with the Project-specific health and safety plan and soil management plan. The health and safety plan and soil management plan shall be reviewed by DTSC before beginning any ground-disturbing activities. While the Project is exempt from the requirements of the San Bernardino County Division of Environmental Health, the health and safety plan shall be prepared in general accordance with the substantive requirements of this agency.

d. In the event that drilling sites must be located within areas of suspected soil contamination, the appropriate PPE shall be worn by all personnel working in these areas and methods specified in the health and safety plan used to control the generation of dust. When working in these areas, personnel shall be required to follow all guidance presented in the site-specific health and safety plan and soil management plan. The site-specific health and safety plan shall include provisions for site control such as, but not limited to, delineation of the exclusion, contaminant reduction and support zones for each work area, decontamination procedures, and procedures for the handling of contaminated soils and other investigation derived wastes. Soil that is excavated shall be loaded directly into containers such as roll-off bins; dust suppression methods shall be used prior to and during loading of soils into the bins. Suspected contaminated soils shall be segregated from suspected uncontaminated soils.

e. Personnel working at the site shall be trained in Hazardous Waste Operations.

f. All soil excavated and placed in roll-off bins or trucks for transportation off-site shall be covered with a tarp or rigid closure before transporting, and personnel working in the area shall be positioned upwind of the loading location, as practicable.

Timing:	Commence at construction and continue for life of the Project.
Responsibility:	PG&E would be responsible for the implementation of these measures. DTSC would be responsible for ensuring compliance.
Significance after Mitigation:	With mitigation, these impacts would be reduced to a **less than significant** level.

Mitigation Measure HAZ-3: Final Groundwater Remedy Decommissioning Plan (New Measure)

Upon achieving the Remedial Action Objectives for the groundwater remedy, PG&E shall provide a written request with documentation to the DTSC and DOI requesting approval for decommissioning the groundwater remedy. Upon approval from DTSC and DOI, PG&E shall then prepare and submit a Final Groundwater Remedy Decommissioning Plan within 120 days to DTSC and DOI for their review and approval. This plan shall comply with the requirements in the Programmatic Agreement (BLM 2010), the Cultural and Historic Properties Management Plan (BLM 2012), the Consent Decree and Appendix C, Scope of Work, to Consent Decree (DOI 2013) (or functional equivalent if those document names change in the future), and the mitigation measures included within this SEIR. This plan shall include the decommissioning specifications and procedures currently described in the Final Remedy Design, but shall be updated to incorporate technology and regulatory changes, if any. In particular, the updated Final Groundwater Remedy Decommissioning Plan shall check for updates to waste disposal acceptance criteria to identify the appropriate disposal or recycling facilities for the Final Groundwater Remedy infrastructure to be removed, and for changes in well abandonment procedures by regulatory agencies (the States of California and Arizona, and the Counties of San Bernardino [California] and Mohave [Arizona]).

Timing:	After approval for decommissioning is received from the DTSC with concurrence from the DOI.
Responsibility:	PG&E shall be responsible for the preparation and implementation of this measure. DTSC would be responsible for ensuring compliance.
Significance after Mitigation:	With mitigation, this impact would be reduced to a **less than significant** level because measures and plans would be in place to manage hazardous materials generated from the decommissioning of the Final Groundwater Remedy Project.

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4.6 Hydrology and Water Quality

4.6.1 Introduction

This section describes the reasonably foreseeable and potentially significant adverse environmental effects related to hydrology and water quality conditions in the Project Area for the Pacific Gas and Electric Company (PG&E) Topock Compressor Station Final Groundwater Remediation Project (Final Groundwater Remedy Project, or proposed Project) as identified in the Project Description of this subsequent environmental impact report (SEIR). Specifically, this section considers the potentially significant adverse effects of the proposed Project during the construction, operation and maintenance, and decommissioning phases, as compared to those identified in the Topock Compressor Station Groundwater Remediation Project Final EIR (Groundwater FEIR; DTSC 2011), consistent with Public Resources Code Section 21166 and the California Environmental Quality Act (CEQA) Guidelines Sections 15162 and 15168, and including changes in impacts related to violations of water quality standards or waste discharge requirements; alterations to drainage patterns that could affect erosion, siltation, or flooding; or the generation of runoff.

The impact evaluation in the Hydrology and Water Quality section of the Modified Initial Study (see Appendix IS) explains why the proposed Project would not result in new significant adverse impacts or a substantial increase in the severity of previously identified significant impacts with respect to: (1) placing housing in flood hazard areas or (2) placing structures in flood areas that would impede or redirect flow, or expose people or structures to significant loss, injury, or death from levee or dam failures, seiches, tsunamis, or mudflows.

Project impacts on water supply, which are related to hydrology, are addressed in Section 4.9, “Water Supply,” of this SEIR. Specifically, Section 4.9 analyzes the potential effects of the Project on substantial depletion of groundwater supplies or substantial interference with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level. Project impacts on water quality relative to water supply impacts are addressed within this Section 4.6.

4.6.2 Summary of 2011 Groundwater FEIR Hydrology and Water Quality Analysis

The Hydrology and Water Quality section of the Groundwater FEIR included a detailed discussion of the environmental setting and potential effects of the proposed remedy on hydrology and water quality. Although largely programmatic, the Groundwater FEIR provided a detailed analysis of the construction and operation of physical facilities anticipated at that time to be necessary to implement the groundwater remedy. The Groundwater FEIR also included a project-level analysis of the conceptual technical methods selected for the final remedy. This SEIR incorporates the analysis in the Groundwater FEIR by reference and evaluates, on a project-specific level, the potential effects associated with construction and operation of the *Basis of Design Report/Final (100%) Design Submittal for the Final Groundwater Remedy, PG&E Topock Compressor Station, Needles, California, November* (Final Remedy Design; CH2M Hill 2015a) and the *Construction/Remedial Action Work Plan for the Final Groundwater Remedy*

(C/RAWP; CH2M Hill 2015b) that were unknown at the time the analysis was conducted for the Groundwater FEIR. The Final Remedy Design is included in its entirety as Appendix BOD to this SEIR. Information included in the Hydrology and Water Quality analysis of the Groundwater FEIR is summarized below and in the following pages.

4.6.2.1 Setting Identified in the 2011 Groundwater FEIR

The following summarizes the setting relative to hydrology and water quality described in the Groundwater FEIR (DTSC 2011).

Climate

The climate discussion in the Groundwater FEIR described the average temperature in the vicinity of the proposed Project as exceeding 100 degrees Fahrenheit during the months of June, July, August, and September, with the temperature rarely dropping below freezing throughout the year. Precipitation averaged 4.67 inches in Needles from the period of 1961 to 1990, primarily falling during the summer thunderstorm months from July through early September or during winter from January through March. May and June are primarily the driest months. Wind speeds average 8.8 miles per hour from the predominant direction of south-southwest. PG&E personnel at the PG&E Topock Compressor Station (Station) reported the winds as predominantly to the southeast. As summarized in Section 4.2, “Air Quality,” this general setting description has not changed since certification of the Groundwater FEIR.

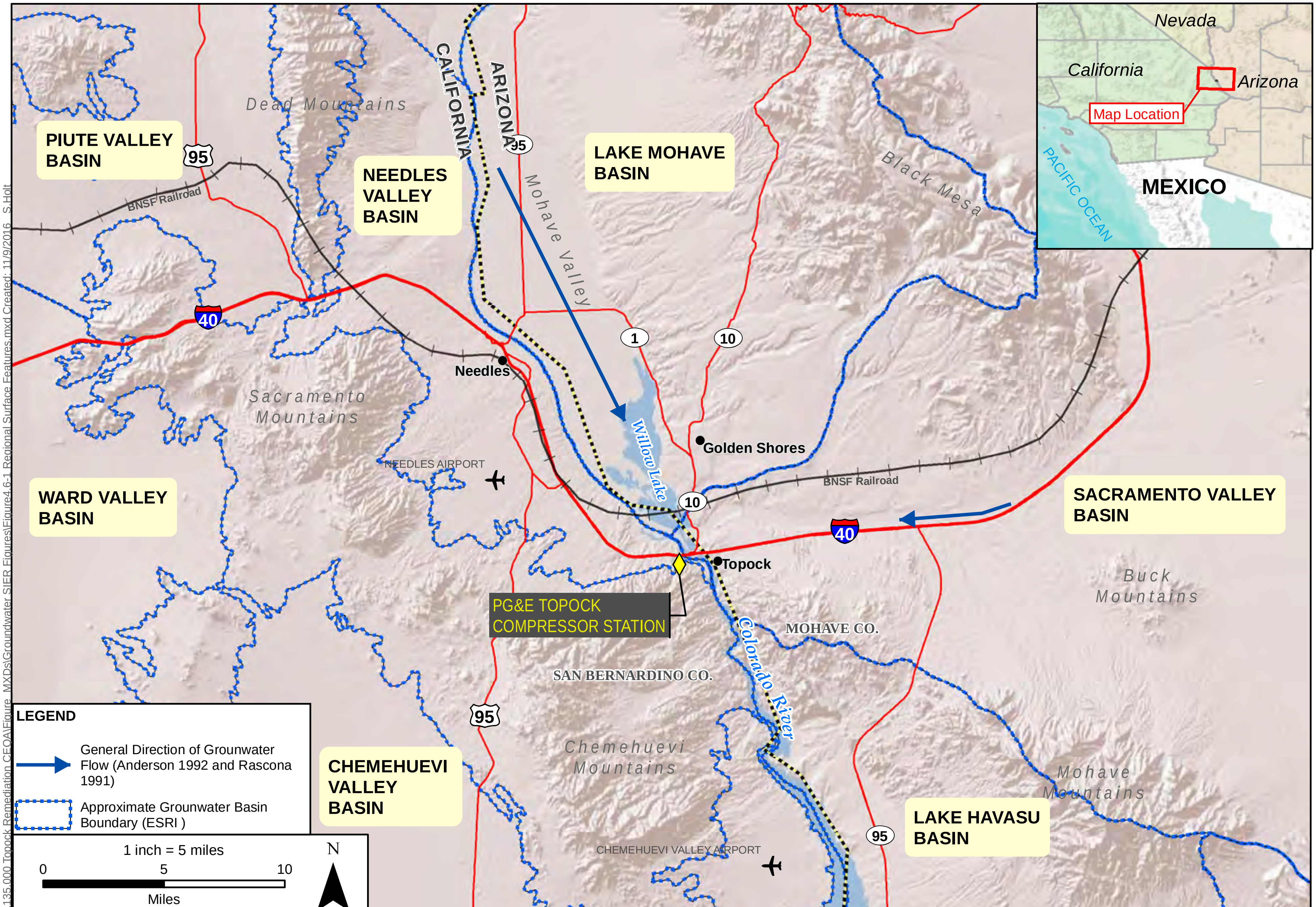
Surface Water

The surface water discussion in the Groundwater FEIR described the overall hydrologic setting in the East Colorado River Basin Planning Area, and the Colorado River and its adjacent wetlands, marshes, and floodplain areas. The local surface water features discussed below are shown in **Figure 4.6-1**. The general description of surface water in the vicinity of the Project Area has not changed since certification of the Groundwater FEIR; for an in-depth discussion, please see the Groundwater FEIR Section 4.7.1.2.

Local Surface Water Features

The Colorado River channel ranges from approximately 600 to 700 feet wide in the area upstream from the Interstate 40 (I-40) bridge crossing at Topock and between approximately 300 and 500 feet wide in the Topock Gorge, located just downstream and south of the Station. In the Project Area” as well as upstream in the Mohave Valley, a floodplain borders both sides of the Colorado River, although, because of upstream dams and flow regulation, the river no longer floods. The width of the floodplain adjacent to the Project Area averages 500 feet and narrows south of the site as the river enters the Topock Gorge, where the shoreline becomes bedrock. Near the Project Area, the floodplains on both sides of the river are covered with sand dunes, which have been attributed to historical dredging activities.

The two major surface drainages in the Project Area include the Sacramento Wash, an east-to-west dry wash (ephemeral stream), located on the Arizona side of the Colorado River, and the Bat Cave Wash, a south-to-north dry wash with its upper reaches located immediately adjacent to the Station on the west. Bat Cave Wash flows only briefly, following intense rainfall events, and drains northward to the Colorado River.



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Final Groundwater Remediation Project SEIR

Map Creation Date: 11/9/2016 Sources: ESRI Aerial, ESA

Regional Surface Features

Figure 4.6-1

ESA North State Resources

Surface Water Flow Conditions

The surface water discussion in the Groundwater FEIR noted that the flow of the Colorado River fluctuates seasonally and daily largely because of upstream flow regulations. The flow of the river in the Project Area is controlled primarily by water releases at Davis Dam on Lake Mohave, located approximately 41 miles upstream. River levels in the area fluctuate by 2 to 3 feet per day and by approximately 5 feet seasonally, with the higher water levels occurring in late spring to early summer. Daily average flows vary from 4,000 to 25,000 cubic feet per second, according to the dam releases.

Surface Water Quality

Water quality samples were routinely collected between July 1997 and October 2007 from 18 surface water monitoring locations along the Colorado River during the Resource Conservation and Recovery Act (RCRA) facility investigation/remedial investigation (RFI/RI) characterization activities. The results are summarized in Table 4.7-1 in the Groundwater FEIR. The samples were analyzed for hexavalent chromium Cr(VI) and total chromium Cr(T), along with trace metals, general chemistry parameters, and perchlorate analyses. Although total chromium has been detected at some sampling locations in river water, Cr(VI) has only been confirmed once in the over 700 samples that have been taken. Cr(VI) was detected on September 18, 2008, at a concentration of 0.23 micrograms per liter (µg/L) in a small, placid, pond-like inlet connected to the Colorado River. No concentrations have exceeded the chemical-specific action levels developed for this Project for Cr(T) (50 µg/L), or Cr(VI) (11 µg/L) or any other surface water analytes. Colorado River sampling activities have continued under the quarterly monitoring program, discussed below in Section 4.6.3.

Potential Surface Water Receptors

The beneficial uses for surface water in the Colorado River Basin are specified in the Colorado River Basin Regional Water Quality Control Board's (RWQCB's) Water Quality Control Plan (Basin Plan; RWQCB 2006). Beneficial uses are designated to protect surface waters for the benefit of receptors. Receptors are humans, animals, and plants that use or contact soil, groundwater, and/or surface water within the Project Area, or from the Project Area. Beneficial uses of the Colorado River include municipal and domestic water supply, agricultural supply, aquaculture, industrial service supply, groundwater recharge, water contact recreation, noncontact water recreation, warm freshwater habitat, cold freshwater habitats, wildlife habitat, hydropower generation, and preservation of rare, threatened, or endangered species. Beneficial uses of Bat Cave Wash include groundwater recharge, noncontact water recreation, and wildlife habitat.

PG&E conducted a risk assessment to evaluate the groundwater to surface water transport pathways (Arcadis 2009). The results indicated that the floodplain groundwater chemicals of potential concern are not being transported to the Colorado River at concentrations that exceed screening-level surface water criteria and no further surface water risk assessment was recommended. These conditions have not changed since the publication of the Groundwater FEIR especially when one considers that the IM-3 Facility has remained operational since then.

Groundwater

The discussion below summarizes groundwater conditions described in the Groundwater FEIR.

Regional and Project Area Hydrogeology and Groundwater Conditions

The majority of the Project Area lies at the southern end of the Mohave Valley groundwater basin within the Needles Subbasin, which is bisected by the Colorado River. Groundwater in the Mohave Valley basin occurs in the alluvial basin deposits. Bedrock water-bearing zones occur locally, where the bedrock formations are weathered or fractured. The Sacramento Valley groundwater basin lies to the east in Arizona. The Sacramento Wash is the principal surface drainage in the Sacramento Valley Basin. The freshwater supply wells and associated water-conveyance piping would be located in the far western part of the Sacramento Valley Basin near the Colorado River.

The groundwater system in the Project Area has been described as a “river aquifer.” The river aquifer consists of permeable and partly saturated sediments and sedimentary rocks that are hydraulically connected to the Colorado River, allowing water to move between the river and the aquifer in response to withdrawal of water from the aquifer or differences in water-level elevations between the river and the aquifer. The boundaries of the river aquifer are the low-permeability bedrock that forms the bottom and sides of the basins that underlie the valley. The regional and Project Area hydrogeology has generally remained the same since the Groundwater FEIR was certified in 2011.

Hydrogeologic Setting of the Alluvial Aquifer

The Groundwater FEIR stated that the groundwater occurs under both unconfined and semiconfined conditions in the alluvial fan and fluvial sediments, which make up the Alluvial Aquifer, under the Project Area. Groundwater in the Alluvial Aquifer occurs at depths ranging from as shallow as 5 feet below ground surface (bgs) on the floodplain adjacent to the river to 170 feet bgs in the upland alluvial terrace areas. The saturated thickness of the aquifer ranges from approximately 20 feet to the south (around the location of Well MW-21) to 260 feet in the IM-3 Facility injection area to more than 350 feet in the northern floodplain (around the location of Well MW-49). The Alluvial Aquifer pinches out along the bedrock outcrops south of the Project Area. The regional and Project Area hydrogeologic setting of the alluvial aquifer has generally remained the same since the Groundwater FEIR was certified in 2011.

Hydrogeologic Setting of the Bedrock Aquifer

The Groundwater FEIR stated that groundwater is also encountered in secondary fractures in the bedrock underlying the Alluvial Aquifer. The groundwater occurs under semiconfined to confined conditions caused by varied interconnectedness of the fracture systems, with upward hydraulic gradients from the bedrock to the alluvial aquifer. The regional and Project Area hydrogeologic setting of the bedrock aquifer has generally remained the same since the Groundwater FEIR was certified in 2011.

Water Budget

To design the Final Groundwater Remedy, modeling was conducted to simulate groundwater and surface water conditions. The model requires input of the water budget for the area to be modeled (model domain). The water budget is a combination of water flowing into and out of the model domain. The inflow and outflow of water into the model domain are not known to have substantially changed since certification of the Groundwater FEIR. However, the groundwater model was revised in 2016 and is currently undergoing review and comments pertaining to the water budget, which may be incorporated into a future version. The results may be modified in response to agency and Tribal review.

General Groundwater Quality

The total dissolved solids (TDS) in the Alluvial Aquifer are of sodium-chloride nature and range from relatively low TDS (less than 500 milligrams per liter [mg/l]) to high TDS (greater than10,000 mg/l). Lower TDS groundwater is generally found in shallow wells and generally increases with depth. Groundwater in the bedrock has TDS ranging from approximately 8,000 to 13,000 mg/l.

As of 2011, a significant finding of site investigations has been the identification of a groundwater reductive zone under the floodplain within organic rich fluvial sediments of the Alluvial Aquifer. The reductive zone is characterized by oxidation-reduction potential measurements between -220 and -90 millivolts in shallow fluvial wells at the floodplain, compared to oxidation-reduction potential readings between 0 and 300 millivolts (aerobic conditions) in the alluvial wells. In the reductive zone associated with the fluvial wells in the floodplain, the soluble form of chromium, Cr(VI), is reduced (converted) to trivalent chromium (Cr[III]). Cr(III) is essentially immobile at a neutral pH and most precipitates out of groundwater. In this context, 'reduction' refers to the transformation of Cr(VI) to Cr(III) and the 'reductive zone' refers to the portion of the aquifer where the geochemical conditions facilitate this transformation of Cr(VI) to Cr(III). Thus, the reductive zone present in the fluvial groundwater in the floodplain can remove chromium from the groundwater. Uncertainties remain regarding the extent to which reducing conditions in fluvial deposits provide a pervasive and permanent barrier to Cr(VI) contaminant migration to the river (CH2M Hill 2009). The general groundwater conditions have not changed since certification of the Groundwater FEIR, and are described below in Section 4.6.3, "Existing Setting of this SEIR."

Groundwater Flow Conditions

Groundwater flow in the Project Area occurs predominantly in the Alluvial Aquifer, with groundwater movement influenced by the level of the Colorado River and pumping of the IM-3 Facility. Groundwater flow is generally toward the Colorado River and locally toward the IM-3 Facility. The average groundwater velocity for the fluvial and upper alluvial sediments has been calculated to be about 45 feet per year. This is a rough estimate, but serves to illustrate that the groundwater movement in the Project Area is not fast.

In the vicinity of the IM-3 groundwater extraction wells, groundwater movement in the medium and deep zones of the Alluvial Aquifer within the floodplain generally shows movement toward the pumping center for the IM-3 Facility. Landward gradients (river water recharging groundwater) were observed in the middle zone while the deep zone groundwater shows similar landward gradients, but seasonal differences are less noticeable.

Throughout the Project Area, vertical groundwater gradient (movement) in the Alluvial Aquifer is primarily upward, which is attributable to the seepage of water from the bedrock to the Alluvial Aquifer. The exception to the upward gradient is observed in the vicinity of the pumping wells for the IM-3 Facility. These pumping wells have deeper screen intervals and the extraction results in a downward movement of groundwater in the area surrounding the IM-3 Facility pumping wells.

The overall groundwater flow conditions have not changed since the certification of the Groundwater FEIR and are described below in Section 4.6.3, "Existing Setting."

Potential Sources of Groundwater Impacts

The investigations up to the certification of the Groundwater FEIR in 2011 identified potential sources of groundwater contaminants at the Former Percolation Bed (Solid Waste Management Unit [SWMU] 1), the area around Former Percolation Bed (AOC 1), and the East Ravine (Area of Concern [AOC] 10). The extent of AOC 1 soil impacts had not been completely delineated as of 2011, but was considered, at a minimum, to be the floor of Bat Cave Wash, extending from the former percolation bed (SWMU 1) northward to the Burlington Northern & Santa Fe Railway railroad tracks. Subsequent soil investigation activities have further characterized and delineated the extent of contamination, including at the SWMU 1 and AOC 1/10 areas, as discussed below and in the following pages.

Contaminant Distribution in Groundwater

The primary chemicals of concern (COCs) in groundwater as described in the Groundwater FEIR in the Project Area are Cr(VI) and Cr(T). As of the certification of the Groundwater FEIR in 2011, the extent of contaminated groundwater in the Alluvial Aquifer encompassed an area of approximately 175 acres that includes groundwater under Bat Cave Wash, the Station, the Uplands area, and the floodplain. The groundwater plume had been defined as groundwater that exceeds a Cr(VI) concentration of 31.8 (rounded to 32) µg/L, which has been established as the regional alluvial background concentration for the Project. The 2011 FEIR describes Cr(VI) concentrations ranging from less than 0.2 µg/L to 15,700 µg/L within the plume boundaries, with the highest concentrations observed in the area beneath the MW-20 and MW-24 benches. Based on the results of wells installed in the Alluvial Aquifer on the California and Arizona shores of the Colorado River, the chromium plume had not been detected in Arizona or under the Colorado River just south of Interstate I-40. The general extent of the plume as of the certification of the Groundwater FEIR is similar to the current conditions discussed further in Section 4.6.3.1.

Arsenic, molybdenum, selenium, and nitrate were found in groundwater samples from the Project Area at concentrations exceeding regional background concentrations or maximum contaminant levels (MCLs; also known as primary drinking water standards set by the U.S. Environmental Protection Agency (USEPA) at the federal level and the Department of Public Health in California). The highest concentrations as of the 2011 FEIR were 157 µg/L for arsenic, 301 µg/L for molybdenum, 155 µg/L for selenium, and 32 µg/L for nitrate.

Arsenic concentrations significantly exceeding the regional background concentration of 24.3 µg/L were found in one Monitoring Well MW-12 with an average concentration of 97.3 µg/L. The source of the arsenic had not been determined, but was not believed to be related to SWMU 1/AOC 1 or AOC 10 activities.

Molybdenum concentrations exceeding the regional background upper tolerance limit established for the Project were observed at 25 well locations. The wells with elevated levels of molybdenum are located within and outside the chromium plume area (17 in the plume area, eight outside the plume area). The very high molybdenum levels detected in the Bat Cave Wash discharge area, the known use of molybdenum by the facility, coupled with its detection in facility wastewater analyses, suggested it would be associated with releases from SWMU 1/AOC 1.

Selenium concentrations exceeding the regional background level of 10.3 µg/L were found in nine monitoring wells (six within the chromium plume area, three outside the chromium plume area). The wells with elevated selenium coincide with the axis of the core of the chromium plume. However, selenium use at the facility has not been documented by PG&E.

Areas of elevated nitrate concentrations in groundwater occur beneath the Station, the TCS Evaporation Ponds area and Upper Bat Cave Wash. Potential sources of the elevated nitrates include blowdown water, Station leach fields and naturally occurring sources such as leaching from disturbed areas of desert pavement. Nitrate is absent in wells along the Colorado River where the natural reducing conditions have transformed nitrate to ammonia.

Potential Groundwater Receptors

When the 2011 FEIR was prepared, groundwater in the Project Area was not being used for industrial or potable use; therefore, no complete pathway for ingestion or dermal contact from these direct uses of groundwater existed. The nearest wells used for potable supply were and still are located at Moabi Regional Park, which is approximately 1 mile northwest of the Project Area, wells at Topock less than one half mile directly across the Colorado River (e.g., Sanders well), and wells at Golden Shores Arizona, located approximately 2.5 miles north-northeast of the Project Area. Park Moabi Well 3 generally detects Cr(VI) up to about 10 µg/L, while Moabi Well 4 detects Cr(VI) ranging up to 21.4 µg/L, both below the regional background level of 32 µg/L. The California MCL for CR(VI) is 10 µg/L.

Due to the known boundary of the PG&E Cr(VI) plume, the Cr(VI) detections in these wells have been considered to not be associated with the PG&E plume. The risk assessment conducted for the Project concluded that there were currently no pathways for human exposure to contaminated groundwater, since there are currently no operating drinking water wells within the area of the contaminant plume. It was recognized, however, that there is a possibility for future hypothetical groundwater users to be exposed if the plume is not cleaned up. Plant uptake pathways and receptors were evaluated in the risk assessment, and the pathways were found to be potentially complete but the risks to ecological receptors were considered not to be significant. The extent of the Cr(VI) plume has not substantially changed since certification of the Groundwater FEIR in 2011; therefore, no new or additional receptors would be affected by the Cr(VI) plume.

4.6.2.2 Impacts and Mitigation Measures Identified in the 2011 Groundwater FEIR

Hydrology and Water Quality impacts were addressed in the Groundwater FEIR, Volume II, Section 4.6. Below is a summary of the analysis and associated mitigation measures for Hydrology and Water Quality.

Groundwater FEIR Effects on Water Quality Standards or Waste Discharge Requirements

The Groundwater FEIR concluded that effects on water quality standards and/or waste discharge requirements could result in potentially significant impacts during the construction, operation and maintenance, and decommissioning phases of the cleanup project. Construction activities involving soil disturbance, excavation, cutting/filling, stockpiling, and grading could potentially degrade receiving water quality, primarily the Colorado River and receiving drainages. In addition, construction materials such as asphalt, concrete, and equipment fluids could also be exposed to rainfall, which could result in contaminated surface runoff and adverse impacts on receiving water quality. Operation and maintenance activities could potentially cause a violation of water quality standards due to leaks or ruptures of pipelines conveying extracted water and/or carbon substrate-amended water from extraction and injection wells or associated piping, in which case the untreated water could enter the Colorado River or nearby washes or infiltrate into the soil. Loading and unloading activities, including unloading treatment chemicals and containers, or loading treatment system solids and empty chemical containers for disposal, could also result in a release of pollutants, which could violate water quality standards. To reduce the potential impact to less than significant, the Groundwater FEIR included Mitigation Measure HYDRO-1, which required the preparation and implementation of a project-specific Stormwater Best Management Practice (BMP) Plan (essentially a Stormwater Pollution Prevention Plan). The BMP Plan would include the implementation of specific BMPs that would control runoff, and comply with the requirements and the water quality standards described in the Construction General Permit. Implementation of the Stormwater BMP Plan reduced the impact to less than significant.

In Situ Treatment Byproducts

The Groundwater FEIR noted that the injection of the carbon substrate into the contaminated portions of the aquifer would create, localized reducing conditions called in situ reducing zones (IRZs) during the decades-long treatment. The reducing conditions created within an IRZ would reduce the soluble Cr(VI) to low-solubility Cr(III). A result of the reducing conditions is the creation of metal byproducts, which include soluble forms of arsenic, iron, and manganese as byproducts of the reduction process. Pilot testing conducted within the floodplain and upland areas have determined that iron, manganese, and arsenic byproduct concentrations from the IRZ operation would be within the range observed in the natural reducing zones along the floodplain areas at the site. Higher concentrations of these metals were temporarily observed in certain pilot test monitoring wells, however, a short time after the injection of carbon substrate ceased, these locally elevated metals concentrations decreased for most wells. Pilot tests indicated that with further distance from the injection wells, substantially attenuated (decreased) concentrations of these constituents would be observed, which in time would return to baseline naturally occurring conditions.

In addition, during IRZ operation, the concentrations of metal byproducts would decrease through combinations of natural processes including sorption to soils or organic material, diffusion with migration, and precipitation as solid forms. The iron and manganese would be liberated during the reduction process and typically coprecipitate with arsenic, thus removing dissolved arsenic from the groundwater. These reactions typically occur within or along the IRZ margins. The presence of iron, manganese, and arsenic byproducts is considered temporary. When the carbon substrate injected into the IRZ is consumed, the concentrations of iron, manganese, and arsenic would return to baseline concentrations and the impact would be less than significant. The Groundwater FEIR concluded that effects on water quality standards or waste discharge requirements relative to in situ treatment byproducts would be a less than significant impact. It should be noted that at PG&E's Hinkley California site, also being remediated for Cr(VI) using similar methods, the generation of the byproduct of manganese required treatment specific to manganese, as discussed in the Project Description, Section 3.6.3.1.

Groundwater FEIR Effects on Drainage Patterns and Runoff

Impervious Surfaces

The Groundwater FEIR concluded that effects on drainage patterns and runoff from impervious surfaces could result in potentially significant impacts. Installation of impervious surfaces such as well heads and vaults, remediation equipment compounds, and chemical storage areas would redirect surface water flows around the features or potentially cause temporary ponding and/or flooding. Flow alterations were described in the Groundwater FEIR as having a potential to temporarily result in erosion and siltation if flows are substantially increased or routed to concentrated flow paths that did not have the capacity to carry the flow. The Groundwater FEIR concluded that the project-related increased runoff had the potential to result in increased erosion and siltation that would present a potentially significant impact. To mitigate for the temporary effects, the Groundwater FEIR required implementation of mitigation measures to reduce the potential impacts to a less than significant level.

Decommissioning of the proposed Project was found to not result in significant impacts on erosion and siltation after the Project Area is stabilized. Post-project restoration was found to result in a less than significant impact.

Polluted Stormwater Runoff

The Groundwater FEIR concluded that the proposed Project would not contribute runoff water to existing stormwater drainage systems and no new systems are proposed; therefore, no significant impact from this activity would occur. However, the Groundwater FEIR concluded that construction, operation and maintenance, and decommissioning activities associated with the proposed Project could result in substantial additional sources of polluted runoff if pollutants are released and if pollutants have the potential to become exposed to stormwater runoff. This impact would be potentially significant. To mitigate for the temporary effects, the Groundwater FEIR proposed mitigation measures to reduce the potential impacts to a less than significant level.

4.6.3 Existing Setting

This section describes the physical hydrologic and water quality characteristics and setting with regard to the Final Remedy Design to be conducted in the Project Area, focusing on those areas where there have been changes or additional information since the Groundwater FEIR.

PG&E conducts an ongoing quarterly monitoring program that includes measuring groundwater levels, sampling surface water and groundwater, and analyzing the samples for various analytes.

The most recent monitoring report is for the Fourth Quarter 2015 monitoring event (Arcadis 2016). The information provided below comes from the quarterly report unless otherwise cited.

4.6.3.1 Groundwater

Groundwater Flow Directions

The direction of groundwater flow in the shallow zone of the Alluvial Aquifer is generally eastward toward the Colorado River as shown on **Figure 4.6-2**. In the localized area around the IM-3 Facility extraction Well TW-03D, the direction of groundwater flow is inward toward the extraction well, as shown on **Figure 4.6-3**. The IM-3 Facility extraction well controls contaminated groundwater in the floodplain area in the vicinity of the Colorado River.

Extent of Groundwater Contamination

Hexavalent Chromium

The extent of Cr(VI) in groundwater in the shallow, mid-depth, and deep wells in the Alluvial Aquifer as of the second quarter of 2016 is shown on **Figures 4.6-4, 4.6-5,** and **4.6-6**, respectively (Arcadis 2016b). The concentration trends of most wells have been decreasing, fluctuating, or generally stable over the recent years. The concentrations of Cr(VI) in wells in the floodplain area and within the capture zone of the IM-3 Facility show decreasing trends. Over the recent sampling events, the concentrations of Cr(VI) have been slightly increasing in Wells MW-26, MW-65-160, MW-65-225, and MW-68-180. More recent data from groundwater wells installed and sampled after completion of the Groundwater FEIR indicate that Cr(VI) concentrations now range up to 12,000 µg/L within the plume boundaries as of the second quarter of 2016, with the highest concentrations observed in the area beneath the Station, and MW-20 and MW-24 benches.

Other Chemicals of Potential Concern

Subsequent to the Groundwater FEIR, the nature and extent of other chemicals of potential concern (COPCs), molybdenum, nitrate, and selenium was further investigated because the initial sampling results of these other COPCs were above regional background concentrations and higher at and downgradient of the Station, suggesting that historical activities at the Station may have been the source. The extent and concentrations of molybdenum, nitrate, and selenium as of the fourth quarter of 2015 are shown on **Figures 4.6-7, 4.6-8,** and **4.6-9**, respectively (Arcadis 2016a). [1] Since these three COPCs occur at concentrations above background and higher concentrations are located at or downgradient of the Station, the distribution indicates that the historical activities at the Station were the source of these elevated COPCs.

In Situ Treatment By-Products

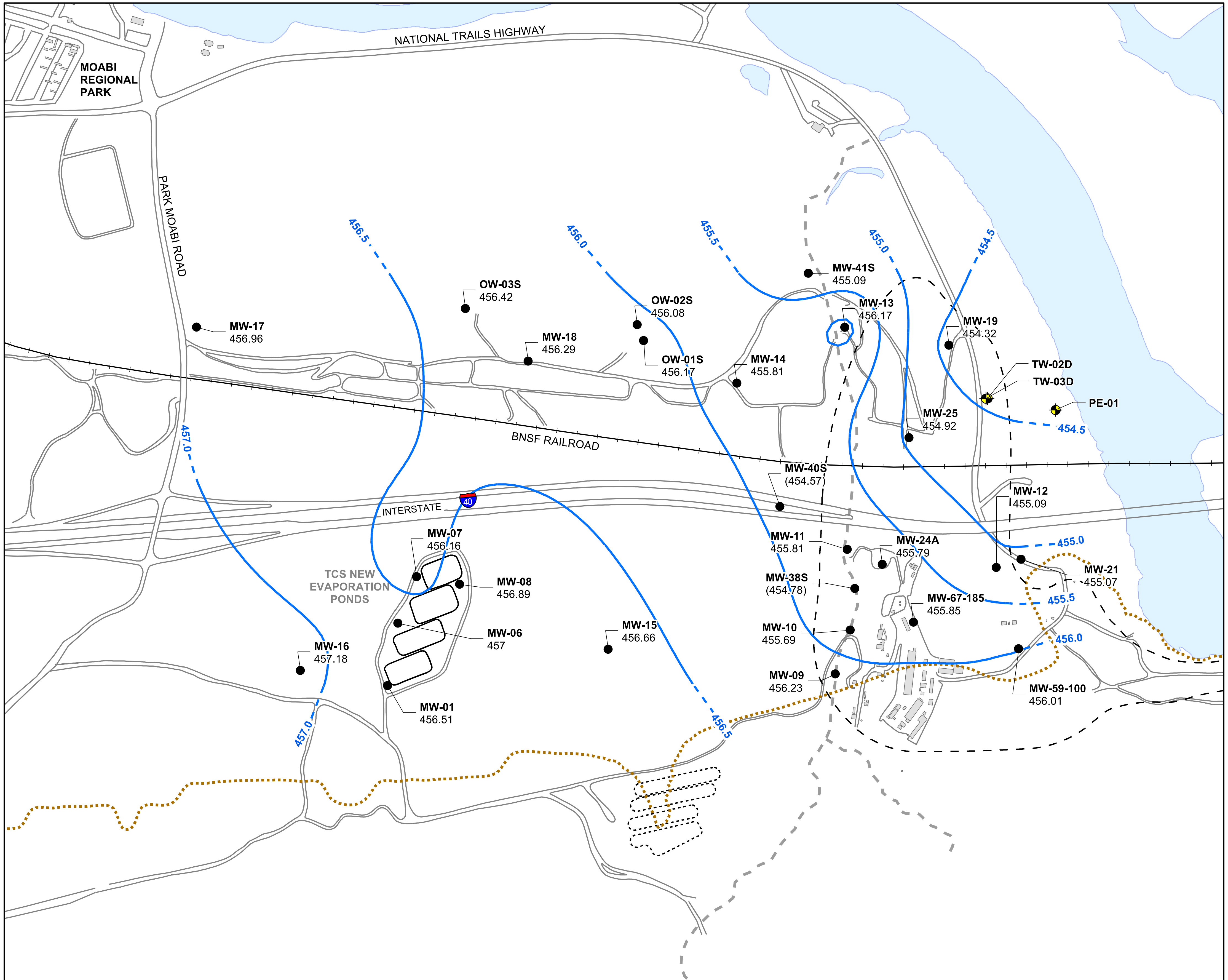
As discussed in Section 4.7.2.1, the Groundwater FEIR noted that in addition to reducing the soluble Cr(VI) to Cr(III) that would precipitate out of groundwater, the reducing conditions could also result in the creation or mobilization of metal byproducts, which could include soluble forms of arsenic, manganese, iron, and barium as byproducts of the reduction process. To assess the

[1] The second quarter 2016 monitoring event has a smaller set of sampled wells and the report does not present maps of the extent of arsenic, manganese, and iron. The fourth quarter 2015 results are presented to provide a more extensive larger dataset and maps of the chemical extents.

existing concentrations, arsenic, manganese, iron, and barium have been further investigated as part of the quarterly monitoring program and as part of the monitoring program for the upland and floodplain In-Situ Pilot Tests. The extent of arsenic and manganese as of the fourth quarter of 2015 are shown on **Figures 4.6-10** and **4.6-11** (Arcadis 2016a), and the extent of iron as included in the Final Remedy Design are shown on **Figure 4.6-12** (Ch2M Hill 2015a). All of these chemicals occur naturally; the investigations conducted to date concluded that the historical Station activities have not affected the naturally occurring concentrations. The scattered elevated concentrations are typically along the floodplain area where organics in the sediments would result in reducing conditions that would mobilize these compounds.

4.6.3.2 Freshwater Supply

As an element of the Final Remedy Design, freshwater would be injected at locations upgradient of the Cr(VI) plume to drive the contaminants through the treatment zones (CH2M Hill 2015a). While three freshwater supply options were evaluated in the Groundwater FEIR (freshwater intake structure on the Colorado River, supply well(s) in California, or supply well(s) in Arizona, the ultimate source of the freshwater identified in the Final Remedy Design (and addressed in the Addendum to the Groundwater FEIR in 2013; DTSC 2013) would be from wells located in Arizona, across the Colorado River from the Station and within the Havasu National Wildlife Refuge (HNWR). The existing wells are HNWR-1, HNWR-1A, Topock-2/-3, and Site B (see Figure 3-5) with HNWR-1A selected as the primary well and the others as contingent supply wells. The HNWR-1 and Topock-2/-3 wells were existing wells; the wells at HNWR-1A and Site B were constructed as part of the freshwater hydrologic analysis in 2013. In addition, existing Monitoring Wells MW-54, MW-55, and MW-56 located on the HNWR and private property were incorporated into the ongoing groundwater monitoring program to monitor the existing water quality. In evaluating the quality of the water of existing Well HNWR-1 through sampling and analysis during the hydrologic analysis, the water at Well HNWR-1 was identified as having naturally occurring arsenic at concentrations that exceed the California MCL of 10 μg/L. Arsenic concentrations ranged from 14 μg/L to 16 μg/L at the HNWR-1 well and around 18 μg/L at the Site B well (CH2M Hill 2014). As noted above, the California MCL for arsenic is 10 μg/L. In addition, subsequent monitoring of the Site B well has revealed concentrations of Cr(VI) ranging from 31 μg/L to 33 μg/L (CH2M Hill 2014).



LEGEND

- Alluvial Aquifer well sampled during sampling event
- Extraction Well
- Groundwater Elevation Contour 0.5 ft, dashed where inferred
- Approximate outline of monitoring wells in Alluvial Aquifer and Bedrock with Cr(VI) concentrations ≥ 32 μg/L
- Approximate bedrock contact at 455 ft AMSL

MW-14 — Sampling Location
455.81 — Groundwater Elevation (feet AMSL)
(454.78) — Groundwater Elevation not used in contouring (feet AMSL)

Notes:
1. Water level contours for the floodplain area are presented in IM Performance Monitoring Reports.
2. Extraction wells TW-03D and PE-01 are pumping from lower portion of the aquifer.
3. Gradients shown on this figure show transient conditions in the aquifer at the time of measurement and may not reflect the expected average groundwater flow directions.
4. AMSL = Above Mean Sea Level

N

0 500 1,000
Feet

FOURTH QUARTER 2015 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT
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Path: G:\Projects\15.135.000 Topock Remediation CEQA\Figure MXDs\Groundwater SEIR Figures\Figure4.6-2 Groundwater Elevation Map Shallow Zone Alluvial Aquifer.mxd Date Saved: 10/7/2016 12:20:56 PM

Final Groundwater Remediation Project SEIR

Map Creation Date: 10/13/2016 Sources: PG&E 2015, Arcadis 2016a

Groundwater Elevation Map, Shallow Zone, Alluvial Aquifer

Figure 4.6-2

ESA

North State Resources

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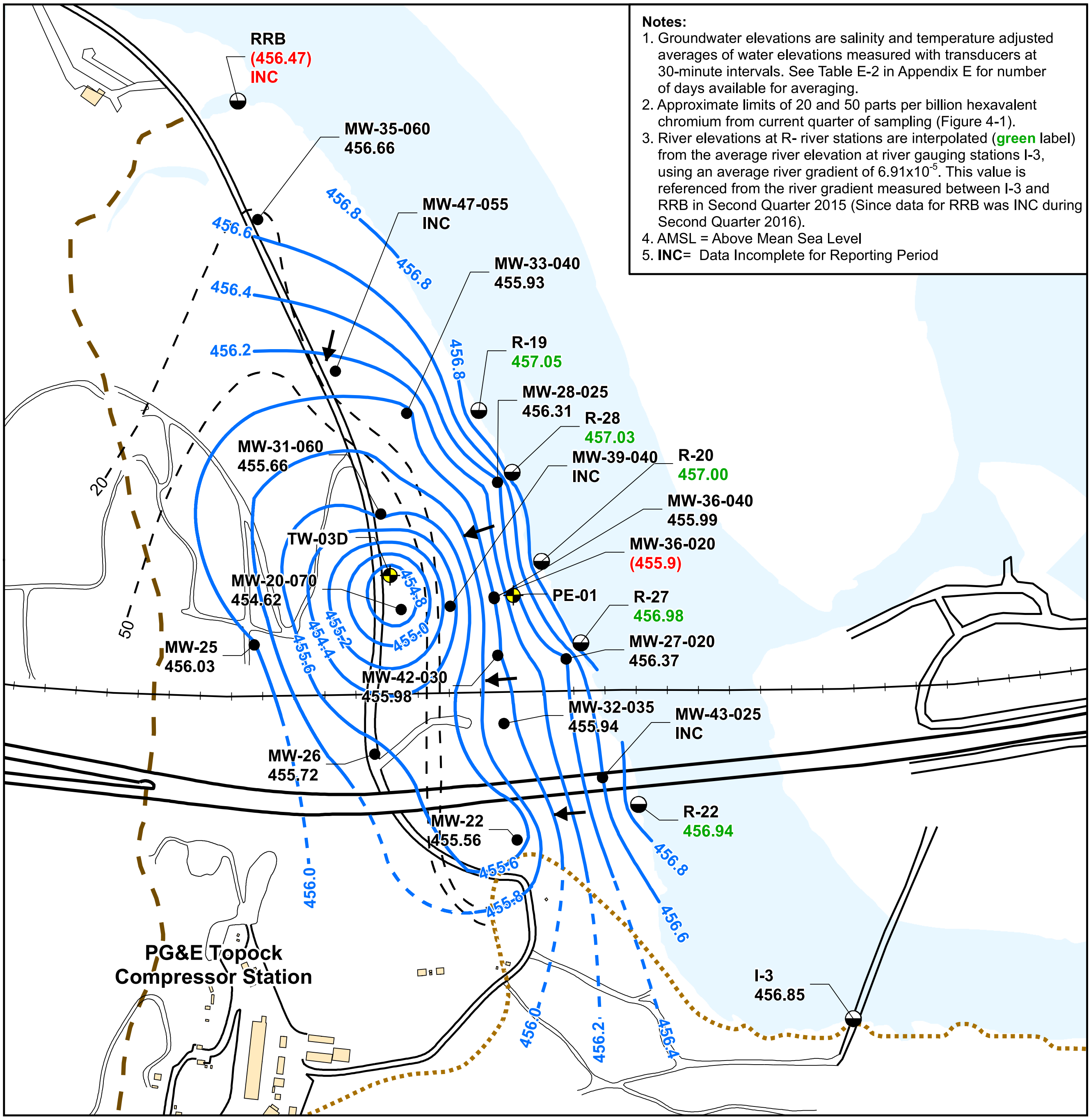

Notes:

1. Groundwater elevations are salinity and temperature adjusted averages of water elevations measured with transducers at 30-minute intervals. See Table E-2 in Appendix E for number of days available for averaging.
2. Approximate limits of 20 and 50 parts per billion hexavalent chromium from current quarter of sampling (Figure 4-1).
3. River elevations at R- river stations are interpolated (green label) from the average river elevation at river gauging stations I-3, using an average river gradient of 6.91x10^{-5}. This value is referenced from the river gradient measured between I-3 and RRB in Second Quarter 2015 (Since data for RRB was INC during Second Quarter 2016).
4. AMSL = Above Mean Sea Level
5. **INC**= Data Incomplete for Reporting Period

LEGEND

- Monitoring Well
- River Station
- Extraction Well
- Bedrock Contact at 455 ft Elevation
- Interpreted Groundwater Flow Direction
- Groundwater Elevation Contour 0.2 ft (dashed where inferred)
- Inferred Cr(VI) Concentration Contour (see note 2)

0 300 600
Feet

N

MW-20-070 — Gauging Location
453.11 — Average Groundwater Elevation (ft AMSL)
(453.74) — Elevation in red parentheses not used for contouring
R-27 — River Station (see note 3)
453.79 — River Elevation (ft AMSL) Interpolated Average

SECOND QUARTER 2016 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

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Final Groundwater Remediation Project SEIR

Map Creation Date: 10/13/2016 Source: PG&E 2015, Arcadis 2016b

IM-3 Area Groundwater Elevation Map, Shallow Wells

Figure 4.6-3

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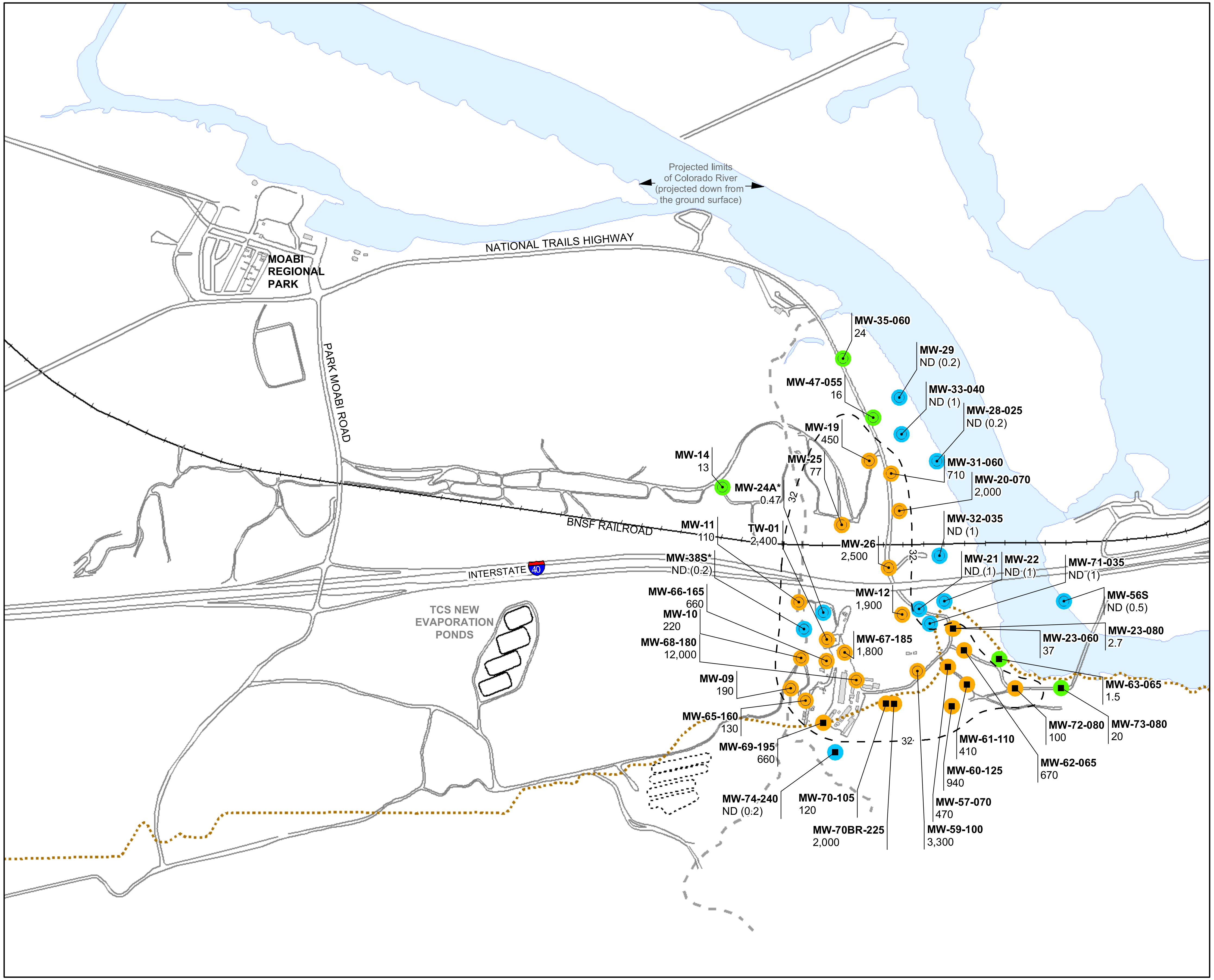

LEGEND

Alluvial Aquifer well sampled during sampling event

Bedrock well sampled during sampling event

Cr(VI) Concentrations

Not detected at analytical reporting limit

Concentration between reporting limit and 32 µg/L

Concentration ≥ 32 µg/L

Approximate outline of "shallow" wells with Cr(VI) concentrations ≥ 32 µg/L

Approximate bedrock contact at 455 feet above mean sea level.

MW-12-345 — Sampling Location
6.7 — Groundwater Concentration (µg/L)

Notes:
1. "ND" = Cr(VI) not detected at listed reporting limit.
2. "J" = The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
3. µg/L = micrograms per liter
4. Cr(VI) = Hexavalent Chromium
5. TCS = Topock Compressor Station
6. * = Wells with sampled values < 32 µg/L shown within footprint of 32 µg/L boundary.
7. Results plotted are maximum concentration from primary and duplicate samples, see Table 3-1 for complete results.
8. The 32 µg/L line for Cr(VI) is estimated based on available groundwater sampling, hydrogeologic and geochemical data.
9. Long-screened wells and wells screened across more than one depth interval are generally not posted on this map. See Table 3-1 for complete results.

N

0 500 1,000
Feet

SECOND QUARTER 2016 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT
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NEEDLES, CALIFORNIA

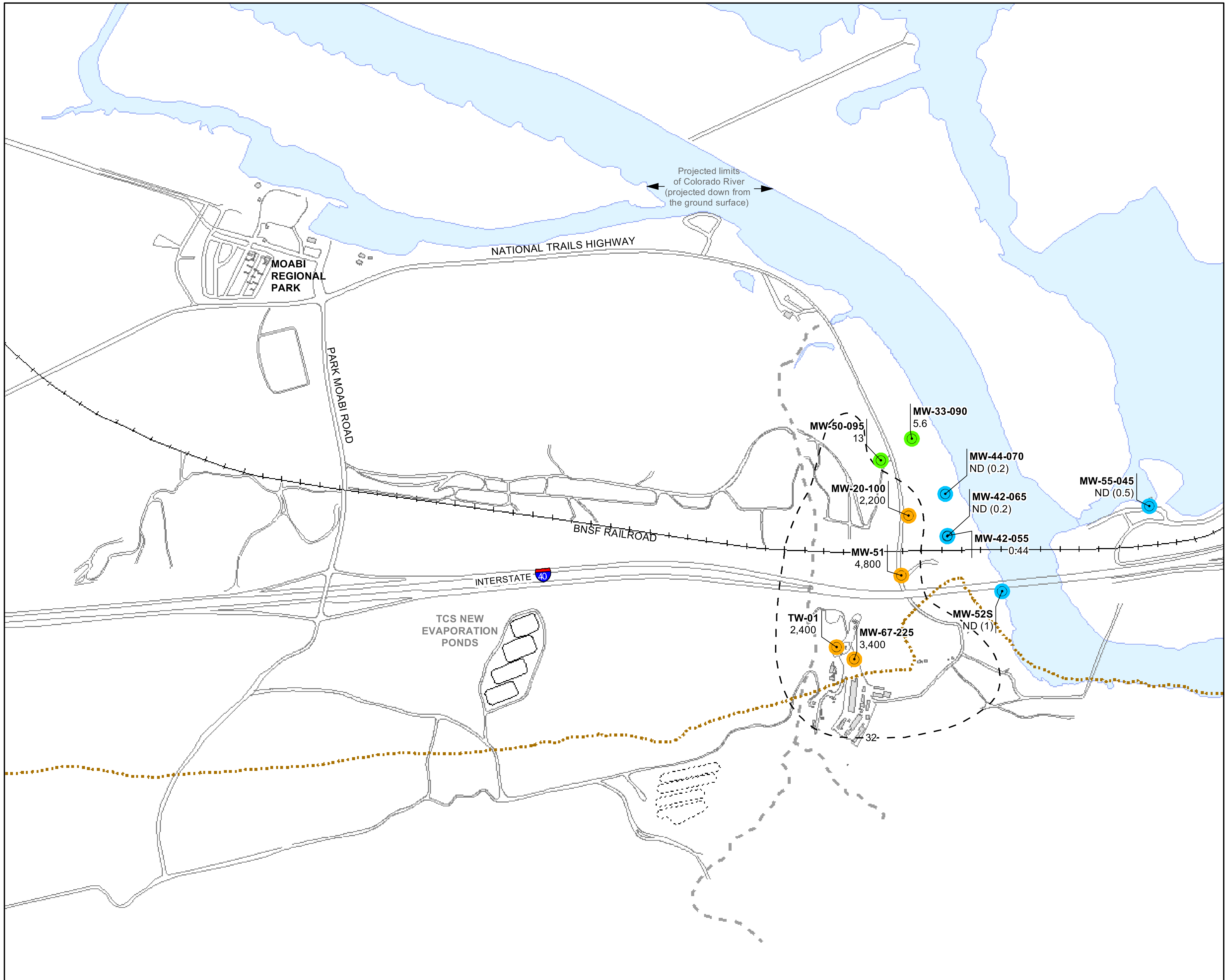
Path: G:\Projects\15.135.000 Topock Remediation CEQA\Figure MXDs\Groundwater SIER Figures\Figure4.6-4 Extent of Hexavalent Chromium Groundwater Shallow Wells.mxd Date Saved: 10/12/2016 10:16:52 AM

Final Groundwater Remediation Project SEIR
Map Creation Date: 10/13/2016 Sources: PG&E 2015, Arcadis 2016b

Extent of Hexavalent Chromium in Groundwater, Shallow Wells

Figure 4.6-4

ESA North State Resources



LEGEND

Alluvial Aquifer well sampled during sampling event

Cr(VI) Concentrations

- Not detected at analytical reporting limit
- Concentration between reporting limit and 32 µg/L
- Concentration ≥ 32 µg/L
- Approximate outline of "mid-depth" wells with Cr(VI) concentrations ≥ 32 µg/L
- Approximate bedrock contact at 425 feet above mean sea level.

MW-12-345 — Sampling Location
6.7 — Groundwater Concentration (µg/L)

Notes:
1. "ND" = Cr(VI) not detected at listed reporting limit.
2. "J" = The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.
3. µg/L = micrograms per liter
4. Cr(VI) = Hexavalent Chromium
5. Results plotted are maximum concentration from primary and duplicate samples, see Table 3-1 for complete results.
6. Long-screened wells and wells screened across more than one depth interval are generally not posted on this map. See Table 3-1 for complete results.
7. TCS = Topock Compressor Station
8. The 32 µg/L line for Cr(VI) is estimated based on available groundwater sampling, hydrogeologic and geochemical data.

N

0 500 1,000
Feet

SECOND QUARTER 2016 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT
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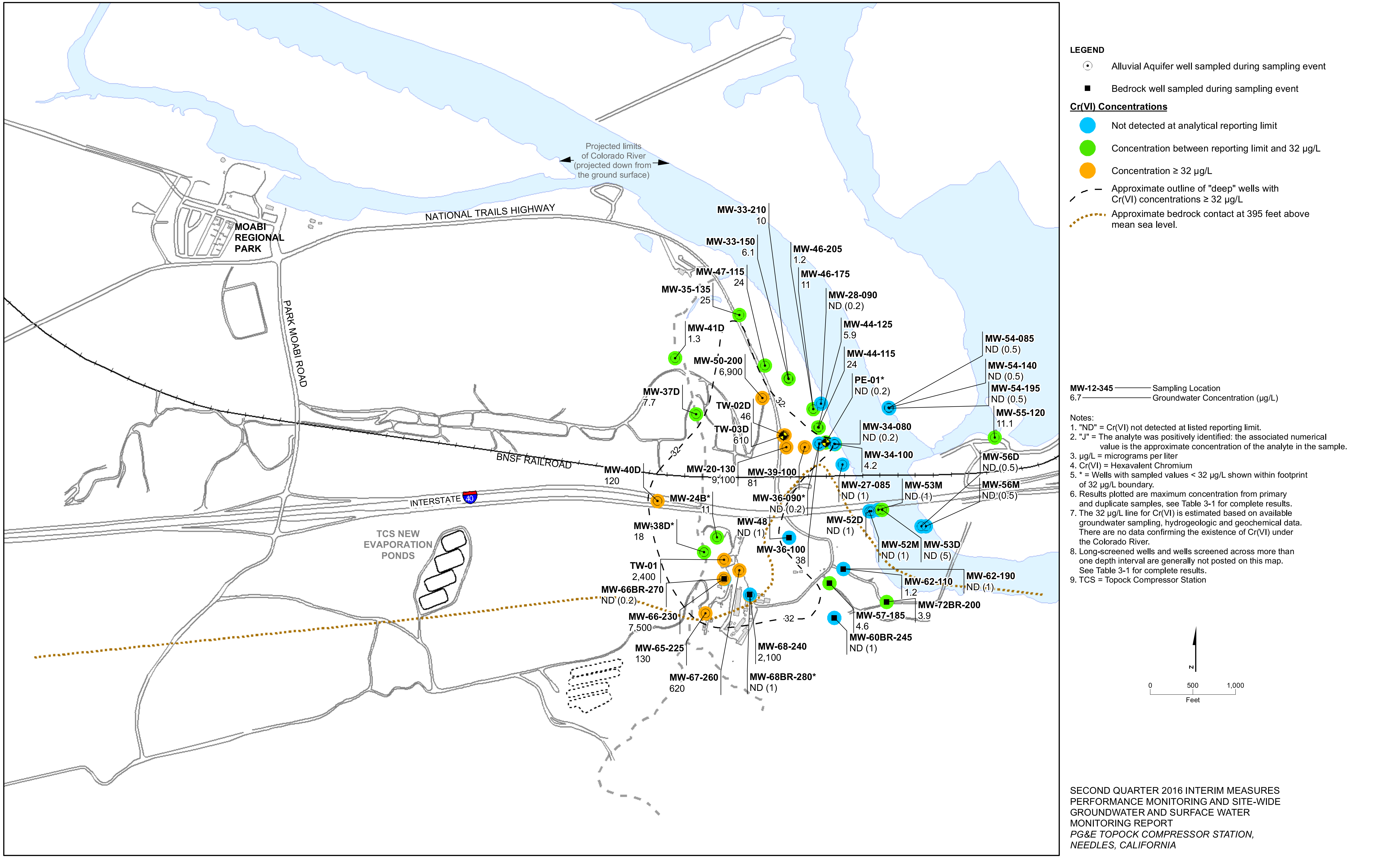
Path: G:\Projects\15.135.000 Topock Remediation CEQA\Figure MXDs\Groundwater SIER Figures\Figure4.6-5 Extent of Hexavalent Chromium Groundwater Mid-Depth Wells.mxd Date Saved: 10/12/2016 10:21:23 AM

Final Groundwater Remediation Project SEIR
Map Creation Date: 10/13/2016 Sources: PG&E 2015, Arcadis 2016b

Extent of Hexavalent Chromium in Groundwater, Mid-Depth Wells

Figure 4.6-5

ESA North State Resources



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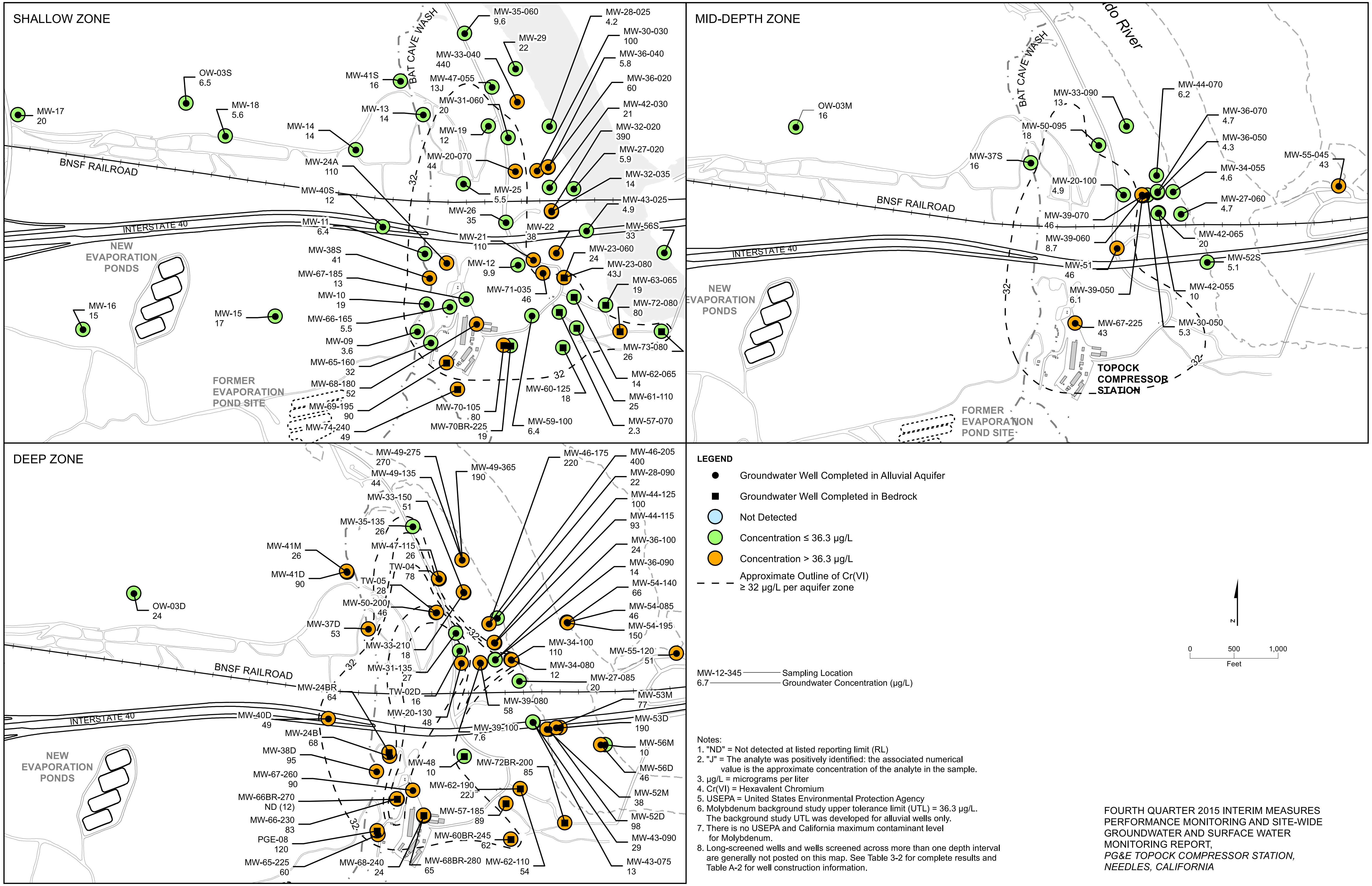
Final Groundwater Remediation Project SEIR
Map Creation Date: 10/13/2016 Sources: PG&E 2015, Arcadis 2016b

Extent of Hexavalent Chromium in Groundwater, Deep Wells

Figure 4.6-6

ESA | North State Resources



LEGEND

- ● Groundwater Well Completed in Alluvial Aquifer
- ■ Groundwater Well Completed in Bedrock
- Not Detected
- Concentration ≤ 36.3 µg/L
- Concentration > 36.3 µg/L
- Approximate Outline of Cr(VI) ≥ 32 µg/L per aquifer zone

MW-12-345 —— Sampling Location
6.7 —— Groundwater Concentration (µg/L)

N

0 500 1,000
Feet

Notes:
1. "ND" = Not detected at listed reporting limit (RL)
2. "J" = The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.
3. µg/L = micrograms per liter
4. Cr(VI) = Hexavalent Chromium
5. USEPA = United States Environmental Protection Agency
6. Molybdenum background study upper tolerance limit (UTL) = 36.3 µg/L. The background study UTL was developed for alluvial wells only.
7. There is no USEPA and California maximum contaminant level for Molybdenum.
8. Long-screened wells and wells screened across more than one depth interval are generally not posted on this map. See Table 3-2 for complete results and Table A-2 for well construction information.

FOURTH QUARTER 2015 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
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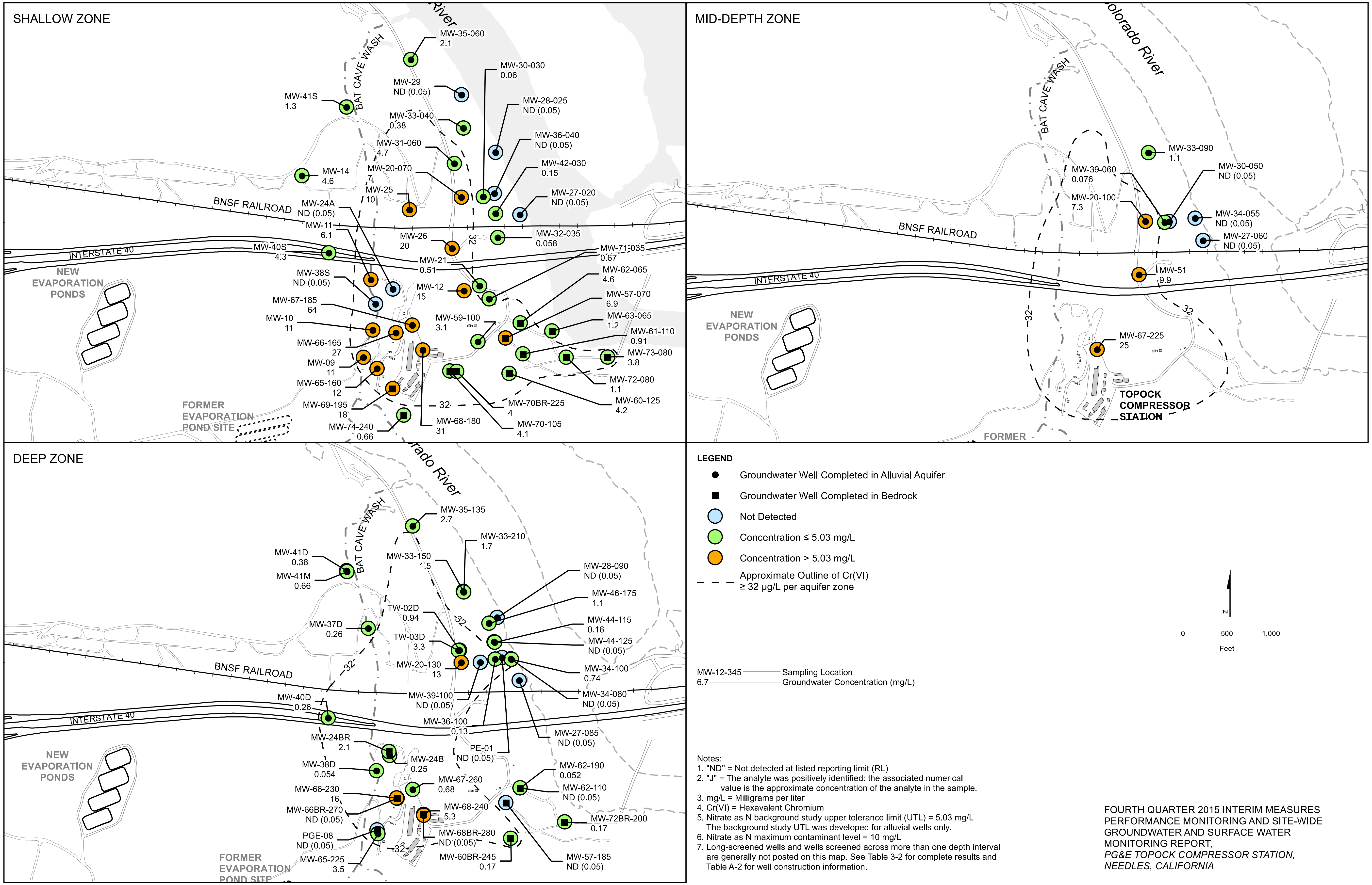
Final Groundwater Remediation Project SEIR
Map Creation Date: 10/13/2016 Sources: PG&E 2015, Arcadis 2016a

Extent of Molybdenum in Groundwater

Figure 4.6-7

ESA North State Resources



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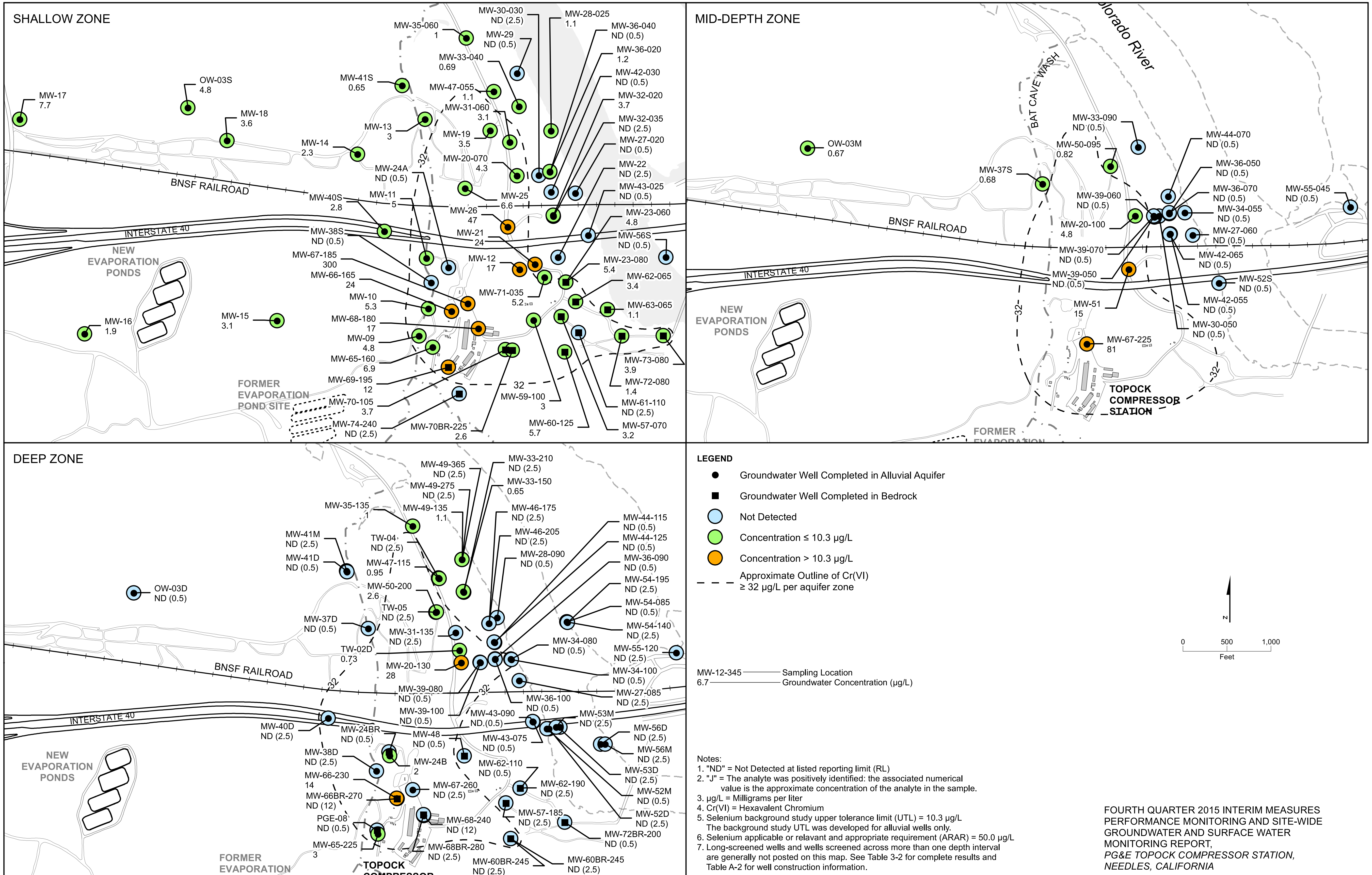
Final Groundwater Remediation Project SEIR

Map Creation Date: 10/13/2016 Sources: PG&E 2015, Arcadis 2016a

Extent of Nitrate in Groundwater

Figure 4.6-8

ESA | North State Resources



LEGEND

- ● Groundwater Well Completed in Alluvial Aquifer
- ■ Groundwater Well Completed in Bedrock
- Not Detected
- Concentration ≤ 10.3 µg/L
- Concentration > 10.3 µg/L
- Approximate Outline of Cr(VI) ≥ 32 µg/L per aquifer zone

MW-12-345 — Sampling Location
6.7 — Groundwater Concentration (µg/L)

Notes:
1. "ND" = Not Detected at listed reporting limit (RL)
2. "J" = The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.
3. µg/L = Milligrams per liter
4. Cr(VI) = Hexavalent Chromium
5. Selenium background study upper tolerance limit (UTL) = 10.3 µg/L
The background study UTL was developed for alluvial wells only.
6. Selenium applicable or relavant and appropriate requirement (ARAR) = 50.0 µg/L
7. Long-screened wells and wells screened across more than one depth interval are generally not posted on this map. See Table 3-2 for complete results and Table A-2 for well construction information.

FOURTH QUARTER 2015 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

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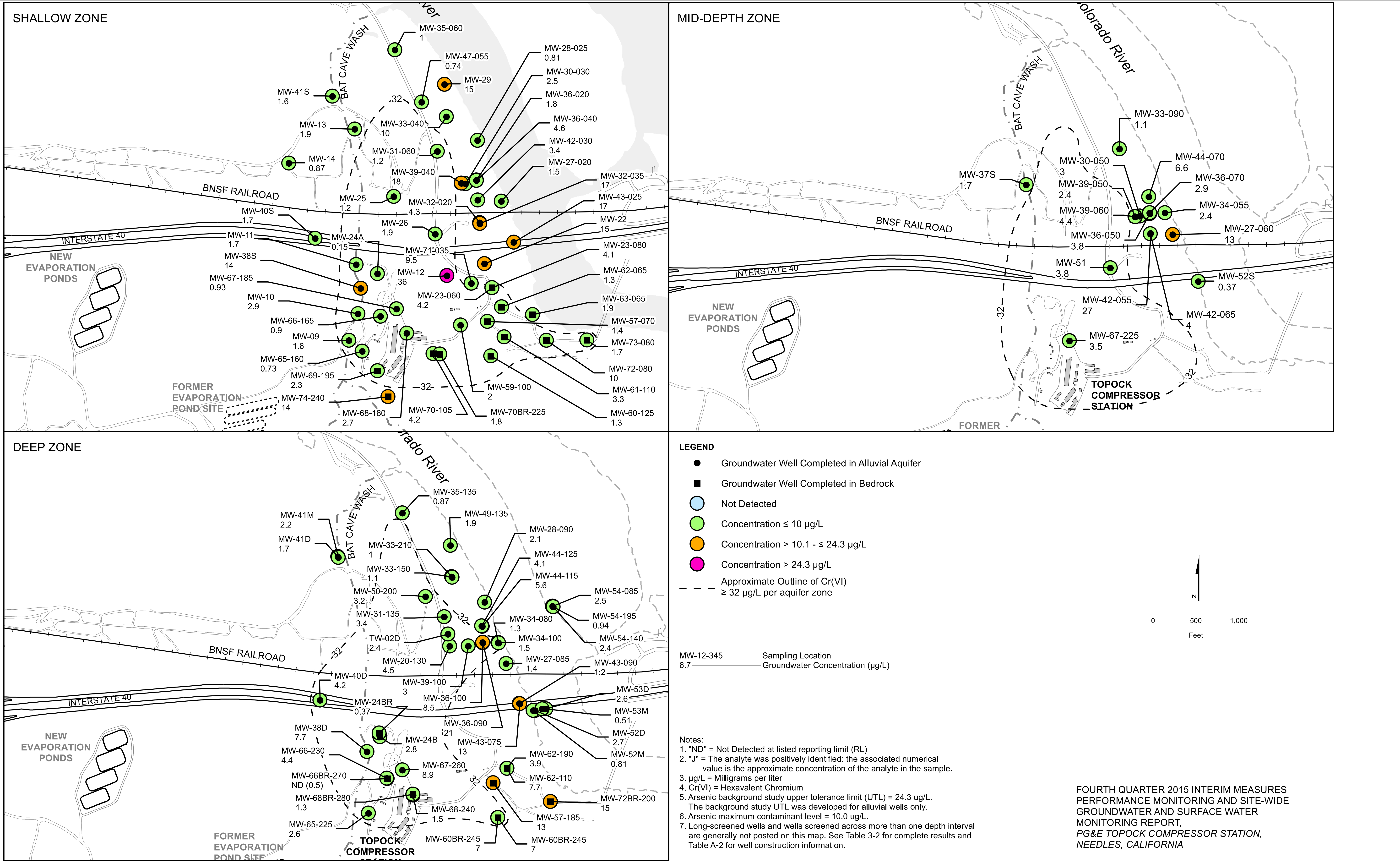
Final Groundwater Remediation Project SEIR

Map Creation Date: 10/13/2016 Sources: ESRI PG&E 2015, Arcadis 2016a

Extent of Selenium in Groundwater

Figure 4.6-9

ESA North State Resources



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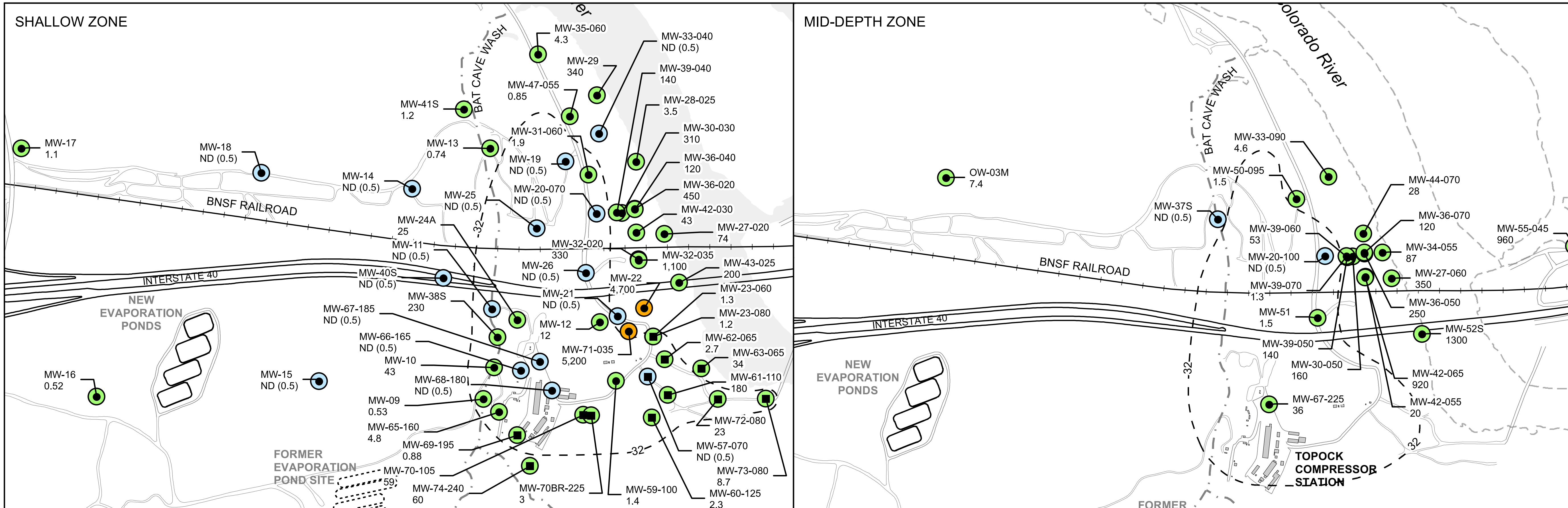
Final Groundwater Remediation Project SEIR

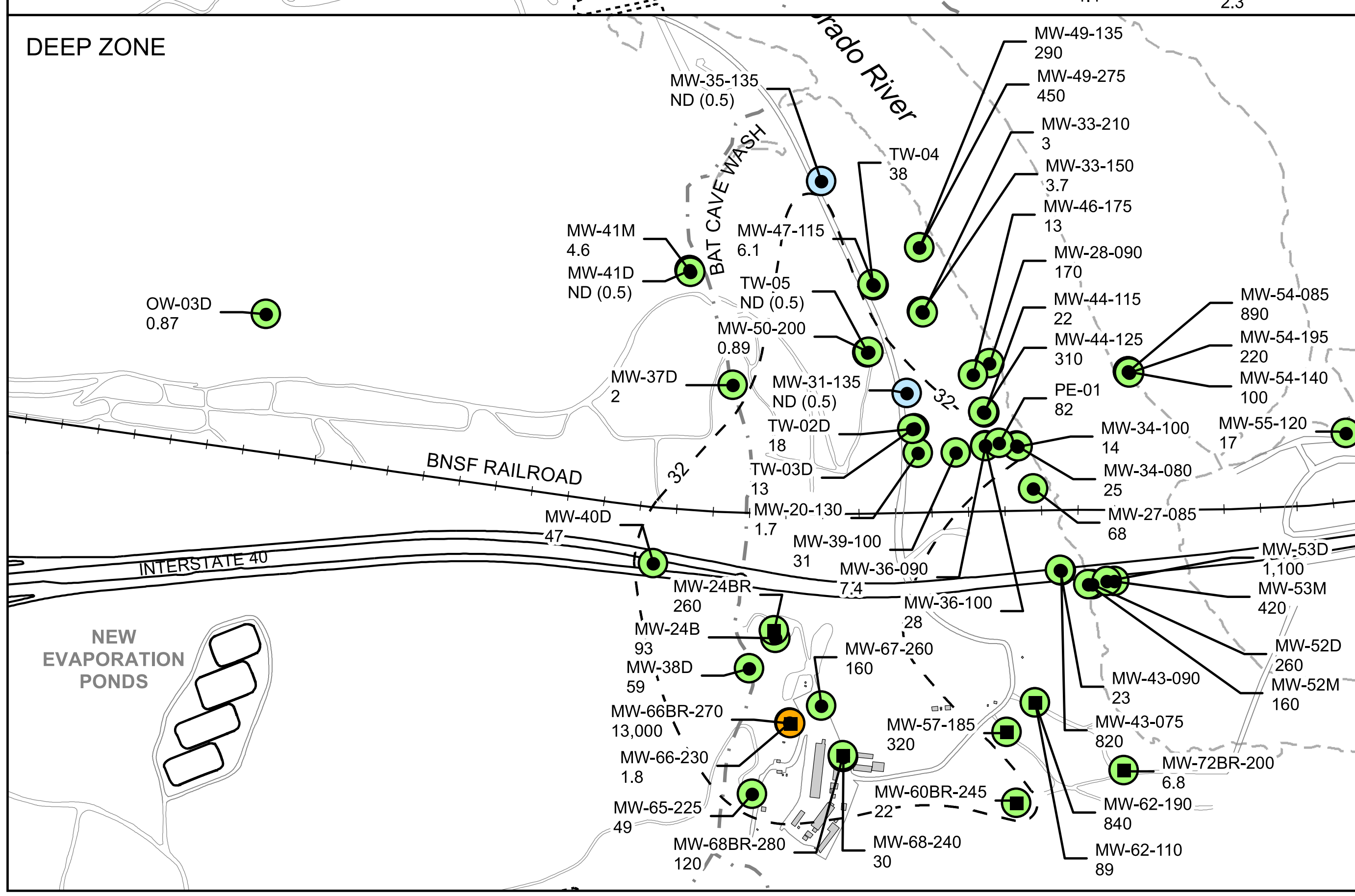
Map Creation Date: 10/13/2016 Sources: PG&E 2015, Arcadis 2016a

Extent of Arsenic in Groundwater

Figure 4.6-10

ESA North State Resources





LEGEND

- Groundwater Well Completed in Alluvial Aquifer
- Groundwater Well Completed in Bedrock
- Not Detected
- Concentration ≤ 1,320 µg/L
- Concentration > 1,320 µg/L
- Approximate Outline of Cr(VI) ≥ 32 µg/L per aquifer zone

N

0 500 1,000
Feet

MW-12-345 — Sampling Location
6.7 — Groundwater Concentration (µg/L)

Notes:
1. "ND" = Not Detected at listed reporting limit (RL)
2. "J" = The analyte was positively identified: the associated numerical value is the approximate concentration of the analyte in the sample.
3. µg/L = Milligrams per liter
4. Cr(VI) = Hexavalent Chromium
5. USEPA = United States Environmental Protection Agency
6. Manganese background study report upper tolerance limit (UTL) = 1,320 ug/L. The background study UTL was developed for alluvial wells only.
7. There is no primary USEPA and California maximum contaminant level (MCL) for Manganese. The secondary MCL is 50 µg/L.
8. Long-screened wells and wells screened across more than one depth interval are generally not posted on this map. See Table 3-2 for complete results and Table A-2 for well construction information.

FOURTH QUARTER 2015 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

Final Groundwater Remediation Project SEIR
Map Creation Date: 10/13/2016 Sources:ESRI PG&E 2015, Arcadis 2016a

Extent of Manganese in Groundwater

Figure 4.6-11

ESA | North State Resources

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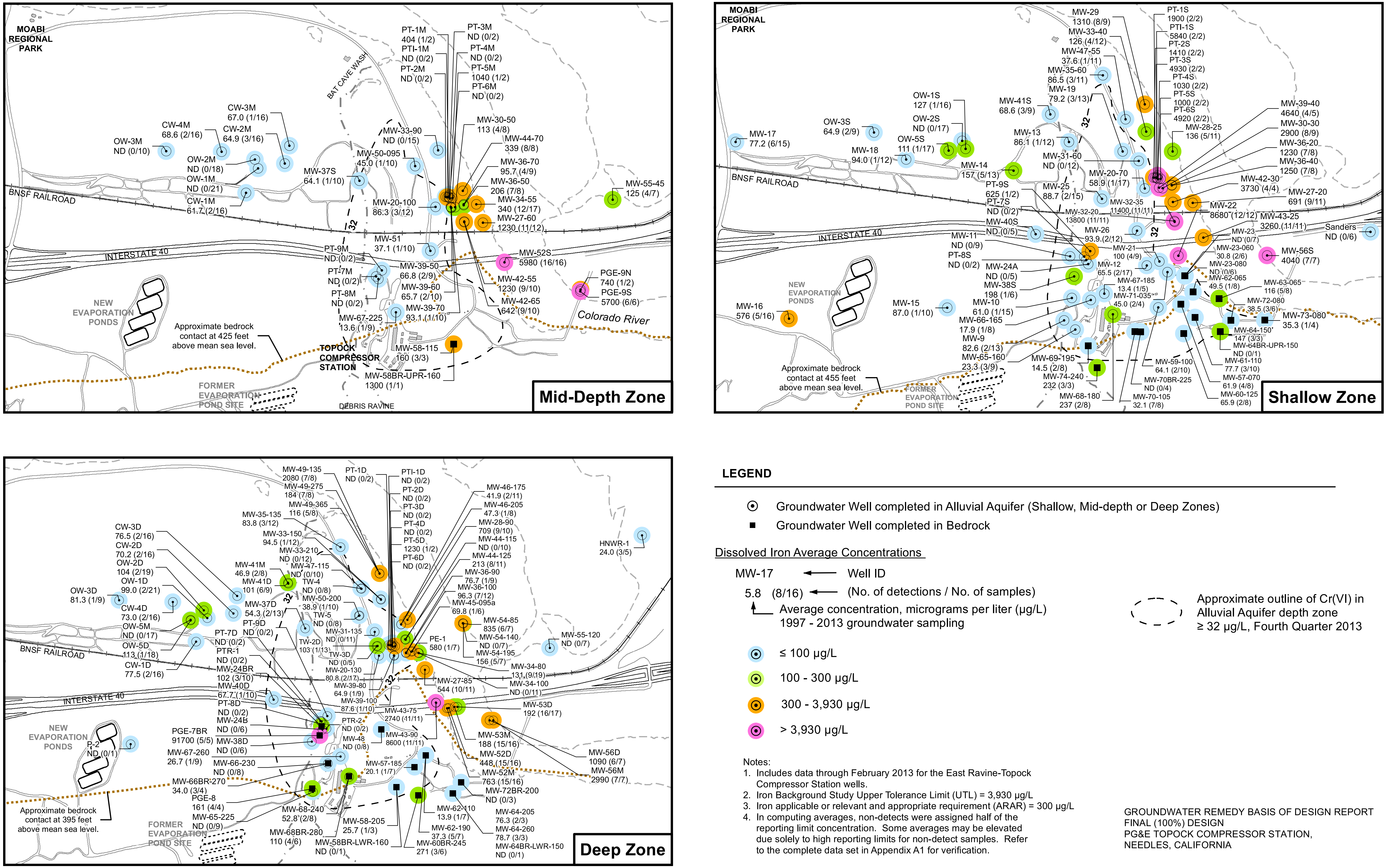

Notes:
1. Includes data through February 2013 for the East Ravine-Topock Compressor Station wells.
2. Iron Background Study Upper Tolerance Limit (UTL) = 3,930 µg/L
3. Iron applicable or relevant and appropriate requirement (ARAR) = 300 µg/L
4. In computing averages, non-detects were assigned half of the reporting limit concentration. Some averages may be elevated due solely to high reporting limits for non-detect samples. Refer to the complete data set in Appendix A1 for verification.

GROUNDWATER REMEDY BASIS OF DESIGN REPORT
FINAL (100%) DESIGN
PG&E TOPOCK COMPRESSOR STATION,
NEEDLES, CALIFORNIA

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Final Groundwater Remediation Project SEIR
Map Creation Date: 10/13/2016 Sources: ESRI PG&E 2015, CH2M Hill 2015a

Extent of Iron in Groundwater

Figure 4.6-12

ESA | North State Resources

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4.6.4 Regulatory Background

4.6.4.1 Federal

Resource Conservation and Recovery Act

The RCRA establishes requirements for the treatment, storage, and disposal of hazardous wastes. These requirements include floodplain protection standards that must be followed by treatment, storage, and/or disposal facilities constructed, operated, or maintained for hazardous wastes that are located within certain distances of floodplains. Portions of the Topock Project Area are located on or near the 100-year floodplain of the Colorado River. RCRA is more fully described in Section 4.5, "Hazards and Hazardous Materials," Subsection 4.5.4.1.

Federal Clean Water Act

In accordance with the CERCLA exemption, PG&E would not be required to apply for or obtain Clean Water Act (CWA) permits as long as the Project actions are implemented in compliance with the substantive elements of the guiding principles associated with the relevant sections of the CWA, described further below.

The CWA (33 USC 1251-1376) is the major federal legislation governing water quality. The CWA established the basic structure for regulating discharges of pollutants into the waters of the United States and gave the USEPA the authority to implement pollution control programs, such as setting wastewater standards for industry. The CWA sets water quality standards for all contaminants in surface waters. Sections 401 and 404 provide for water quality standards, criteria, and guidelines. The statute employs a variety of regulatory and nonregulatory tools to reduce direct pollutant discharges into waterways, finance municipal wastewater treatment facilities, and manage polluted runoff. The U.S. Army Corps of Engineers (USACE) has jurisdiction over all waters of the United States, including but not limited to perennial and intermittent streams, lakes, and ponds, as well as wetlands in marshes, wet meadows, and side hill seeps.

The relevant sections of the CWA are summarized below and in the following pages.

Section 401 Water Quality Certification

Section 401 of the CWA states that any person applying for a federal permit or license that may result in the discharge of pollutants into waters of the United States must obtain a state certification that the activity complies with all applicable water quality standards, limitations, and restrictions. In California, this certification is administered in California by the State Water Resources Control Board (SWRCB) via the RWQCBs. In Arizona, this certification is administered by the Arizona Department of Environmental Quality. No license or permit may be granted by a federal agency until certification required by Section 401 has been granted. Further, no license or permit may be issued if certification has been denied. An entity seeking a Section 401 water quality certification typically must obtain a CWA Section 404 permit from USACE.

Section 404 of the Clean Water Act

Section 404 of the CWA requires that any person conducting any activity that involves any discharge of dredged or fill material into waters of the United States, including wetlands, obtain a permit. USACE is responsible for issuing permits for the placement of fill or discharge of material into waters of the United States required under CWA Sections 401 and 404. Water supply projects that involve instream construction, such as dams or other types of diversion structures, trigger the need for these permits and related environmental reviews by USACE. USACE also is responsible for flood control planning and assisting state and local agencies with the design and funding of local flood control projects.

Water Quality Criteria and Standards

Under federal law, the USEPA has published water quality regulations under Volume 40 of the Code of Federal Regulations. Section 303 of the CWA requires states to adopt water quality standards for all surface waters of the United States. As defined by the CWA, water quality standards consist of two elements: identified designated beneficial uses of the water body in question and criteria that protect the designated uses. Section 304(a) requires USEPA to publish advisory water quality criteria on the kind and extent of all effects on health and welfare caused by pollutants in water. The criteria must accurately reflect the latest scientific knowledge. Where multiple uses of a water body exist, water quality standards must protect the most sensitive use. In California, USEPA has granted SWRCB and its nine RWQCBs the authority to identify beneficial uses and adopt applicable water quality objectives. In Arizona, water quality is regulated by the Arizona Department of Environmental Quality.

Section 303(d) Impaired Waters List

Under Section 303(d) of the CWA, states must develop lists of water bodies that would not attain water quality objectives for specific pollutants after implementation of required levels of treatment by point-source dischargers (municipalities and industries). Section 303(d) requires that the state develop a total maximum daily load (TMDL) for each of the listed pollutants. The TMDL is the amount of loading that the water body can receive and still be in compliance with water quality objectives. It can also act as a plan to reduce loading of a specific pollutant from various sources to achieve compliance with water quality objectives. The TMDL prepared by the state must include an allocation of allowable loadings to point and nonpoint sources, with consideration of background loadings and a margin of safety. The TMDL must also include an analysis that shows the linkage between loading reductions and the attainment of water quality objectives. USEPA must either approve a TMDL prepared by the state or, if it disapproves the state’s TMDL, issue its own. NPDES permit limits for listed pollutants must be consistent with the waste load allocation prescribed in the TMDL. After implementation of the TMDL, it is anticipated that the problems that led to placement of a given pollutant on the Section 303(d) list would be remediated. The section of the Colorado River adjacent to the Project Area is not listed on the impaired waters list (USEPA 2007).

Executive Order 11988

Under Executive Order 11988 – Floodplain Management, the Federal Emergency Management Agency (FEMA) is responsible for management of floodplain areas defined as the lowland and relatively flat areas adjoining inland and coastal waters subject to a one percent or greater chance of flooding in any given year (the 100-year floodplain). FEMA requires that local governments covered by federal flood insurance pass and enforce a floodplain management ordinance that specifies minimum requirements for any construction within the 100-year floodplain. The Order addresses floodplain issues related to public safety, conservation, and economics. It generally requires federal agencies constructing, permitting, or funding a project in a floodplain to:

- Avoid incompatible floodplain development
- Be consistent with the standards and criteria of the National Flood Insurance Program
- Restore and preserve natural and beneficial floodplain values

Executive Order 11990

Under Executive Order 11990 – Protection of Wetlands, federal agencies are required to follow avoidance, mitigation, and preservation procedures, with public input, before proposing new construction in wetlands. It generally requires:

- Avoidance of wetlands
- Minimization of activities in wetlands
- Coordination with USACE and Section 404 of the CWA regarding wetlands mitigation

Federal Land Policy and Management Act

BLM is responsible for implementing the Federal Land Policy and Management Act. The act directs BLM to take any action necessary to prevent unnecessary or undue degradation of public lands they oversee.

Fish and Wildlife Coordination Act

In the Project Area, U.S. Fish and Wildlife Service (USFWS) is also responsible for overseeing the implementation of the National Wildlife Refuge System Administration Act, as amended, for work taking place at the Havasu National Wildlife Refuge. The act requires USFWS to evaluate ongoing and proposed activities and uses to ensure that such activities are appropriate and compatible with both the mission of the overall refuge system and the specific purposes for which the Havasu National Wildlife Refuge was established. The Fish and Wildlife Coordination Act requires that any federally funded or authorized modification of a stream or other water body must provide adequate provisions for conservation, maintenance, and management of wildlife resources and their habitat.

Federal Antidegradation Policy

The federal antidegradation policy has been in existence since 1968. The policy protects existing uses and water quality and national water resources. It directs states to adopt a statewide policy that includes the following primary provisions:

- Existing instream uses and the water quality necessary to protect those uses shall be maintained and protected.
- Where existing water quality is better than necessary to support fishing and swimming conditions, that quality shall be maintained and protected unless the state finds that allowing lower water quality is necessary for important local economic or social development.

- Where high-quality waters constitute an outstanding national resource, such as waters of national and state parks, wildlife refuges, and waters of exceptional recreational or ecological significance, that water quality shall be maintained and protected.

National Toxics Rule and California Toxics Rule

The National Toxics Rule (NTR) was issued by the USEPA on December 22, 1992, and amended on May 4, 1995, and November 9, 1999, to establish numeric criteria for priority toxic pollutants necessary to bring all states, including California, into compliance with the requirements of Section 303(c)(2)(B) of the CWA. The NTR established water quality criteria for 42 pollutants that were not covered under California's statewide water quality regulations. As a result of a court-ordered revocation of California's statewide water quality control plan (basin plan) for priority pollutants in September 1994, USEPA initiated efforts to issue additional numeric water quality criteria for California. On May 18, 2000, USEPA issued the California Toxics Rule (CTR), which established numeric criteria for priority pollutants not included in the NTR; the CTR was amended on February 13, 2001. The CTR documentation (65 Federal Register 31682) carried forward the previously established criteria of the NTR, thereby providing a single document listing California's fully adopted and applicable water quality criteria for priority pollutants.

Safe Drinking Water Act

The Safe Drinking Water Act was passed in 1974 to regulate the nation's drinking-water supply. The law, which was amended in 1986 and 1996, requires many actions to protect drinking water and its sources: rivers, lakes, reservoirs, springs, and groundwater. The Safe Drinking Water Act authorizes USEPA to set national health-based standards for drinking water to protect against both naturally occurring and human-made contaminants that may be found in drinking water. USEPA sets national standards for drinking water to protect against health risks, considering available technology and costs. These national recommended water quality criteria set enforceable MCLs for particular contaminants in drinking water or required ways to treat water to remove contaminants.

4.6.4.2 State of California

SWRCB Resolution No. 68-16 – State Nondegradation Policy

SWRCB has broad authority over discharges to waters of the state. In 1968, the SWRCB adopted a nondegradation policy aimed at maintaining the high quality of waters in California through the issuance of Resolution No. 68-16 ("Statement of Policy with Respect to Maintaining High Quality Waters in California"), whereby actions that tend to degrade the quality of water are prohibited. Oversight of this policy is done through the RWQCBs. The nondegradation policy states that:

- Whenever the existing quality of water is better than the quality established in policies as of the date on which such policies become effective, such existing high quality will be maintained until it has been demonstrated to the state that any change will be consistent with maximum benefit to the people of the state, will not unreasonably affect present and anticipated beneficial use of such water, and will not result in water quality less than that prescribed in the policies.

- Any activity which produces or may produce a waste or increased volume or concentration of waste and which discharges or proposes to discharge to existing high quality waters must meet waste discharge requirements, which will result in the best practicable treatment or control of the discharge necessary to ensure that (a) a pollution or nuisance will not occur and (b) the highest water quality consistent with maximum benefit to the people of the state will be maintained.

SWRCB has interpreted Resolution No. 68-16 to incorporate the federal antidegradation policy, which is applicable if a discharge that began after November 28, 1975, will lower existing water quality.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act (Division 7 of the California Water Code) provides the basis for water quality regulation within California and defines water quality objectives as the limits or levels of water constituents that are established for reasonable protection of beneficial uses. The SWRCB administers water rights, water pollution control, and water quality functions throughout the state, while the Colorado River Basin RWQCB conducts planning, permitting, and enforcement activities. The Porter-Cologne Act requires the RWQCB to establish a regional basin plan with water quality objectives, while acknowledging that water quality may be changed to some degree without unreasonably affecting beneficial uses. Beneficial uses, together with the corresponding water quality objectives, are defined as standards, per federal regulations. Therefore, the regional basin plans form the regulatory references for meeting state and federal requirements for water quality control. Changes in water quality are allowed if the change is consistent with the maximum beneficial use of the state, does not unreasonably affect the present or anticipated beneficial uses, and does not result in water quality less than that prescribed in the water quality control plans. The basin plan for this location is discussed below.

Water Quality Control Plan for the Colorado River Basin

The Colorado River Basin RWQCB, under the authority of the state Porter-Cologne Water Quality Control Act and pursuant to the CWA, is responsible for authorizing and regulating activities that may discharge wastes to surface water or groundwater resources. The preparation and adoption of water quality control plans (Basin Plans) are required by the California Water Code (Section 13240). According to Section 13050 of the California Water Code, Basin Plans consist of a designation or establishment for the waters within a specified area of beneficial uses to be protected, water quality objectives to protect those uses, and a program of implementation needed for achieving the objectives. Because beneficial uses, together with their corresponding water quality objectives, can be defined per federal regulations as water quality standards, the Basin Plans are regulatory references for meeting the state and federal requirements for water quality control.

The Basin Plan for the Colorado River Basin, originally adopted by the Colorado River Basin RWQCB in 1993 and last amended in June 2006, identifies the beneficial uses of water bodies and provides water quality objectives and standards for waters of the Colorado River Basin. The beneficial uses for each type of water body in the Basin are:

> **Surface Waters of the Colorado River** – municipal and domestic water supply, agricultural supply, aquaculture, industrial service supply, groundwater recharge, contact and noncontact water recreation, warm and cold freshwater habitats, hydropower generation, and preservation and enhancement of rare, threatened, or endangered species
>
> **Washes (ephemeral streams) –** potential[2] municipal and domestic, groundwater recharge, contact and noncontact water recreation, warm freshwater habitats, and preservation and enhancement of rare, threatened, or endangered species
>
> **Groundwater in the East Colorado Basin, Piute Hydrologic Unit (713.00)** – municipal and domestic water supply, industrial service supply, and agricultural supply

The Colorado River Basin Plan identifies specific narrative and numeric water quality objectives for a number of physical properties (e.g., temperature, turbidity, and suspended solids), biological constituents, and COPCs, including inorganic parameters, trace metals, and organic compounds. Water quality objectives for toxic priority pollutants (i.e., select trace metals and synthetic organic compounds) are also identified in the Basin Plan.

Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65)

In 1986, California voters approved an initiative to address their growing concerns about exposure to toxic chemicals. That initiative became the Safe Drinking Water and Toxic Enforcement Act of 1986, better known by its original name of Proposition 65. Proposition 65 requires the state to publish a list of chemicals known to cause cancer or birth defects or other reproductive harm. This list, which must be updated at least once a year, has grown to include approximately 800 chemicals since it was first published in 1987.

Proposition 65 requires businesses to notify Californians about significant amounts of chemicals in the products they purchase, in their homes or workplaces, or that are released into the environment. By providing this information, Proposition 65 enables Californians to make informed decisions about protecting themselves from exposure to these chemicals. Proposition 65 also prohibits California businesses from knowingly discharging significant amounts of listed chemicals into sources of drinking water. The following section is relevant to this Project because the Colorado River and the groundwater basin are designated sources of drinking water.

> **Section 25249.5. Prohibition On Contaminating Drinking Water With Chemicals Known to Cause Cancer or Reproductive Toxicity.** No person in the course of doing business shall knowingly discharge or release a chemical known to the state to cause cancer or reproductive toxicity into water or onto or into land where such chemical passes or

2 Potential use designation will be determined on a case-by-case basis as necessary in accordance with the "Sources of Drinking Water Policy" in the Basin Plan.

probably will pass into any source of drinking water, notwithstanding any other provision or authorization of law except as provided in Section 25249.9.

NPDES Construction General Permit

In accordance with the CERCLA exemption (see Chapter 3, "Project Description," Section 3.10, and Section 4.6.4.1), PG&E would not be required to submit a Notice of Intent or a Stormwater Pollution Prevention Plan (SWPPP) to the RWQCB for their review and approval to comply with the requirement of the state Construction General Permit (CGP). This does not, however, remove the requirement to meet the substantive provisions of applicable laws. Therefore, as part of the Project, PG&E will develop and implement an erosion control plan that is in conformance with the substantive requirements of the CGP. Because the erosion control plan will fulfill the requirements of the CGP, it will have substantive components similar to those that would be included in an SWPPP (note: the Groundwater FEIR called this a Stormwater BMP Plan). The general CGP requirements are summarized below.

The RWQCB administers the NPDES stormwater permitting program in the Colorado River Basin region. Construction activities disturbing one acre or more of land are subject to the permitting requirements of the NPDES Construction General Permit for Discharges of Storm Water Runoff Associated with Construction Activity (Construction General Permit [CGP]; Order 2009-0009-DWQ; NPDES No. CAS000002 as amended by 2010-0014-DWQ). Project activities such as clearing, grading, stockpiling, and excavation would be subject to the statewide general construction activity NPDES permit.

The CGP requires that the site be assigned a risk level of 1 (low), 2 (medium), or 3 (high) based on sediment and receiving waters risk. The sediment risk level is the relative amount of sediment that can be discharged given the project and location details. The receiving waters risk level reflects the risk sediment discharges pose to the receiving waters. A construction analysis provides a preliminary risk level assessment.

For non-exempt projects, the CGP requires the preparation and implementation of a SWPPP prior to construction commencement. At a minimum, the SWPPP includes the following:

- Description of construction materials, practices, and equipment storage maintenance
- List of pollutants likely to contact stormwater and site-specific erosion and sedimentation control practices
- List of provisions to eliminate or reduce discharge of materials to stormwater
- BMPs for fuel and equipment storage
- Non-stormwater management measures such as installing specific discharge controls during activities such as paving operations and vehicle and equipment washing and fueling
- Equipment, materials, and workers will be available for rapid response to spills and/or emergencies. All corrective maintenance or BMPs will be performed as soon as possible, depending upon worker safety

An SWPPP provides specific construction-related BMPs to prevent soil erosion and loss of topsoil. BMPs implemented could include, but would not be limited to, physical barriers to prevent erosion and sedimentation, construction of sedimentation basins, limitations on work periods during storm events, use of swales, protection of stockpiled materials, and a variety of other measures that would substantially reduce or prevent erosion from occurring during construction. Post-construction requirements require that construction sites match pre-project hydrology to ensure that the physical and biological integrity of aquatic ecosystems are sustained in their existing condition, unless the site is located within an area subject to the post-construction standards of an active Phase I or II municipal separate storm sewer system (MS4) permit that has an approved stormwater management plan. This Project Area is not within a MS4 area. The post-construction standards (post-investigation standards for the purposes of the proposed Project) include structural and nonstructural control measures to replicate the pre-project water balance and pre-project drainage density, and reduce pollutants in stormwater discharges.

NPDES General Industrial Storm Water Permit

The *NPDES General Permit for Storm Water Discharges Associated with Industrial Activities*, Order NPDES No. CAS000001, adopted July 1, 2015 (the Industrial General Permit), is an NPDES permit that regulates discharges associated with 10 broad categories of industrial activities that include the Station operations. In addition to requiring the implementation of best available technologies to achieve performance standards, the Industrial General Permit also requires the development of a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP will identify the site-specific sources of pollutants and describe the measures at the facility applied to reduce stormwater pollution. The SWPPP developed for this Project is discussed later in the description of Impact HYDRO-1.

NPDES Waste Discharge Requirements Order No. R7-2004-0080

Discharges to the existing four evaporation ponds used by the Station are regulated by the Colorado River Basin RWQCB under NPDES Waste Discharge Requirements Order No. R7-2004-0080. The Waste Discharge Requirements (WDRs) are specifically limited to discharges to the evaporation ponds, which are classified as Class II surface impoundments. The WDRs describe the existing ponds, discharge acceptance criteria, and prohibitions. The WDRs require that 30 days prior to the introduction of any new waste stream into the Class II surface impoundments, the discharger (PG&E) must receive approval from the RWQCB.

Hazardous Material Release Response Plans and Inventory Law (California Health and Safety Code, Division 20, Chapter 6.95)

This state law requires businesses to disclose the hazardous materials used in their businesses and to develop a Hazardous Material Management Plan or a “business plan” for hazardous materials emergencies if they handle, at any one time, more than 500 pounds, 55 gallons, or 200 cubic feet of hazardous materials. The business plan includes an inventory of all hazardous materials stored or handled at a facility above these thresholds. This law is designed to reduce the occurrence and severity of hazardous material releases and to promote emergency response preparedness by local agencies. The Hazardous Materials Management Plan must be submitted to the Certified Unified Program Agency (CUPA), which for the Project vicinity is the San Bernardino County Fire

Department, Hazardous Materials Division. The state has integrated the federal Emergency Planning and Community Right-to-Know Act (EPCRA) reporting requirements into this law; once a facility is in compliance with the local administering agency requirements, submittals to other agencies are not required. The Hazardous Material Management Plan also defines response procedures and equipment for spills or releases of hazardous materials.

California Well Standards, Bulletin 74-90

The state of California promulgated water well standards under Bulletin 74-90 to protect groundwater quality. The requirements address well construction techniques and materials, including appropriate locations, materials, annular seals, sealing off strata, well development, rehabilitation and repair, and well destruction. The well standards apply to all water wells, including extraction, injection, and monitoring wells.

Law of the River (Colorado River Allocations)

The Colorado River is the most important waterway in the region. The river supplies water for use within the region and elsewhere. Apportionment of water available for diversion from the river is made in accordance with a number of documents collectively referred to as the Law of the River. These include interstate compacts, federal legislation, water delivery contracts, state legislation, a treaty with Mexico, U.S. Supreme Court decrees, and federal administrative actions. Presently, California is receiving waters unused by other states. The 2003 Quantification Settlement Agreements created California's "soft landing" by reducing California's Colorado River water usage from 5.2 million acre-feet per year (AFY) to 4.4 million AFY in a normal year over 15 years through the conservation and transfer of water from agricultural to urban uses in San Diego County Water Authority's, Metropolitan's, and Coachella Valley Water District's jurisdictions, through quantifying the agencies' priority water rights to the river and allocating water in times of shortage. This effort was called the "Interim Surplus Guidelines." PG&E's existing contracted entitlement is 422 acre-feet annually (DTSC 2011).

4.6.4.3 State of Arizona

Arizona Department of Water Resources

Well Construction and Abandonment Requirements

Well construction and abandonment standards in the State of Arizona are provided in *State of Arizona Department of Water Resources, Title 45 Waters, Chapter 2 Groundwater Code, Article 10 Wells*, dated 2011. Well construction requirements are provided in Section R12-15-811, Minimum Well Construction Requirements; well abandonment requirements are provided in Section R12-15-816, Abandonment. Both the installation and abandonment of water wells require permits.

Arizona Department of Environmental Quality

Arizona Pollutant Discharge Elimination System Program for Construction and Land Disturbance Activities (General Permit) Order No. AZG2013-001

Similar to the California Construction General Permit, the State of Arizona also has a program to address controlling runoff from construction sites. The program requires acquiring coverage under the permit for projects that disturb more than one acre of area. The program requires the submittal of a Notice of Intent, the preparation and implementation a SWPPP with appropriate BMPs, fees, and reporting. The types of BMPs cited in the Arizona General Permit include scheduling of activities, prohibitions of practices, maintenance procedures; other BMPs to prevent or reduce discharge of pollutants to waters of the United States; and operating procedures and practice to control site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw materials storage. Some of the relevant BMPs include:

- Scheduling (SS-1): Proper scheduling assists in identifying ways to minimize disturbed areas, which allows for a reduction in the active Project Area requiring protection and also minimizes the length of time disturbed soils are exposed to erosive processes.
- Preservation of Existing Vegetation (SS-2): Preserving existing vegetation to the maximum extent practicable facilitates protection of surfaces from erosion and can also help to control sediments. Sensitive areas should also be clearly identified and protected.
- Geotextiles, Plastic Covers, and Erosion Control Blankets/Mats (SS-7): These erosion control methods can be used on flat or, usually, sloped surfaces, channels, and stockpiles.
- Stabilized Construction Entrance/Exit (TC-1): A graveled area or pad located at points where vehicles enter and leave a construction site can be built. This BMP provides a buffer area where vehicles can drop their mud and sediment to avoid transporting it onto public roads, to control erosion from surface runoff, and to help control dust.
- Runoff Control Measures (SS-9, SS-10, and SC-10): These include graded surfaces to redirect sheet flow, diversion dikes or berms that force sheet flow around a protected area
- Gravel Bag Berm (SC-6) and Sand/Gravel Bag Barrier (SC-8): A temporary sediment barrier consisting of gravel-filled fabric bags is designed to retain sediment from small disturbed areas by reducing the velocity of sheet flows.

Secondary concerns include potential pollutants from inappropriate material storage and handling procedures and non-stormwater discharges. These will be addressed through the following types of BMPs, which shall be incorporated into the stormwater BMP plan:

- Material Delivery and Storage (WM-1): Provide covered storage for materials, especially toxic or hazardous materials, to prevent exposure to stormwater. Store and transfer toxic or hazardous materials on impervious surfaces that will provide secondary containment for spills. Park vehicles and equipment used for material delivery and storage, as well as contractor vehicles, in designated areas.
- Spill Prevention and Control (WM-4): Ensure that spills and releases of materials are cleaned up immediately and thoroughly. Ensure that appropriate spill response equipment, preferably spill kits preloaded with absorbents in an overpack drum, is provided at convenient locations throughout the site. Spent absorbent material must be managed and disposed of in accordance with applicable regulations. In particular, absorbents used to clean up spills of hazardous materials or waste must be managed as hazardous waste unless characterized as nonhazardous.

- Solid Waste Management (WM-5): Provide a sufficient number of conveniently located trash and scrap receptacles to promote proper disposal of solid wastes. Ensure that the receptacles are provided with lids or covers to prevent windblown litter.
- Hazardous Waste Management (WM-6): Provide a sufficient number of proper receptacles to promote proper disposal of hazardous wastes.
- Concrete Waste Management (WM-8): Dispose of excess concrete in specific concrete washout facilities.
- Sanitary/Septic Waste Management (WM-9): Locate sanitary and septic waste facilities away from drainage courses and traffic areas. Maintain the facilities regularly.
- Vehicle and Equipment Cleaning (NS-8): Clean vehicles and equipment that regularly enter and leave the construction site.
- Vehicle and Equipment Fueling (NS-9): Fuel vehicles and equipment off-site whenever possible. If off-site fueling is not practical, establish a designated on-site fueling area with proper containment and spill cleanup materials.
- Vehicle and Equipment Maintenance (NS-10): Use off-site maintenance facilities whenever possible. Any on-site maintenance areas must be protected from stormwater runoff and on-site flooding.

4.6.4.4 Local

County of San Bernardino (California) Department of Public Health

The San Bernardino County Department of Public Health, Division of Environmental Health Services (EHS) is responsible for issuing permits for the installation of soil borings, vapor monitoring wells, and groundwater wells in San Bernardino County. EHS personnel are responsible for inspecting boring and well installations for conformance with state and local well standards. Soil borings deeper than 25 feet are required to be permitted under Program Element 4555 (San Bernardino County 2013).

County of San Bernardino (California) Water and Sanitation Division

The San Bernardino County Water and Sanitation Division is responsible for water supply monitoring and protection at Moabi Regional Park in California. This includes testing the Moabi Regional Park public water supply for the presence of various chemicals, including Cr(VI).

4.6.5 Environmental Impacts

4.6.5.1 Thresholds of Significance

Based on the current (2016) CEQA Guidelines, Appendix G, a project may be deemed to have a significant effect on the environment with respect to hydrology and water quality if it would:

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

- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation on- or off-site;
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner, which would result in flooding on- or off-site; or
- Create or contribute runoff water, which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.

The complete list of CEQA significance criteria used in the hydrology and water quality analysis is included in the Modified Initial Study (see Appendix IS), which also explains why the proposed Project would not result in new significant impacts or substantially increase the severity of significant impacts previously identified in the Groundwater FEIR (see Pub. Resources Code, Section 21166; CEQA Guidelines, Section 15162) on hydrology and water quality with respect to depletion of groundwater supplies in California and interference with groundwater recharge in California; placement of housing or structures within a 100-year flood zone; flooding as a result of failure of a levee or dam; and inundation by seiche, tsunami, or mudflow. As a result, those impacts will not be addressed further in this SEIR and are summarized below. The potential to substantially deplete groundwater supplies in Arizona is discussed in Section 4.9, "Water Supply."

Flood Hazards

As discussed in the Groundwater FEIR, the area is no longer subject to flooding because upstream dams and flow regulation control the flow of the Colorado River and the river no longer floods. In addition, the Project does not include the construction of housing. This condition has not changed since certification of the Groundwater FEIR. The Project would not result in new significant impacts or substantially increase the severity of impacts previously identified in the Groundwater FEIR on hydrology and water quality with respect to flood hazards. Therefore, this issue is not evaluated further in this SEIR.

Dam Failure

As discussed in the Groundwater FEIR, the nearest dam is the Davis Dam on Lake Mohave, located approximately 41 miles upstream of the Project Area, too far to significantly affect the Project Area in the unlikely event of a dam failure. This condition has not changed since certification of the Groundwater FEIR. The Project would not result in new significant impacts or substantially increase the severity of impacts previously identified in the Groundwater FEIR with respect to dam failure. Therefore, this issue is not evaluated further in this SEIR.

Inundation by Seiche, Tsunami, or Mudflow

Inundation by seiche, tsunami, or mudflow does not apply because the Project Area is not subject to inundation by seiches, tsunamis, or mudflows. This condition has not changed since certification of the Groundwater FEIR. The Project would not result in new significant impacts or substantially increase the severity of impacts previously identified in the Groundwater FEIR with respect to seiche, tsunami, or mudflow. Therefore, this issue is not evaluated further in this SEIR.

4.6.5.2 Approach to Analysis

This section presents a revised analysis per Public Resources Code Section 21166 and CEQA Guidelines Sections 15162 governing conditions required for preparation of a SEIR, including substantial changes to the Project or circumstances under which the Project is taken that result in major revisions to the original FEIR. Subsequent to certification of the Groundwater FEIR, the Final Remedy Design was prepared to include design details not available in 2011. This section outlines the approach to the potential hydrology and water quality impacts based on the Project-specific information now available, as well as the additional information obtained regarding the existing environmental setting (see Section 4.6.3, which summarizes the additional information included in the Final Remedy Design).

Some of the mitigation measures in this section refer to various plans or other documents that have been prepared and included in the Final Remedy Design for the groundwater remedy or are part of the Project's federal requirements. Many of these plans and documents included in the Final Remedy Design were prepared to implement mitigation measures previously adopted as part of DTSC's January 31, 2011, decision approving Alternative E as the groundwater remedy (DTSC 2011). Appendix GWMM to this SEIR presents a comparison between the mitigation measures included in the Groundwater FEIR as reflected in the Mitigation Monitoring and Reporting Program approved by DTSC on January 31, 2011, and those presented in this SEIR for the Final Groundwater Remedy Project.

All plans and documents included in the Final Remedy Design and references in this SEIR are appended to this SEIR as Appendix BOD. In addition, the documents are available online at the following link: http://dtsc-topock.com/documents/cleanup-implementation/groundwater/remedy-design/remedial-design-documents.

Construction Impact Methodology

Subsequent to publication of the Groundwater FEIR, additional details were developed regarding the number and location of wells, lengths and locations of piping and roads, and footprints of treatment infrastructure that would be constructed to implement the Final Groundwater Remedy Project. The revisions would result in an increase in the number of boreholes[3] to be installed from the 170 boreholes estimated in the Groundwater FEIR to up to 191 boreholes planned for the Final Remedy Design, along with an associated increased use of fuel, lubricants, paint, glue, and solvents, and an increase in the volume of disturbed soil that could result in additional erosion/water quality impacts, as discussed in Section 3.9, "Project Description" of this SEIR. Potential impacts associated with storage and processing of soils at the Soil Processing Area as it relates to water quality and drainage will also be addressed.

In addition, the Final Groundwater Remedy Project includes a Future Activity Allowance of all infrastructure to be constructed as part of the Project (i.e., wells, pipelines, roads, structures, etc.). Generally, the Future Activity Allowance includes two components: (1) an additional allowance for all Project infrastructure, established at up to 25 percent of the parameter set forth in the Final Remedy Design, and (2) up to 10 additional monitoring well boreholes to be installed in Arizona

[3] Note that multiple wells may be constructed within a given borehole.

as part of the monitoring program. The Future Activity Allowance could include construction of Project infrastructure at locations that are currently not known but are assumed to be located within the Project Area. Implementation of the Future Activity Allowance could occur during both the temporary construction and long-term operation and maintenance phases. Pipelines and electrical power would be located underground, consistent with the known Project elements. Additional boreholes could be located throughout the Project Area, depending on the overall performance of the remedy, and monitoring well borehole needs in Arizona. This SEIR therefor also includes in the impacts analysis the anticipated effects associated with the Future Activity Allowance. **Table 4.6-1** includes a summary of wells, lengths of piping and roads, and footprints of treatment infrastructure above what was analyzed in the Groundwater FEIR.

TABLE 4.6-1
SUMMARY OF INFRASTRUCTURE

Component	Groundwater FEIR Estimate	Final Remedy Design	Future Activity Allowance	Total	Difference Between FEIR Limit and Total New SEIR Features [b]
Boreholes[a]	170	191	58	249	61
Disturbed Ground (cubic yards)	13,400	45,200	11,300	56,500	43,100
Fluid Conveyance Piping (linear feet, underground)	50,000	127,500 [c]	31,875	159,375	109,375
Electrical/Communications Conduits (linear feet, underground)	50,000	124,000 [c]	31,000	155,000	105,000
Buildings and Structures (square feet)	110,000	42,000	10,500	52,500	(57,500)
Roadway Improvements (linear feet)	6,000	8,150 linear feet (new) and 4,060 linear feet (improvements to existing)	2,038 linear feet (new) and 1,015 linear feet (improvements to existing)	10,188 (new) 5,075 (improvements to existing)	9,263

[a] Each borehole may contain multiple wells; inclusive of both remediation and monitoring wells.
[b] Difference equals Total SEIR Boreholes (249) minus Groundwater FEIR Limit boreholes (170) minus Installed Boreholes (18).
[c] 124,000 linear feet of piping and/or conduits in 43,200 linear feet of trenches.

SOURCE: CH2M Hill 2015a, 2015b.

The construction activities would include ground disturbing activities that could result in the release of pollutants (sediment and/or chemicals) and the use of chemicals (e.g., fuels, lubricants, paints, solvents) that if released could affect water quality. The impacts from chemical use have already been analyzed in Section 4.5, "Hazards and Hazardous Materials," and are not further addressed in this section.

In addition, the Final Remedy Design includes improvements to the TCS Evaporation Ponds. The improvements are described in Section 3.6.1.9 of the Project Description, and would consist of new drip systems and agitators, remote monitoring cameras, new valves, a new natural gas fueled electrical power generator, a truck-loading containment area, and a natural gas pipeline.

This section presents a revised analysis of the impacts to hydrology and water quality related to water quality from the proposed treatment system and associated treatment infrastructure, and drainage patterns or runoff from Project-related infrastructure and activities based on the additional information. The analysis assumes that construction activities would be conducted in compliance with all applicable regulations and work plans, and the impact would be considered less than significant if the proposed activities would not violate any water quality standards or waste discharge requirements, or otherwise degrade water quality. All other construction-related impacts of the proposed Project are unchanged from what is presented in the Groundwater FEIR.

Operation & Maintenance Impact Methodology

Subsequent to publication of the Groundwater FEIR, additional details were developed regarding the operation and maintenance of the Final Groundwater Remedy. Ethanol has been selected as the carbon substrate to reduce Cr(VI) to Cr(III), but other non-toxic/food grade carbon substrates can also be used (e.g. molasses), and the Final Remedy Design (CH2M Hill 2015a) and C/RAWP (CH2M 2015b) provide details on the treatment zones, Remedy-Produced Water Conditioning System, Clean-In-Place System, Contingent Freshwater Pre-Injection Treatment System, waste discharge to the existing regulated ponds, and other associated infrastructure. Although the listed treatment systems would use chemicals that if released could affect water quality, the impacts from chemical use, other than the carbon substrate and Arizona freshwater that may contain elevated arsenic and possibly chromium, have already been analyzed in Section 4.5, “Hazards and Hazardous Materials” of this SEIR, and are not further addressed in this section.

This section presents an analysis of the impacts to hydrology and water quality from (1) the use of ethanol or other carbon substrates to the water quality of the aquifer associated with its injection on Cr(VI) and other COPCs, and the in situ treatment by-products, (2) from the use of freshwater that may contain arsenic above water quality objectives set by the State of California, or Cr(VI) above the 32µg/L water quality objective, or other constituents above water quality objectives and (3) the potential discharge of remedy-produced water to the evaporation ponds, all based on the additional information provided in the Final Remedy Design. The analysis assumes that, consistent with the Groundwater FEIR, the operation and maintenance activities would be conducted in compliance with all applicable regulations and work plans and that all other operation and maintenance related-impacts of the proposed Project are unchanged from what is presented in the Groundwater FEIR.

As described in the setting above, overall groundwater flow directions are toward the Colorado River with the exception of the local groundwater capture area around the extraction wells that pump groundwater to the IM-3 Facility. As discussed in the Final Remedy Design, upon completion of the Phase 1 installation activities, the IM-3 Facility would be turned off and its extraction wells would no longer cause a localized groundwater capture zone. The groundwater flow patterns would be replaced with the groundwater flow patterns caused by the proposed groundwater treatment zone. Groundwater would be captured by extraction wells along the river, amended with a carbon substrate, and reinjected in upgradient wells to create a treatment zone. The net effect would still prevent groundwater with Cr(VI) from flowing into the Colorado River.

Subsequent to publication of the Groundwater FEIR, additional details were developed regarding the management of the remedy-produced water during operation of the Project. These are described in detail in the Final Remedy Design, Section 3.4, "Remedy-Produced Water Management," and summarized in this SEIR, Section 3.6.1.5, "Remedy-Produced Water Conditioning System." The Final Remedy Design includes the following methods of managing remedy-produced water during long-term operation and maintenance (as well as potentially during construction), in order of PG&E's preference: (1) reuse by blending with carbon-amended water and injection into the NTH IRZ injection wells, (2) reuse by blending with fresh water and use in the existing Station cooling towers, (3) discharge to TCS Evaporation Ponds, and (4) trucking off-site.

Although the first preference is to reuse as much if not all of the water by injecting the water back into the aquifer or though blending in the existing Station cooling towers, the Final Remedy Design includes discharge of remedy-produced water to the existing TSC Evaporation Ponds as the third option. The evaporation ponds would be used if the injection wells and cooling towers are unable to accept the volume or quality of remedy-produced water. Section 3.4 of the Final Remedy Design describes the pre-treatment of the remedy-produced water at the Remedy-Produced Treatment System to be located within the Station fence line. Section 3.6.1.9 of this SEIR describes the improvements that would be made to the existing evaporation ponds in order to support the new source of water. This would include installing new drip systems and agitators to increase the evaporation rate, cameras to enable remote monitoring, new valves, a utility building to house the new natural gas fueled reciprocating internal combustion engine electrical power generator, containment area for truck loading, and piping for natural gas to power equipment. Water quality impacts associated with this new potential source of water entering the existing evaporation ponds is analyzed within this section.

The Final Remedy Design includes contingencies to implement in the event that elements of the Design do not perform as expected. The Project Description of this SEIR (see Chapter 3) summarizes contingencies that would be implemented if the following were to occur:

- Section 3.6.3.1 - Treatment does not effectively remove Cr(VI), results in excessive generation of byproducts (e.g., manganese), does not control the plume, or there are well or pipeline failures.
- Section 3.6.3.3 - The remedy-produced water treatment system does not perform as expected.
- Section 3.6.3.4 - The TCS evaporation ponds have insufficient capacities or evaporation rates.
- Section 3.6.3.5 - Well maintenance does not adequately maintain well performance.

As described in Section 3.6 of the Project Description, the Final Groundwater Remedy Project includes a Future Activity Allowance for all Project infrastructure, which could occur during the construction or operation and maintenance phase. In terms of location, the Future Activity Allowance could include construction of replacement/additional pipelines and electrical power underground throughout the Project Area, and would primarily be situated in proximity to existing infrastructure. For example, additional boreholes could be located in the floodplain and in the vicinity of existing/planned boreholes, and additional buildings/structures would likely be situated near other existing/planned structures and facilities (at the Station, Transwestern Bench, and Long-Term Remedy Support Area, etc.).

Decommissioning Impact Methodology

Subsequent to publication of the Groundwater FEIR, additional details were developed regarding the decommissioning of the IM-3 Facility. The IM-3 Facility decommissioning details and procedures are provided in Appendix F of the C/RAWP (CH2M Hill 2015b). However, the additional details and procedures do not result in a significant change to hydrology and water quality conditions and therefore do not significantly change the impacts analyzed in the Groundwater FEIR, as discussed in the Modified Initial Study (Appendix IS). Therefore, the decommissioning of the IM-3 Facility is not further addressed.

Subsequent to publication of the Groundwater FEIR, additional details were developed regarding the decommissioning of the Final Groundwater Remedy Project. As noted above, the number of wells, types of chemical use (e.g., treatment chemicals), and quantities of infrastructure (e.g., lengths of piping, electrical conduit, and roadways, building footprints) increased from the amounts estimated in the Groundwater FEIR. The decommissioning activities would include the removal of infrastructure (e.g., wells, buildings, piping, and other associated infrastructure), the movement of soil for restoration activities, and the handling of chemicals (e.g., fuel, unused treatment chemicals) that if improperly handled could adversely impact hydrology (drainage patterns) and water quality (sediment or chemicals). As noted above, the impacts from the release of pollutants (sediment or chemicals) is analyzed in Section 4.5, “Hazards and Hazardous Materials” of this SEIR.

The decommissioning discussion in this section presents a revised analysis of the impacts associated with changes to drainage patterns that would occur during the decommissioning activities for the Final Groundwater Remedy Project. The analysis assumes that the decommissioning activities would be conducted in compliance with all applicable regulations and work plans, and the impact would be considered less than significant if decommissioning activities would not result in adverse impacts to hydrology and water quality. All other decommissioning-related impacts of the proposed Project are unchanged from what is presented in the Groundwater FEIR.

4.6.5.3 Impact Analysis

IMPACT HYDRO-1 **Exceedance of Water Quality Standards, Violation of Waste Discharge Requirements, or Degradation of Water Quality.** The ground disturbing activities associated with constructing the Final Groundwater Remedy Project, use of carbon substrate to be injected into the aquifer or the use of Arizona freshwater, the generation of byproducts above water quality objectives, the discharge of remedy-produced water to the TCS Evaporation Ponds, and runoff associated with the soils stockpiling could result in the exceedance of water quality standards, violation of waste discharge requirements, or substantial degradation of water quality. This would be a **potentially significant** impact, as previously identified in the Groundwater FEIR.

Water quality issues related to the release of pollutants (sediment or chemicals) during construction and decommissioning activities are addressed in Section 4.5, “Hazards and

Hazardous Materials" of this SEIR. The use of chemicals during operation and maintenance activities are analyzed below.

Ground-Disturbing Activities

The Final Remedy Design includes the construction of wells, pipelines, roadways, buildings, and storage tanks, as described in Chapter 3, "Project Description" of this SEIR. Because the overall footprint of construction activities would exceed 1 acre, the ground-disturbing activities would be required to comply with the NPDES General Permit for Discharges of Storm Water Runoff Associated with Construction and Land Disturbance Activities (Order 2009-0009-DWQ, NPDES No. CAS000002; as amended by Orders 2010-0014-DWQ and 2012-006-DWQ) (Construction General Permit), described in the Regulatory Background. The State of Arizona has similar requirements. These state requirements were developed to ensure that stormwater is managed and erosion is controlled on construction sites. The California and Arizona General Construction Permits require preparation and implementation of a SWPPP, which requires applications of BMPs to control run-on and runoff from construction work sites. The BMPs would include, but would not be limited to, physical barriers to prevent erosion and sedimentation, construction of sedimentation basins, limitations on work periods during storm events, use of bioinfiltration swales, protection of stockpiled materials, and a variety of other measures that would substantially reduce or prevent erosion from occurring during construction. Because Project construction activities would be subject to the requirements noted above, impacts associated with substantial increases in soil erosion during construction would be less than significant for all project components.

Subsequent to the Groundwater FEIR and in compliance with Groundwater FEIR Mitigation Measures HYDRO-1[4] PG&E prepared the Best Management Practices Plan for Groundwater Remedy Construction activities (BMP Plan) and the Operation and Maintenance Storm Water Pollution Prevention Plan for operation and maintenance activities (O&M SWPPP) (Final Remedy Design, Appendix L, Volume 1, Appendix D; CH2M Hill 2015a). These plans would comply with the California and Arizona General Construction Permits and are included as modifications to Groundwater FEIR Mitigation Measure HYDRO 1: **Mitigation Measure HYDRO-1a/2a/3a** and **Mitigation Measure HYDRO-1b/2b/3b**.

Use of Ethanol or Other Carbon Substrate

At the time of the Groundwater FEIR, the specific carbon substrate proposed to treat the Cr(VI) had not been selected. The Final Remedy Design identifies ethanol as the preferred carbon substrate (CH2M Hill 2015a), but with possibility to change to other non-toxic, food grade carbon substrates based on the response of the plume to treatment. As described in Chapter 3, Project Description of this SEIR, the Final Remedy Design provided further details on the treatment method for Cr(VI) in groundwater in the Project Area, including the impacts of the addition of the carbon substrate, the effects on Cr(VI) and other CPOCs, and the generation of in situ treatment byproducts.

[4] Note that the Groundwater FEIR Mitigation Measures HYDRO-2 and HYDRO-3 were simply to implement Groundwater FEIR Mitigation Measure HYDRO-1.

Addition of Ethanol and Effects on Cr(VI)

Ethanol (C_2H_6O) is a form of organic carbon, also commonly called ethyl alcohol, drinking alcohol, or simply alcohol, and is the principal type of alcohol found in alcoholic beverages. Ethanol is a volatile, flammable, colorless liquid with a slight chemical odor. It is used as an antiseptic, a solvent, a fuel, and, due to its low freezing point, the active fluid in post-mercury thermometers. The molecule is a relatively simple one that biodegrades relatively easily.

As described in the Final Remedy Design, the injection of ethanol into groundwater stimulates the microbial uptake of oxygen to create an anaerobic (oxygen-deficient) zone. This condition would reduce soluble Cr(VI) to Cr(III), while the microbes consume excess organic carbon, such as the ethanol. In addition, Cr(VI) is readily reduced in the presence of ferrous iron and sulfide, chemicals also produced by reducing conditions. Most of the low-solubility Cr(III) would then precipitate out of groundwater. The Final Remedy Design has estimated the appropriate amount of ethanol needed to change the volume of Cr(VI) in the plume to the less mobile and toxic Cr(III) variant. The ethanol would be consumed by microbial activity, breaking it down to carbon dioxide, methane, and biomass, with no substantial amount of ethanol remaining in groundwater after the process. The monitoring program described in the Operation and Maintenance Manual (Final Remedy Design Appendix L) would sample and analyze groundwater samples throughout the plume and treatment zones to ensure that the appropriate amount of ethanol is added. The monitoring program would indicate the effectiveness of the treatment process. In the event that the treatment is not as effective in removing Cr(VI) or performing as designed, the results of the monitoring program would trigger implementing one or more of the contingencies discussed later in this section.

In addition, the monitoring program noted above would assess the performance of the groundwater remedy in containing the contaminant plume and preventing the migration of Cr(VI), COPCs, or treatment byproducts beyond the extraction wells. The monitoring program includes wells located upgradient, within, and downgradient of the treatment zones, including across the Colorado River in Arizona. With the injection of freshwater upgradient of the contaminant plumes, along with the injection of treated water in the recirculation loops, the volume of water being injected into the aquifer exceeds the volume of water being extracted, which results in an increased head pressure driving water through the treatment zones. Existing and proposed monitoring wells in Arizona along the eastern shore of the Colorado River would monitor water quality in the area across the river to indicate if Cr(VI) have migrated beneath and across the river to Arizona. This condition would prompt one or more of the contingencies discussed below.

As summarized in Chapter 3, “Project Description” of this SEIR, the Final Remedy Design includes contingencies in the event that the groundwater remedy does not remove Cr(VI) as expected or the extraction system is not effective at preventing Cr(VI) from migrating toward the Colorado River (CH2M Hill 2015a; Appendix L, Operation and Maintenance Manual; Volume 3, Contingency Plan). Potential causes and the contingencies to address the causes are summarized below.

- Insufficient volume of carbon substrate: Operational adjustments could include increasing the flow rate of the carbon substrate or changing to a different carbon substrate.

- Inadequate well spacing or Cr(VI) plume is larger than expected: Operational adjustments could include installing provisional wells in areas where treatment is underperforming.
- Recalcitrant (resistant to treatment) contaminant mass in immobile pore spaces: Operational adjustments could include installing additional wells in areas where treatment is underperforming or changing to a different carbon substrate.
- Unexpected hydrogeologic conditions (e.g., preferential flow paths allowing groundwater to flow through treatment zone without treatment): Operational adjustments could include installing provisional wells in areas where groundwater flow is missing the treatment zone
- Limitations to injection and/or extraction: Operational adjustments could include installing provisional wells in areas where limitations are observed or redirecting water from the TCS Recirculation Loop to the NTH IRZ.
- Inadequate extraction: Operational adjustments could include adjusting pumping rates of wells or installing provisional wells in areas where extraction is underperforming.
- Excessive extraction: Excessive extraction could cause toxic water from the river to be pulled into the floodplain reducing the naturally occurring reducing area near the river. This natural reducing zone would be used to treat residual levels of Cr(VI) after active remediation ends. Operational adjustments could include adjusting pumping rates of extraction wells along the riverbank to reduce excessive extraction.
- Insufficient treatment at the TCS Recirculation Loop: The remedy design at the TCS Recirculation Loop may be ineffective at driving the plume through the treatment zone. Operational adjustments could include injecting freshwater at the upgradient edge of the plume of the TCS Recirculation Loop. This would also require the installation of arsenic monitoring wells.

The above-listed contingencies would be implemented as needed and would further ensure that groundwater remedy removes Cr(VI) from groundwater and does not allow Cr(VI) to reach the Colorado River at concentrations above action levels. Therefore, the impact of the addition of carbon substrate to groundwater would be less than significant and no mitigation measures would be required.

Effects on Other COPCs

The Groundwater FEIR and the Final Remedy Design noted that molybdenum, nitrate, and selenium are considered COPCs whose concentrations in groundwater may have been increased by the historical activities of the Station. As discussed in the Final Remedy Design, these three COPCs are not expected to have any significant effect on the treatment system performance. All three of these COPCs are located in smaller localized areas within the Cr(VI) plume and the treatment system would be operated such that elevated concentrations of these COPCs would not be expected to extend beyond the Cr(VI) plume. In addition, nitrate would be reduced to ammonia or nitrogen gas. The Sampling and Monitoring Plan described in the Operation and Maintenance Manual (Final Remedy Design Appendix L) would sample and analyze groundwater samples at the downgradient portion of the treatment zones to ensure that the appropriate amount of carbon substrate is added and that COPCs are not being detected at elevated concentrations downgradient of the treatment zones.

In addition, as summarized in the Project Description of this SEIR, the Final Remedy Design developed contingencies in the event that the groundwater remedy results in undesirable increases in the concentrations of other COPCs that may extend beyond the Cr(VI) plume (CH2M Hill 2015a; Appendix L, Operation and Maintenance Manual; Volume 3, Contingency Plan). Potential causes and the contingencies to address those causes are discussed above. The above-listed contingencies would be implemented as needed and would further ensure that elevated concentrations of the other COPCs in groundwater would not extend beyond the Cr(VI) plume or the California shoreline. Therefore, the impact of the other COPCs in groundwater would be less than significant and no mitigation measures would be required.

In Situ Treatment By-Products

As discussed in Section 4.6.3.1 of this SEIR, the Groundwater FEIR noted that in addition to reducing the soluble Cr(VI) to Cr(III), the reducing conditions within the treatment zones would also result in the creation or mobilization of in situ treatment byproducts, which could include soluble forms of arsenic, manganese, iron, and barium as byproducts of the reduction process. As described in the Final Remedy Design, some of these byproducts would migrate downgradient of the IRZ to the River Bank extraction wells where they would be intercepted, extracted, and re-injected into the aquifer in the upgradient IRL wells. This process loop would be used to contain the byproducts within the contaminant plume. Upon completion of treatment activities, the carbon substrate would no longer be injected into the aquifer, groundwater conditions would return to a more oxidized state, and the byproducts would no longer be produced.

The Sampling and Monitoring Plan described in the Operation and Maintenance Manual (Final Remedy Design Appendix L) would collect and analyze groundwater samples within and downgradient of the treatment zones to monitor for byproducts. As summarized in the Project Description of this SEIR, the Final Remedy Design developed contingencies in the event that the groundwater remedy results in byproducts above baseline concentrations that extend beyond the Cr(VI) plume (CH2M Hill 2015a; Appendix L, Operation and Maintenance Manual; Volume 3, Contingency Plan). Potential causes and the contingencies to address those causes are discussed above. The above-listed contingencies would be implemented as needed to prevent the migration of elevated concentrations of byproducts in groundwater beyond the Cr(VI) plume or the California shoreline.

For arsenic, iron, and barium, the impact of byproducts in groundwater, the Project would not result in any new significant impacts or substantially more severe impacts on water quality than previously identified in the Groundwater FEIR and no mitigation measures would be required. Additional considerations regarding manganese are discussed below.

PG&E has a similar Cr(VI) site to the northwest at Hinkley, California. The Hinkley site is undergoing treatment for Cr(VI) and generates similar byproducts. PG&E's experience has revealed that the concentrations of the treatment byproduct manganese can increase to above water quality standards, prompting additional measures beyond the contingency measures described above. Based on PG&E's experience at their Hinkley site, the Final Remedy Design discusses available methods for the treatment of manganese and iron (Appendix J of the Final Remedy Design). PG&E's proposed method to address manganese would be the use of adsorptive or greensand filtration, as described in Section 3.6.3.1 of this SEIR. The 2,500 square-foot-concrete foundation with a building or partially sided roof (sunshade) could be located at the TW Bench or MW-20 Bench (after the IM-3 Facility is decommissioned/removed), but not at the Station, the Remedy Produced Water Conditioning Plant, or the Contingent Freshwater Pre-injection Treatment System.

Because of the similar conditions, the treatment of manganese with a purpose-built treatment system may be necessary if the concentrations of manganese exceed the basin water quality objective of 0.05 mg/L. To address the conditions under which a manganese treatment system might be required by DTSC, **Mitigation Measure HYDRO-4**, would require the construction and operation of the manganese treatment system as a contingency.

Undesirable Chemicals in Freshwater Source

The sources of freshwater for use in the remedial system were further investigated after certification of the Groundwater FEIR. As discussed in Section 4.6.3.3, Freshwater Supply, the source of the freshwater would be from one or more existing wells (Wells HNWR-1A, HNWR-1, Topock-2/-3, and Site B; see Figure 3-5), located across the Colorado River in Arizona. Arsenic concentrations in groundwater samples from wells within the HNWR vary but have been detected as high as 16 µg/L (CH2M Hill 2014). The Colorado River Basin Plan uses the California MCL of 10 µg/L as the water quality objective for groundwater in the basin in California. Arsenic concentrations in California in the area of planned injection of Arizona water are around 4 to 5 µg/L. PG&E installed Monitoring Wells MW-54, MW-55, and MW-56 in the HNWR area to provide for additional monitoring of water quality east of the plume, which is near some water supply wells (e.g. Sanders well). The known concentrations of arsenic in the injected freshwater from Arizona are anticipated to exceed the water quality objectives of the Basin Plan. This would be a potentially significant impact.

Based on PG&E's request, the SWRCB provided direction in a letter to DTSC dated November 20, 2013 (SRWCB 2013). The SWRCB provided agreement for injection of imported water from Arizona with conditions if monitoring for arsenic within the zone of imported water injection shows that the arsenic is above the water quality objective of 10 µg/L and extends more than 150 feet from any injection well location. The SWRCB letter clarifies that if these conditions occur, then PG&E must immediately re-assess its modeling calculations and identify interim actions, including the construction and activation of the contingent arsenic pretreatment system to limit the migration of. The SWRCB further states that if the water quality objective is exceeded at 225 feet from any point of injection, PG&E shall immediately cease the injection of untreated water from HNWR-1A (or other contingency wells if used) and that the DTSC would either require pre-treatment to remove arsenic prior to injection or require another source of freshwater in order to meet the water quality objective.

Subsequent to the SWRCB letter, DTSC provided direction to PG&E in its comments on the 60% Final Remedy Design documents, as Comment DTSC-2 (Final Remedy Design, Appendix I, Comments on the 60% Design, CH2M Hill 2015a), which required that the Final Remedy Design clarify that "arsenic treatment will be fully developed, regardless, in the 90% and final designs. If arsenic treatment is not required by the State Board now, it should be ready as a contingency should arsenic levels rise over the course of the remedy."

To enable the Final Groundwater Remedy Project to treat freshwater that has arsenic above the water quality objective, PG&E has provided the design of the Contingent Freshwater Pre-Injection Treatment System. Details of the treatment system are provided in the following Final Remedy Design documents:

- The Contingent Freshwater Pre-Injection Treatment System plans and specifications provided in Final Remedy Design Appendices D and E, which describe the storage and containment structures, including secondary containment that would minimize the potential for spills and contain those spills that do occur.
- Procedures in the Operation and Maintenance Manual (Appendix L to the Final Remedy Design) to monitor and sample water from wells and analyze samples for chemicals, including arsenic.
- Appendix L in the Operation and Maintenance Manual, which includes the Contingency Plan (Volume 3, Appendix B), describes the treatment process and system components. Appendix I provided and discussed the SWRCB and DTSC decision criteria for the conditions under which the treatment system would be used.

Relevant plans and procedures regarding construction of the treatment system and managing hazardous materials generated by the treatment system are provided in the C/RAWP (CH2M Hill 2015b):

- The Standard Operating Procedures (Appendix B) provide numerous detailed standard operating procedures, including procedures for the handling, sampling, and disposal of soil and water; decontamination of personnel and equipment; the operation of systems that use hazardous materials; and spill prevention, containment, and control measures.
- The Construction Health and Safety Plan (Appendix D) describes procedures and training requirements to assess, monitor, control, and reduce hazards to workers, visitors, and the public. This plan includes emergency response procedures in the event that a hazardous materials incident occurs. The Construction Health and Safety Plan meets the standards set by the United States OSHA (29 CFR 1910 and 1926), and Cal/OSHA), and Hazardous Waste Operations and Emergency Response (HAZWOPER) regulations found at Title 8 of the California Code of Regulations Section 5192 (8 CCR 5192).
- The Best Management Practices Plan (Appendix M) describes measures to control and manage erosion, sediment, waste, and non-stormwater, and other good housekeeping practices.
- The Waste Management Plan (Appendix R) provides detailed procedures to manage wastes generated during construction, operations, and decommissioning including the spent filter media that would contain the removed arsenic.

As discussed earlier in this section, in addition to arsenic, the concentrations of Cr(VI) in the Site B well have ranged from below reporting limits to as high as 16 µg/L. If the concentration of Cr(VI) in any of the freshwater supply wells is at or above the water quality objective of 32 µg/L, then the freshwater may need to be pre-treated to reduce the concentration of Cr(VI) to below the water quality objective.

To address the conditions under which the use of the pre-treatment system might be required by DTSC, **Mitigation Measure HYDRO-5**, requires the monitoring of arsenic concentrations (or any other constituents exceeding water quality criteria) in the freshwater and the treatment of the freshwater if the arsenic concentrations exceed the SWRCB conditions or the other constituent concentrations exceed the existing water quality objective concentrations, unless DTSC agrees that PG&E can select an alternative well (or blend from different wells) to meet the fresh water quality objectives.

Discharge of Remedy-Produced Water to the TCS Evaporation Ponds

As described in the Final Remedy Design and summarized above in the Approach to Analysis, although most if not all of the remedy-produced water would be injected back into the aquifer or reused in the existing Station cooling towers, the Project would discharge some remedy-produced water to the TCS Evaporation Ponds during construction, long-term operation and maintenance, and remedy decommissioning. The remedy-produced water treatment system would be constructed and used to treat the water prior to injection back into the aquifer, used in the cooling towers, or discharged to the evaporation ponds. As discussed in Section 4.6.4, “Regulatory Background,” the current WDRs for the evaporation ponds do not include the discharge of the remedy-produced water to the ponds and would require a revision of the WDR and acceptance by the RWQCB. The RWQCB would review the pond improvements (physical and chemical changes), and approve the revised WDR if consistent with the RWQCB standards for WDRs. The RWQCB would use the Revised Report of Waste Discharge (PG&E 2016) and this SEIR in support of their review and revision of the WDR. Compliance with the WDR requirements would ensure that the Project would not result in any new significant impacts or substantially more severe impacts on water quality than previously identified in the Groundwater FEIR and no mitigation measures would be required.

Runoff from Soil Stockpile at Soil Processing Area

As described in the Final Remedy Design, the Soil Processing Area at the Construction Headquarters would be used to store and process soil generated from the construction of the remedy. The area would consist of 2.68 acres that would process up to 11,000 cubic yards (CY) of clean soil, and 4,000 CY for soil above screening levels (but below hazardous waste levels), and up to 11,300 cubic yards resulting from the Future Activity Allowance. If stormwater falls upon exposed stockpiled soils, the runoff water could wash out sediment or chemicals that could enter and pollute waterways.

As described in the Operations and Maintenance Manual (CH2M Hill 2015a, Appendix L, Volume 4, Soil Management Plan), the Soil Processing Area would be lined with minimum 20-mil polyethylene sheeting or equivalent. The stockpiles would be surrounded with berms constructed of hay bales or straw wattle under the liner. During the rainy season and rain events, stockpiles would be covered with a minimum 6-mil polyethylene sheeting or equivalent and anchored down with gravel bags and/or sand bags. The cover would extend over the outer edges of the perimeter berm and liner so that rainfall is prevented from entering the stockpile. In the event that non-RCRA hazardous soil is stockpiled, minimum 20-mil polyethylene sheeting or equivalent will be used for liners if the stockpile is on a foundation, or minimum 60-mil polyethylene sheeting or equivalent will be used if the stockpile is not on a foundation.

In conformance with the substantive requirements of the Arizona General Permit (Order No. AZG2013-001) and California General Permit (Order No. 2009-0009-DWQ), described above in the Regulatory Background, visual inspections be implemented to assess the effectiveness of BMPs related to soil storage, and to modify those BMPs, if necessary, to continue to reduce pollutants and impacts on receiving waters. Anticipated activities associated with the inspections include the following:

- Record the time, date and rain gauge reading of all qualifying rain events.
- Visually inspect BMPs and stormwater discharges at discharge locations within two business days (48 hours) after each qualifying rain event (producing precipitation of one-half inch or more of discharge). The inspections would identify whether BMPs were adequately designed, implemented, and effective, and identify additional BMPs accordingly.
- Visually inspect the discharge of stored or contained stormwater that is derived from and discharged subsequent to a qualifying rain event producing precipitation of one-half inch or more at the time of discharge. Stored or contained stormwater that would likely discharge after operating hours due to anticipated precipitation will be observed prior to the discharge during operating hours.

Construction and operation of the soil stockpiles as described in the Soil Management Plan and compliance with the substantive requirements of the California and Arizona General Permits would ensure that the Project would not result in significant impacts on water quality from soil stockpiles and no mitigation measures would be required.

Impacts to Water Quality from Use of Freshwater Supply Wells

As discussed in Section 3.6.1.7, Freshwater Flushing, one or more freshwater supply wells would be used to inject freshwater upgradient of the treatment zones to drive the Cr(VI) plume through the treatment zones. The pumping of the freshwater supply wells in Arizona would create a cone of depression around the freshwater supply well(s) and would change the local groundwater flow directions. As previously discussed, the freshwater supply wells may have elevated concentrations of arsenic and possibly Cr(VI). The change in groundwater flow directions could result in adversely affecting the water quality of other nearby non-Project water supply wells by drawing lower quality water into those non-Project water supply wells, which would result in a significant impact if the water quality exceeds water quality standards.

As shown on Figure 4.9-1, there are several known non-Project water supply wells located downgradient and within about one mile of the proposed Project freshwater supply well HNWR-1A. The Topock-2 (active), Topock-3 (active), Marina-1 (fire water supply), Sanders (unknown status), Smith (disconnected), PGE-9N (inactive due to elevated salt content), and

PGE-9S (inactive due to elevated salt content) wells are located about 900 to 3,500 feet southwest and southeast of Well HNWR-1A. In addition, two wells (MTS-1 and MTS-2; unknown status) are located at the Kinder Morgan Mojave Topock Compressor Station, approximately 4,500 feet east of Well HNWR-1A. Well GSRV-2 is located about 8,300 feet north of Well HNWR-1. While the Topock-2 and Topock-3 wells are identified as contingent monitoring wells for the remedy, they currently supply water to the Station and Topock Marina.

The current monitoring program includes sampling the following monitoring wells in the HWNR area: MW-54, MW-55, and MW-56 (Arcadis 2016). To address the potential for the Project to cause non-Project water supply wells to become unusable, **Mitigation Measure HYDRO-6**, described further below, requires that the monitoring of nearby non-Project water supply wells be offered to the well owners and that in the event that the Project causes the water quality of the nearby non-Project water supply wells to exceed water quality standards, PG&E will implement measures to restore the water supply for the non-Project water supply well owner.

Comparison of Impact HYDRO-1 Impacts (Revised) to Groundwater FEIR Impact Analysis

The Groundwater FEIR determined that hydrology and water quality impacts associated with in situ treatment by-products would result in a less than significant impact and no mitigation measures were provided. However, the presence of elevated concentrations of arsenic and possibly hexavalent chromium in the freshwater sources was not known at that time and was not analyzed. In addition, details of various components of the Final Remedy Design were not known at that time and were therefore not available for analysis. The Groundwater FEIR proposed implementation of Mitigation Measure HYDRO-1 but this measure was focused on sediment or chemicals that could be released during construction and decommissioning activities (specifically sediment, asphalt, concrete, or equipment fluids), and the potential for pipelines breaks or leaks that could release extracted water or carbon substrate-amended water that might enter drainages and the Colorado River. The mitigation measure required compliance with applicable local, state, and federal laws, and the preparation and implementation of BMPs consistent with the California and Arizona General Construction Permits. Although the CERCLA exemption provides that the project is exempt from permits, the exemption requires that the project still comply with the substantive requirements of permits. In this case, compliance with the California and Arizona Construction Permits would result in the preparation and implementation of the BMPs that are included in SWPPPs and described above in Sections 4.6.4.2 and 4.6.4.3.

Subsequent to the Groundwater FEIR, PG&E prepared the Final Remedy Design (CH2M Hill 2015a) and C/RAWP (CH2M Hill 2015b). As described in Section 4.6, “Hazardous Materials,” these design and planning documents provide specifications and procedures that incorporated the requirements included in the Groundwater FEIR Mitigation Measure HYDRO-1 With the completion of the Final Remedy Design and the availability of additional Project details, the Project would result in new significant impacts relative to water quality standards and water quality not previously identified in the Groundwater FEIR. The Groundwater FEIR mitigation measures are included below, followed by the additional mitigation measures developed for this SEIR. With implementation of Mitigation Measure HYDRO-1a/2a/3a, Construction Best Management Practices Plan, the impact would be reduced to less than significant.

Mitigation Measures

Groundwater FEIR Mitigation Measure HYDRO-1, Exceedance of Water Quality Standards (Groundwater FEIR Measure with Revisions).

Mitigation Measures HYDRO-1a/2a/3a: Construction Best Management Practices Plan (Groundwater FEIR Measure with Revisions). Subsequent to the Groundwater FEIR and as noted in the Regulatory Background, the Construction General Permits were updated for California (2014) and Arizona (2013). In compliance with the Groundwater FEIR Mitigation Measures HYDRO-1, HYDRO-2, and HYDRO-3, and incorporating the construction general permit updates, PG&E prepared a BMP Plan for construction activities (C/RAWP, Appendix M; CH2M 2015b). The BMP Plan complies with the substantive requirements of the California and Arizona Construction General Permits, as well as all other applicable federal, state, and local permit and regulatory requirements, even if a permit is not required pursuant to CERCLA, for purposes of ensuring the protection of receiving water quality. Details of the BMPs are provided in the BMP Plan and are summarized below. Site workers shall be trained in the implementation of these BMPs.

<u>Erosion Control BMPs</u>: The following measures shall be used to reduce erosion and control sediment:

- <u>Preservation of Existing Vegetation</u> – Existing vegetation will be preserved to the maximum extent practicable to facilitate protection of surfaces from erosion and help control sediments. To the extent practical, remedy facilities have been located on previously disturbed areas. In the event that existing vegetation needs to be disturbed, areas that need to be preserved will be identified by a qualified biologist and marked with temporary fencing. Site workers will be informed of the limits of disturbance within the construction site and will be instructed to keep clear of delineated areas.
- <u>Geotextiles and Mats</u> – Natural (e.g., excelsior, straw, coconut) or synthetic (usually polyethylene) materials will be used to reduce soil erosion by wind or water.
- <u>Road Preparation and Maintenance</u> – During road preparation activities, loose sediment will be uniformly compacted, consistent with the substantive San Bernardino County Building and Land Use Services Department requirements, to aid in reducing wind erosion. Ongoing road maintenance will include: (1) visual inspections to identify areas of erosion, (2) localized road repair and regrading, installation, and maintenance of erosion control features such as berms, silt fences, or straw wattles, (3) grading for road smoothness, and (4) measures to reduce water erosion, such as clearing ditches and culverts of debris.

<u>Sediment Control BMPs</u> –The following materials would be used to retain sediment in place where soil is being disturbed by construction processes, to intercept runoff and reduce flow velocity, and to allow sediment to settle from runoff before water leaves the construction site.

- <u>Silt Fences</u> – Silt fences are typically used in combination with sediment basins and sediment traps as erosion control measures.
- <u>Fiber Rolls/Sediment Wattles</u> – These consist of aspen wood excelsior, straw, flax, or other similar materials rolled and bound into tight tubular rolls and placed on the face of slopes at regular intervals, depending on steepness of slopes. Fiber rolls/sediment wattles will be inspected prior to a forecasted rain event and after rain events to ensure the fiber rolls are working properly.

Sediment accumulated by the fiber rolls will be removed to maintain the effectiveness of the fiber rolls.

- Gravel Bag Berms – Gravel bag berms can be used as an alternative to fiber rolls and sediment wattles. If used, they will be installed prior to rain events to form a barrier to intercept runoff or reduce its velocity. Gravel bags will also be used, if necessary, during trenching activities when stockpiles are on-site. In the event that gravel bag berms are used as perimeter erosion control, bags will be stacked, one on top of the other (two high). When used to anchor stockpiles, the bags will be placed one high.
- Sandbag Berms – Sandbag berms can also be used as an alternative to fiber rolls and sediment wattles. If used, they will be installed prior to rain events to form a barrier to intercept runoff or reduce its velocity. Sandbags will also be used, if necessary, during trenching activities when stockpiles are left overnight. In the event that sandbag berms are needed, they will be placed around the staging area and trenching area.
- Straw-Bale Barriers – Straw-bale barriers can also be used as an alternative to fiber rolls, gravel bag berms, and sandbag berms.

Material Delivery and Storage – Proper management practices for delivery and storage of materials will be implemented to ensure minimal discharge or elimination of discharge of these materials to the storm drain systems or waterways. Construction materials and equipment will be parked and stored in the staging area. Materials subject to erosion from rain events within the storage area will be covered during nonworking days and prior to and during rain events. Storage and transfer of toxic or hazardous materials (e.g., ethanol, acids for well cleaning) will be on impervious surfaces appropriate to the stored materials.

Material Use – Proper use of materials will be implemented to ensure minimal or complete elimination of discharge to the storm drain systems or waterways. Spill cleanup materials will be kept near the construction and staging areas. Leaks and spills will be cleaned up immediately using proper absorbent materials, which will then be disposed of as hazardous waste, unless determined to be non-hazardous waste.

Stockpile Management – Stockpile management was discussed above in “Runoff from Soil Stockpile at Soil Processing Area.”

Spill Prevention and Control – Spill prevention and control procedures and practices will be implemented in conjunction with the Waste Management Plan to prevent and control spills anytime chemicals and/or hazardous materials are stored on the construction site. Leaks and spills will be immediately cleaned up to the extent possible using absorbent materials, which will then be disposed of properly. Leaks and spills shall not be covered and/or buried or washed with water. Kits with appropriate spill response equipment will be kept near the construction and staging areas. The materials used for cleaning will not be allowed to enter storm drains or watercourses and will be collected and disposed of in accordance with BMPs. In particular, absorbents used to clean up spills of hazardous materials or waste must be managed as hazardous waste unless characterized as non-hazardous.

Solid Waste Management – Solid waste management procedures and practices will be implemented at the beginning and throughout the Project. Solid waste, consisting primarily of asphalt concrete waste, shall be loaded directly onto trucks for off-site disposal. Loose debris will be picked up daily. Trash and scrap receptacles shall be placed at convenient locations to promote proper disposal of solid wastes. Receptacles shall be provided with lids or covers to prevent windblown litter. Hazardous wastes shall be accumulated at appropriate collection locations following appropriate labeling and management requirements pursuant to Title 22, California Code of Regulations.

Concrete Waste Management – Concrete waste management procedures will be implemented where concrete is used as a construction material or where concrete dust and debris result from demolition activities. The concrete waste containers will be placed a minimum 50 feet from any drainage ways. Washouts will include secondary containment so that there is no discharge into the underlying soil and onto the surrounding areas. Watertight containers with lids and secondary containment, manufactured for the expressed purpose of containing waste concrete and its liquid residue, may be used. Containers will be emptied or removed from the project site when 75 percent of the full capacity has been reached.

Sanitary/Septic Waste Management – Sanitary/septic waste management procedures and practices are implemented at construction sites when a temporary or portable sanitary/septic waste system exists. Sanitary facilities will be located away from Staging Areas 6 and 7 (due to proximity to culturally sensitive areas), drainage facilities, waterways, and from traffic circulation. In the event of high winds or a risk of high winds, temporary sanitary facilities will be secured with spikes or weighed down to prevent overturning. The sanitation subcontractor will monitor on-site sanitary/septic waste storage and disposal procedures on a weekly basis in accordance with the sanitary/septic waste management BMPs. Wastewater will not be discharged or buried. Waste will be removed and disposed off-site. Regular waste collection should be arranged before facilities overflow. The sanitary facility will be located a minimum of 50 feet away from drainage facilities and away from waterways and traffic circulation.

Liquid Waste Management – Liquid waste management procedures will be employed to prevent the discharge of pollutants from liquid waste to the storm drain systems or watercourses. Liquid waste management will be applied if non-hazardous residuals or wastes are generated by construction activities.

Tracking Control BMPs – A temporary construction entrance is defined as a stabilized point of entrance/exit to a construction site to reduce the tracking of mud and dirt onto private or public paved roads by construction vehicles. A temporary construction entrance will be established at applicable paved intersections and entry points to prevent sediment tracking. The temporary construction entrance will be inspected routinely.

Good Housekeeping BMPs – Good housekeeping measures will be implemented on-site for the duration of the project and include the following:

- Store chemicals in watertight containers (with appropriate secondary containment) in a completely enclosed storage cabinet, trailer, or sealed drums shed to prevent spillage and leakage.
- Minimize exposure of construction materials to precipitation.

- Cover waste disposal containers at the end of every business day and during rain events.
- Prevent discharges from waste disposal containers to the stormwater drainage system or receiving water.
- Prevent oil, grease, or fuel from leaking into the ground, storm drains, or surface waters.
- Immediately clean up leaked material and dispose of properly.
- Establish and maintain effective perimeter controls and stabilize construction entrances and exits to control erosion and sediment discharges from the site.
- Conduct regular stormwater tailgate meetings with the workforce when the project is staffed and work is under way.

Timing:	Before and during Project activities (construction, operation and maintenance, and decommissioning phases).
Responsibility:	PG&E would be responsible for the implementation of these measures. DTSC would be responsible for ensuring compliance.
Significance after Mitigation:	With mitigation, these impacts would be reduced to a **less than significant** level.

Mitigation Measure HYDRO-1b/2b/3b: O&M SWPPP (Groundwater FEIR Measure with Revisions). Subsequent to the Groundwater FEIR and in compliance with the Groundwater FEIR Mitigation Measures HYDRO-1, HYDRO-2, and HYDRO-3, PG&E prepared a SWPPP for operation and maintenance activities (O&M SWPPP; Final Remedy Design, Appendix L, Volume 1, Appendix D; CH2M Hill 2015a) to comply with the substantive requirements of the 2015 California General Industrial Storm Water Permit. The O&M SWPPP requires the BMPs summarized below. Site workers shall be trained in the implementation of these BMPs.

Good Housekeeping, including:

- Observe all outdoor areas associated with industrial activity; including stormwater discharge locations, drainage areas, conveyance systems, waste handling/disposal areas, and perimeter areas impacted by off-facility materials or stormwater run-on to determine housekeeping needs. Clean and dispose of properly any identified debris, waste, spills, tracked materials, or leaked materials
- Minimize or prevent material tracking
- Minimize dust generated from industrial materials or activities
- Ensure that all facility areas impacted by rinse/wash waters are cleaned as soon as possible
- Cover all stored industrial materials that can be readily mobilized by contact with stormwater
- Contain all stored non-solid industrial materials or wastes that can be transported or dispersed by the wind or contact with stormwater
- Prevent disposal of any rinse/wash waters or materials into the stormwater conveyance system

- Minimize stormwater discharges from non-industrial areas (e.g., stormwater flows from employee parking area) that contact industrial areas of the facility
- Minimize authorized non-stormwater discharges from non-industrial areas (e.g., potable water, fire hydrant testing) that contact industrial areas of the facility

Preventive Maintenance, including:

- Identify all equipment and systems used outdoors that may spill or leak pollutants
- Observe the identified equipment and systems to detect leaks, or identify conditions that may result in the development of leaks
- Establish inspection schedule and maintenance schedule of identified equipment and systems
- Establish procedures for prompt maintenance and repair of equipment, and maintenance of systems when conditions exist that may result in the development of spills or leaks

Material Handling and Waste Management, including:

- Prevent or minimize handling of industrial materials or wastes that can be readily mobilized by contact with stormwater during a storm event
- Contain all stored non-solid industrial materials or wastes that can be transported or dispersed by the wind, erosion or contact with stormwater during handling
- Cover industrial waste disposal containers and industrial material storage containers that contain industrial materials when not in use
- Divert run-on and stormwater generated from within the facility away from all stockpiled materials
- Clean all spills of industrial materials and/or wastes that occur during handling
- Observe and clean as appropriate, any outdoor material/ or waste handling equipment or containers that can be contaminated by contact with industrial materials or wastes

Erosion and Sediment Controls, including:

- Implement effective wind erosion controls
- Provide effective stabilization for inactive areas, finished slopes, and other erodible areas prior to a forecasted storm event
- Maintain effective perimeter controls and stabilize all site entrances and exits to sufficiently control discharges of erodible materials from discharging or being tracked off the site
- Divert run-on and stormwater generated from within the facility away from all erodible materials

The Industrial General Permit requires that the site, to the extent feasible, implement and maintain any advanced BMPs necessary to reduce or prevent discharges of pollutants in its stormwater discharge in a manner that reflects best industry practice considering technological availability and economic practicability and achievability. Advanced BMPs may include:

- Exposure Minimization BMPs (such as storm resistant shelters that prevent the contact of stormwater with the industrial materials or areas of industrial activity)
- Storm Water Containment and Discharge Reduction BMPs that divert, infiltrate, reuse, contain, retain, or reduce the volume of stormwater runoff
- Treatment Control BMPs (the implementation of one or more mechanical, chemical, biologic, or any other treatment technology)
- Storm resistant shelters (i.e., buildings) for Operations at the TW Bench, Hazardous Materials storage at the TCS, and Carbon Amendment facilities at the MW-20 Bench
- Storm water drainage at the TW Bench to divert stormwater run on and reduce the volume of stormwater runoff
- Features in access roads to reduce erosion and divert storm water from remedy facilities such as wells and associated control equipment

Timing:	Before and during Project activities (construction, operation and maintenance, and decommissioning phases).
Responsibility:	PG&E would be responsible for the implementation of these measures. DTSC would be responsible for ensuring compliance.
Significance after Mitigation:	With mitigation, these impacts would be reduced to a **less than significant** level.

Mitigation Measure HYDRO-4: Manganese Treatment System (New Measure). Sampling as described in the Final Remedy Design, specifically in the Sampling and Monitoring Plan provided in the Operation and Maintenance Manual (CH2M Hill 2015a, Appendix L), shall be implemented throughout the duration of the groundwater remedy and shall include groundwater monitoring for manganese. If manganese exceeds concentrations as specifically identified in Table 2.2-1 of Appendix L, O&M Volume 2 (e.g., 1 to 2.5 mg/L at California wells downgradient of the IRZ, or above baseline concentrations in Arizona wells), then PG&E shall evaluate and implement operational modifications to control the manganese in accordance with Section 2, O&M Volume 2. If operational modifications are unsuccessful at decreasing manganese concentrations to below the action levels cited on the above-referenced Table 2.2-1 and as determined by DTSC, then the contingency measure of manganese treatment shall be implemented. As described in the Project Description (Section 3.6.3.1) of this SEIR and in Appendix J of the Final Remedy Design, PG&E shall install an adsorptive or greensand filtration treatment system (or equivalent), located at the TW Bench, MW-20 Bench, and/or the Station. A manganese treatment system shall remain operational until the manganese concentrations remain below concentrations identified in Table 2.2-1 and DTSC approves of the cessation of the system.

Timing:	Commence if elevated manganese concentrations remain above anticipated concentrations identified in Table 2.2-1 of the O&M Volume 2, Appendix L after operational modifications prove to be ineffective. Manganese treatment would continue until concentrations decrease to below objectives and with the approval of the DTSC.

Responsibility:	PG&E would be responsible for the implementation of these measures. DTSC would be responsible for ensuring compliance.
Significance after Mitigation:	With mitigation, these impacts would be reduced to a **less than significant** level.

Mitigation Measure HYDRO-5: Contingent Freshwater Pre-Injection Treatment (New Measure). To implement the Final Groundwater Remedy such that PG&E will be able to respond to the triggering conditions described below, PG&E shall implement the following measures.

Mitigation Measure HYDRO-5a: Incorporate Arsenic Monitoring of Freshwater Injection into the Sampling and Monitoring Plan (New Measure). Sampling as described in the Final Remedy Design, specifically in the Sampling and Monitoring Plan provided in the Operation and Maintenance Manual (CH2M Hill 2015a, Appendix L), shall be implemented throughout the duration of the groundwater remedy, even after injection ceases. Wells used to monitor freshwater supply injection shall be sampled and analyzed in accordance with the Project monitoring program for arsenic and other chemicals as described in the Sampling and Monitoring Plan. PG&E shall install and monitor wells designated in the Final Remedy Design for arsenic monitoring located approximately 150 feet and 225 feet from each freshwater injection well to comply with the SWRCB's requirements for freshwater injection with arsenic concentrations above the California MCL. Monitoring shall commence prior to freshwater injection and continue until observed arsenic concentrations return to pre-injection levels pursuant to Mitigation Measure HYDRO-5d. Monitoring wells for the freshwater injection area shall initially be sampled monthly for the first two quarters, then quarterly thereafter, unless the monitoring interval is modified with prior DTSC approval. The results of this monitoring shall determine whether Mitigation Measures HYDRO-5b and 5c are implemented.

Mitigation Measure HYDRO-5b: Assessment and Implementation of Interim Action if the California MCL is Exceeded 150 Feet Radially from Freshwater Injection Point (New Measure). If, as a result of the monitoring required in Mitigation Measure HYDRO-5a, the concentration of arsenic at the leading edge of the arsenic plume is found to exceed the arsenic water quality objective (California MCL) 150 feet radially from the freshwater injection point, PG&E shall immediately reassess their groundwater modeling and identify interim actions to limit the migration of the arsenic plume. PG&E shall submit the assessment and proposed action to DTSC within 60 days (or other timeframe directed by DTSC) of confirmed detections above water quality objectives.

Mitigation Measure HYDRO-5c: Implementation of Alternatives if California MCL is Exceeded for Arsenic 225 feet from any Freshwater Injection Point (New Measure). If the concentration of arsenic at the leading edge of the plume migrates and exceeds the water quality objective (California MCL) at 225 feet radially from the freshwater injection point, PG&E shall promptly notify DTSC and resample within 30 days. If the expedited resample confirms the exceedance, PG&E shall immediately cease fresh water injection. The injection shall not recommence until PG&E either blends the water source to below the California MCL at the point of injection; constructs and re-routes any contingent freshwater supply lines and appurtenances to the Contingent Freshwater Pre-Injection Treatment System to pre-treat the water and remove arsenic before injection; or proposes a new water source that will comply with the California water quality objectives for injection. PG&E shall obtain approval from DTSC prior to implementation of the options identified above. Pre-injection treatment of the freshwater shall continue until further monitoring indicates that pre-treatment is no longer needed and DTSC approves of cessation of pre-treatment.

Mitigation Measure HYDRO-5d – Post-Remedy Arsenic Monitoring (New Measure). The SWRCB provided remedy requirements associated with injection of groundwater containing naturally occurring arsenic in a 2013 position letter (SWRCB 2013). To ensure that water quality objectives are not exceeded in groundwater within freshwater injection areas after completion of the remedy, sampling of the arsenic monitoring wells and possibly other wells (as directed by DTSC) would continue under the Sampling and Monitoring Plan for an estimated 20 years and possibly longer after completion of active treatment to ensure that arsenic concentrations are within and remain at pre-remedy background levels. The sampling would cease after results demonstrate that the concentrations of arsenic remain within water quality objectives and DTSC approves of ceasing the monitoring for arsenic.

Timing:	Commence at construction and continue for life of the Project.
Responsibility:	PG&E would be responsible for the implementation of these measures. DTSC would be responsible for ensuring compliance.
Significance after Mitigation:	With mitigation, these impacts would be reduced to a **less than significant** level.

Mitigation Measure HYDRO-6, Protection of Non-Project Water Supply Wells (New Measure). To minimize any potential impacts to non-Project water supply wells associated with the long-term operation and maintenance of the Final Groundwater Remedy Project, PG&E shall implement the mitigation measure described below.

Mitigation Measure HYDRO-6a: Incorporate Non-Project Water Supply Wells and/or Additional Monitoring Wells into the Monitoring Program (New Measure).

- For water supply wells located within about one mile of HNWR-1A (currently Topock-2, Topock-3, Marina-1, Sanders, Smith, PGE-9N, PGE-9S, MTS-1, MTS-2, and GSRV-2), PG&E shall request well construction information and access to sample, test and assess current well conditions. If access is granted, PG&E shall add the non-Project water supply wells to the monitoring program (Appendix L, O&M Volume 2, Sampling and Monitoring Plan, Section 5.4). If access is denied, PG&E will alert DTSC of such response in a timely manner and provide associated documentation. If the well owner does not otherwise respond within 60 days, PG&E shall initiate a second request. If the well owner still does not respond, PG&E will alert DTSC of such response in a timely manner and provide documentation of both attempts to contact the owner. If new non-Project water supply wells are installed or discovered in the general area in the future, DTSC may direct PG&E to take additional action for access and add them to the wells listed above at any time.

- PG&E shall submit a well installation work plan to DTSC describing installation of a new nested monitoring well located between HNWR-1 and wells Topock-2/Topock-3 since wells Topock-2/Topock-3 are currently the largest producing non-Project supply wells in the area. The work plan shall also propose the installation of any additional monitoring wells that are needed to ensure protection of the water resource in the vicinity of the non-Project water supply wells. PG&E shall submit the well installation work plan to DTSC within four months of DTSC's approval of the remedy design and would be implemented only after DTSC's review and approval. Up to ten well locations from the total borehole count evaluated in this SEIR can be allocated for the monitoring of water quality to protect non-Project water supply wells. Overtime, wells may be added to or removed from the monitoring program (with prior DTSC approval) based on accumulated data or lack thereof.
- Monitoring of wells identified in this mitigation measure shall initially be quarterly for the first two years of operation and include groundwater levels and chemical constituents to establish baseline conditions and assess seasonal variations in the area of the non-Project water supply wells and monitoring wells. Pressure transducers shall be fitted to monitoring wells, Well HNWR-1, Site B, and the above-listed non-Project water supply wells (some which are not currently pumping) to track and evaluate pumping effects over time and to assist with assessments required below in Mitigation Measure HYDRO-6b and 6c. Chemical testing shall include, at a minimum, Title 22 metals, Cr(VI), stable isotopes of hydrogen and oxygen, general minerals, and TDS. After the second year of monitoring, sampling frequencies may be reduced to semi-annually for two additional years and annually thereafter with DTSC approval. The well network, monitoring frequency, pressure transducer monitoring, and chemical constituents may be modified with DTSC approval.

Mitigation Measure HYDRO-6b: Water Supply Mitigation (New Measure).

- If non-pumping groundwater elevations substantially decrease from baseline conditions established under HYDRO-6a in a monitored non-Project water supply well (e.g., below top of well screen, below pump depths, or causes significant decrease in well yield) or a similar groundwater elevation decrease is observed in a water resource protection monitoring well described in HYDRO-6a, PG&E shall inform DTSC as soon as practicable and no longer than two weeks (unless modified with DTSC approval) after receipt of data documenting such an event. Additionally, PG&E will assess well and aquifer conditions to evaluate if the Project has caused a substantial decrease in groundwater elevations/well yield. PG&E shall promptly provide its assessment to DTSC for review. At a minimum, the assessment shall consider the following conditions:
    - Historical well usage
    - Well condition
    - Anticipated drawdown effects
    - Regional groundwater level trends
- If PG&E or DTSC determines that the Project has adversely impacted a non-Project water supply well to the extent that the Project is determined to be the primary cause, or one of the primary contributing causes, of the reduction in well yield or elevation such that the well does

not provide sufficient water, PG&E shall promptly notify the well owner. PG&E shall coordinate with the well owner(s) to arrange for an interim drinking water supply if necessary, and develop a plan (for DTSC approval) which will assist in restoring the water resource by using measures that may include:

- o Lowering the well pump
- o Rehabilitating the well
- o Deepening the existing well
- o Providing short and/or long term replacement of water supply
- o Constructing a new replacement well
- o Modifying remedy operations (e.g., placing a packer in HNWR-1A)

An alternate course of action may be considered, provided it is mutually agreeable to DTSC, PG&E, and the well owner.

Unless an alternative period is approved by DTSC, the plan/alternate course of action should be provided to DTSC for approval within 30 days of determining that the Project adversely impacted a non-Project water supply well.

Mitigation Measure HYDRO-6c: Water Quality Mitigation (New Measure).

- If the groundwater quality of a non-Project water supply well deteriorates by exceeding water quality objectives (e.g., MCLs for drinking water wells) and baseline conditions established pursuant to HYDRO-6a, PG&E will immediately notify DTSC and DOI and take steps to collect confirmation samples from the well within 60 days of original sample collection unless modified with DTSC approval. PG&E shall identify/confirm the specific uses of the well and inform DTSC, DOI, the Arizona Department of Environmental Quality, and the well owner of the deterioration as soon as possible (e.g., within 7 days of receiving confirmation samples results). This shall include PG&E providing both the initial and confirmation sample data to agencies and well owner even if the initial exceedance is not confirmed.
- If PG&E or DTSC determines that the Project has adversely impacted a non-Project water supply well to the extent that the Project is determined to be the primary cause, or one of the primary contributing causes, of the reduction in water quality, PG&E shall immediately notify the well owner. PG&E shall coordinate with the well owner(s) to arrange for an interim drinking water supply if necessary, and develop a plan (for DTSC approval) which will assist in restoring the water resource by using measures which may include:
  - o Deepening the existing well
  - o Providing short and/or long term replacement of water supply
  - o Constructing a new replacement well
  - o Conducting water treatment
  - o Modifying remedy operations (e.g., placing a packer in HNWR-1A)

An alternate course of action may be considered, provided it is mutually agreeable to DTSC, PG&E and the well owner.

The plan/alternate course of action should be provided to DTSC for approval within 30 days, unless modified with DTSC approval, of determining that the Project adversely impacted a non-Project water supply well.

- If the groundwater quality of any monitoring well installed as part of HYDRO-6a deteriorates by exceeding water quality objectives (e.g., MCLs for drinking water wells) and baseline conditions, PG&E shall conduct confirmation sampling and promptly assess aquifer conditions to evaluate if the Project has adversely impacted the well. PG&E shall promptly inform DTSC, DOI, and the Arizona Department of Environmental Quality of any adverse impacts and provide an assessment with any recommendations for review and approval.

Timing:	During the use of the freshwater wells.
Responsibility:	PG&E shall be responsible for the implementation of these measures. DTSC would be responsible for ensuring compliance.
Significance after Mitigation:	With mitigation, these impacts would be reduced to a **less than significant** level.

IMPACT HYDRO-2	**Drainage Pattern Alterations.** The proposed Project would require the construction of wells, piping corridors, buildings, and associated infrastructure that could alter the existing drainage system that could result in a substantial increase of erosion and siltation or flooding on and off the Project Area. This impact would be **potentially significant**, as previously identified in the Groundwater FEIR.

Water quality issues related to the drainage pattern alterations would only occur during ground disturbing activities during construction and decommissioning. During operations and maintenance, drainage issues would have been addressed during the construction phase.

Construction

The Final Groundwater Remedy Project would include the construction of structures, such as wells, buildings, treatment systems, and piping corridors between wells and treatment systems. The Final Groundwater Remedy Project also includes a Future Activity Allowance, which includes up to a 25 Percent Future Activity Allowance on all components included in the Final remedy Design, and up to 10 monitoring wells in Arizona. The construction of the treatment infrastructure would include ground disturbing activities that could alter drainage patterns. The alteration of drainage patterns could result in substantial erosion or siltation or flooding on or off site. The Groundwater FEIR concluded this would be a significant impact and proposed Mitigation Measures HYDRO-1 and HYDRO-2 (which was simply to implement Mitigation Measure HYDRO-1). Groundwater FEIR Mitigation Measure HYDRO-1 would require implementing the substantive criteria of the NPDES Construction General Permit and the BMPs that would be included in the SWPPP.

There are various federal, state, and local regulations, laws, and policies that require controlling runoff from construction sites, as summarized above in Section 4.6.4, "Regulatory Framework." Specifically, the California NPDES Construction General Permit and the Arizona Pollutant Discharge Elimination System Program for Construction and Land Disturbance Activities include requirements to implement a SWPPP with BMPs to control erosion and runoff from construction activities. Although the CERCLA exemption does not require PG&E to apply for the permits under these programs, PG&E is still required by law to comply with the substantive requirements of the programs.

To comply with the regulations, PG&E has developed plans and procedures as part of the Project to incorporate regulatory requirements. The plans and procedures listed below are relevant to hydrology and water quality and are designed to control erosion, siltation, and flooding to less than significant levels. Note that the list of items below is similar to but slightly different from those discussed in impact analysis in Section 4.5, "Hazards and Hazardous Materials."

- Relevant plans and procedures provided in the Final Remedy Design (CH2M Hill 2015a) include the following measures relevant to hydrology and water quality:
  - Design criteria, plans, and specifications are provided in the Final Remedy Design Sections 3.5 and 3.6, and Appendices C, D, and E for all Project components, including designs and specifications for routing surface water flow around Project components such as well heads, buildings, and roads in a manner that would reduce concentrating surface water flows and enable low-energy recharge of surface water into the ground.
  - Appendix L provides the Operation and Maintenance Manual, which includes the Operation and Maintenance Plan and Soil Management Plan. These plans describe the procedures to be used by workers to operate systems, including drainage control and the management of soil stockpiles in a manner that would control runoff.
- Relevant plans and procedures provided in the C/RAWP (CH2M Hill 2015b) include the following measures relevant to hydrology and water quality:
  - C/RAWP Section 3.2 provides construction methods for wells, piping, utilities, buildings and other vertical infrastructure, and access pathways.
  - The Standard Operating Procedures (Appendix B) provide numerous detailed standard operating procedures, including procedures for spill prevention, containment, and control; decontamination of personnel and equipment; and well installation and abandonment operations.
  - The Soil Management Plan (Appendix L) provides detailed procedures for the screening and classifying, handling and storage, transportation, and disposal of soil, including erosion control procedures to construct and manage soil stockpiles to prevent run-on, runoff, and wind erosion. As discussed in the description of Impact HYDRO-1, Appendix L includes the O&M SWPPP that would control runoff and minimize erosion during operations.
  - The Best Management Practices Plan (Appendix M) describes measures to control and manage erosion, sediment, waste, and non-stormwater, and other good housekeeping practices. As discussed in the description of Impact HYDRO-1, Appendix M includes the

BMP Plan for construction activities that would control runoff and minimize erosion during construction activities.

- The Waste Management Plan (Appendix R) provides detailed procedures to manage wastes generated during construction, operations, and decommissioning including wastewater, displaced soil, precipitated solids, sludge, spent solvents and filters, gas cylinders, surplus or partially used chemicals, contaminated concrete and asphalt rubble, decontamination fluids, used oil and oily waste, general construction waste, and sanitary waste.

In addition, subsequent to the publication of the Groundwater FEIR, the Final Remedy Design included changes to piping corridors and roadways to further avoid altering the drainage pattern of Bat Cave Wash. The piping and conduit corridor across the southern portion of Bat Cave Wash just west of the Station and the piping and conduit crossing in the northern portion of the Bat Cave Wash along the former unpaved portion of Route 66 would now be directly buried in the wash, thus avoiding constructing aerial crossings that would have altered the drainage patterns. With the burial of piping and conduit in the crossings, the topographic land surface would remain unchanged.

Implementation of the plans listed above would ensure compliance with substantive requirements of applicable regulations regarding erosion control. Collectively, compliance with existing regulations and implementation of the above-listed plans would reduce the impacts from erosion, siltation, and flooding to a less than significant level.

Decommissioning

The plans listed above include plans, specifications, and procedures to control erosion, siltation, and flooding. In addition, the decommissioning plan for the IM-3 Facility is provided in the Final Remedy Design Section 7.4, and Section 6.2.2 and Appendix F of the C/RAWP.

The decommissioning of the Final Groundwater Remedy Project would not occur for decades in the future and regulations and technology may evolve with time. Consequently, although the Final Remedy Design provides an overview of the decommissioning of the Final Groundwater Remedy Project in the Final Remedy Design Section ES-6, along with various plans and procedures that would be used to decommission the Final Groundwater Remedy Project, it is acknowledged that a Final Groundwater Remedy Decommissioning Plan would have to be prepared decades in the future. To address this, Mitigation Measure HAZ-3**,** Final Groundwater Remedy Decommissioning Plan, described in Section 4.5 “Hazards and Hazardous Materials” of this SEIR, would require the preparation and implementation of this plan.

Comparison of Construction and Decommissioning Impacts (Revised) to Groundwater FEIR HYDRO-2 Impact Analysis

The Groundwater FEIR determined that hydrology and water quality impacts associated with construction and decommissioning activities would result in a potentially significant impact. To mitigate the impacts, the Groundwater FEIR proposed implementation of Mitigation Measures HYDRO-1 and HYDRO-2, that latter of which was simply to implement HYDRO-1. These mitigation measures required compliance with applicable local, state, and federal laws, and the preparation and implementation of BMPs consistent with the California and Arizona General Construction Permits. It should be noted that the actions required by the mitigation measures are required by law. Subsequent to the Groundwater FEIR, PG&E prepared the Final Remedy Design (CH2M Hill 2015a) and C/RAWP (CH2M Hill 2015b). As described above, these design and planning documents provide specifications and procedures that incorporate the items covered by the Groundwater FEIR mitigation measures, as well as all other Project activities. Therefore, the Project would not result in any new significant impacts or substantially more severe impacts relative to hazardous materials than previously identified in the Groundwater SEIR.

HYDRO-3 **Polluted Stormwater Runoff.** The proposed Project does not include discharge to an existing or planned stormwater drainage system. The Project does have the potential to contribute substantial additional sources of polluted runoff if materials and operations are not properly handled. This impact would be **potentially significant**, as previously identified in the Groundwater FEIR.

Water quality issues related to the polluted stormwater runoff are similar for construction, operation and maintenance, and decommissioning activities.

Construction, Operation & Maintenance, & Decommissioning

The Final Groundwater Remedy Project would include the construction of structures, such as wells, buildings, treatment systems, and piping corridors between wells and treatment systems. The Final Groundwater Remedy Project also includes a Future Activity Allowance, which includes up to a 25 Percent Future Activity Allowance on all components included in the Final remedy Design, and up to 10 monitoring wells in Arizona. The construction of the treatment infrastructure would include ground disturbing activities and the use of chemicals that could result in polluted runoff of sediment or chemicals.

The Groundwater FEIR concluded this would be a significant impact and proposed Mitigation Measure HYDRO-3, which was simply to implement Mitigation Measure HYDRO-1. Groundwater FEIR Mitigation Measure HYDRO-1 would require implementing the substantive criteria of the California and Arizona General Construction Permits and the BMPs that would be included in the SWPPP.

There are various federal, state, and local regulations, laws, and policies that require controlling runoff from construction sites, as summarized above in Section 4.6.4, "Regulatory Framework" of this SEIR. Specifically, the California NPDES Construction General Permit and the Arizona Pollutant Discharge Elimination System Program for Construction and Land Disturbance Activities include requirements to implement a SWPPP with BMPs to control runoff from construction activities. Although the CERCLA exemption does not require PG&E to apply for the permits under these programs, PG&E is still required by law to comply with the substantive requirements of the programs.

To comply with the regulations, PG&E has developed plans and procedures as part of the Project to incorporate regulatory requirements. The plans and procedures relevant to hydrology and water quality are included in HYDRO-1 and are designed to control polluted runoff to less than significant levels. In addition, the plans and specifications provided in the Final Remedy Design Appendices C, D, and E provide designs for secondary containment for all structures that contain hazardous materials, such as treatment chemicals. With implementation of Mitigation Measure HYDRO-1, impacts to stormwater runoff would be reduced to a less than significant level.

Comparison of Impacts (Revised) to Groundwater FEIR Impact HYDRO-3 Impact Analysis

The Groundwater FEIR determined that hydrology and water quality impacts associated with construction, operation and maintenance, and decommissioning activities would result in a potentially significant impact. To mitigate the impacts, the Groundwater FEIR proposed implementation of Mitigation Measure HYDRO-3, which was simply to implement Groundwater FEIR Mitigation Measure HYDRO-1. This mitigation measure required compliance with applicable local, state, and federal laws, and the preparation and implementation of BMPs consistent with the California and Arizona General Construction Permits. It should be noted that the actions required by the mitigation measures are required by law. Subsequent to the Groundwater FEIR, PG&E prepared the Final Remedy Design (CH2M Hill 2015a) and C/RAWP (CH2M Hill 2015b). As described above, these design and planning documents provide specifications and procedures that incorporate the items covered by the Groundwater FEIR mitigation measure, as well as all other Project activities. Therefore, the Project would not result in any new significant impacts or substantially more severe impacts relative to hazardous materials than previously identified in the Groundwater SEIR.

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4.7 Noise

4.7.1 Introduction

This section describes the reasonably foreseeable and potentially significant adverse environmental effects of the Pacific Gas and Electric Company (PG&E) Topock Compressor Station Final Groundwater Remediation Project (Final Groundwater Remedy Project, or proposed Project) as identified in the Project Description of this SEIR and related to the noise environment in the Project Area. Specifically, this section considers the potentially significant adverse effects of the proposed Project during the construction, operation and maintenance, and decommissioning phases, as compared to those identified in the Topock Compressor Station Groundwater Remediation Project Final EIR (Groundwater FEIR; DTSC 2011), consistent with Public Resources Code Section 21166 and the California Environmental Quality Act (CEQA) Guidelines Sections 15162 and 15168, including changes in impacts related to the exposure of people to generation of noise and vibration levels in excess of standards, and a substantial temporary or permanent increase in ambient noise levels.

The impact evaluation in the Noise section of the Modified Initial Study (see Appendix IS) explains why the proposed Project would not result in new significant adverse impacts or a substantial increase in the severity of previously identified significant impacts relative on noise impacts, including with respect to excessive noise within 2 miles of a public airport or private airstrip. Therefore, these topics are not addressed further in this section.

4.7.2 Summary of 2011 Groundwater FEIR Noise Analysis

The Noise section of the Groundwater FEIR included a detailed discussion of the environmental setting and potential effects of the proposed remedy related to noise. Although largely programmatic, the Groundwater FEIR provided a detailed analysis of the construction and operation of physical facilities anticipated at that time to be necessary to implement the groundwater remedy. The Groundwater FEIR also included a project-level analysis of the conceptual technical methods selected for the final remedy. This subsequent environmental impact report (SEIR) incorporates the analysis in the Groundwater FEIR by reference and evaluates, on a project-specific level, the potential effects associated with construction and operation of the *Basis of Design Report/Final (100%) Design Submittal for the Final Groundwater Remedy, PG&E Topock Compressor Station, Needles, California* (Final Remedy Design; CH2M Hill 2015a) and the *Construction/Remedial Action Work Plan for the Final Groundwater Remedy* (C/RAWP; CH2M Hill 2015b) that were unknown at the time the analysis was conducted for the Groundwater FEIR. The Final Remedy Design is included in its entirety as Appendix BOD to this SEIR. Information included in the noise analysis of the Groundwater FEIR is summarized in the following pages.

4.7.2.1 Setting Identified in the 2011 Groundwater FEIR

The following discussion summarizes the setting relative to noise described in the Groundwater FEIR (DTSC 2011).

Existing Noise Environment

The Groundwater FEIR stated that the existing noise environment within the Project Area was influenced primarily by transportation noise emanating from vehicular traffic along Interstate 40 (I-40) and train operations on the Burlington Northern Santa Fe (BNSF) Railway, both of which travel through the Project Area. The majority of vehicular traffic noise occurred along I-40 and to a lesser extent along Park Moabi Road and National Trails Highway. Noise associated with the operation of the PG&E Topock Compressor Station (Station) was audible within the vicinity of the Station and the Interim Measure 3 Groundwater Extraction and Treatment Facility (IM-3 Facility); however, because of the existing topography (intervening mesas), noise-sensitive receptors did not have direct exposure to these noise sources. Additional noise sources included occasional aircraft overflights and recreational activities (watercraft operations) at regional parks and on the Colorado River nearby. This general setting description has not changed since certification of the Groundwater FEIR.

Noise and Vibration-Sensitive Land Uses

The Groundwater FEIR provided an overview of various noise-sensitive land uses. It identified the Topock Marina Mobile Home Park as an existing residential area that would be considered noise sensitive. It also identified additional land uses such as parks, historic sites, cemeteries, the Havasu National Wildlife Refuge (HNWR), and other recreation areas as sensitive to increases in exterior noise levels. The Moabi Regional Park was considered a noise-sensitive land use, and San Bernardino County has established transportation noise source standards for park uses. The Groundwater FEIR stated that Moabi Regional Park allows short-term residency for a period of up to 5 months in a given year. The Topock Cultural Area was considered a sensitive land use because of the special values this resource has for Native Americans.

Additional noise-sensitive receptors (rural residences and a mobile home park) were stated to be located across the Colorado River in Arizona and within the Project Area. While these noise-sensitive receptors have generally remained unchanged, the current sensitive land uses analyzed in this report are detailed later in Section 4.7.3.1 of this SEIR.

Ambient Noise Survey

The Groundwater FEIR described the results of an ambient noise survey that was conducted in the Project Area between December 10 and December 11, 2008. Normal daily activities were observed during the ambient noise survey including operation of the Station and IM-3 Facility, as well as maintenance activities at existing wells. The purpose of the noise measurements was to establish a baseline ambient noise level for the existing setting. Two measurement sites were chosen to collect long-term (24-hour) noise level data in 1-hour intervals. Three short-term noise measurement sites were chosen to collect 15-minute ambient noise levels. The results of the ambient noise survey from the Groundwater FEIR are summarized in **Table 4.7-1**. Subsequent to the Groundwater FEIR, several ambient noise collection efforts were made, including most recently in March 2016. The results of the subsequent noise surveys that have been conducted since 2008 are included in Section 4.7.3, of this SEIR.

TABLE 4.7-1
SUMMARY OF MEASURED AMBIENT NOISE SURVEY LEVELS (2008)

Long-Term Noise Measurements									
			Average Measured Hourly Noise Levels, dBA						
				Daytime (7 a.m.–10 p.m.)			Nighttime (10 p.m.–7 a.m.)		
Site	Location	Time	L_{dn}	L_{eq}	L_{50}	L_{max}	L_{eq}	L_{50}	L_{max}
A	Adjacent to I-40	12/10/08–12/11/08	77.3	73.0	68.0	84.7	70.4	60.9	85.4
B	Adjacent to BNSF tracks	12/10/08–12/11/08	74.3	65.7	42.3	86.2	68.2	44.6	88.3

Short-Term Noise Measurements					
			A-Weighted Decibel Sound Level		
Site	Location	Time	L_{eq}	L_{min}	L_{max}
1	South of I-40	1:00–1:15 p.m.	47.2	42.3	54.0
2	North of I-40	1:35–1:50 p.m.	41.4	36.3	60.6
3	Moabi Regional Park	1:35–1:50 p.m.	58.4	43.2	73.8

NOTES:
BNSF = Burlington Northern Santa Fe Railway; dB = A-weighted decibels; L_{dn} = day-night average noise level; L_{eq} = the equivalent hourly average noise level; L_{50} = the noise level exceeded 50% of a specific period of time; L_{max} = maximum noise level; L_{min} = minimum noise level.

SOURCE: DTSC 2011.

Roadway Traffic Noise

In the Groundwater FEIR, the existing traffic noise level for I-40 was calculated for the roadway segment in the Project vicinity using the Federal Highway Administration (FHWA) Federal Highway Traffic Noise Prediction Model, (FHWA-RD-77-108) (FHWA 1978) and traffic data provided in the *2006 Annual Average Daily Truck Traffic on the California State Highway System*. The results showed that noise from I-40 was responsible for sound levels of 70 dB L_{dn} up to 265 feet from the I-40 centerline, 65 dB up to 551 feet from the centerline, and 60 dB up to 1,187 feet from the centerline. For the Park Moabi Road area, the adjacent roadway was responsible for sound levels of 70 dB L_{dn} up to 2 feet from the centerline, 65 dB up to 5 feet from the centerline, and 60 dB up to 11feet from the centerline.

Railroad Operational Noise

In the Groundwater FEIR, to determine the amount of noise emanating from BNSF Railway operations, a 24-hour continuous noise measurement was conducted 105 feet from the railroad centerline on December 10 and 11, 2008. The 24-hour continuous noise measurement results indicated that the average single event noise exposure level (SENEL) associated with operation of an individual train pass by was 99 dB Sound Exposure Level (SEL) at a distance of 105 feet from the railroad centerline. At a distance of 105 feet from the railroad centerline, the noise level attributable to overall train activity during the 24-hour measurement period was 73.1 dB L_{dn}. Applying an attenuation rate of 4.5 dBA per doubling distance, which is standard for linear noise sources, the distances to the 60, 65, and 70 dB L_{dn} noise contours were estimated.

4.7.2.2 Impacts and Mitigation Measures Identified in the Groundwater FEIR

Impacts to noise were addressed in the Groundwater FEIR, Volume II, Section 4.9. Below is a summary of the analysis and associated mitigation measures for noise.

Effect on Long-Term Operational-Related Non-Transportation Noise Impacts

The Groundwater FEIR indicated that the freshwater flushing component would be enclosed in new buildings, which would provide adequate noise shielding, and electric submersible pumps would be installed below grade and encased in a subsurface concrete vault. Additional generators would be small enough to be shielded by on-site structures, natural topography, or permanent noise enclosures to reduce visual and noise effects on receptors. Operation of the facilities and components analyzed in the Groundwater FEIR were found not to cause generation of noise levels that resulted in a noticeable, permanent increase in ambient noise levels at nearby sensitive receptors due to non-transportation noise sources (i.e., water filtration facilities, generators, or wells). Therefore, impacts were found to be less than significant in the Groundwater FEIR and no mitigation measures were required.

Effect on Long-Term Operational-Related Transportation Noise Impacts

The Groundwater FEIR found that long-term operation would result in predicted traffic noise level increases along the affected segment of Park Moabi Road from I-40 to National Old Trails Road that range from 2.2 to 4 dB. The Groundwater FEIR found no substantial permanent increase in ambient noise levels relative to existing sensitive receptors in the Project Area above existing levels or to expose persons to or generate noise levels in excess of applicable standards. Therefore, impacts were found to be less than significant in the Groundwater FEIR and no mitigation measures were required.

Effect on Groundborne Vibration and Noise Impacts Caused by Construction Activities

The Groundwater FEIR found that vibration standards would be exceeded if construction activities occurred within 30 feet and 275 feet of a vibration-sensitive land use when conducted within California and Arizona, respectively. If construction were to occur within these distances of a vibration-sensitive land use, damage to property was expected to occur. For annoyance and/or sleep disruption related to vibration-sensitive receptors, it was anticipated that vibration standards would be exceeded when these activities occurred within 45 feet. If construction were to occur within this distance (i.e., 30 feet within California and 275 feet within Arizona) of a vibration-sensitive receptor, annoyance and/or sleep disruption could occur. The Groundwater FEIR concluded that construction-related vibration levels had the potential to, depending on the location of new wells, exceed the San Bernardino County Development Code in California

(Section 83.01.090) and/or the Mohave County Zoning Ordinance in Arizona. As a result, this impact was found to be potentially significant.

The Groundwater FEIR included Mitigation Measure NOISE–1, which required that construction of new wells be located at a minimum of 45 feet from vibration-sensitive receptors. It also required avoiding the constructing of wells within 30 feet of vibration-sensitive land uses located in California and 275 feet of vibration-sensitive land uses located in Arizona. In addition, it required designation of a disturbance coordinator to manage complaints resulting from construction vibration. Mitigation Measure NOISE-1 required that reoccurring disturbances be evaluated by a qualified acoustical consultant to ensure compliance with applicable standards. With implementation of Mitigation Measure NOISE-1, impacts were concluded to be less than significant.

Effect on Project-Generated Construction-Related Noise Levels

The Groundwater FEIR stated that construction activities conducted within 1,850 feet and 5,830 feet from sensitive receptors in California would exceed San Bernardino County's daytime and nighttime noise standards of 55 dB and 45 dB L_{eq}, respectively. Construction activities conducted within 330 feet and 735 feet of noise-sensitive receptors in Arizona would exceed Mohave County's daytime and nighttime noise standards of 70 dB and 63 dB L_{eq}, respectively. Construction-related noise levels were found to exceed applicable standards and could consequently result in a temporary substantial increase in ambient noise levels, particularly if construction activities would occur during the nighttime hours. As a result, this impact was found to be potentially significant in the Groundwater FEIR.

The Groundwater FEIR included Mitigation Measure NOISE-2, which required construction equipment to be properly maintained per manufacturer specifications and fitted with the best available noise-suppression devices (e.g., mufflers, silencers, wraps). It also required construction equipment to not idle for extended periods of time (more than 15 minutes) when not being used during construction activities. Finally, it required construction activities to include the use of physical noise-reducing barriers such as berms, stockpiles, dumpsters, and or bins to shield the nearest noise-sensitive receptor adjacent to construction activities to within acceptable noise level standards. When construction activities were to occur within the distances in Impact NOISE-2, noise measurements were to be made, and if noise levels were found to exceed noise standards, temporary barriers were to be erected as close to the construction activities as feasible. With implementation of Mitigation Measure NOISE-2, impacts were concluded to be reduced to less than significant levels.

Effects on Land Use Compatibility of Future Project Noise Levels with the Topock Cultural Area

The Groundwater FEIR stated that construction and operation activities could result in noise levels that could expose what was known as the Topock Traditional Cultural Area (a place of worship for Native Americans and now referred to as the Topock Cultural Property) to levels that exceed San Bernardino County's standards or would conflict with Native American values associated with this resource. Future construction, operation and maintenance, and decommissioning activities were found to increase noise levels within the Topock Cultural Area. Locations of future activities were not specifically known at the time that the Groundwater FEIR was certified, and it was not feasible to calculate noise levels attributable to the Project throughout the Project Area. Without knowing the specific locations of each noise generating remediation activity, there was no assurance that topographic features would intervene and result in adequate shielding of sensitive receptors from noise impacts. The potential for future noise to conflict with the values associated with the Topock Cultural Area by Native American participants was found to still exist and it was expected that any introduction of new noise sources would be perceived as a significant impact by some Native American participants. As a result, this impact was found to be potentially significant in the Groundwater FEIR.

The Groundwater FEIR included Mitigation Measure NOISE-3, which required implementation of all measures outlined in Mitigation Measures NOISE-1 and NOISE-2. It also stated that upon completion of detailed groundwater remedy design, the determination of remediation activities and the schedule established to achieve these activities was to be communicated to Native American Tribes. PG&E was to maintain a liaison with requesting Tribes to alert them to activities that would generate new noise in the Topock Cultural Area on at least an annual basis. The impact was found to be significant and unavoidable even after implementation of the above-mentioned measures.

4.7.3 Existing Setting

This section describes the physical noise characteristics and setting with regard to the Final Remedy Design to be conducted in the Project Area, focusing on those areas where there have been changes made to the Project, changes in the circumstances surrounding the Project, or new information discovered since the Groundwater FEIR was certified (see Public Resources Code, Section 21166; CEQA Guidelines, Sections 15162 and 15168).

4.7.3.1 Noise and Vibration-Sensitive Land Uses

The following have been identified as new sensitive land uses in and around the Project Area for the Final Groundwater Remedy Project, beyond those identified in the Groundwater FEIR and/or present new information regarding distances from Project elements that were not known at the time that the Groundwater FEIR was certified:

1) Single-family residences between Park Moabi Road and National Trails Highway in California, located approximately 1,100 feet to the northeast of the closest project-related activity: the proposed Construction Headquarters/Long-Term Remedy Support Area and Soil Processing/Clean-Soil Storage Area.
2) Pirate Cove Resort in California, located approximately 2,300 feet to the northeast of the closest Project-related activity: the proposed Construction Headquarters/Long-Term Remedy Support Area and Soil Processing/Clean-Soil Storage Area.

3) Topock 66 Spa & Resort and adjacent residences located approximately 180 feet from the closest Project-related activity: the proposed freshwater pipeline located along the Oatman-Topock Highway and 225 feet to the northwest of Staging Area 27.
4) Residences located on the south side of I-40 in Arizona, approximately 800 feet to the southwest of Topock 66 Spa & Resort and approximately 220 feet from the closest Project-related activity, Staging Area 26.
5) There are three Tribal sensitive receptors. Boring activities would be located approximately 57 feet, 112 feet, and 160 feet from each of these Tribal sensitive receptors.

The locations of these sensitive receptors, with the exception of confidential Tribal sensitive receptors, are shown in **Figure 4.7-1**. The distance of the above sensitive receptors to Project-related activity took into account the locations of the known boreholes identified in Table 3-1 of the Project Description, as well as all Project pipelines and structures to be constructed as part of the Project. It is important to note, however, that the proposed Project also includes a Future Activity Allowance, which includes a 25 percent allowance for all components included in the Final Remedy Design, as well as 10 additional monitoring well boreholes in Arizona, which may add Project infrastructure as needed to meet Project objectives, which could possibly locate a borehole or other Project feature closer to a sensitive receptor than indicated above.

4.7.3.2 Ambient Noise Surveys

There have been several opportunities for additional ambient noise surveys to be conducted in and around the Project Area since certification of the Groundwater FEIR in 2011. Ambient noise surveys were conducted in and around the Project Area in August 2012 and December 2012 to January 2013 for the groundwater remedy design development, and December 2013 for the analysis conducted for the Soil Investigation Project EIR. One measurement site was chosen to collect long-term (24-hour) noise level data at 1-hour intervals. Nine noise measurement locations were chosen to collect short-term (15-minute) ambient noise levels. The results of previously conducted ambient noise surveys from 2012 to 2013 are summarized in **Table 4.7-2**.

TABLE 4.7-2
SUMMARY OF MEASURED AMBIENT NOISE SURVEY LEVELS (2012-2013)

Long-Term Noise Measurement (2013)

			Average Measured Hourly and Max Noise Levels, dBA				
				Daytime (7 a.m.–10 p.m.)		Nighttime (10 p.m.–7 a.m.)	
Site	Location	Date	L_{dn}	L_{eq}	Lmax	L_{eq}	Lmax
C	Southeast Fence Line of Station	12/16/13–12/17/13	72.2	66.2	82.5	65.0	81.7

Comparison of Average (L_{eq}, dBA) Sound Levels at the Short-Term Monitoring Sites

		August 2012				December 2012-January 2013			
		Daytime (7 a.m.–10 p.m.)		Nighttime (10 p.m.–7 a.m.)		Daytime (7 a.m.–10 p.m.)		Nighttime (10 p.m.–7 a.m.)	
Site	Location	Max Hourly L_{eq}	Min Hourly L_{eq}	Max Hourly L_{eq}	Min Hourly L_{eq}	Max Hourly L_{eq}	Min Hourly L_{eq}	Max Hourly L_{eq}	Min Hourly L_{eq}
1	South of I-40	63	39	61	40	63	42	61	42
2	North of I-40	70	40	62	37	75	39	73	39
3	Moabi Regional Park	76	51	64	50	69	40	60	34

Additional Short-Term Measurements (December 2013)[a]

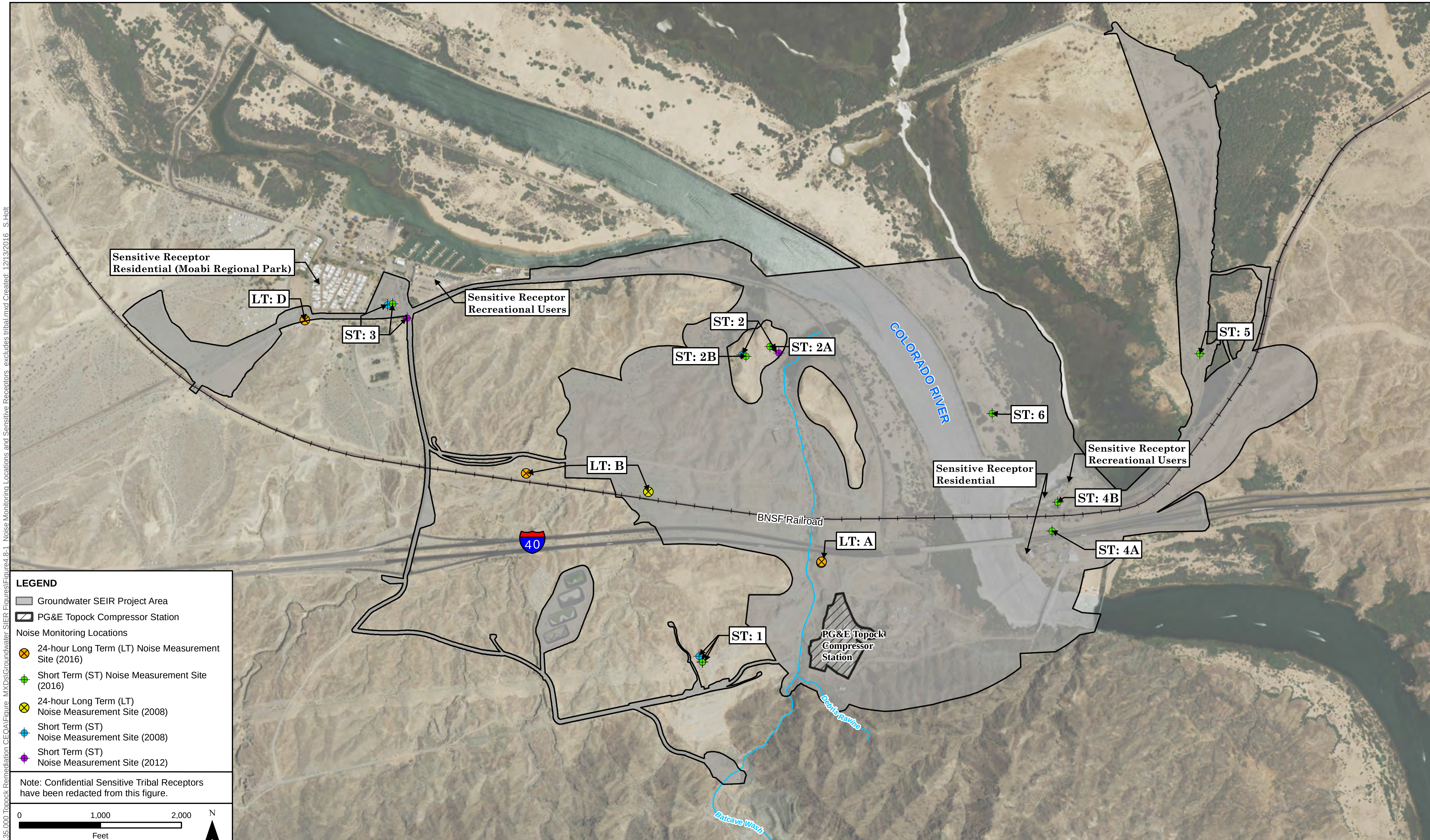
Site	Location	L_{eq} (15 min)	Observed Noise Sources
4	South of I-40, ~550' East of Station	50	Station, traffic on I-40, goods movement train
5	South of I-40, ~940' East of Station	57	Station, traffic on I-40, high winds
6	~385' North of BNSF Track, ~40' South of a Tribal Sensitive Receptor	61	Station, traffic on I-40, backup beepers
7	60' North of a Tribal Sensitive Receptor	51	Traffic on I-40, high winds
8	South of I-40, Eastern Boundary of a Tribal Sensitive Receptor	64	Station, buffered traffic noise, high winds, several trains
9	Southeast Fence Line of Station	60	Station equipment

NOTES:
BNSF = Burlington Northern Santa Fe Railway; dBA = A-weighted decibels; L_{dn} = day-night average noise level; L_{eq} = the equivalent hourly average noise level; Lmax = maximum noise level; Lmin = minimum noise level; ~ = approximate; ' = feet.

ESA conducted additional short-term and a long-term measurement in December 2013 to provide up-to-date ambient noise monitoring information.

[a] Single 15-minute measurements were collected at these locations in December 2013.

SOURCE: CH2M Hill 2013.



Final Groundwater Remediation Project SEIR

Map Creation Date: 12/13/2016 Sources: ESRI Aerial, ESA, PG&E 2015

Noise Monitoring Locations and Sensitive Receptors

Figure 4.7-1

ESA North State Resources

G:\Projects\15.135.000 Topock Remediation CEQA\Figure MXDs\Groundwater SEIR Figures\Figure4.8-1 Noise Monitoring Locations and Sensitive Receptors excludes tribal.mxd Created: 12/13/2016 S.Holt

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As part of this SEIR, ambient noise survey measurements were confirmed and additional noise measurements were conducted in the Project Area between March 23 and March 25, 2016. The results of the most recent ambient noise survey are summarized in **Table 4.7-3**. Two of the long-term measurement sites were measured and found to be generally unchanged from data included in the 2011 Groundwater FEIR, while one additional long-term noise measurement was taken near Moabi Regional Park to establish measurements along the roadway to the proposed Construction Headquarters/Long-Term Remedy Support Area and Soil Processing/Clean-Soil Storage Area, since this specificity was not included in the Groundwater FEIR. Three short-term measurements collected in 2016 confirmed conditions are generally unchanged from data provided in the 2011 Groundwater FEIR, as described later. Three additional short-term sites were chosen in Arizona to reflect new design details not considered in the Groundwater FEIR. Table 4.7-3 describes the locations of the short-term and long-term noise measurements collected specifically for this SEIR. The locations are shown on Figure 4.7-1. Noise level measurements in 2016 were taken in accordance with American National Standards Institute (ANSI) standards using a Larson Davis Laboratories (LDL) Model 820 and 720 precision integrating sound level meters (SLMs). The SLMs were calibrated before and after use with an LDL Model CAL200 acoustical calibrator to ensure that the measurements would be accurate. This equipment meets all pertinent specifications of the ANSI for Type 1 SLMs (ANSI S1.4-1983[R2006]).

Local roadway traffic, rail operations, aircraft overflights, and wind gusts affected the noise environment at each noise measurement site. The Station was not operating on the days the noise measurements were recorded because of unanticipated maintenance needs, and thus would yield a lower sound level than most typical days. For the purpose of this analysis, a lower ambient noise reading, such as the 2016 noise survey results, yields a more conservative and worst-case scenario, as it requires a lower sound level increase to cause a significant impact. Wind gusts ranged from 5 miles per hour (mph) to 24 mph during the first 2 days of monitoring, which are not atypical for locations in the Project Area. Although wind gusts may cause a periodic increase in recorded noise levels, the proper use of windshields, as were employed during this monitoring effort, results in accurate data.

Comparison of results in Table 4.7-3 with Table 4.7-1 and Table 4.7-2 demonstrates that data gathered in 2016 were within reasonable ranges of prior noise surveys. For example, at short-term survey location 1 south of I-40, in 2008 ambient levels of 47.2 dBA L_{eq} were recorded and in 2016 a noise level of 43.5 dBA L_{eq} was recorded. A difference of 3.7 dBA lower in 2016 as compared to 2008 may be explained by the inoperability of the Station, lower traffic levels on I-40 during the 15 minute period, or some combination of the two factors. At long-term survey location A, a noise level of 77.3 dBA L_{dn} in 2008 was recorded (Location A was not monitored long term in 2013), compared to a noise level of 74.4 dBA L_{dn} in 2016. A difference of 3.1 dBA may be explained by the inoperability of the Station, lower traffic levels on I-40, or some combination of the two factors, in 2016 as compared to 2008.

TABLE 4.7-3
SUMMARY OF MEASURED AMBIENT NOISE SURVEY LEVELS (2016)

Long-Term Noise Measurements									
			Average Measured Hourly Noise Levels, dBA						
				Daytime (7 a.m.–10 p.m.)			Nighttime (10 p.m.–7 a.m.)		
Site	**Location**	**Time**	**L_{dn}**	**L_{eq}**	**L_{50}**	**L_{max}**	**L_{eq}**	**L_{50}**	**L_{max}**
A	Adjacent to I-40	3/23/16–3/24/16	74.4	69.9	67	71.6	67.2	60	68.3
B	Adjacent to BNSF tracks	3/23/16–3/24/16	74.8	67.5	46	73.7	68.5	44	72.6
D	Moabi Regional Park [a]	3/23/16–3/24/16	52.9	50	40	56.5	45.4	34	50

Short-Term Noise Measurements					
			A-Weighted Decibel Sound Level		
Site	**Location**	**Time**	**L_{eq}**	**L_{min}**	**L_{max}**
1	South of I-40	9:34- 9:49 A.M. (3/24/2016)	43.5	35	66.4
2	North of I-40	8:19 – 8:34 A.M. (3/24/2016)	46.2	31.1	62
3	Moabi Regional Park	11:09 – 11:24 A.M. (3/23/2016)	49	35.5	77.7
4	South of Oatman-Topock Hwy [a]	10:45 – 11:00 A.M. (3/24/2016)	48.4	39.9	69.2
5	West of Oatman-Topock Hwy [a]	12:00 – 12:15 P.M. (3/24/2016)	58	35.6	76.3
6	East of Colorado River [a]	12:27- 12:42 P.M. (3/25/2016)	49.4	39.5	74.1

NOTES:
BNSF = Burlington Northern and Santa Fe Railway; dB = A-weighted decibels; L_{dn} = day-night average noise level; L_{eq} = the equivalent hourly average noise level;

[a] New measurements taken in 2016

SOURCE; Data collected by ESA in 2016.

To further validate the noise levels recorded near roadways in 2016, ambient noise levels due to road-way traffic were calculated and presented in **Table 4.7-4**. Detailed noise calculations are presented in Appendix NOI. Traffic data gathered in 2016 (LIN Consulting, Inc. 2016; see Appendix TRA) and California Department of Transportation (Caltrans) traffic data from the Traffic Census Program were used to calculate noise levels at a representative distance of 25 feet from the roadway centerline. As shown in Table 4.7-4 and compared to Table 4.7-1, the calculated value of 72.3 dBA L_{dn} adjacent to I-40 is 2.1 dBA less than the measured ambient noise level of 74.4 dBA L_{dn}. The difference of 2.1 dBA from the observed (measured) and calculated noise results indicates that noise levels at that location are also influenced by other sources, likely nearby train operations or recreational activity on the Colorado River, which were noted during the 2016 survey. For the Moabi Park Road location, which is farther from the Station and BNSF Railway line, the modeled noise level is 52.4 dBA L_{dn}, which compares favorably with the 2016 measured level of 52.9 L_{dn} dBA, verifying that roadway traffic is the primary source of noise at that location.

TABLE 4.7-4
SUMMARY OF MODELED EXISTING (2016) TRAFFIC NOISE LEVELS

Roadway	Segment	L_{dn} at 25 feet (dBA) (existing)
Adjacent to I-40	Junction SR 95 to Stateline	72.3
Moabi Park Road	I-40 to National Old Trails Highway	52.4

NOTES:
dB = A-weighted decibels; CNEL = community noise equivalent level .

SOURCE: ESA 2016 (Appendix NOI).

As part of the March 2016 noise survey, railway noise level data were collected alongside the rail lines. The 24-hour average noise level recorded at approximately 80 feet from the rail lines was 74.8 dBA L_{dn}. As shown on Table 4.7-1, noise levels of 74.3 dBA L_{dn} was recorded in 2008. Because a difference of 0.5 dB is undetectable to the human ear, within the tolerance of the noise meters, and within the margin of error of the calculations, the latest noise level is essentially equal to the earlier noise levels. Thus, the data verifies that noise associated with daily railroad conditions have not changed since certification of the Groundwater FEIR.

4.7.4 Regulatory Background

4.7.4.1 Federal

The U.S. Environmental Protection Agency (USEPA) Office of Noise Abatement and Control was originally established to coordinate federal noise control activities. After its inception, USEPA's Office of Noise Abatement and Control issued the Federal Noise Control Act of 1972, establishing programs and guidelines to identify and address the effects of noise on public health and welfare and the environment. USEPA administrators determined in 1981 that subjective issues such as noise would be better addressed at lower levels of government. Consequently, in 1982, responsibilities for regulating noise control policies were transferred to state and local governments. However, noise control guidelines and regulations contained in the rulings by USEPA in prior years remain upheld by designated federal agencies, allowing more individualized control for specific issues by designated federal, state, and local government agencies.

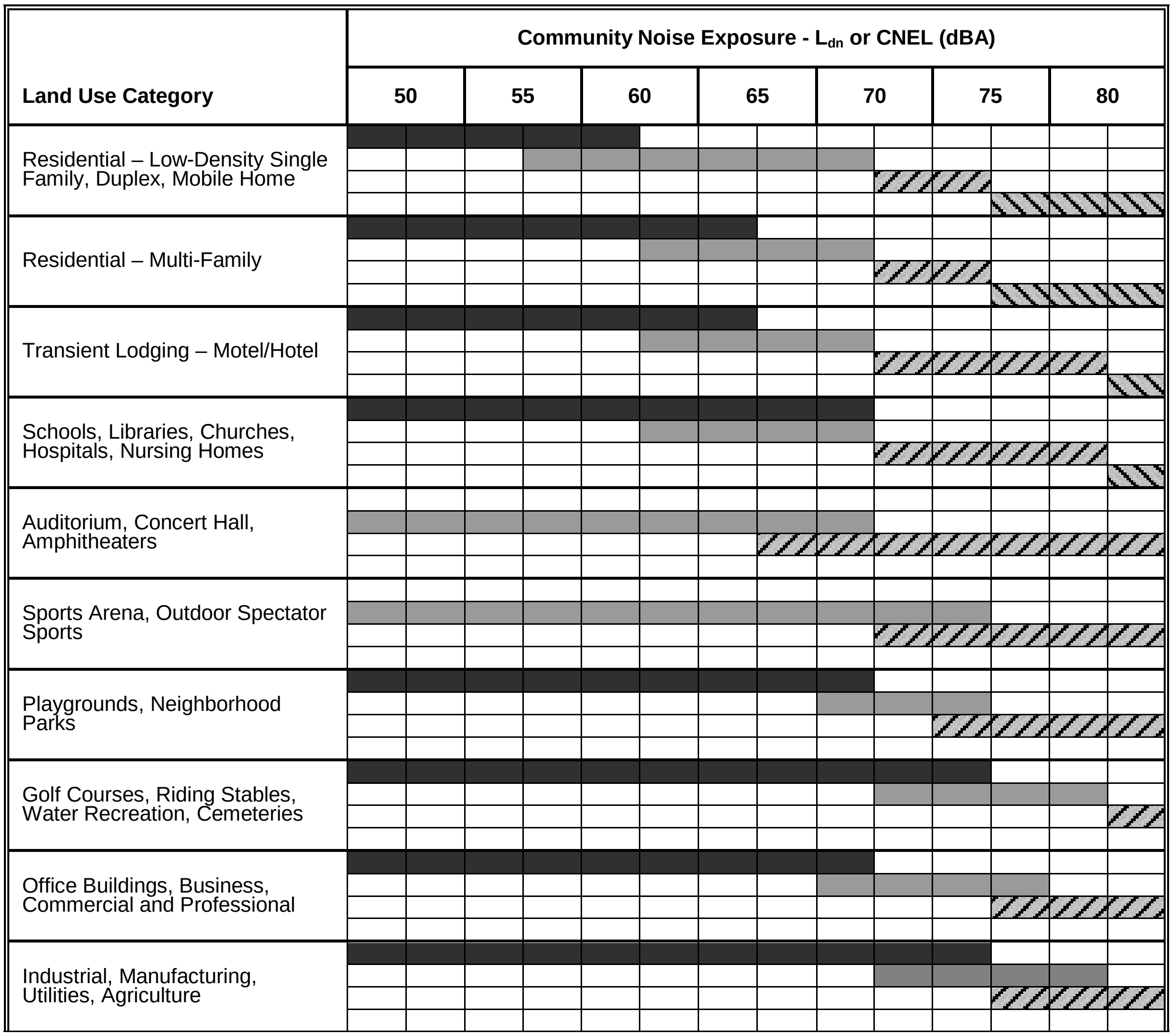
In regard to groundborne vibration, building damage is not a factor for most projects, with the occasional exception of blasting and pile driving during construction. Annoyance from vibration often occurs when the vibration exceeds the threshold of perception by only a small margin. A vibration level that causes annoyance will be well below the damage threshold for normal buildings. The Federal Transit Administration's (FTA's) threshold of architectural damage for conventional sensitive structures is 0.2 inches per second peak particle velocity (PPV) and human annoyance response groundborne vibration threshold level of 80 VdB (FTA 2006). Caltrans also provides the following criteria to define human annoyance from vibration: barely perceptible, distinctly perceptible, strongly perceptible, and severe. A vibration criterion of 0.04 inches per second PPV is a barely perceptible threshold.

4.7.4.2 State of California

The State of California has guidelines for evaluating the compatibility of various land uses as a function of community noise exposure, as shown in **Figure 4.7-2**. The State of California also establishes noise limits for vehicles licensed to operate on public roads. For heavy trucks, the state pass-by standard is consistent with the federal limit of 80 dB. The state pass-by standard for light trucks and passenger cars (less than 4.5 tons, gross vehicle rating) is also 80 dBA at 15 meters from the centerline. These standards are implemented through controls on vehicle manufacturers and by legal sanction of vehicle operators by state and local law enforcement officials.

For the protection of fragile, historic, and residential structures from groundborne vibration, Caltrans recommends a threshold of 0.2 inches/second PPV for normal residential buildings and 0.08 inches/second PPV for old or historically significant structures (Caltrans 2004). These standards are more stringent than the federal standards presented earlier.

Figure 4.7-2
Land Use Compatibility for Community Noise Environment



	Normally Acceptable	Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.
	Conditionally Acceptable	New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features are included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.
	Normally Unacceptable	New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirement must be made and needed noise insulation features included in the design.
	Clearly Unacceptable	New construction or development generally should not be undertaken.

SOURCE: Office of Planning and Research (OPR) 2003.

4.7.4.3 Local

County of San Bernardino (California) 2007 General Plan

The Noise Element of the County of San Bernardino 2007 General Plan establishes specific goals and policies to ensure an acceptable noise environment for each land use. This element establishes maximum acceptable interior and exterior noise level criteria for a variety of land uses. These County noise standards are contained in the San Bernardino County Development Code. Applicable goals and policies applied to the proposed Project include the following (San Bernardino County 2007):

GOAL N 1. The County will abate and avoid excessive noise exposures through noise mitigation measures incorporated into the design of new noise-generating and new noise-sensitive land uses, while protecting areas within the County where the present noise environment is within acceptable limits.

> **Policy N 1.1** Designate areas within San Bernardino County as "noise impacted" if exposed to existing or projected future exterior noise levels from mobile or stationary sources exceeding the standards listed in Chapter 83.01 of the Development Code.
>
> **Policy N 1.2** Ensure that new development of residential or other noise-sensitive land uses is not permitted in noise-impacted areas unless effective mitigation measures are incorporated into the project design to reduce noise levels to the standards of Noise-sensitive land uses include residential uses, schools, hospitals, nursing homes, places of worship and libraries.
>
> **Policy N 1.4** Enforce the state noise insulation standards (California Administrative Code, Title 24) and Chapter 35 of the California Building Code (CBC).
>
> **Policy N 1.5** Limit truck traffic in residential and commercial areas to designated truck routes; limit construction, delivery, and through-truck traffic to designated routes; and distribute maps of approved truck routes to County traffic officers.
>
> **Policy N 1.6** Enforce the hourly noise-level performance standards for stationary and other locally regulated sources, such as industrial, recreational, and construction activities as well as mechanical and electrical equipment.

GOAL N 2. The County will strive to preserve and maintain the quiet environment of mountain, desert and other rural areas.

> **Policy N 2.1** The County will require appropriate and feasible on-site noise attenuating measures that may include noise walls, enclosure of noise generating equipment, site planning to locate noise sources away from sensitive receptors, and other comparable features.
>
> **Policy N 2.2** The County will continue to work aggressively with federal agencies, including the branches of the military, the U.S. Forest Service, U.S. Bureau of Land Management (BLM), and other agencies to identify and work cooperatively to reduce potential conflicts arising from noise generated on federal lands and facilities affecting nearby land uses in unincorporated County areas.

San Bernardino County Development Code

To protect people from severe noise levels, the San Bernardino County Development Code sets limits for interior and exterior noise levels generated throughout the community for stationary and mobile sources as well as vibration levels that affect noise-sensitive land uses. Specifically, Division 3, Countywide Development Standards, establishes the following noise and vibration standards (83.01.080 Noise and 83.01.090 Vibration, San Bernardino County Development Code):

83.01.080 Noise

(b) Noise impacted areas. Areas within the County shall be designated as "noise-impacted" if exposed to existing or projected future exterior noise levels from mobile or stationary sources exceeding the standards listed in Subsection (d) (Noise standards for stationary noise sources) and Subsection (e) (Noise standards for adjacent mobile noise sources), below. New development of residential or other noise-sensitive land uses shall not be allowed in noise-impacted areas unless effective mitigation measures are incorporated into the project design to reduce noise levels to these standards. Noise-sensitive land uses shall include residential uses, schools, hospitals, nursing homes, religious institutions, libraries, and similar uses.

(c) Noise standards for stationary noise sources.

(1) Noise standards. Table 83-2 of the San Bernardino County Development Code - Noise Standards for Stationary Noise Sources (**Table 4.7-5**) describes the noise standard for emanations from a stationary noise source, as it affects adjacent properties:

TABLE 4.7-5
NOISE STANDARDS FOR STATIONARY NOISE SOURCES

Affected Land Uses (Receiving Noise)	7 a.m.–10 p.m. L_{eq}	10 p.m.–7 a.m. L_{eq}
Residential	55 dB(A)	45 dB(A)
Professional Services	55 dB(A)	55 dB(A)
Other Commercial	60 dB(A)	60 dB(A)
Industrial	70 dB(A)	70 dB(A)

NOTES:
L_{eq} = equivalent energy level. The sound level corresponding to a steady-state sound level containing the same total energy as a time-varying signal over a given sample period, typically 1, 8, or 24 hours.
dB(A) = A-weighted sound pressure level. The sound pressure level, in decibels, as measured on a sound level meter using the A-weighting filter network. The A-weighting filter deemphasizes the very low and very high frequency components of the sound, placing greater emphasis on those frequencies within the sensitivity range of the human ear.

SOURCE: San Bernardino County Development Code, 83.01.080 Noise.

(2) Noise limits categories. No person shall operate or cause to be operated a source of sound at a location or allow the creation of noise on property owned, leased, occupied, or otherwise controlled by the person, which causes the noise level, when measured on another property, either incorporated or unincorporated, to exceed any one of the following:

(A) The noise standard for the receiving land use as specified in Subsection B (Noise-impacted areas), above, for a cumulative period of more than 30 minutes in any hour.

(B) The noise standard plus 5 dB(A) for a cumulative period of more than 15 minutes in any hour.

(C) The noise standard plus 10 dB(A) for a cumulative period of more than five minutes in any hour.

(D) The noise standard plus 15 dB(A) for a cumulative period of more than one minute in any hour.

(E) The noise standard plus 20 dB(A) for any period of time.

(d) Noise standards for adjacent mobile noise sources. Noise from mobile sources may affect adjacent properties adversely. When it does, the noise shall be mitigated for any new development to a level that shall not exceed the standards described in the following Table 83-3 of the San Bernardino County Development Code - Noise Standards for Adjacent Mobile Noise Sources (**Table 4.7-6**).

TABLE 4.7-6
NOISE STANDARDS FOR ADJACENT MOBILE NOISE SOURCES

		L_{dn} (or CNEL) dB(A)	
Land Use Categories	**Uses**	**Interior** [a]	**Exterior** [b]
Residential	Single and multifamily, duplex, mobile homes	45	60[c]
Commercial	Hotel, motel, transient housing	45	60[c]
	Commercial retail, bank, restaurant	50	N/A
	Office building, research and development, professional offices	45	65
	Amphitheater, concert hall, auditorium, movie theater	45	N/A
Institutional/Public	Hospital, nursing home, school classroom, religious institution, library	45	65
Open Space	Park	N/A	65

NOTES:
L_{dn} = day-night noise level. The average equivalent A-weighted sound level during a 24-hour day obtained by adding 10 decibels to the hourly noise levels measured during the night (from 10 pm to 7 am). In this way L_{dn} takes into account the lower tolerance of people for noise during nighttime periods.
CNEL = community noise equivalent level. The average equivalent A-weighted sound level (dB[A]) during a 24-hour day, obtained after addition of approximately 5 decibels to sound levels in the evening from 7 p.m. to 10 a.m. and 10 decibels to sound levels in the night before 7 a.m. and after 10 p.m.

[a] The indoor environment shall exclude bathrooms, kitchens, toilets, closets and corridors.
[b] The outdoor environment shall be limited to hospital/office building patios, hotel and motel recreation areas, mobile home parks, multifamily private patios or balconies, park picnic areas, private yard of single-family dwellings, school playgrounds
[c] An exterior noise level of up to 65 dB(A) (or CNEL) shall be allowed provided exterior noise levels have been substantially mitigated through a reasonable application of the best available noise reduction technology, and interior noise exposure does not exceed 45 dB(A) (or CNEL) with windows and doors closed. Requiring that windows and doors remain closed to achieve an acceptable interior noise level shall necessitate the use of air conditioning or mechanical ventilation.

SOURCE: San Bernardino County Development Code, 83.01.080 Noise.

(e) Increases in allowable noise levels. If the measured ambient level exceeds any of the first four noise limit categories in Subsection (d)(2), above, the allowable noise exposure standard shall be increased to reflect the ambient noise level. If the ambient noise level exceeds the fifth noise limit category in Subsection (d)(2), above, the maximum allowable noise level under this category shall be increased to reflect the maximum ambient noise level.

(f) Reductions in allowable noise levels. If the alleged offense consists entirely of impact noise or simple tone noise, each of the noise levels in Table 83-2 - Noise Standards for Stationary Noise Sources (Table 4.7-2) shall be reduced by 5 dB(A).

(g) Exempt noise. The following sources of noise shall be exempt from the regulations of this section:

(1) Motor vehicles not under the control of the commercial or industrial use.

(2) Emergency equipment, vehicles, and devices.

(3) Temporary construction, maintenance, repair, or demolition activities between 7:00 a.m. and 7:00 p.m., except Sundays and Federal holidays.

83.01.090 Vibration

(a) Vibration standard. No ground vibration shall be allowed that can be felt without the aid of instruments at or beyond the lot line, nor shall any vibration be allowed which produces a particle velocity greater than or equal to two-tenths (0.2) inches per second measured at or beyond the lot line.

(b) Vibration measurement. Vibration velocity shall be measured with a seismograph or other instrument capable of measuring and recording displacement and frequency, particle velocity, or acceleration. Readings shall be made at points of maximum vibration along any lot line next to a parcel within a residential, commercial and industrial land use zoning district.

(c) Exempt vibrations. The following sources of vibration shall be exempt from the regulations of this Section.

(1) Motor vehicles not under the control of the subject use.

(2) Temporary construction, maintenance, repair, or demolition activities between 7:00 a.m. and 7:00 p.m., except Sundays and Federal holidays.

Mohave County, Arizona, General Plan

The Noise Element of the Mohave County 2015 General Plan establishes specific goals and policies to ensure an acceptable noise environment for each land use. This element establishes maximum acceptable exterior noise level criteria for a variety of land uses. Applicable goals and policies applied to the proposed project include the following:

GOAL 8: To minimize noise levels throughout the County and, wherever possible, mitigate the effects of noise to provide a safe and healthy environment.

Policy 8.1: The County should establish standards for noise and land use compatibility based on Exhibit V.6 [**Table 4.7-7**].

TABLE 4.7-7
MOHAVE COUNTY INDUSTRIAL NOISE PERFORMANCE STANDARDS

Octave band (cps)	37 75	75 150	150 300	300 600	600 1200	1200 2400	2400 4800	4800 9600	A Scale
Daylight decibel band limit (dB re 0.0002 microbar)	90	80	74	69	65	62	60	58	70
Nighttime decibel band limit (dB re 0.0002 microbar)	83	73	67	62	58	55	53	51	63

NOTES:
cps = cycles per second; dB = A-weighted decibel.

SOURCE: Mohave County Zoning Ordinance, Section 27.S.

Policy 8.2: The County should use the General Plan and zoning ordinance to separate noise-sensitive land uses. For example, new subdivisions should be adequately noise buffered from highways and rail road mainline tracks.

Mohave County Noise Ordinance

On June 1, 2015, the Mohave County Board of Supervisors adopted Ordinance Number 2015-05, limiting and prohibiting loud, disturbing, and unnecessary noise in the unincorporated county areas and providing for enforcement and penalties. Section 4.C. of this ordinance exempts sounds resulting from reasonable use of construction vehicles, including delivery truck and cement trucks, equipment, and tools necessary to construction activity, but only between the hours of 6:00 a.m. and sunset.

Mohave County Zoning Ordinance

To protect people from severe noise levels, the Mohave County Zoning Ordinance sets limits for exterior noise levels generated by industrial sources and vibration levels affecting noise-sensitive land uses. Specifically, Section 27.S. Industrial Performance Standards establishes the following noise and vibration standards:

C. Locations Where Determinations Are to Be Made for Enforcement Standards.

1. Noise, vibration, radiation, light and glare: at the location of the use creating the same at a point on the source property line which has the highest readings, and at other points off site where the existence of such elements may be more apparent.
2. Noise: at the boundary between the manufacturing district and residential districts, the maximum sound level radiated by any use or facility, other than transportation facilities, temporary construction work or safety relief systems shall not exceed the limits set forth in Table 4.7-7.
3. Vibration: at the boundary between a manufacturing district and a residential district, earth born vibration from any operation or plant shall not exceed the limits set forth in the following table in the frequency ranges specified (**Table 4.7-8**).

TABLE 4.7-8
MOHAVE COUNTY INDUSTRIAL VIBRATION STANDARDS

Frequency Cycles per Second	Displacement in Inches
0 to 10	0.0020
10 to 20	0.0016
20 to 30	0.0010
30 to 40	0.0006
40 and over	0.0005

SOURCE: Mohave County Zoning Ordinance, Section 27.S.

4.7.5 Environmental Impacts

4.7.5.1 Thresholds of Significance

Generally for the proposed Project, the significance determination of noise- and vibration-related impacts is based on a comparison between predicted noise levels and noise criteria defined by San Bernardino and Mohave Counties. Impacts are considered significant if existing or proposed sensitive receptors would be exposed to noise levels in excess of the San Bernardino County and/or Mohave County General Plans and San Bernardino County Development Code and Mohave County Zoning Ordinance as described above (see Section 4.9.2, “Regulatory Background”), or if implementation of the proposed Project would result in an increase in ambient noise levels in excess of the decibel increase outlined in the CEQA Guidelines thresholds of significance described below.

Based on the current (2016) CEQA Guidelines, Appendix G, a project may be deemed to have a significant effect on the environment with respect noise materials if it would:

- Expose persons to or generate noise levels in excess of standards established in any applicable plan or noise ordinance, or applicable standards of other agencies;
- Expose persons to or generation of excessive groundborne vibration or groundborne noise levels;
- Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project; or
- Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above existing levels without the project.

The complete list of CEQA significance criteria used in the noise analysis is included in the Modified Initial Study (see Appendix IS), which also explains why the proposed Project would not result in new significant impacts or substantially increase the severity of impacts previously identified in the Groundwater FEIR (see Public Resources Code, Section 21166; CEQA Guidelines, Section 15162) with respect to excessive noise levels for projects near an airport or private airstrip. As a result, those impacts are summarized below and will not be evaluated further in this SEIR.

Excessive Noise Levels Near Public and Private Airports

The Groundwater FEIR determined that the Project would not be located within 2 miles of a public or private airstrip. This condition has not changed since certification of the Groundwater FEIR. The Project would not result in new significant impacts or substantially increase the severity of impacts previously identified in the Groundwater FEIR on noise with respect to proximity to public or private airports. Therefore, this issue is not evaluated further in this SEIR.

Local Noise Thresholds

Based on the Noise Element of the applicable County General Plans (San Bernardino and Mohave), the proposed Project would result in a significant impact with respect to noise or vibration if implementation would:

- Expose persons to or generate noise levels in excess of applicable standards (e.g., San Bernardino County and Mohave County general plans, and San Bernardino County Development Code and Mohave County Zoning Ordinance exterior and interior noise levels as shown in Tables 4.7-5, 4.7-6, 4.7-7, and 4.7-8, respectively);
- Result in a substantial permanent increase in ambient noise levels in the Project vicinity above levels existing without the Project:
  - Where existing ambient noise levels are less than 60 dB a significant increase would be considered 5 dB or greater change in ambient noise levels due to the Project, or
  - Where existing ambient noise levels exceed 60 dB a significant increase would be considered 3 dB or greater change in ambient noise levels due to the project (FICON 1992, Caltrans 2009);
- Result in a substantial temporary or periodic increase in ambient noise levels in the Project vicinity above levels existing without the Project:
  - Where existing ambient noise levels are less than 60 dB a significant increase would be considered 5 dB or greater change in ambient noise levels due to the Project
  - Where existing ambient noise levels exceed 60 dB a significant increase would be considered 3 dB or greater change in ambient noise levels due to the Project (FICON 1992: 3.5–3.6, Caltrans 2009: 40–43);
- Expose persons to or generate excessive groundborne vibration or groundborne noise levels (San Bernardino County Development Code [83.01.090] and the Mohave County Zoning Ordinance as shown in Table 4.9-8); or
- Generate noise levels that would conflict with land use compatibility guidelines established for Places of Worship or would result in a conflict with Native American values associated with the Topock Cultural Area.

4.7.5.2 Approach to Analysis

This section presents a revised analysis per Public Resources Code Section 21166 and CEQA Guidelines Sections 15162 governing conditions required for preparation of a SEIR, including substantial changes to the Project or circumstances under which the Project is taken that result in major revisions to the Groundwater FEIR. Subsequent to certification of the Groundwater FEIR, the Final Groundwater Remedy Design was prepared to include design details not available in 2011. This section outlines the approach to the potential noise and vibration impacts based on the project specific information now available, as well as the additional information obtained regarding the existing environmental setting (see Section 4.7.3, which summarizes the additional information included in the Final Remedy Design).

Some of the mitigation measures in this section refer to various plans or other documents that have been prepared and included in the Final Remedy Design for the groundwater remedy or are part of the Project's federal requirements. Many of these plans and documents included in the Final Remedy Design were prepared to implement mitigation measures previously adopted as part of DTSC's January 31, 2011, decision approving Alternative E as the groundwater remedy (DTSC 2011). Relevant plans and procedures regarding noise and vibration provided in the C/RAWP (CH2M Hill 2015b; Section 4.6.3) would require noise measurement and protocols to be implemented during construction, operation and maintenance, and decommissioning activities. The protocols include implementing Groundwater FEIR Mitigation Measures NOI-1 and NOI-2, and include designating a noise disturbance coordinator to monitor noise conditions, and implement noise barriers if work activities exceeding noise thresholds would occur within the designated noise buffer zones around the mobile home park at Moabi Regional Park, the mobile home park at the Topock Marina, the private residence in the Topock Marina area, or other noise-sensitive land use. The designated noise disturbance coordinator was required to respond to all noise complaints. In addition, equipment was required to use the appropriate mufflers or noise shrouds/shields.

Appendix D of the C/RAWP provides procedures that would be applied during construction activities. Section 7.4.6.2 of this plan requires noise level monitoring and the use of hearing protection when noise levels exceed the action level of 85 decibels over an 8-hour work day.

Appendix GWMM to this SEIR presents a comparison between the mitigation measures included in the Groundwater FEIR as reflected in the Mitigation Monitoring and Reporting Program approved by DTSC on January 31, 2011, and those presented in this SEIR for the Final Groundwater Remedy Project.

All plans and documents included in the Final Remedy Design and references in this SEIR are appended to this SEIR as Appendix BOD. In addition, the documents are available online at the following link: http://dtsc-topock.com/documents/cleanup-implementation/groundwater/remedy-design/remedial-design-documents.

Construction Impact Methodology

Subsequent to certification of the Groundwater FEIR, additional details were developed regarding new or modified infrastructure needed to support the remedy, which resulted in more clarity regarding the sources of noise and vibration generation from what was analyzed in the Groundwater FEIR. Details regarding construction scheduling were also provided. The proposed Project includes the construction of a Construction Headquarters and Soil Processing/ Clean-Soil Storage Area that was not included in the Groundwater FEIR. Construction of these facilities would be located near Moabi Regional Park, in an area not previously assessed for noise and vibration impacts. Construction also includes installation of a pipeline in Arizona to connect the freshwater well network in Arizona to Project facilities in California, which was not specifically proposed in the Groundwater FEIR. Construction staging areas were also identified with specificity. Other proposed modifications to facilities would be generally similar to what was proposed in the Groundwater FEIR in terms of noise and vibration generation.

The proposed Project also includes a Future Activity Allowance for all Project infrastructure to be constructed (wells, pipelines, structures, etc.). Generally, the Future Activity Allowance includes two components: (1) an additional allowance for all Project infrastructure, established at up to 25 percent of the parameter set forth in the Final Remedy Design, and (2) up to 10 additional monitoring well boreholes to be installed in Arizona as part of the monitoring program. It could involve as many as 61 new boreholes from what was analyzed in the Groundwater FEIR (see **Table 4.7-9**). These 61 new boreholes would be constructed within the Project Area, and could possibly be located closer to a noise sensitive receptor than what is currently accounted for in the Final Groundwater Remedy Design. Although exact locations are unknown, boreholes installed as part of the Future Activity Allowance would likely be installed closer to sensitive receptors, and new boreholes may also require new access routes and pipeline segments at locations to be determined that might also be closer to identified sensitive receptors. This SEIR therefore also includes in the impacts analysis the anticipated effects associated with the Future Activity Allowance.

TABLE 4.7-9
SUMMARY OF INFRASTRUCTURE

Component	Groundwater FEIR Estimate	Final Remedy Design	Future Activity Allowance	Total	Difference Between FEIR Limit and Total New SEIR Features [b]
Boreholes[a]	170	191	58	249	61
Disturbed Ground (cubic yards)	13,400	45,200	11,300	56,500	43,100
Fluid Conveyance Piping (linear feet, underground)	50,000	127,500[c]	31,875	159,375	109,375
Electrical/Communications Conduits (linear feet, underground)	50,000	124,000 [c]	31,000	155,000	105,000
Buildings and Structures (square feet)	110,000	42,000	10,500	52,500	(57,500)
Roadway Improvements (linear feet)	6,000	8,150 (new) 4,060 linear ft. (improvements to existing)	2,038 (new) 1,015 linear ft. (improvements to existing)	10,188 (new) 5,075 (improvements to existing)	9,263

NOTES:
[a] Each borehole may contain multiple wells; inclusive of both remediation and monitoring wells.
[b] Difference equals Total SEIR Boreholes (249) minus Groundwater FEIR Limit boreholes (170) minus Installed Boreholes (18).
[c] 124,000 linear feet of piping and/or conduits in 43,200 linear feet of trenches.

SOURCE: CH2M Hill 2015a, 2015b.

Table 4.7-10 lists typical equipment likely to be used in the construction of the wells, pipelines, and associated facilities. The table also shows the estimated usage factors for the equipment. The usage factors are based on FHWA's Roadway Construction Noise Model User's Guide (FHWA 2006). To more accurately characterize construction-period noise levels, the average (Hourly L_{eq}) noise level associated with each construction stage is calculated based on the quantity, type, and usage factors for each type of equipment used during each construction stage and are typically attributable to multiple pieces of equipment operating simultaneously. These maximum noise levels would occur when equipment is operating under full power conditions.

TABLE 4.7-10
CONSTRUCTION EQUIPMENT NOISE LEVELS

Equipment	Estimated Usage Factor (%)	Maximum Noise Level at 50 feet from Equipment, dBA (Lmax)
Tractor	40	84.0
Backhoe	40	77.6
Concrete Pump Truck	20	81.4
Concrete Mixer Truck	40	78.8
Dump Truck	40	76.5
Excavator	40	80.7
Vacuum Street Sweeper	10	81.6
Dozer	40	81.7
Generator	50	80.6
Man Lift	20	74.7
Front End Loader	40	79.1
Mounted Impact Hammer	20	90.3
Shears (on Backhoe)	40	96.2

SOURCE: FHWA 2006.

Construction noise levels were estimated based on an industry standard sound attenuation rate of 6 dB per doubling of distance (from the 50-foot reference distance) for point sources (e.g., construction equipment). Within the analysis, all construction equipment was assumed to operate simultaneously with an estimated usage factor at the construction area nearest to potentially affected residential receptors (at the fence line), because equipment used on construction sites usually operates intermittently over the course of a construction day. These assumptions represent a worst-case noise scenario as all construction equipment used in a given phase would not typically operate concurrently and at full power, and the location of activities is routinely spread across the Project Area, rather than concentrated close to the nearest noise-sensitive receptors. Project-generated noise levels were predicted using the FHWA Roadway Construction Noise Model (FHWA 2006).

As estimated, 6 portable generators were assumed to be operating simultaneously over an average workday to support construction operations, and 11 portable generators on a maximum-intensity workday. Types of portable generators that could be used include a 5,000-watt portable generator with hour meter or a 6,800-watt electric-start gas-powered portable generator.

Noise associated with construction worker vehicle and equipment trips was also quantified based on the Traffic Impact Study that was prepared for the Project (LIN Consulting, Inc. 2016; see Appendix TRA). In addition to these typical highway/roadway trips associated with arriving to and from the Project Area each day, the analysis also considered off-highway vehicle circulation to and from the Construction Headquarters that would occur internal to the Project Area, many of which are on unpaved roads.

Hours of construction activities are analyzed as described in Section 3.7.7, "Project Working Hours" of the Project Description. The primary working hours for field construction activities would be between 7:00 a.m. and 5:00 p.m., Monday through Friday. However, some activities could occur outside these hours, such as mobilization, survey efforts, and equipment deliveries. Additionally, variations of the typical workday schedule could be modified and result in work outside of the 7:00 a.m. to 5:00 p.m. timeframe. The noise analysis thus accounts for activities at various work times.

Operation & Maintenance Impact Methodology

Key operation and maintenance activities include routine or preventative maintenance to mitigate performance losses at injection and extraction wells, which would generally be conducted without intrusive modifications to the wellhead or well and would not require removing existing equipment from the well for access. Well maintenance may also involve removal of existing well equipment, and in some instance wells may need to be replaced and would follow similar methods used to construct wells and other associated infrastructure, as described above. Other routine maintenance activities could include inspection and preventative maintenance of generators and solar panels in the Project Area; water delivery to the potable water tank; inspection and maintenance of the booster pump; removal and off-site disposal of sewage; decontamination of vehicles and equipment; management of rainwater collected in the secondary containment; inspection and maintenance of the sump pump; and off-site hauling of wastewater from the decontamination water storage tank. Water from this tank would be trucked to the appropriate location (e.g., the Remedy-Produced Water Conditioning Plant, Topock Compressor Station (TCS) Evaporation Ponds, or off-site) for management.

Operation and maintenance would involve long-term (operational-related) non-transportation noise sources associated with buildings and structures at the Station, Transwestern Bench, MW-20 Bench, HNWR-1A Well, the Long-Term Remedy Support Area, and the TCS Evaporation Ponds. Operation and maintenance activities at the Long-Term Remedy Support Area would include on-site sample processing, and vehicle and equipment storage, decontamination, and maintenance. Based on review of the equipment and processes to be operated at each of these areas, the locations with the highest potential for noise generation would be the Station, TCS Evaporation Ponds, and the Long-Term Remedy Support Area. The main noise sources from these areas are off-road heavy duty equipment, natural gas electrical generators, and pumps. These notable noise source areas are analyzed quantitatively based on a reference noise level from similar noise sources or equipment. All other areas are analyzed qualitatively since a review of the process concluded these areas would not contain any substantial noise sources.

The Project would include operation of a natural gas generator at the TCS Evaporation Ponds, two new 480 volt natural gas generators to be installed in the existing Auxiliary Building at the Station, and a portable rental generator to be located behind the Remedy-Produced Water Conditioning Plant. A portable rental backup generator would also be mobilized at the IM-3 Facility (Isuzu Model 6WG1X) as needed during Project implementation to provide backup power, as well as a backup generator for the operation of some functions at the Construction Headquarters when utility power is not available.

With respect to long-term (operational-related) transportation noise sources, traffic noise modeling was conducted based on peak hour traffic volumes obtained from the transportation analysis prepared for this project (LIN Consulting, Inc. 2016; see Appendix TRA). It uses two scenarios to determine operational traffic levels: the Existing Plus Project (2017) and the Future Plus Project (2020). Noise levels for both scenarios were calculated based on the projected traffic volumes. To be consistent with the Groundwater FEIR, the FHWA Highway Traffic Noise Prediction Model RD 77-108 was used to predict traffic noise levels along affected roadways, based on project-specific trip distribution. The Project's contribution to the existing traffic noise levels along area roadways was determined by comparing the predicted noise levels (CNEL) at 25 feet from the roadway centerline, with and without Project-generated traffic. There is expected to be minimal noise impacts from idling of trucks (Title 13, Section 2485 of the California Code of Regulations; Mitigation Measure AIR-2) in all areas during Project operation given the nature of activities.

As described in Section 3.6 of the Project Description, the proposed Project includes a Future Activity Allowance for all Project infrastructure, installation of which could occur during the operation and maintenance phase during as well as during initial construction. The Future Activity Allowance could involve construction of up to 61 new boreholes and associated infrastructure (i.e., roads, during the operation and maintenance phase from what was analyzed in the Groundwater FEIR (for a total of 249 boreholes). These 61 new boreholes and other infrastructure would be constructed within the Project Area, but could possibly be located closer to a noise sensitive receptor than what is currently accounted for in the Final Groundwater Remedy Design. This SEIR therefore also includes in the impacts analysis regarding the anticipated effects associated with the Future Activity Allowance during operation and maintenance.

Decommissioning Impact Methodology

After obtaining cleanup objectives or determining that the remedy facilities are no longer needed, there would be decommissioning of the remedy infrastructure as indicated in the Final Remedy Design. The steps and schedule for decommissioning and restoration may occur during multiple mobilizations and would be affected by the specific infrastructure to be decommissioned. Decommissioning and restoration of remedy components is largely projected to occur decades in the future and would be affected by information and conditions that become available prior to and at the time of decommissioning and restoration. However, some restoration activities would begin during Phase 1 Construction, e.g., restoration of disturbed areas after well installation activities have been completed, revegetation to offset habitat loss that could not be avoided during construction. Potential decommissioning impacts are analyzed in this SEIR to the extent such feature activities are foreseeable at this time. Since the typical equipment used for decommissioning is similar to those of construction, impacts analysis will refer to the construction noise impact results.

4.7.5.3 Impact Analysis

IMPACT NOISE-1	**Long-Term Operational-Related Non-Transportation Noise and Vibration Impacts.** Operation-related non-transportation noise sources involve activities such as water filtration pumps, generators, off-road mobile sources such as forklifts, etc. This equipment would not expose sensitive receptors to noise levels in excess of the applicable noise standards and/or result in a substantial increase in ambient noise levels. As a result, this impact would be **less than significant**. Construction activities associated with the Additional Activity Allowance that could occur during long-term operation and maintenance could result in noise levels that exceed applicable standards. This impact would be **potentially significant**, which is a new identified impact from the Groundwater FEIR.

Noise

Predicted operational noise levels (L_{eq}) at existing off-site sensitive receptor locations as a result of long-term operation of the identified noise sources for the Station, TCS Evaporation Ponds, and the Long-term Remedy Support Area, were calculated and are summarized in **Table 4.7-11**. Impacts are discussed in detail below. Potential impacts related to long-term operation of the Transwestern Bench, MW-20 Bench, and the HNWR-1A Well is qualitatively discussed thereafter.

The Station would contain the conditioning plant for remedy-produced water, including associated tanks and chemical storage, auxiliary building, truck loading/unloading station, equipment decontamination pad, and the remedy freshwater storage tank. The area around the Station would have 6 operational pumps, which could result in an increase in noise levels at nearby Tribal noise-sensitive use. As shown in Table 4.7-11, operation of the pumps would result in noise level of approximately 44.5 dBA at a distance of 900 feet (distance to the nearest Tribal sensitive receptor). This would result in an increase above ambient sound level of 43.5 dBA by 3.5 dBA. This would not exceed the 5 dB increase threshold (the level considered significant for areas where ambient noise levels are less than 60 dB) threshold. Impacts at other noise-sensitive receptors, located further away, would be less than those discussed due to sound attention with distance and/or due to intervening topography. The noise impacts from Project-related infrastructure located at the Station would be less than significant.

TABLE 4.7-11
OPERATIONAL NOISE LEVELS (L_{EQ}) AT EXISTING OFF-SITE SENSITIVE RECEIVER LOCATIONS

Noise-Sensitive Receptor	Operation Activity & Noise Source	Ambient Sound Level L_{eq} (dBA)	Distance between Nearest Receptor and Construction Activity (feet)	Estimated Operational Noise Levels at the Noise-Sensitive Receptor by Hourly L_{eq} (dBA)[3]	Combined Sound Level L_{eq} (dBA)[3]	Ambient Sound Level Increase	Exceed Threshold?
Tribal Sensitive Receptor	Pumps 6x (Compressor at the Station)	43.5	600	44.5	47.0	3.5	**No**
Tribal Sensitive Receptor	Pumps 7x (Carbon Amendment Building)	43.5	330	44.6	47.1	3.6	**No**
Tribal Sensitive Receptor	Cummins GGMC Generator , Pumps 2x (TCS Evaporation Pond)	42.8	900	42.1	45.5	2.7	**No**
Single-family residences between Park Moabi Road and National Trails Highway	Soil Processing Facility-Tractor/Loader/Back hoe & Forklift	49.0	1,100	48.3	51.7	2.7	**No**

SOURCE: LIN Consulting 2016 (see Appendix TRA).

The MW-20 Bench would contain the Carbon Amendment Building and Carbon Amendment Storage Tank, the reuse of three existing 20,000-gallon frac tanks, and a 960-square-foot truck-loading/unloading containment pad. Operation of the Carbon Amendment building and the influent tank farm requires the use of 7 pumps, which would result in an increase in noise levels at nearby Tribal noise-sensitive use. All of these pumps would be enclosed inside insulated metal structure, although this material typically does not have significant noise-reducing properties, therefore to be conservative, no walls were assumed in the analysis. As shown in Table 4.7-11, operation of the 7 pumps would result in noise level of approximately 44.6 dBA at a distance of 330 feet (distance to the nearest Tribal sensitive receptor). This would result in an increase above the ambient sound level of 43.5 dBA by 3.6 dBA. This would not exceed the 5 dB increase (the level considered significant for areas where ambient noise levels are less than 60 dB) threshold. Therefore, the operational noise impacts from the MW-20 Bench are considered less than significant.

The TCS Evaporation Ponds contain ponds that would filter water through evaporation. While the evaporation itself would not be a potential noise source, the area would also include a utility building that would house a generator and 2 pumps located on floating platforms, within each of the evaporation ponds. As shown in Table 4.7-11, operation of the Cummins GGMC Generator and 2 pumps would result in noise level of 42.1 dBA at the nearest Tribal sensitive receptor 900 feet away. This would result in an increase above ambient sound level of 42.8 dBA by 2.7 dBA. This would not exceed the 5 dB increase (the level considered significant for areas where ambient noise levels are less than 60 dB) threshold. Additionally, the pumps at the TCS Evaporation

Ponds would operate only as needed, and for limited period of time. The noise impacts from the TCS Evaporation Ponds would be less than significant.

Noise impacts associated with the Long-Term Remedy Support Area and Soil Storage and Processing Area, to be located southwest of Moabi Regional Park, were not analyzed in the 2011 Groundwater FEIR. The Long-Term Remedy Support Area would function as an operations and maintenance support area for the lifetime of the Project. Facilities include workshop/sample processing building with sample processing rooms, equipment decontamination pad, utility pad, offices, septic tanks, wastewater tank. While most of the operations and facilities are not expected to be substantial noise sources, it is anticipated the area would need at least a forklift and tractor/loader/backhoe for material handling, unloading, etc. As shown in Table 4.7-11, this equipment would result in noise level of 48.3 dBA at the nearest sensitive receptor 1,100 feet away, the residential area of the Moabi Regional Park. Although this is lower than the existing ambient noise level of 49.0 dBA at the sensitive receptor area, the addition of this new source of noise could increase ambient noise levels by 2.7 dBA. In addition, the Final Design indicates that provisional noise barriers of 6 to 20 feet tall would be situated in this area. Because this increase is less than the significance threshold of a 5 dBA increase, noise impacts from the Construction Headquarters/Long-Term Remedy Support Area and Soil Storage and Processing Area would be less than significant.

The Transwestern Bench area would contain programmable logic controllers, uninterruptible power supply, communications, Remedy SCADA system, Operator Interface Terminal systems, etc. In addition, space would be reserved in the building for a small drinking water system (approximately 2,000 gallons per day capacity). A 10,000-gallon underground septic waste tank would also be installed. Activities associated with this area, which includes water delivery, are not expected to create noticeable noise impacts. Noise impacts from this area would be less than significant.

The HNWR-1A freshwater supply well located in the HNWR in Arizona would contain aboveground piping, electrical control equipment, and a sand separator. The sand separator separates sand and or other solids from water using centrifugal force. Noise from such sources, is expected to be shielded by on-site structures or natural topography to reduce noise. The electric submersible water pumps installed at borehole locations would be below grade and encased in a subsurface concrete vault, which would reduce all related noise impacts. Because they are electric and would be installed below grade, sound generated by these pumps would not be audible at nearby sensitive receptors.

In addition to the known locations of Project infrastructure presented above, the Future Activity Allowance would involve construction of new wells, pipeline segments, and access roads during the operation and maintenance phase of the Project at locations that are presently unknown. The additional allowance would use the same equipment and procedures as those involved in the construction of the Project (as analyzed further in this section), and maximum noise impacts would be similar. The activities involved with the Future Activity Allowance would be more sporadic and intermittent as they would be performed based on unforeseen malfunctions or needs throughout the 30-year operation and maintenance phase of the Project. Construction activities associated with the Future Activity Allowance during operation and maintenance could exceed thresholds resulting in significant impacts. The Future Activity Allowance activities would involve the same equipment as construction activities. As shown in the table, activities related to construction would have significant impact. Therefore, activities related to the allowance would have significant impact. **Mitigation Measure NOISE-2** would be implemented for the construction activities during the long-term operation and maintenance phase (as it would during the initial construction phase). While implementation of this measure would reduce noise impacts to sensitive receptors during construction activities that could occur during operation and maintenance, impacts would remain significant and unavoidable.

Vibration

In terms of vibration, equipment such as air handling units, condenser units, exhaust fans, generators, and pumps produce vibration. In addition, the primary sources of transient vibration would include vehicle movement (forklifts, loaders, etc.) in the immediate vicinity of work areas. Groundborne vibration generated by each of the above-mentioned activities could generate approximately up to 0.005 inches per second (PPV) adjacent to the vibration source (FTA 2006). With the potential vibration sources at least 600 feet away from all sensitive receptors, the maximum vibration level exposed to those receptors would be significantly less. Caltrans provides that the vibration criterion of 0.04 inches per second PPV is a barely perceptible threshold. Vibration exposure would be less than the significance threshold of 0.04 PPV for perceptibility. As such, vibration impacts associated with operation of the Project would be below the significance threshold and impacts would be less than significant.

As a result, operation of the proposed Project would not result in any non-transportation noise sources that would generate noise levels that would result in a noticeable, permanent increase in ambient noise levels at nearby sensitive receptors or vibration impacts in excess of applicable thresholds. Therefore, this would be a less than significant impact.

Comparison of Impacts (Revised) to Groundwater FEIR Impact Analysis

The Groundwater FEIR determined that noise-related impacts associated with operation and maintenance would be less than significant and that no mitigation measures would be required. The analysis was focused primarily on the operational features of the remedy, such as structures, pipelines, and wells. Because more details are known regarding source-receptor distances and the specific infrastructure to be used, the analysis presented above quantitatively analyzed impacts from the operation of generators and pumps in those areas/processes with the potential to result in increases in off-site ambient noise levels and confirms the findings from the Groundwater FEIR. The detailed quantitative analysis indicates that operational impacts would be less than significant. However, consideration of construction activities that could occur during implementation of the Future Activity Allowance would be the source of significant noise impacts. Mitigation Measure NOISE-2 from the Groundwater FEIR, regarding construction-related noise, is required for construction activities that could occur during the long-term operation and maintenance phase; however, impacts would remain significant and unavoidable.

Mitigation Measures

Mitigation Measure NOISE-2: Potential Impacts to Noise Levels and Noise Standards (Groundwater FEIR Measure with Revisions).

- Construction equipment shall be properly maintained per manufacturer specifications and fitted with the best available noise-suppression devices (e.g., mufflers, silencers, wraps). All impact tools shall be shrouded or shielded, and all intake and exhaust ports on power equipment shall be muffled or shielded.
- Construction equipment shall not idle for extended periods of time (more than 15 minutes) when not being utilized during construction activities. A notable exception is when a support vehicle is needed to remain running for health and safety reasons (i.e., air conditioning), consistent with health and safety procedures.
- Construction activities shall include, but not limited to, the use of berms, stockpiles, dumpsters, and/or bins to shield the nearest noise-sensitive receptor adjacent to construction activities to within acceptable non-transportation noise level standards. When construction activities are conducted within the distances outlined earlier (i.e., 1,850 feet and 5,830 feet from California receptors and 330 feet and 735 feet from Arizona receptors for daytime and nighttime noise, respectively) relative to noise-sensitive uses in the project area, noise measurements shall be conducted under the supervision of a qualified acoustical consultant at the nearest noise-sensitive land use relative to the construction activities with a sound level meter that meets the standards of the American National Standards Institute (ANSI Section S14 1979, Type 1 of Type 2) to ensure that construction noise associated with the project component complies with applicable daytime and nighttime noise standards. Coordination with the Tribes and appropriate landowner(s) shall occur to allow opportunity for input in determining noise monitoring locations. If noise levels are still determined to exceed noise standards, temporary engineered acoustical barriers shall be erected as close to the construction activities as feasible, breaking the line of sight between the source and receptor where noise levels exceed applicable standards. Coordination with the Tribes shall occur in a manner consistent with the Cultural Impact Mitigation Program (CIMP; see Appendix H to the C/RAWP) throughout all Project phases, including input in determining constraints in locating temporary noise barriers to avoid or minimize physical impact to cultural resources. All acoustical barriers shall be constructed with material having a minimum surface weight of 2 pounds per square foot or greater and a demonstrated Sound Transmission Class (STC) rating of 25 or greater as defined by the American Society for Testing and Materials' Test Method E90. Placement, orientation, size, and density of acoustical barriers shall be specified by, or under the direct supervision of, a qualified acoustical consultant.
- A disturbance coordinator shall be designated by the PG&E, which will post contact information in a conspicuous location near groundwater project activity areas so that it is clearly visible to nearby noise-sensitive receptors as identified in Figure 4.7-1 and Interested Native American Tribes (Chemehuevi Indian Tribe, Cocopah Indian Tribe, Colorado River Indian Tribes, Fort Mojave Indian Tribe, and the Hualapai Indian Tribe). The coordinator will manage and thoroughly investigate complaints resulting from the Project-related noise to ensure resolution. Reoccurring disturbances will be evaluated by a qualified acoustical consultant retained by PG&E to ensure compliance with applicable standards. Noise

complaints shall be reported to DTSC as soon as practicable and no more than 72 hours upon receipt of complaint. Resolutions will be recorded, tracked, and reported to DTSC on a monthly basis. The disturbance coordinator will contact nearby noise-sensitive receptors as labeled in Figure 4.7-1 and Interested Tribes, advising them of the Project activity schedule. The disturbance coordinator will also consider the timing of Project activities in relation to Tribal ceremonial events that are sensitive to noise, which will be accommodated by PG&E to the extent practicable.

- This shall be achieved in part through annual project update mailings (could be combined with other annual project mailings) to potentially impacted owners/occupants of sensitive land uses to give notice of possible disturbances and impacts. The mailing shall also identify the disturbance coordinator's contact information.

Timing:	During all construction activities that occur during the initial construction phase, as well as during operation and maintenance and decommissioning.
Responsibility:	PG&E shall be responsible for the implementation of these measures. DTSC shall be responsible for ensuring compliance.
Significance after Mitigation:	The impact would be **significant and unavoidable** after implementation of the measure detailed above. Due to the nature of the Project, it is impossible to ensure that nearby receptors could not be impacted by construction activities.

Long-Term Operational-Related Transportation Noise Impacts. Operation of the proposed Project would not result in any transportation noise sources (material/equipment delivery, truck trips for off-site waste disposal, etc.) that would generate noise levels that would result in a noticeable, permanent increase in ambient noise levels at nearby sensitive receptors or vibration impacts in excess of applicable levels. Therefore, this would be a **less than significant impact**, as previously identified in the Groundwater FEIR.

Increases in noise at noise-sensitive receptors from transportation sources for the long-term operation and maintenance of the Project were predicted based on information for Project-generated traffic (LIN Consulting, Inc. 2016; see Appendix TRA). Long-term operational transportation noise would be primarily related to regular employee vehicle trips and regular operation and general maintenance activities (material/equipment delivery, truck trips for off-site waste disposal, etc.). As shown in **Table 4.7-12**, operational noise associated with the proposed Project would result in a net increase of 0.3 dBA along Park Moabi Road and 0.7 dBA along I-40 during the "Existing Plus Project Scenario," which is estimated to occur in 2017. This increase would not be audible to the human ear. As shown in **Table 4.7-13**, long-term operation of the proposed Project would result in a net increase of 3.0 to 3.7 dBA along Park Moabi Road and 2.2 dBA along I-40 during the "Future Plus Project" scenario, which is estimated to occur in 2020. The data are representative of noise levels 25 feet away from the roadway centerline.

TABLE 4.7-12
SUMMARY OF MODELED TRAFFIC NOISE LEVELS (EXISTING PLUS PROJECT – 2017)

		CNEL at 25 feet (dBA)				
Roadway	**Segment**	**Existing (2016)**	**Existing Plus Project**	**Net Change**	**Significance Threshold**	**Exceedance**
Park Moabi Road	North of I-40	54.8	55.1	0.3	5	No
Park Moabi Road	South of I-40	51.3	51.6	0.3	5	No
I-40 [a]	From Park Moabi Road to Stateline	53.4	54.1	0.7	3	No

NOTES:
dB = A-weighted decibels; CNEL = community noise equivalent level .

[a] At this location, based on prior measurements, contributions from non-roadway sources may result in ambient noise levels greater than 60 dBA.

SOURCE: ESA 2016 (see Appendix NOI).

TABLE 4.7-13
SUMMARY OF MODELED TRAFFIC NOISE LEVELS (FUTURE PLUS PROJECT – 2020)

		CNEL at 25 feet (dBA)				
Roadway	**Segment**	**Future No Project (2020)**	**Future (2020) Plus Project**	**Net Change**	**Significance Threshold**	**Exceedance**
Park Moabi Road	North of I-40	55.3	58.3	3.0	5	No
Park Moabi Road	South of I-40	52.1	55.8	3.7	5	No
I-40[a]	From Park Moabi Road to Stateline	54.0	56.2	2.2	3	No

NOTES:
dB = A-weighted decibels; CNEL = community noise equivalent level .

[a] At this location, based on prior measurements, contributions from non-roadway sources may result in ambient noise levels greater than 60 dBA.

SOURCE: ESA 2016 (see Appendix NOI).

The increases of 0.3 and 0.7 dBA in 2017 and 3.0 and 3.7 dBA in 2020 would not exceed the 5 dBA threshold applicable to the Park Moabi Road segments (the level considered substantial for areas where ambient noise levels are less than 60 dBA CNEL). As discussed earlier, validation of the noise monitoring data by calculating noise levels based on traffic data demonstrates that noise in the vicinity of Park Moabi Road is dominated by roadway noise. Thus, the ambient noise levels of 51.3 to 55.3 dBA that are calculated based on existing and future traffic movements (shown in Tables 4.7-12 and 4.7-13) are considered representative of ambient conditions. The validation calculations based on traffic data to confirm the noise monitoring results along I-40 indicate that other sources of noise, possibly from trains along the nearby BNSF Railway tracks, boats on the Colorado River, or noise from normal operations of the Station, would normally contribute some measureable noise levels to the ambient conditions along the major Interstate. As a conservative basis, because the additional noise contribution to the ambient noise conditions from non-roadway sources cannot be estimated in the future, the more stringent threshold of 3 dBA was applied to I-40 segment as if ambient noise levels are greater than 60 dBA. The increases of 0.7 dBA in 2017 and 2.2 dBA in 2020 for existing and future conditions, respectively, do not exceed the conservative 3 dBA threshold along the I-40 segments. Thus, Project-generated traffic noise would not result in a substantial permanent increase in ambient noise levels relative to existing sensitive receptors in the Project Area above levels existing without the Project or expose persons to or generate noise levels in excess of applicable standards. As a result, this impact would be less than significant and no mitigation would be required.

Transportation noise impacts from the Future Activity Allowance would be immaterial as the activities would be sporadic and intermittent. In addition, the number of vehicles, consisting mostly of haul trucks and employee vehicles, would not noticeably change the overall traffic numbers in the Project Area. Therefore, operational-related transportation impacts from the Future Activity Allowance would be less than significant and no mitigation would be required.

Comparison of Impacts (Revised) to Groundwater FEIR Impact Analysis

The Groundwater FEIR determined that transportation-noise-related impacts associated with operation and maintenance would be less than significant. Although the specific locations of Project infrastructure and main transportation corridors to be used are identified more specifically in this SEIR, the proposed Project's impact on operational transportation noise is not predicted to exceed applicable thresholds, similar to the conclusion in the Groundwater FEIR. Therefore, the operation of the Project would result in a less than significant impact and no mitigation is required.

IMPACT NOISE-2 **Groundborne Vibration Impacts Caused by Construction Activities.** Implementation of the proposed Project would result in the exposure of sensitive receptors to groundborne vibration levels that exceed the applicable standards of the San Bernardino County Development Code (83.01.090) and the Mohave County Zoning Ordinance. These groundborne vibration levels could result in annoyance or architectural/structural damage. As a result, this impact would be **potentially significant**, as previously identified in the Groundwater FEIR.

The proposed Project would involve construction activities over a 5-year period that would involve drilling of boreholes to support remediation and monitoring wells; trenching for pipeline construction; access road improvements and installation; and new buildings and other infrastructure to support the Project. Typical construction activities included as part of the Project would not result in significant vibration impacts, consistent with the analysis contained in the Groundwater FEIR. This is because reference vibration levels for these types of equipment based on FTA documents would generate PPV levels below what is considered perceivable. However, the drilling and large bulldozers equipment that would be used in the installation of boreholes for wells would result in the worst-case vibration impacts to nearby sensitive receptors. Therefore, the analysis below is focused on the specific locations of wells presented in the Final Remedy Design (see also Figure 3-3 series in Chapter 3, "Project Description" of this SEIR).

Vibration standards would be exceeded when construction activities occur within 30 feet and 275 feet from a vibration-sensitive land use when conducted in the California and Arizona parts of the Project Area, respectively. It also found that if construction, and particularly the drilling of wells due to the type of equipment used, was to occur within these distances (30 feet in California and 275 feet in Arizona) of a vibration-sensitive land use, damage to property or structures could occur, thus resulting in a significant impact. In regard to annoyance and/or sleep disruption related to vibration-sensitive receptors, it was anticipated that vibration standards would be exceeded when these activities occur within 45 feet. If construction, particularly of wells given the equipment use, were to occur within this distance (45 feet) of a vibration-sensitive receptor, annoyance and/or sleep disruption could occur. The closest construction activity to a nearest Tribal sensitive receptor is a monitoring well to be constructed 57 feet away. This construction activity is in California, and it is not within 30 feet of vibration-sensitive land use. Therefore, groundborne-vibration impacts from construction activities associated with the known remediation components would be less than significant.

The proposed Project includes a Future Activity Allowance, which may involve construction of new wells, pipeline segments, access roads, and other Project facilities as needed to support the remedy. The installation of additional boreholes specifically could result in the most vibration-sensitive equipment usage like drill rigs and bulldozers explained above. Implementation of the Future Activity Allowance could occur either during the initial 5-year construction period, or at any time during the long-term operation and maintenance phase. The locations of these potential activities are not known—they could be located near sensitive receptors. For example, construction of boreholes may be located within 30 feet of vibration sensitive receptors in California or within 275 feet of vibration sensitive receptors in Arizona. As a result, this impact would be potentially significant. Implementation of **Mitigation Measure NOISE-1** would require a minimum of 45 feet between sensitive receptors and Project activity, when feasible, and involvement of a disturbance coordinator. Compliance with this mitigation measure would reduce vibration-related impacts during construction activities to less than significant levels.

Comparison of Impact NOISE-1 Construction Groundborne Vibration and Noise Impacts (Revised) to Groundwater FEIR Impact Analysis

The Groundwater FEIR determined that construction of the Project would result in short-term significant groundborne vibration impacts to sensitive receptors. Implementation of Mitigation Measure NOISE-1 would require new wells to be constructed 45 feet from vibration-sensitive receptors, and would require a disturbance coordinator to manage complaints and require an acoustical consultant for reoccurring disturbances. With implementation of Mitigation Measure NOISE-1, impacts were reduced to a less than significant level. The number of Project features has overall increased for the Final Groundwater Remedy Design and the Future Activity Allowance may result in construction of new wells in locations within 30 feet of sensitive receptors, resulting in significant impacts. This could occur during initial construction or during the long-term operation and maintenance phase. Compliance with this mitigation measure would reduce vibration-related impacts during construction activities to a less than significant level.

Mitigation Measures

Mitigation Measure NOISE–1: Short-Term Groundborne Vibration Levels Caused by Project Activities Near Sensitive Receptors (Groundwater FEIR Measure with Revisions).

- New wells shall be constructed a minimum of 45 feet from vibration-sensitive receptors, as feasible. Constructing new wells within 30 feet of vibration-sensitive land uses located in California and 275 feet of vibration-sensitive land uses located in Arizona shall be avoided.
- A disturbance coordinator shall be designated by PG&E, which will post contact information in conspicuous locations near Project activity areas such as on construction fencing or trailers, but with consideration to culturally sensitive areas such as the Topock Maze. Signage will be clearly visible to nearby vibration-sensitive receptors as identified in Figure 4.7-1. The coordinator will manage complaints resulting from the construction vibration. Reoccurring disturbances will be evaluated by a qualified acoustical consultant retained by the project applicant to ensure compliance with applicable standards. The disturbance coordinator will contact nearby vibration-sensitive receptors, advising them of the construction schedule. This shall be achieved in part through annual project update mailings (could be combined with other annual project mailings) to owners/occupants of potentially impacted sensitive land uses to give notice of possible disturbances and impacts. The mailing shall also identify the disturbance coordinator's contact information.

Timing:	Upon commencement of construction activities being performed in proximity to vibration-sensitive receptors.
Responsibility:	PG&E shall be responsible for the implementation of these measures. DTSC shall be responsible for ensuring compliance.
Significance after Mitigation:	The impact would be **less than significant** after implementation of the measures detailed above. Mitigation Measure NOISE-1 would ensure construction of new wells would occur sufficient distances from vibration-sensitive land uses and receptors to prevent property damage and annoyances.

IMPACT NOISE-3

Project-Generated Construction-Related Noise Levels. Implementation of the proposed Project would result in intermittent construction activities associated with the installation of new wells, roadways, water conveyance, utilities, water filtration facilities, and structures. These construction activities could potentially expose sensitive receptors to noise levels in excess of the applicable noise standards and/or result in a substantial increase in ambient noise levels. As a result, this impact would be **potentially significant**, as previously identified in the Groundwater FEIR.

Construction-Related Equipment Noise

Borehole Construction

As discussed earlier, the type of construction equipment for the proposed Project would not differ substantially from the equipment identified in the Groundwater FEIR for borehole construction. The Groundwater FEIR assumed all construction would occur between the hours of 7:00 a.m. and

7:00 p.m. As described in Section 3.7.7, "Project Working Hours," in the Project Description, the primary working hours for field construction activities would be between 7:00 a.m. and 5:00 p.m., Monday through Friday. However, some activities could occur outside these hours, such as mobilization, survey efforts, and equipment deliveries. Additionally, variations of the typical work day schedule could be modified and result in work outside of the 7:00 a.m. to 5:00 p.m. timeframe. The noise analysis thus accounts for activities at various work times.

Additionally, the Final Groundwater Remedy Design places wells at specific locations. The closest distance between a borehole construction site and a Tribal sensitive receptor is between a proposed well location at 57 feet. Construction activities conducted within 1,850 feet and 5,830 feet from California receptors would exceed San Bernardino County's daytime and nighttime noise standards of 55 dB and 45 dB L_{eq}, respectively. Construction activities conducted within 330 feet and 735 feet from Arizona receptors would exceed Mohave County's daytime and nighttime noise standards of 70 dB and 63 dB $L_{eq,}$ respectively. Because borehole construction activity would occur within these distances, borehole activity would cause a significant noise impact under the San Bernardino County and Mohave County standards. As a result, noise impacts from well construction activities would be significant. Mitigation Measure NOISE-2 would reduce noise levels; however, impacts would remain significant and unavoidable.

Soil Processing/Clean-Soil Storage Area and Construction Headquarters

Construction activities within the Soil Processing/ Clean-Soil Storage Area and Construction Headquarters would involve off-road equipment such as tractor, backhoe, concrete pump truck, concrete mixer truck, dump truck, excavator, vacuum street sweeper, dozer, generator, manlift, and front end loader. The noise level for these equipment ranges from 74 dB to 82 dB. As shown in **Table 4.7-14**, there are two sensitive receptors located in close proximity to the Soil Processing/ Clean-Soil Storage Area.

For the single-family residences between Park Moabi Road and National Trails Highway, located 1,100 feet northeast from the Soil Processing/Clean-Soil Storage Area, construction activities would result in noise level of approximately 59.3 dBA. This would result in an increase of 10.7 dBA above the ambient sound level of 49.0 dBA. This would exceed the 5 dBA increase (the level considered significant for areas where ambient noise levels are less than 60 dB) threshold. The California San Bernardino County's noise standard for 55 dBA during daylight hours in residential areas would also be exceeded. The noise impacts from the Soil Processing Facility to this receptor would be significant.

The second sensitive receptor impacted would be the Pirate Cove Resort, located 2,300 feet northeast from the Soil Processing/ Clean-Soil Storage Area. Construction activities would result in noise level of approximately 52.9 dBA at this sensitive receptor. This would result in an increase of 5.4 dBA above the ambient sound level of 49.0 dBA. This would exceed the 5 dBA increase (the level considered significant for areas where ambient noise levels are less than 60 dB) threshold. The noise impacts from the Soil Processing/Clean-Soil Storage Area to this receptor would be significant.

TABLE 4.7-14
ESTIMATE OF NEW CONSTRUCTION NOISE LEVELS (L_{EQ}) AT EXISTING OFF-SITE SENSITIVE RECEIVER LOCATIONS

Noise-Sensitive Receptor	Nearest Construction Activity (not including boreholes)	Ambient Sound Level L_{eq} (dBA)	Distance between Nearest Receptor and Construction Activity (feet)	Estimated Construction Noise Levels at the Noise-Sensitive Receptor by Construction Phase,[a] Hourly L_{eq} (dBA)[c]	Combined Sound Level L_{eq} (dBA)[c]	Ambient Sound Level Increase	Exceed Threshold?
Daytime Noise Levels (7:00 a.m.-10:00 p.m.)							
Single-family residences between Park Moabi Road and National Trails Highway	Soil Processing/ Clean-Soil Storage Area and Construction Headquarters	49.0	1,100	59.3	59.7	10.7	**Yes**
Pirate Cove Resort	Soil Processing/ Clean-Soil and Construction Headquarters	49.0	2,300	52.9	54.4	5.4	Yes
Residences located on the south side of I-40 in Arizona	Pipeline Construction and Staging Area 26	43.5[2]	220	73.3	73.3	29.8	**Yes**
Topock 66 Spa & Resort and adjacent residences	Pipeline Construction and Staging Area 27	43.5[2]	180	75.1	75.1	31.6	**Yes**
Tribal Sensitive Receptor	IM-3 Decommissioning	43.5	600	71.8	71.8	28.3	**Yes**
Tribal Sensitive Receptor	IM-3 Decommissioning	46.2	1,200	65.8	65.8	19.6	**Yes**
Tribal Sensitive Receptor	IM-3 Decommissioning	42.8	2,400	59.8	59.9	17.1	**Yes**
Early Morning Noise Levels (5:00 a.m.-7:00 a.m.)							
Single-family residences between Park Moabi Road and National Trails Highway	Soil Processing/ Clean-Soil Storage Area and Construction Headquarters	42.0	1,100	59.3	59.4	17.4	**Yes**
Pirate Cove Resort	Soil Processing/ Clean-Soil Storage Area and Construction Headquarters	42.0	2,300	52.9	53.2	11.2	Yes
Residences located on the south side of I-40 in Arizona	Pipeline Construction and Staging Area 26	36.5[b]	220	73.3	73.3	36.8	**Yes**
Topock 66 Spa & Resort and adjacent residences	Pipeline Construction and Staging Area 27	36.5[b]	180	75.1	75.1	38.6	**Yes**
Tribal Sensitive Receptor	IM-3 Decommissioning	36.5	600	71.8	71.8	35.3	**Yes**

TABLE 4.7-14
ESTIMATE OF NEW CONSTRUCTION NOISE LEVELS (L_{EQ}) AT EXISTING OFF-SITE SENSITIVE RECEIVER LOCATIONS

Noise-Sensitive Receptor	Nearest Construction Activity (not including boreholes)	Ambient Sound Level L_{eq} (dBA)	Distance between Nearest Receptor and Construction Activity (feet)	Estimated Construction Noise Levels at the Noise-Sensitive Receptor by Construction Phase,[a] Hourly L_{eq} (dBA)[c]	Combined Sound Level L_{eq} (dBA)[c]	Ambient Sound Level Increase	Exceed Threshold?
Tribal Sensitive Receptor	IM-3 Decommissioning	39.3	1,200	65.8	65.8	26.5	**Yes**
Tribal Sensitive Receptor	IM-3 Decommissioning	35.8	2,400	59.8	59.8	24.0	**Yes**

NOTES:
[a] Estimated construction noise levels represent the worst-case condition when noise generators are located closest to the receptors and are expected to last the entire duration of each construction phase.
[b] These locations are a similar distance to I-40 and would have a similar ambient sound level.
[c] Construction equipment assumptions for each construction activity is detailed in the model outputs in Appendix NOI.

SOURCE: LIN Consulting 2016 (see Appendix TRA).

Pipeline Construction and Staging Areas 26 & 27

Construction activities for pipeline construction in Arizona and staging activities in Areas 26 and 27 involve off-road equipment such as tractor, backhoe, concrete pump truck, concrete mixer truck, dump truck, excavator, vacuum street sweeper, dozer, generator, manlift, and front end loader. The noise level for these equipment ranges from 74dB to 82 dB.

As shown in Table 4.7-14, the nearest sensitive receptor to Staging Area 26 are residences located on the south side of I-40 in Arizona, 200 feet away. Construction activities would result in noise levels of approximately 73.3 dBA at this sensitive receptor. This would result in an increase of 29.8 dBA above the ambient sound level of 43.5 dBA. This would exceed the 5 dB increase (the level considered significant for areas where ambient noise levels are less than 60 dB) threshold. The noise impacts resulting from Project activities in Staging Area 26 to this receptor would be significant.

The nearest sensitive receptor to Staging Area 27 is Topock 66 Spa & Resort and adjacent residences, located 180 feet away. Construction activities would result in noise levels of approximately 75.1 dBA at this sensitive receptor. This would result in an increase of 31.6 dBA above the ambient sound level of 43.5 dBA. This would exceed the 5 dB increase (the level considered significant for areas where ambient noise levels are less than 60 dB) threshold. The noise impacts resulting from Project activities in Staging Area 27 to this receptor would be significant.

IM-3 Facility Decommissioning

IM-3 Facility decommissioning activities would involve off-road equipment such as cranes, backhoes, dump trucks, excavators, vacuum street sweepers, front end loaders, shears, and mounted impact hammers. The noise level for these equipment ranges from 74 dB to 97 dB. As shown in Table 4.7-14, the IM-3 Facility decommissioning activities would occur near three sensitive receptor areas, discussed below and on the next page.

The first sensitive Tribal receptor is located approximately 600 feet away from the IM-3 Facility decommissioning activities. Decommissioning activities would result in noise levels of approximately 71.8 dBA at this sensitive receptor, which would result in an increase of 28.3 dBA above the ambient sound level of 43.5 dBA. This would exceed the 5 dB increase (the level considered significant for areas where ambient noise levels are less than 60 dB) threshold. The noise impacts from decommissioning activities to this receptor would be significant.

The second Tribal sensitive receptor is located approximately 1,200 feet away from the IM-3 Facility decommissioning activities. Decommissioning activities would result in noises level of approximately 65.8 dBA. This would result in an increase of 19.6 dBA above the ambient sound level of 46.2 dBA. This would exceed the 5 dB increase (the level considered significant for areas where ambient noise levels are less than 60 dB) threshold. The noise impacts from decommissioning activities to this receptor would be significant.

The third Tribal sensitive receptor is located approximately 2,400 feet away from IM-3 Facility decommissioning activities. Decommissioning activities would result in noise level of approximately 59.8 dBA at this sensitive receptor. This would result in an increase of 17.1 dBA above ambient sound level of 42.8 dBA. This would exceed the 5 dB increase (the level considered significant for areas where ambient noise levels are less than 60 dB) threshold. The noise impacts from decommissioning activities to this receptor would be significant.

It should be noted that there are several intervening topographic features (mesas) between California construction activities and Moabi Regional Park. The mesas would fully or partially break line of sight (and therefore sound travel path) between construction activities and sensitive receptors using Moabi Regional Park, and would therefore be expected to reduce Project-generated construction noise levels during both the daytime and nighttime hours at Moabi Regional Park to inaudible or immeasurable levels. Similarly, vegetation along the Colorado floodplain would help diminish construction-related noise along many portions of the Colorado River. However, a maximum noise scenario is provided above. Impacts would be significant and unavoidable, even after implementation of all feasible strategies contained within Mitigation Measure NOISE-2. Ambient noise measurements indicate that evening hours (after 7:00 p.m.) are similar to those observed during daytime (7:00 a.m. and 7:00 p.m.) and that during early morning (5:00 a.m. to 7:00 a.m.) sound level averages can be up to 7 dBA lower than daytime averages. As shown in Table 4.7-14, this means that construction activities during this period would cause higher noise level increases from ambient noise levels. As described above, it is possible that construction activities would occur in this time period. Therefore, impacts from construction-related non-transportation noise would be significant and unavoidable.

Construction-Related Traffic Noise

As shown in **Table 4.7-15**, existing traffic in the Project Area generates between approximately 51 to 56 dBA CNEL at 25 feet. This sound level would increase to between 52 dBA to 56 dBA CNEL with the inclusion of construction haul trucks, vendor trips, and worker trips during Project construction. Many of the worker trips would be contained within the Project Area. However these trips would use local roadway to access various Project components. It was assumed that 104 total trips (LIN Consulting, Inc. 2016; see Appendix TRA) would be made in and around the Project Area between haul trucks, workers, and delivery vehicles. Detailed calculations are provided in Appendix TRA to this SEIR.

TABLE 4.7-15
SUMMARY OF MODELED CONSTRUCTION TRAFFIC NOISE LEVELS (2016)

		CNEL at 25 feet (dBA)				
Roadway	**Segment**	**Existing**	**Existing Plus Haul Trucks**	**Net Change**	**Significance Threshold**	**Exceedance**
Park Moabi Road	North of I-40	54.8	55.1	0.3	5	No
Park Moabi Road	South of I-40	51.3	51.6	0.3	5	No
I-40	From Park Moabi Road to Stateline	53.4	54.1	0.7	3	No

NOTES:
dB = A-weighted decibels; CNEL = community noise equivalent level.

SOURCE: LIN Consulting 2016 (see Appendix TRA).

The nearest Tribal sensitive receptor to roadways which were analyzed in the traffic study is located approximately 50 feet from the I-40 right of way at the nearest point. At 50 feet, the sound level at this location would be approximately 52.3 dBA CNEL. The increase of 0.3 dBA would not exceed the 5 dBA threshold applicable to the Park Moabi Road segments (the level considered substantial for areas where ambient noise levels are less than 60 dBA CNEL).

As discussed previously, validation of the monitoring data demonstrated that noise in the vicinity of Park Moabi Road is dominated by roadway noise. Thus, the noise level of 54.8 dBA calculated based on existing and future traffic movements (shown on Table 4.7-15) is considered representative of ambient conditions. The validation calculations for noise monitoring along I-40, discussed above, indicate that other sources of noise, possibly from trains along the nearby tracks, boats on the Colorado River, or noise from normal operations of the Station, would normally contribute some measureable noise levels to the ambient conditions along the Interstate. As a conservative basis, because the additional noise contribution from non-roadway sources cannot be estimated in the future, the more stringent threshold of 3 dBA was applied to I-40 segment as if ambient noise levels are greater than 60 dBA. The increase of 0.7 dBA for existing and future conditions does not exceed the conservative 3 dBA threshold along the I-40 segments. Construction-related traffic noise impact would be less than significant and no mitigation would be required.

The Future Activity Allowance would involve construction of new wells, pipeline segments, and access roads during the construction and operation and maintenance phases of the Project at locations that are presently not known. The additional allowance would use the same equipment and procedures as those involved in the construction of the Project, and maximum noise impacts would be similar. The activities involved with the Future Activity Allowance would be more sporadic and intermittent as they would be performed based on unforeseen malfunctions or needs throughout the 5-year construction phase of the Project. Activities associated with the Future Activity Allowance during construction and operation and maintenance would require mitigation measures outlined in Mitigation Measures NOISE-2. Since the allowance activities would have the same equipment as construction activities, please refer to Table 4.7-14 for noise impacts. As shown in the table, activities related to construction would have significant impact. Therefore, activities related to the Future Activity Allowance would have a significant and unavoidable impact.

Decommissioning

Typical equipment that may be used for decommissioning wells includes drill rigs, support vehicles, backhoes, dump trucks, front loaders, cement trucks or trailers, and/or pump service trucks. The length of time required to decommission a well is anticipated to be between 1 day and 2 weeks per well depending on the procedure, location, condition, and design of the well. Decommissioning activities would use the similar equipment and procedures as the construction of the Project, and maximum noise impacts would be similar. Construction activities associated with decommissioning would require application of Mitigation Measures NOISE-2; however, impacts would remain significant and unavoidable.

Comparison of Impact NOISE-2 Project-Generated Construction Impacts (Revised) to Groundwater FEIR Impact Analysis

The Groundwater FEIR determined that construction of the Project would result in significant noise impacts to sensitive receptors. Implementation of Mitigation Measure NOISE-2 would require construction activities require a disturbance coordinator to manage complaints and require an acoustical consultant for reoccurring disturbances. Mitigation Measure NOISE-2 would not be able to reduce impacts and impacts would be significant and unavoidable.

IMPACT NOISE-4 **Land Use Compatibility of Future Project Noise Levels with the Topock Traditional Cultural Property.** Implementation of the proposed Project could result in future noise (construction, operation and maintenance, and decommissioning activities) that could result in conflicts with land use compatibility that exceed San Bernardino County standards for Places of Worship or conflict with Native American values associated with the Topock Traditional Cultural Property (TCP). As a result, this impact would be **potentially significant**, as previously identified in the Groundwater FEIR.

Implementation of the proposed Project could result in future noise that could expose the Topock TCP, a place of worship for Native Americans, to noise levels that exceed San Bernardino County standards for a place of worship or would conflict with Native American values associated with this resource. As noted in Section 4.4, "Cultural Resources" of this SEIR, the Topock TCP is considered highly sensitive, and changes in the noise environment would adversely affect Native American participants. Construction, operation and maintenance, and decommissioning of the proposed Project would result in noise levels that conflict with the use of this area.

The ambient noise levels at the three Tribal sensitive receptors are 39 dBA to 64 dBA, 42.8 dBA to 61 dBA, and 37 dBA to 75 dBA during the 7:00 a.m. to 7:00 p.m. period, and considerably lower during the early morning hours of 5:00 a.m. to 7:00 a.m. Noise levels resulting from construction, operation and maintenance, and decommissioning phases (see analysis in previous sections) of the Project could result in noise levels that could expose the Topock TCP to levels that exceed the County's standards and that would conflict with Native American values associated with this resource.

Project-related noise levels would exceed applicable County standards for a place of worship and could consequently result in a temporary substantial increase in ambient noise levels, especially if Project activities would occur during the nighttime hours. Ambient noise levels at existing noise-sensitive land uses may experience increased noise levels due to various construction, operation and maintenance, and decommissioning activities. As a result, this impact would be potentially significant. Mitigation Measures NOISE-1 and NOISE-2 would reduce potential impacts related to noise. In addition, CUL-1a-12 would ensure specifically that accommodations for Tribal ceremonies are provided for during construction activities. However, due to the heightened sensitivity and use of the area, impacts are considered significant and unavoidable after implementation of these measures.

Comparison of Impact NOISE-3 Noise Impacts to the Topock TCP (Revised) to Groundwater FEIR Impact Analysis

The Groundwater FEIR determined that construction, operation and maintenance, and decommissioning of the Project would result in significant noise impacts to applicability of San Bernardino Country standards for a place of worship associated with the Topock Traditional Cultural Area. Implementation of Mitigation Measure NOISE-1 and NOISE-2 would limit construction of Project features within 45 feet of sensitive receptors (Topock TCP), implement acoustic shields to limit noise to sensitive receptors, and require a disturbance coordinator. Since certification of the Groundwater FEIR, the Project Area has been identified as a Traditional Cultural Place, and impacts to this place of worship would remain significant. Even with implementation of mitigation measures, this impact would remain significant and unavoidable.

4.8 Utilities, Service Systems, and Energy

4.8.1 Introduction

This section describes the reasonably foreseeable and potentially significant adverse environmental effects of the Pacific Gas and Electric Company (PG&E) Topock Compressor Station Final Groundwater Remediation Project (Final Groundwater Remedy Project or proposed Project) as identified in the Project Description of this subsequent environmental impact report (SEIR) and related to utilities, service systems, and energy in the Project Area. Specifically, this section considers the potentially significant adverse effects of the proposed Project during the construction, operation and maintenance, and decommissioning phases, as compared to those identified in the Topock Compressor Station Groundwater Remediation Project Final EIR (Groundwater FEIR; DTSC 2011), consistent with Public Resources Code Section 21166 and California Environmental Quality Act (CEQA) Guidelines Sections 15162 and 15168, and including changes in impacts related to new or expanded water, wastewater treatment, or stormwater drainage facilities; landfill capacities; energy consumption; or renewable or energy efficiency measures.

The impact evaluation in the utilities, service systems, and energy resources section of the Modified Initial Study (see Appendix IS) explains why the proposed Project would not result in new significant impacts or substantially increase the severity of previously identified significant impacts on utilities, service systems, and energy.

Project impacts on water supply are analyzed in Section 4.9, “Water Supply,” and potential Project impacts to wastewater treatment requirements are analyzed in Section 4.6, “Hydrology and Water Quality” of this SEIR.

4.8.2 Summary of 2011 Groundwater FEIR Utilities and Service Systems Analysis

The Utilities and Service Systems section of the Groundwater FEIR included a detailed discussion of the environmental setting and potential effects of the proposed remedy on utilities and service systems. Energy was addressed in Chapter 5 and Other CEQA Sections of the Groundwater FEIR. Although largely programmatic, the Groundwater FEIR provided a detailed analysis of the construction and operation of physical facilities anticipated at that time to be necessary to implement the groundwater remedy. The Groundwater FEIR also included a project-level analysis of the conceptual technical methods selected for the final remedy. This SEIR incorporates the analysis in the Groundwater FEIR by reference and evaluates, on a project specific level, the potential effects associated with construction and operation of the *Basis of Design Report/Final (100%) Design Submittal for the Final Groundwater Remedy, PG&E Topock Compressor Station, Needles, California, November* (Final Remedy Design; CH2M Hill 2015a) and the *Construction/Remedial Action Work Plan for the Final Groundwater Remedy* (C/RAWP; CH2M Hill 2015b) that were unknown at the time the analysis was conducted for the Groundwater FEIR. The Final Remedy Design is included in its entirety as Appendix BOD to this SEIR. Information included in the utilities and service systems, and energy resources analysis of the Groundwater FEIR is summarized in the following pages.

4.8.2.1 Setting Identified in 2011 Groundwater FEIR

The following summarizes the environmental setting and analysis relative to utilities, service systems, and energy resources described in the Groundwater FEIR.

Wastewater

The Groundwater FEIR described the manner in which treated groundwater, domestic graywater, and sewage from the PG&E Topock Compressor Station (Station) was managed. The Groundwater FEIR stated that the Interim Measure 3 Groundwater Extraction and Treatment Facility (IM-3 Facility) discharged treated groundwater, sewage, and graywater to a 2,000-gallon storage tank, which was pumped into a tanker truck and disposed of by a wastewater disposal contractor approximately every 2 weeks (104,000 gallons annually). Only solid waste and waste saltwater, containing chromium solids, laboratory waste, and oily waste resulting from the IM-3 Facility treatment process, were trucked off-site for disposal. The IM-3 Facility treatment system remains the same since the Groundwater FEIR was certified in 2011.

The Groundwater FEIR stated that the Waste Discharge Requirements (WDRs) were issued by the Colorado River Basin Regional Water Quality Control Board (RWQCB) for discharges associated with industrial activities within its jurisdiction. At the time the Groundwater FEIR was certified, the Station operated under Order No. 97-03-DWQ (General Permit No. CAS000001 [General Industrial Permit]). This Order was superseded by Order 2014-0057-DWQ (General Industrial Storm Water Permit, NPDES No. CAS000001). WDRs were issued to PG&E for discharging treated groundwater by three different methods at the Station: discharge to the Colorado River, discharge to land by subsurface injection, and discharge to Class II surface impoundments. Current discharge is by subsurface injection; discharge to the Colorado River never occurred and is no longer being considered. Currently, PG&E's discharge by subsurface injection is under the oversight of the U.S. Department of the Interior (DOI) under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) exemption for permits. As discussed in Section 4.6, "Hydrology and Water Quality," the current WDRs for the evaporation ponds do not include the discharge of the remedy-produced water to the ponds and would require a revision of the WDR and acceptance by the RWQCB. No changes to the existing sanitary wastewater treatment and collection system have occurred since certification of the Groundwater FEIR, and therefore the description of on-site operation and maintenance has not changed since certification of the Groundwater FEIR.

Stormwater

The Groundwater FEIR stated that the IM-3 Facility had a general permit to discharge stormwater to the surrounding landscape and dry washes from the Colorado Basin RWQCB. To comply with the general permit, a Stormwater Pollution Prevention Plan (SWPPP) and Notice of Intent (NOI) were required. At the time the Groundwater FEIR was certified, the Station was operating under Waste Discharge Identification Number 736IO19443. An SWPPP for the Topock Project Area was prepared to identify sources of pollutants that could affect discharges. The SWPPP described best management practices (BMPs) to reduce pollutants in discharges that may impact receiving water quality. As described above, in 2011 the IM-3 Facility injected treated groundwater back into the aquifer and does not discharge treated water to the surrounding landscape. No changes to the existing stormwater discharge system have occurred since adoption of the Groundwater FEIR, and therefore the setting description has not changed since certification of the Groundwater FEIR. Section 4.6 of this SEIR, "Hydrology and Water Quality," describes permitting requirements for stormwater runoff that may occur during ground-disturbing construction activities associated with the activities described in the Groundwater FEIR.

Electricity and Natural Gas

The Groundwater FEIR stated that the City of Needles supplied electricity to PG&E for operation and maintenance at the Station and within the Project Area as a commercial customer. The City of Needles provided electricity for the existing IM-3 Facility and Station via their electrical distribution system, including the Eagle Pass Substation and a 12,470 volt line with a conductor size of #4 aluminum-conductor steel-reinforced cable (ACSR). In 2011, the Station primarily generated and still generates its own electricity on-site, but can rely on backup supply from the City of Needles, as needed. At the time the Groundwater FEIR was certified, the Station and the IM-3 Facility required approximately 1.6 million total kilowatt-hours (kWh) annually. Updated setting information on electricity and natural gas is included in Section 4.8.3.1.

As described in the Groundwater FEIR, the IM-3 Facility experienced periodic electrical outages using the City of Needles' distribution system, primarily during lightning storms and secondarily from equipment failure. While the electrical outages were infrequent, the IM-3 Facility was configured with a diesel-fueled emergency generator, which provided sufficient electricity to continue the operation of IM-3 Facility during an outage. According to the Groundwater FEIR, PG&E would continue to maintain an emergency generator for the IM-3 Facility during the operation of the Project. Updated setting information on electricity and natural gas is included in Section 4.8.3.1.

Natural gas used at the Station is drawn from the pipeline itself. The IM-3 Facility does not currently use natural gas. Southwest Gas Company would serve the IM-3 Facility if gas were required and has existing lines adjacent to the Station.

Solid Waste Disposal

The Groundwater FEIR identified Allied Waste Services as the solid non-hazardous waste provider for the Station. At the time the Groundwater FEIR was published, PG&E produced approximately 520 cubic yards per year of operational/incidental non-hazardous solid waste. Allied Waste Services provided large steel roll-off bins that when full were removed from the Station. The contents of these roll-off bins were generally disposed of at the Mohave Valley Landfill, east of Bullhead City, Arizona. Other landfills identified in the Groundwater FEIR serving the Station include Kettleman Hills, Landers Sanitary, Barstow Sanitary, California Street, Victorville Sanitary, and Mohave Valley Landfills. These conditions have not changed since certification of the Groundwater FEIR.

The Groundwater FEIR identified that operation of the IM-3 Facility produced 90 cubic yards per year of residual waste stream, or sludge, from the chromium reduction treatment system. This sludge is considered a hazardous waste because of its toxicity, and was sent on a monthly basis for disposal at the Kettleman Hills Landfill in Kings County, California. This waste was and still is transported to the permitted Chemical Waste Management Landfill in Kettleman Hills, California. The Groundwater FEIR described the Kettleman Hills Landfill as a chemical waste disposal and treatment site with a capacity of 5,700,000 cubic yards. The Kettleman Hills Landfill is a CERCLA-approved facility that offers hazardous waste treatment storage and disposal options. Updated setting information with regard to existing landfill capacities is included in Section 4.8.3.

Energy

The Groundwater FEIR addressed how the Project would result in the irreversible and irretrievable commitment of energy during Project construction and operation, including energy expended in the form of electricity, gasoline, diesel fuel, and oil for equipment and transportation vehicles that would be needed for Project investigative, construction, maintenance, and decommissioning-related activities. Updated setting information with regard to energy sources is described in Section 4.8.3.

4.8.2.2 Impacts and Mitigation Measures Identified in the 2011 Groundwater FEIR

Impacts to utilities and service systems were addressed in the Groundwater FEIR, Volume II, Section 4.11. Energy resources were addressed in Section 5.2 of the Groundwater FEIR. Following is a summary of the analysis and associated mitigation measures for utilities, service systems, and energy resources.

Groundwater FEIR Effects on Wastewater

The Groundwater FEIR concluded that the effects on existing wastewater collection and treatment facilities would be a less than significant impact since the Project would not generate substantial amounts of domestic wastewater (sewage or graywater) and the effluent generated by the Project would not exceed applicable standards or capacity, nor would the proposed Project require the construction of new treatment facilities. Since the Project did not result in significant impacts to wastewater collection and treatment facilities, no mitigation measures were identified in the Groundwater FEIR. As discussed in Section 4.8.5, the Final Remedy Design includes the construction and operation of new water treatment facilities.

Groundwater FEIR Effects on Stormwater

The Groundwater FEIR concluded that there would be no contribution of runoff water to existing stormwater drainage systems and no new systems were proposed; therefore, no significant impacts were identified. Permitting requirements for stormwater runoff and associated impacts as described in the Groundwater FEIR are included in Section 4.6 of this SEIR, "Hydrology and Water Quality."

Groundwater FEIR Effects on Electricity and Natural Gas

The Groundwater FEIR stated that operational activities would require up to 1.6 million kWh of electricity annually. At the time the Groundwater FEIR was certified, the Station and the IM-3 Facility required approximately 1.8 million total kWh for ongoing operation and maintenance.

The City of Needles, which supplied electricity to the Station and the IM-3 Facility, indicated in 2011 that the existing electrical line would not be able to accommodate up to 1.6 million additional kWh required, and that it did not have plans to upgrade or expand its electrical facilities. During the preparation of the Groundwater FEIR, PG&E provided supplemental information regarding how electricity would be supplied for the 1.6 million additional kWh needed to serve the Project while the IM-3 Facility continued to operate. Potential sources of electricity for the Groundwater FEIR were stated as being supplemental power from the Station, a dedicated portable diesel fuel generator (approximately 320 kW), or small solar panels. These sources of electricity were to be used either individually or in combination to meet the proposed electrical demands. The air quality analysis also contemplated use of a generator. Based on this additional source of electricity, the Groundwater FEIR determined that PG&E had adequate sources of electricity available from on-site sources, and the impacts would be less than significant. Since the Groundwater FEIR did not identify significant impacts to electricity and natural gas services, no mitigation measures were identified.

Groundwater FEIR Effects on Solid Waste Disposal

Non-Hazardous Waste Disposal

The Groundwater FEIR concluded that construction activities would generate 2,400 total cubic yards of solid waste, including incidental trash. The waste stream would consist of investigation-derived waste (drill cuttings and water associated with well construction), which would be disposed of as hazardous or nonhazardous waste depending on its classification. Operation of the Project would generate nonhazardous waste that would include incidental trash (e.g., food containers and other routine waste) generated by personnel, and construction materials from repair of constructed facilities, which would be anticipated to total up to 200 cubic yards per year (3.8 cubic yards per week). The Groundwater FEIR concluded that construction and operation waste streams would be minimal in relation to available or foreseeable capacity at the surrounding landfills; therefore, impacts to solid waste disposal services would be less than significant and no mitigation was required.

The Groundwater FEIR stated that the decommissioning of the IM-3 Facility would generate between 1,000 and 5,000 cubic yards of solid waste. Assuming a worst-case scenario, the decommissioning would generate 5,000 cubic yards over 1 year and would generate a daily volume of approximately 13.8 cubic yards per day. While the precise mass that this volume of waste would generate was found to vary depending on the mixture of constituent wastes, this volume was found not to exceed the maximum daily capacity of 750 tons per day identified at the Barstow Sanitary Landfill. The Groundwater FEIR concluded that decommissioning of the IM-3 Facility would result in less than significant impacts to solid waste disposal services and no mitigation was required.

Hazardous Waste Disposal

The Groundwater FEIR determined that hazardous wastes consisting of soil cuttings and mud rotary well installation waste (drilling mud) and decommissioning rinse water would be generated. Investigation-derived waste materials included groundwater, drill cuttings, and incidental trash. The Groundwater FEIR estimated 300 cubic yards per year of hazardous waste would be generated, requiring off-site disposal. At the time the Groundwater FEIR was certified, hazardous waste associated with operation and maintenance activities were to be sent for disposal to Kettleman Hills Landfill, in Kettleman City, California, or the Clean Harbors Buttonwillow Landfill in Buttonwillow, California. Based on the permitted capacities identified at the time the Groundwater FEIR was published, the estimated 300 cubic yards per year of hazardous waste to be generated was determined to not exceed the permitted capacity of either the Kettleman Hills Landfill or the Clean Harbors Buttonwillow Landfill. The Groundwater FEIR concluded that impacts to hazardous waste facilities would be less than significant and no mitigation measures were required.

Groundwater FEIR Effects on Energy Consumption

The use of nonrenewable resources in the form of electricity, gasoline, diesel fuel, and oil for equipment and transportation vehicles was determined to account for a minimal portion of the region's resources and would not affect the availability of these resources for other needs within the region. The Groundwater FEIR determined that construction activities would not result in inefficient use of energy or natural resources. Employees constructing and implementing the Project would be required to be instructed to use best available engineering techniques, construction and design practices, and equipment operating procedures. The relatively small commitment of land to project uses was considered less than significant when compared to other types of development, such as urban development, in a local and regional context. No significant impacts related to energy consumption were identified in the Groundwater FEIR and no mitigation measures were required.

4.8.3 Existing Setting

This section describes the utilities, service systems, and energy consumption characteristics and setting with regard to the Final Remedy Design to be conducted in the Project Area, focusing on those areas where there have been changes made to the Project, changes in the circumstances surrounding the Project, or new information discovered since the Groundwater FEIR was certified (see Public Resources Code, Section 21166; CEQA Guidelines, Sections 15162 and 15168). The analysis related to stormwater impacts is included in Section 4.6, "Hydrology and Water Quality," of this SEIR.

4.8.3.1 Energy

Petroleum supplies used for fueling the Project's truck and worker vehicles are purchased by the individual users at fueling stations in nearby communities and in more distant locations, including but not limited to Los Angeles, California; Lake Havasu City, Arizona; Phoenix, Arizona; and Las Vegas, Nevada.

The Project Area in California is currently served by PG&E's on-site generation of electricity and use of natural gas for fuel in the generators at the TCS Ponds. PG&E generated approximately

0.011 million kWh annually through the use of the emergency generator. The Needles Public Utility Authority (City of Needles) also provides electricity to the Station. In 2015, PG&E purchased 0.947 million kWh from the City of Needles to serve the IM-3 Facility. Approximately 0.039 million kWh were also purchased for miscellaneous electric loads for the Station. The remainder of electricity for the gas facilities was self-generated at the Station.

The Mohave Electric Cooperative supplies power in Arizona, which would provide electricity to operate the freshwater wells in the Havasu National Wildlife Refuge (HNWR) in Arizona. The location of the freshwater wells and the associated source of power were unknown at the time of the Groundwater FEIR. This information was identified in the Final Remedy Design (and addressed in the Addendum to the Groundwater FEIR in 2013). There are five existing power poles at the Well HNWR-1A site and one pole at the Site B well site. The Mohave Electric Cooperative is a distribution cooperative that provides electric services to residential, irrigation, commercial, and industrial customers in Mohave County, Yavapai County, and Coconino County. Mohave Electric Cooperative is regulated by the Arizona Electric Cooperative in Benson, Arizona.

4.8.3.2 Solid Waste Disposal

The IM-3 Facility currently produces approximately 208 cubic yards of residual waste stream, or sludge, from the chromium reduction treatment system. In 2014, the Station generated approximately 108 cubic yards of non-hazardous trash and 99 pounds of universal waste. Recycled material included 32 tons of scrap metal, 127 pounds of batteries, and 210 pounds of e-waste.

Existing landfills available to serve the Project are listed in **Table 4.8-1**.

TABLE 4.8-1
LANDFILLS IN THE VICINITY, PERMITTED CAPACITY, AND ANTICIPATED FACILITY LIFESPAN

Landfill	Remaining Capacity (cubic yards)	Maximum Daily Capacity (tons/day)	Distance from Project (miles)	Anticipated Cease of Operations
Kettleman Hills Landfill (hazardous waste disposal)	15,600,000	8,000	375	Unknown
Clean Harbors Buttonwillow (hazardous waste disposal)	9,000,000	10,500	323	2040
Mohave Valley Landfill (non-hazardous waste disposal)	Unknown	400	20	Unknown
Landers Sanitary Landfill (non-hazardous waste disposal)	765,098	1,200	110	2018
Barstow Sanitary Landfill (non-hazardous waste disposal)	71,481,660	1,500	135	2071
California Street Landfill (non-hazardous waste disposal)	6,800,000	829	155	2042
Victorville Sanitary Landfill (non-hazardous waste disposal)	81,510,000	3,000	155	2047

SOURCE: Cal Recycle 2016; DTSC 2015.

Following certification of the Groundwater FEIR, the capacity at the Kettleman Hills Landfill was increased in 2014 by approximately 5 million cubic yards to a permitted capacity of 15.6 million cubic yards. The Barstow Sanitary Landfill's remaining capacity reported in the 2011 Groundwater FEIR also increased from 924,401 cubic yards to 71,481,660 cubic yards. No other substantial changes were identified for the permitted landfill capacities evaluated in the Groundwater FEIR.

The Station has an existing Hazardous Material Storage Building located along the western side of the Station (see Figure 3-4). This building is used for the processing of solid waste, excluding soil, for recycling or salvaging. The Project would share the existing use of this building for the recycling or salvage of materials from the IM-3 Facility structures (trailer and mobile warehouse units, equipment, and tank systems) and other uncontaminated materials with potential recycle, reuse, or resale value (e.g., steel, iron, non-ferrous copper, stainless steel, plastic, and concrete).

4.8.4 Regulatory Background

4.8.4.1 Federal

Utilities and Service Systems

No federal or state regulations or laws related to utilities and service systems are applicable to the proposed Project. Section 4.5, "Hazards and Hazardous Materials," of this SEIR reviews the regulatory setting for the corrective action at the Station, including the federal Resource Conservation and Recovery Act and California's delegated authority to regulate hazardous waste and associated state laws and regulations developed pursuant to this delegated authority. Section 4.6, "Hydrology and Water Quality," of this SEIR provides a regulatory context for the regulation of stormwater discharge and groundwater discharge in injection wells.

Energy

National Energy Act of 1978

The National Energy Act of 1978 includes the Public Utility Regulatory Policies Act (Public Law 95-617), Energy Tax Act (Public Law 95-318), National Energy Conservation Policy Act (Public Law 95-619), Power Plant and Industrial Fuel Use Act (Public Law 95-620), and the Natural Gas Policy Act (Public Law 95- 621).

The intent of the National Energy Act is to promote greater use of renewable energy, provide residential consumers with energy conservation audits to encourage slower growth of electricity demand, and promote fuel efficiency. The Public Utility Regulatory Policies Act created a market for non-utility electric power producers to permit independent power producers to connect to their lines and to pay for the electricity that was delivered.

The Energy Tax Act promoted fuel efficiency and renewable energy through taxes and tax credits. The National Energy Conservation Policy Act required utilities to provide residential consumers with energy conservation audits and other services to encourage slower growth of electricity demand.

Energy Policy Acts

The Energy Policy Act of 1992 (EPAct) was developed to reduce dependence on imported petroleum and improve air quality by addressing all aspects of energy supply and demand, including alternative fuels, renewable energy, and energy efficiency. EPAct requires certain federal, state, and local government and private fleets to purchase alternative fuel vehicles. The act also includes definitions for “alternative fuels,” and includes fuels such as ethanol, natural gas, propane, hydrogen, electricity, and biodiesel.

The Energy Policy Act of 2005 was signed into law on August 8, 2005. The Energy Policy Act set federal energy management requirements for energy-efficient product procurement, energy-savings performance contracts, building performance standards, renewable energy requirements, and alternative fuel use. The Energy Policy Act also amends existing regulations, including fuel economy testing procedures.

Energy Independence and Security Act of 2007

Signed into law in December 2007, the Energy Independence and Security Act was passed to increase the production of clean renewable fuels; increase the efficiency of products, buildings, and vehicles; improve the energy performance of the federal government; and increase U.S. energy security, develop renewable fuel production, and improve vehicle fuel economy. The Energy Independence and Security Act included the first increase in fuel economy standards for passenger cars since 1975. The act also included a new energy grant program for use by local governments in implementing energy-efficiency initiatives, as well as a variety of “green” building incentives and programs.

4.8.4.2 State of California

Utilities and Service Systems

Section 4.5, “Hazards and Hazardous Materials,” of this SEIR reviews the regulatory setting for the corrective action at the Station, including the federal Resource Conservation and Recovery Act and California’s delegated authority to regulate hazardous waste and associated state laws and regulations developed pursuant to this delegated authority. Section 4.7 of this SEIR, “Hydrology and Water Quality,” provides a regulatory context for the regulation of stormwater discharge and groundwater discharge in injection wells.

Integrated Waste Management Act (AB 939)

Assembly Bill (AB) 939 established the California Integrated Waste Management Act of 1989, which defined an integrated waste management hierarchy starting with the newly established CalRecycle (formerly the California Integrated Waste Management Board) and local agencies, to guide in implementation of, in order of priority as follows: (1) source reduction, (2) recycling and composting, and (3) environmentally safe transformation and land disposal. AB 939 also replaced the various County Solid Waste Management Plans with Integrated Waste Management Plans and Siting Elements. AB 939 established statewide waste diversion goals to divert 25 percent of all solid waste from landfills by January 1, 1995, and 50 percent of all solid waste by January 1, 2000, through source reduction, recycling, composting, and, to a limited extent, transformation activities.

AB 939 also established a comprehensive statewide system of permitting, inspections, enforcement, and maintenance for solid waste facilities, although the measurement for the waste diversion was changed to disposal-based, per capita limits by SB 1016, and the statewide waste diversion from disposal target was increased to 75 percent by AB 341.

Energy

California Global Warming Solutions Act of 2006

The passage of AB 32 requires a sharp reduction of greenhouse gas (GHG) emissions for the State of California to set the stage for its transition to a sustainable, low-carbon future. AB 32 was the first program in the country to take a comprehensive, long-term approach to addressing climate change, and does so in a way that aims to improve the environment and natural resources while maintaining a robust economy. As part of AB 32, landfill methane emissions are a targeted source of GHG reductions, as methane is a powerful GHG with about 10 times the global warming potential of carbon dioxide.

California Energy Commission Plans and Programs

The California Energy Commission (CEC) is the state's primary energy policy and planning agency. The CEC collects and analyzes energy-related data, prepares statewide energy policy recommendations and plans, promotes and funds energy efficiency programs, and adopts and enforces appliance and building energy efficiency standards. The CEC has five major responsibilities: (1) forecasting future energy needs and keeping historical energy data, (2) licensing thermal power plants 50 MW or larger, (3) promoting energy efficiency through appliance and building standards, (4) developing energy technologies and supporting renewable energy, and (5) planning for and directing the state response to an energy emergency.

Last updated in 2008, the State of California Energy Action Plan establishes goals and specific actions to ensure adequate, reliable, and reasonably priced electrical power and natural gas supplies, initiatives for increasing supply and reducing demand, in the context of global climate change (CEC 2008).

The CEC conducts assessments and forecasts of all aspects of energy industry supply, production, transportation, delivery, and distribution, The CEC adopts the Integrated Energy Policy Report (IEPR) every 2 years and an update every other year. The 2014 IEPR is the most recent report and provides a summary of energy issues, outlining strategies and recommendations to further California's goal of ensuring reliable, affordable, and environmentally responsible energy sources (CEC 2015a).

California Public Utilities Commission

The California Public Utilities Commission (CPUC) has authority to set electric rates, regulate natural gas utility service, protect consumers, promote energy efficiency, and ensure electric system reliability. The California electricity market, regulated by the CPUC, serves 11.5 million customers with 32,698 miles of transmission lines and 239,112 miles of distribution lines for a total economic value of $23.7 billion (CPUC 2015).

The CPUC has established rules for the planning and construction of new transmission facilities, distribution facilities, and substations. Utility companies are required to obtain permits to construct certain power line facilities or substations. The CPUC also has jurisdiction over the siting of natural gas transmission lines.

The CPUC regulates distributed generation policies and programs for both customers and utilities. This includes incentive programs (e.g., California Solar Initiative) and net energy metering policies. Net energy metering allows customers to receive a financial credit for power generated by their on-site system and fed back to the utility. The CPUC is involved with utilities through a variety of energy procurement programs, including the Renewable Portfolio Standard program.

In 2008, the CPUC adopted the Long Term Energy Efficiency Strategic Plan, which is the roadmap to achieving maximum energy savings in California through 2020 (CPUC 2008). Consistent with California's energy policy and electricity “loading order,” the Energy Efficiency Strategic Plan indicates that energy efficiency is the highest priority resource in meeting California’s energy needs. The CPUC also adopted energy goals that require all new residential construction in California to be zero net energy (ZNE) by 2020. The ZNE goal means new buildings must use a combination of improved efficiency and distributed renewable energy generation to meet 100 percent of their annual energy need (CEC 2015b). In addition to the ZNE goals for residential buildings by 2020, the CPUC has adopted goals that all new commercial construction in California will be ZNE by 2030 and 50 percent of existing commercial buildings will be retrofit to ZNE by 2030.

Renewable Portfolio Standard

California law (SB X1-2, Statutes of 2011) requires retail suppliers of electricity to procure at least 33 percent of annual retail sales from eligible renewable energy sources by 2020.

Performance Standard for Baseload Power Generation

Senate Bill (SB) 1368 (Chapter 598, Statutes of 2006) required the CPUC to establish a GHG emissions performance standard for “baseload” generation from investor-owned utilities of 1,100 lb of CO2/MWh. The CEC established a similar standard for local publicly owned utilities. All electricity provided to California, including imported electricity, must be generated from plants that meet or exceed this standard.

Senate Bill 1 (Chapter 132, Statutes of 2006)

The California Solar Initiative (Senate Bill 1, Chapter 132, Statutes of 2006), also known as the “Million Solar Roofs” legislation, set a goal of installing 3,000 megawatts of new solar capacity by 2017.

Title 24 Energy Standards

Energy Conservation Standards for new residential and nonresidential buildings were first adopted by the CEC in June 1977 and were most recently revised in 2013 (Title 24, Part 6, of the California Code of Regulations [Title 24]). Title 24 governs energy consumed by commercial and residential buildings in California. This includes the heating, ventilation, and air conditioning (HVAC) system; water heating; and some fixed lighting. Nonbuilding energy use, or “plug-in” energy use, is not covered by Title 24. The standards are updated periodically to allow for consideration and possible incorporation of new energy efficiency technologies and methods. California's Building Energy Efficiency Standards are updated on an approximate 3-year cycle. The most recent update was in 2013. The 2013 Title 24 standards went into effect July 1, 2014, and improve on the 2008 Title 24 standards. The CEC estimates that the 2013 Standards are 25 percent more energy-efficient than the previous standards for residential construction and 30 percent more efficient for nonresidential construction (CEC 2014a, 2014b).

In January 2012, California Air Resources Board (CARB) approved a new emissions-control program for model years 2017 through 2025. The program combines the control of smog, soot, and global warming gases and requirements for greater numbers of zero-emission vehicles into a single package of standards called Advanced Clean Cars (13 CCR 1962.1 and 1962.2). The Advanced Clean Cars requirements include new GHG standards for model year 2017 to 2025 vehicles. CARB anticipates that the new standards will reduce motor vehicle GHG emissions by 34 percent in 2025 (CARB 2014a).

The Advanced Clean Cars Program also includes the LEV III amendments to the LEV regulations (13 CCR 1900 et seq.) Zero Emission Vehicle Program and the Clean Fuels Outlet Regulation. The Zero Emission Vehicle Program is designed to achieve California's long-term emission reduction goals by requiring manufacturers to offer for sale specific numbers of the very cleanest cars available. These zero-emission vehicles, which include battery electric, fuel cell, and plug-in hybrid electric vehicles, are just beginning to enter the marketplace. They are expected to be fully commercial by 2020. Most vehicle manufacturers agree that providing a selection of these technologies will be necessary to meet climate goals by 2050 (CARB 2014b). The Clean Fuels Outlet regulation ensures that fuels such as electricity and hydrogen are available to meet the fueling needs of the new advanced technology vehicles as they come to market.

Executive Order B-16-12

Executive Order B-16-12 orders State entities under the direction of the Governor including CARB, the Energy Commission, and Public Utilities Commission to support the rapid commercialization of zero emission vehicles (ZEVs). It directs these entities to achieve various benchmarks related to zero emission vehicles, including:

- Infrastructure to support up to one million zero emission vehicles by 2020
- Widespread use of zero emission vehicles for public transportation and freight transport by 2020
- Over 1.5 million zero emission vehicles on California roads by 2025
- Annual displacement of at least 1.5 billion gallons of petroleum fuels by 2025
- A reduction of GHG emissions from the transportation sector equaling 80 percent less than 1990 levels by 2050

It also sets a state GHG emissions reduction target for the transportation sector of 80 percent below 1990 levels by 2050.

4.8.4.3 State of Arizona

Arizona Corporation Commission

The Arizona Corporation Commission oversees the electric power industry in Arizona. The Utilities Division of the Arizona Corporation Commission makes specific recommendations regarding public utility rates, utility finance, and quality of service. The Division is responsible for researching and developing utility issues, providing information and evidence in Commission proceedings dealing with utility applications, and monitoring the quality of utility service, and the rates approved by the Arizona Corporation Commission.

Renewable Energy Standard and Tariff

In 2006, the Commission approved the Renewable Energy Standard and Tariff (REST). These rules require that regulated electric utilities must generate 15 percent of their energy from renewable resources by 2025. Each year, Arizona's utility companies are required to file annual implementation plans describing how they will comply with the REST rules. The proposals include incentives for customers who install solar energy technologies for their own homes and businesses. The Commission's Renewable Energy Standards encourage utilities to use solar, wind, biomass, biogas, geothermal and other similar technologies to generate "clean" energy to power Arizona's future.

4.8.4.4 Local

County of San Bernardino (California) 2007 General Plan

The Circulation and Infrastructure Element (Section IV) and the Conservation Element (Section V) of the County of San Bernardino General Plan (2007) includes policies and goals to minimize energy consumption and to promote safe energy extraction, uses, and systems to benefit local regional and global environmental goals. Applicable policies include:

- CI 11.12 – Prior to approval of new development, ensure that adequate and reliable water supplies and conveyance systems will be available to support the development, consistent with coordination between land use planning and water system planning.
- CO 8.1 – Maximize the beneficial effects and minimize the adverse effects associated with the siting of major energy facilities. The County of San Bernardino will site energy facilities equitably in order to minimize net energy use and consumption of natural resources, and avoid inappropriately burdening certain communities. Energy planning should conserve energy and reduce peak load demands, reduce natural resource consumption, minimize environmental impacts, and treat local communities fairly in providing energy efficiency programs and locating energy facilities.
- CO 10 – The General Plan will anticipate and accommodate future electric facility planning and will enable information-sharing to improve electric load forecasting.

Mohave (Arizona) County General Plan (2015)

The Mohave County General Plan Energy Element includes goals and policies to manage energy consumption and ensure the availability of economically and environmentally sound energy supplies in cooperation between Mohave County, its residents and utility companies, and the Arizona Corporation Commission. Applicable goals include the following:

- Goal 9 – To encourage the efficient use of alternative energy sources by residential and non-residential users.
- Goal 10 – To encourage energy conservation through more efficient design, materials, equipment and practices.

The Public Infrastructure and Services Element addresses concerns related to infrastructure for the water, wastewater, solid waste, flood control/drainage, and road systems in Mohave County. Applicable goals and policies include:

- Goal 47 **–** To plan for adequate wastewater treatment and disposal systems, at levels (type of treatment, and capacity) appropriate to meet the needs of urban, suburban and rural communities.
- Goal 48 **–** To provide coordination by the County for the planning and operation of wastewater treatment and disposal systems.
- Goal 49 – To provide adequate sanitary landfill facilities that comply with applicable state and federal laws and requirements to meet the needs of county residents.

4.8.5 Environmental Impacts

4.8.5.1 Thresholds of Significance

Based on the current (2016) California Environmental Quality Act (CEQA) Guidelines, Appendix G, a project may be deemed to have a significant effect on the environment with respect to utilities, service systems, and energy if it would:

- Require or result in the construction of new or expanded water, or wastewater treatment or stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects;
- Not be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs;
- Result in wasteful, inefficient, or unnecessary consumption of energy, during project construction or operation; or
- Not incorporate renewable energy or energy efficiency measures into building design, equipment use, transportation or other project features.

The complete list of CEQA significance criteria used in the utilities, service systems, and energy analysis is included in the Modified Initial Study (see Appendix IS), which also explains why the proposed Project would not result in new significant impacts or substantially increase the severity of significant impacts previously identified in the Groundwater FEIR (see Public Resources Code, Section 21166; CEQA Guidelines, Section 15162) on utilities, service systems, and energy with respect to compliance of the Project with applicable regulations with regard to solid waste. As a result, this impact will not be addressed further in this SEIR and is summarized below. Potential Project impacts to water supply are analyzed in Section 4.9, "Water Supply," and potential Project impacts to wastewater treatment requirements and stormwater drainage systems are analyzed in Section 4.6, "Hydrology and Water Supply."

At the time of the adoption of the Groundwater FEIR, the CEQA Checklist did not include thresholds of significance to assess a project's potential impacts related to energy consumption. In 2015, the Office of Planning and Research released two draft thresholds in light of a California Clean Energy Committee decision for energy consumption. These draft guidelines have been included in the SEIR and are addressed in the following analysis.

Compliance with Federal, State, and Local Regulations

The Groundwater FEIR required adherence to federal, state, and local regulations regarding the utilities, service systems, and energy. This condition has not changed since certification of the Groundwater FEIR. The Project includes relevant plans and procedures such as the plans and specifications (Appendices C and D), which include references to the relevant regulatory requirements for equipment. The Project would not result in new significant impacts or substantially increase the severity of impacts previously identified in the Groundwater FEIR on utilities, service systems, and energy with respect to equipment. Therefore, this issue is not evaluated further in this SEIR.

4.8.5.2 Approach to Analysis

This section presents a revised analysis per Public Resources Code Section 21166 and CEQA Guidelines Section 15162 governing conditions required for preparation of a SEIR, including substantial changes to the Project or circumstances under which the Project is taken that result in major revisions to the original FEIR. Subsequent to certification of the Groundwater FEIR, the Final Remedy Design was prepared to include design details not available in 2011. This section outlines the approach to the potential utilities and service systems and energy impacts based on the Project-specific information now available, as well as the additional information obtained regarding the existing environmental setting (see Section 4.8.3 summarizing the additional information included in the Final Remedy Design). This section considers whether construction of the Final Groundwater Remedy Project, including the new elements described in the Setting above, would result in new or additional impacts to public utilities, service systems, and energy consumption.

Some of the mitigation measures in this section refer to various plans or other documents that have been prepared and included in the Final Remedy Design for the groundwater remedy or are part of the Project's federal requirements. Many of these plans and documents included in the Final Remedy Design were prepared to implement mitigation measures previously adopted as part of the California Department of Toxic Substances Control's (DTSC's) January 31, 2011, decision approving Alternative E as the groundwater remedy (DTSC 2011). Appendix GWMM to this SEIR presents a comparison between the mitigation measures included in the Groundwater FEIR as reflected in the Mitigation Monitoring and Reporting Program approved by DTSC on January 31, 2011, and those presented in this SEIR for the Final Groundwater Remedy Project.

All plans and documents included in the Final Remedy Design and references in this SEIR are appended to this SEIR as Appendix BOD. In addition, the documents are available online at the following link: http://dtsc-topock.com/documents/cleanup-implementation/groundwater/remedy-design/remedial-design-documents.

Construction Impact Methodology

Subsequent to certification of the Groundwater FEIR, additional details were developed in the Final Remedy Design regarding the number and location of wells, lengths of piping and roads, and footprints of treatment infrastructure that would be constructed to implement the Final Groundwater Remedy Project, as described in Section 3.6 of this SEIR. The Project would include construction of a Remedy-Produced Water Conditioning System to treat and reuse water from construction and maintenance activities including well backwashing and rehabilitation, purge water from monitoring well sampling, equipment decontamination wastewater, and rainfall that collects in remedy facility secondary containment, as described in Section 3.6.1.5 of this SEIR. The Project would also include construction of a Contingent Freshwater Pre-Injection Treatment System, if necessary, to treat freshwater from water supply wells located in the HNWR in Arizona in the event that the freshwater contains arsenic at concentrations above the water quality objective of 32 micrograms per liter, as described in Section 3.6.1.7 of this SEIR. The Project would include construction of improvements at the Topock Compressor Station (TCS) Evaporation Ponds, namely a small structure to house a natural gas generator, as described in Section 3.6.1.9 of this SEIR.

Construction power would be supplied by portable generators whenever existing utility power is not readily available near the point of use. Approximately 6 portable generators would be operating simultaneously over an average workday, and 11 portable generators on a maximum-intensity work day. Types of portable generators that could be used include a 5,000-watt portable generator with hour meter or a 6,800-watt electric start gas powered portable generator. With the exception of security lighting at Moabi Regional Park in the Construction Headquarters area, temporary lighting would be supplied by portable generators and lights, as needed and consistent with any applicable mitigation measures and conditions of approval.

In addition, vehicles, worker staffing, hauling, and vendor traffic would use energy traveling to, within, and from the Project Area is described in the Project Description (Section 3.7) of this SEIR. During construction the Project would use on average 149,283 gallons of diesel and 20,468 gallons of gasoline annually. This is 0.0057 percent of the State’s usage in 2012 for diesel and 0.0001 percent for gasoline, see Appendix ENERGY for calculations.

This section considers whether construction of the Final Groundwater Remedy Project, including the new elements described above, would result in new or additional impacts to public utilities, service systems, and energy consumption. The analysis is based on the Final Remedy Design estimates of construction energy requirements, basic assumptions regarding construction-related fuel consumption, and PG&E’s proposed energy efficiency design elements. Temporary increases in energy consumption would occur during Project construction. These would include the use of nonrenewable resources such as electricity, gasoline, diesel fuel, and oil for equipment and transportation vehicles. Additionally, the Final Groundwater Remedy Project includes a Future

Activity Allowance for all Project infrastructure to be constructed (wells, pipelines, structures, etc.). Generally, the Future Activity Allowance includes two components: (1) an additional allowance for all Project infrastructure, established at up to 25 percent of the parameter set forth in the Final Remedy Design, and (2) up to 10 additional monitoring well boreholes to be installed in Arizona as part of the monitoring program. This would result in additional diesel and gasoline to power construction equipment. Assuming a worst-case scenario, the Future Activity Allowance could result in in 90,866 gallons of diesel and 8,507 gallons of gasoline annually, see Appendix ENERGY for calculations. The assessment of energy consumption impacts is addressed further below. All other construction-related impacts of the proposed Project are unchanged from what is presented in the Groundwater FEIR.

Operation & Maintenance Impact Methodology

Subsequent to publication of the Groundwater FEIR, additional details were developed regarding the systems that would use energy to operate the Project. The Project-related systems and operation and maintenance that would use energy include the pumps for the injection/extraction wells, the Remedy-Produced Water Conditioning System, the Contingent Freshwater Pre-Injection Treatment System, and the TCS Evaporation Pond improvements, all described in Section 3.6 of this SEIR. In addition, workers would use energy traveling to, within, and from the site, as described in Section 3.7 of this SEIR.

The Groundwater FEIR estimated a demand of 1.6 million KWh of electricity annually. The Final Remedy Design estimates a higher demand of electricity of up to 7.82 million KWh annually (an increase of 6.22 million KWh annually). The increase in power demand is primarily due to the development of system details that were not included in the Groundwater FEIR, such as the TCS Recirculation Loop, the Contingent Freshwater Pre-Injection Treatment System (FWPTS), the TCS Evaporation Ponds, and the Moabi Regional Park facilities. The sources and demand of electricity are described below. As described in Section 3.6 of the Project Description, the Final Groundwater Remedy Project includes a Future Activity Allowance, which could occur during the construction or operation and maintenance phase. Assuming a worst-case scenario, the Future Activity Allowance could result in 2.37 million kWh additional electricity usage during the operation and maintenance phase.

Station and TCS Evaporation Ponds

For the Final Groundwater Remedy Project, the primary power supply source in California would be power provided by the Station, as described in Section 3.6.1.9 of this SEIR. The Remedy-Produced Water Conditioning System (described in Section 3.6.1.5 of this SEIR) and the FWPTS (described in Section 3.6.1.7 of this SEIR) would be located within the Station and would therefore receive power supply from the Station. Buried electrical conduit would be routed from the Station to well heads to provide power to the well pumps (described in Section 3.6.1.9 of this SEIR). The existing generators at the Station would be supplemented by two new 480 volt natural gas generators with a new switchgear and auxiliary system (e.g., lighting controls, sensors, security cameras, and valve actuators) that would be housed in the existing Auxiliary Building. The Project also includes the use of photovoltaic solar panels at the workshop building and parking shade structure to provide additional power supply.

The TCS Evaporation Pond improvements and operations are described in Section 3.6.1.9 of this SEIR, Section 3.4 of the Final Remedy Design, and the Operation and Maintenance Manual provided as Appendix L in the Final Remedy Design (CH2M Hill 2015a). Although the first preference is to reuse as much if not all of the water by injecting the water back into the aquifer or though blending in the existing Station cooling towers, the Final Remedy Design includes discharge of remedy-produced water to the existing TSC Evaporation Ponds as the third option. The TCS Evaporation Ponds would be used if the injection wells and cooling towers are unable to accept the volume of remedy-produced water. For improvements at the TCS Evaporation Ponds, the power supply for the new agitator and pumps would be provided by a new natural-gas-fueled reciprocating internal-combustion engine electrical power generator housed in a new enclosed utility building located within the TSC evaporation ponds fence line. Fuel for the generator would be provided via a new underground natural gas line brought in from the existing main line located south of the ponds. Power for auxiliary equipment (lighting, controls, sensors, security cameras, and valve actuators) would be provided by new 24-volt direct current thermoelectric generators within the fence line adjacent to the new utility building. The electrical load for the TCS Evaporation Ponds facilities is estimated to be 0.020 million kWh annually during remedy operation.

The new electrical power generation at the Station and the TCS Evaporation Ponds would provide approximately 5.19 million kWh/yr to power the remedy systems. The generation of electricity would require the use of natural gas, estimated to be approximately 1,160,000 million standard cubic feet (SCF) per year for operation and maintenance activities.

City of Needles and Solar Cells

Power for the Construction Headquarters and Soil Processing Area would be provided by the City of Needles. The electrical load for the Moabi Regional Park facilities is estimated to be 1.3 million kWh annually during remedy construction and 0.85 million kWh during remedy operation. A backup generator would be used for the operation of some functions at the Construction Headquarters when utility power is not available. Power for the Soil Processing Area would be routed from the existing overhead service line to the area via a new overhead distribution line. It is anticipated that the new overhead distribution will consist of two to three electrical poles in the area between the existing distribution line and the Soil Processing Area. Once inside the Soil Processing Area, wire would run down the pole to a conduit and power distribution panel for use throughout the yard.

Photovoltaic solar panels are planned to be located at the workshop/sample-processing building and parking shade structure at the Construction Headquarters, as described above, and at select remote well locations to power well data recording instruments. Five 140-watt solar panels would be installed for monitoring at remote well locations in Arizona. In addition, a portable, rental backup generator would be mobilized as needed during Project implementation to provide power to temporary remote locations that do not need a permanent or long-term power supply. The Final Groundwater Remedy Project also includes a connection panel and reserved space for a portable rental generator to be located behind the Remedy-Produced Water Conditioning Plant. The solar cells are estimated to provide 0.0152 kWh/yr.

Mohave Electric Cooperative

The Mohave Electric Cooperative would supply power for the freshwater supply well in Arizona where there are 5 existing power poles at the Well HNWR-1A site and one pole at the Site B well site. An additional two power poles would be installed at the HNWR-1A well site and one power pole proposed at the Site B well site (three total poles), and electrical lines routed to the well locations. The Mohave Electric Cooperative would provide up to 1.4 million kWh/yr to power the Arizona freshwater wells.

Vehicles and Portable Generators

In addition to operational energy use by the remedial system, vehicles, worker staffing, hauling and vendor traffic would use energy traveling to, within, and from the site as described in Section 3.7 of this SEIR. During operational activities, the proposed Project is anticipated to use 55,649 gallons of diesel and 46,705 gallons of gasoline annually. This is 0.0021 percent of the State's usage in 2012 for diesel and 0.0003 percent for gasoline, see Appendix ENERGY for calculations.

A portable, rental backup generator of similar make and model to the existing generator at the IM-3 Facility (Isuzu Model 6WG1X) would be mobilized on-site as needed during Project implementation to provide backup power. A connection panel is included in the Final Remedy Design and space is reserved for the portable rental generator behind the Remedy-Produced Water Conditioning Plant.

Decommissioning Impact Methodology

Subsequent to certification of the Groundwater FEIR, additional details were developed regarding the decommissioning of the Final Groundwater Remedy Project. As previously described in Chapter 3, "Project Description," the number of wells, length of piping, electrical conduit, and roadways increased from the amounts estimated in the Groundwater FEIR. Consequently, during decommissioning, the generation of wastewater, consumption of energy (e.g., fuel), and the volume of waste materials that could be generated for disposal (e.g., equipment that used hazardous materials for treatment) would increase. Because the decommissioning of the Final Groundwater Remedy Project would occur decades in the future, the final decommissioning procedures would be prepared in a future work plan to account for regulatory and technological changes. However, using current regulatory requirements, the Final Remedy Design describes the overall decommissioning procedures and Appendix B of the C/RAWP provides standard operating procedures for the decommissioning of wells, the management of demolition waste, and the shutdown of treatment systems.

The discussion in the following impact analysis presents a revised analysis of the impacts associated with the Project's routine waste and wastewater disposal and energy consumption based on the additional information. The analysis assumes that the handling, storage, and disposal of waste and wastewater material would be conducted in compliance with all applicable regulations and work plans.

4.8.5.3 Impact Analysis

IMPACT UTIL-1 **Potential to Exceed Wastewater Treatment Requirements or Require a New Wastewater Facility.** The proposed Project includes several wastewater improvements in order to operate successfully that would not exceed requirements or require new facilities. Impacts associated with the development of these facilities would be **less than significant**, as previously identified in the Groundwater FEIR. The proposed Project does, however, include two new septic tank systems that could exceed requirements or require new facilities. Development of the new septic tanks could result in **potentially significant impacts**, which is a new identified impact from the Groundwater FEIR.

Remedy-Produced Water-Conditioning System and the Contingent Freshwater Pre-Injection Treatment System

The proposed Project includes the construction of the Remedy-Produced Water Conditioning System, the Contingent Freshwater Pre-Injection Treatment System, and improvements to the TCS Evaporation Ponds. The remedy-produced water would be generated during remedy start-up and as part of on-going maintenance activities, such as backwashing of wells. The options for remedy-produced water are to be injected back into the aquifer, used in the cooling towers, or discharged to the TCS Evaporation Ponds. This wastewater stream would be transported from point of generation to the Remedy-Produced Water Conditioning System via pipes or trucks. The remedy-produced water would be treated by removing solids and adjusting the pH, and transported via piping to the IRZ wells for re-injection, and/or routed to the cooling towers and/or discharged to TCS Evaporation Ponds. The Remedy-Produced Water Conditioning System is not designed for treatment of RCRA and non-RCRA hazardous waste. Only non-hazardous waste would be sent to the TCS Evaporation Ponds. The estimated total volume of remedy-produced water is approximately 7.6 MG per year. Water not managed on-site due to quality or quantity issues would be transported off-site to a permitted facility for treatment, disposal or reuse. This is an additional impact on wastewater generation and disposal not previously known at the time of the Groundwater FEIR (see the following discussion regarding the availability of landfill capacity to serve the proposed Project).

Relevant plans and procedures regarding construction of the wastewater treatment systems are provided in the C/RAWP (CH2M Hill 2015b) as listed below:

- The Standard Operating Procedures (Appendix B) provide numerous detailed standard operating procedures, including procedures for the handling, sampling, and disposal of soil and water; decontamination of personnel and equipment; the operation of systems that use hazardous materials; and spill prevention, containment, and control measures.
- The Best Management Practices Plan (Appendix M) describes measures to control and manage erosion, sediment, waste, and non-stormwater, as well as other good housekeeping practices.
- The Waste Management Plan (Appendix R) provides detailed procedures to manage wastes generated during construction, operation and maintenance, and decommissioning including the spent filter media that would contain metals, such as arsenic.

The treatment systems would be operated in compliance with all applicable regulations and work plans, and construction of the treatment systems would occur on previously disturbed areas within the Station. Consequently, the proposed treatment facilities would not result in adverse impacts to the surrounding Project area and impacts would be less than significant.

Septic Tanks at the Construction Headquarters and at Transwestern Bench

The proposed Project includes the installation of two septic tanks at the Construction Headquarters and one septic tank at the Transwestern Bench. The septic tanks would each have a capacity of 10,000 gallons. No leach fields would be constructed; all septic tank waste would be pumped from the septic tanks into sanitary waste tanker trucks and transported to a permitted off-site sanitary waste facility.

Relevant plans and procedures regarding installation and operation of the septic tanks are provided in the C/RAWP (CH2M Hill 2015b) in Appendix M, Section 2.3.7. Septic tanks would be located a minimum of 50 feet away from drainage facilities and away from waterways and traffic circulation. Sanitation subcontractors would be required to monitor on-site septic waste storage and disposal procedures on a weekly basis. Septic waste would be removed and disposed at a permitted off-site sanitary waste facility. Regular waste collection should be arranged before facilities overflow. These plans and procedures are consistent with Groundwater FEIR Mitigation Measure HYDRO-1 (u) Sanitary/Septic Waste Management (specifically WM-9), which requires that sanitary and septic waste facilities be located away from drainage courses and traffic areas, and that the facilities be regularly maintained.

Regulations for septic systems are managed at the county level. The San Bernardino County Department of Public Health provides the local management for septic systems, which includes the following minimum requirements:

- Septic tanks must be water-tight, properly vented, and constructed of durable noncorrosive materials
- The construction of all septic tanks must be listed and approved by the International Association of Plumbing and Mechanical Officials (IAMPO) or an American National Standards Institute (ANSI) accredited testing organization
- The tank connections must conform to National Sanitation Foundation (NSF)/ANSI Standard 46.
- Septic tanks must be set back a minimum of 2,500 feet from surface water intakes for public water supplies.

The septic tanks would be manufactured and operated in compliance with all applicable regulations and work plans, which would not result in adverse impacts to the surrounding Project area and impacts would be less than significant. However, the two septic tanks to be located at the Construction Headquarters would be located in a previously undisturbed area. To address this, **Mitigation Measure HYDRO-1** (specifically WM-9) from the Groundwater FEIR would require siting of the septic tanks away from drainage courses and traffic areas, and would require the facilities to be maintained regularly.

Comparison of Impacts (Revised) to Groundwater FEIR Impact Analysis

The Groundwater FEIR determined that utilities impacts associated with the construction of new or expanded treatment of stormwater drainage facilities would be less than significant and that no mitigation measures would be required. Although new and expanded treatment facilities would be constructed, the proposed components of the systems would be located within the Station boundary, at the existing TCS Evaporation Ponds, or at the existing Transwestern Bench, all of which are previously disturbed areas. Because the proposed Project would develop the treatment facilities within previously disturbed areas, the impact would remain less than significant. For the two septic tanks to be located within previously undisturbed area at the proposed Construction Headquarters, Mitigation Measures HYDRO-1 (specifically WM-9) from the Groundwater FEIR would ensure septic facilities would be located away from drainage areas. With implementation of Mitigation Measures HYDRO-1 (specifically WM-9) from the Groundwater FEIR, this impact would be reduced to a less than significant level for the two septic tanks to be located at the Construction Headquarters.

IMPACT UTIL-2 **Potential to Exceed Landfill Capacity.** The Project would generate incidental non-hazardous waste and hazardous waste during construction and operation activities, which would not exceed the available daily capacity of relevant landfills. This impact would be **less than significant**, as previously identified in the Groundwater FEIR. Decommissioning of the Project, including the IM-3 Facility, would generate a variety of construction debris, including concrete, metal sheeting, and pipe, which could exceed the available daily capacity of relevant landfills. This impact would be **potentially significant**, which is a new identified impact from the Groundwater FEIR.

Construction

Based on current Project design information, the projected waste streams generated during construction would be approximately 6,347 cubic yards, which is approximately 3,947 cubic yards of additional waste compared to the Groundwater FEIR. The Final Remedy Design includes a Waste Management Plan for construction activities (C/RAWP; CH2M Hill 2015). According to the Plan, and consistent with the conclusions in the Groundwater FEIR, general construction waste would be transported off-site for recycling or disposal. Waste stream generated during construction is shown in Table 4.8-2.

TABLE 4.8-2
PROJECTED WASTE STREAM DURING CONSTRUCTION

Waste Stream	Estimated Volumes (cubic yards)
Concrete and asphalt pavement rubble (from construction within roads, at Station)	321.4
Construction and demolition debris (lumber, gypsum wallboard, glass, metal, roofing material, carpeting, plastic pipe, etc.)	6,000
Miscellaneous waste (trash, paper bags, cardboard boxes, office debris, etc.)	17.86
Empty drums/cans, unused chemicals/paints, used oil, used solvents, oily solids, and used fuel filters/parts from equipment maintenance, etc.	1.42
Universal waste (batteries, electronic devices, lamps, aerosol cans, and mercury-containing equipment)	2
Sampling equipment such as calibration gas cylinders	5
Total	**6,347**

SOURCE: PG&E 2015 (C/RAWP, Appendix R).

Waste materials would be managed on-site in demarcated waste management areas. Within the waste management areas, hazardous wastes would be segregated from non-hazardous wastes. Additionally, incompatible hazardous wastes (for example, flammable and corrosives wastes) would be segregated. Wastes of the same matrix, contamination, and source may be aggregated to facilitate accumulation and disposal. Lined roll-off boxes would be used to contain solid wastes. Liquid wastes would be contained in drums, totes, or portable tanks. Incidental trash, such as wooden pallets and food and beverage containers, would be contained in dumpsters located in staging areas near temporary facilities. Overall, the waste stream associated with construction, and the management of these materials, is consistent with the conclusions presented in the Groundwater FEIR. Although the proposed Project would generate more construction-related waste stream than anticipated in the Groundwater EIR, given the available capacity of landfills that serve the Project Area, impacts to landfill capacities would be less than significant.

Operation & Maintenance

Operation of the proposed Project would generate nonhazardous solid waste that would include incidental trash (e.g., used personal protective equipment, empty drums, bottles, and cans, paper bags, cardboard boxes, basic household and office debris, food containers, and other routine waste) generated by personnel, and construction materials from repair of constructed facilities. Based on current Project design information, the projected waste streams of non-hazardous waste for the Project would be 520 cubic yards per year. Based on current and foreseeable landfill capacities presented in Table 4.8-1, these waste streams are anticipated to be minimal and not exceed the available capacity at existing landfills. For example, daily capacity at Barstow Sanitary Landfill is 1,500 tons per day. Relevant plans and procedures regarding the proper collection, characterization, storage, transportation and disposal of waste generated during operation and maintenance of the Project are provided in the Final Remedy Design, Appendix L – Operation and Maintenance Manual, Volume 1 – Operation and Maintenance Plan, Appendix B – Standard Operating

Procedures (CH2M Hill 2015a). The plans and procedures that are anticipated to be made conditions of approval of the Final Remedy Design include the following:

- IRZ-Standard Operating Procedure (SOP-10: Discharge of Clean-in-Place Water to the Remedy-Produced Water Conditioning Plant. This specification describes the procedures for the transfer of Clean-in-Place water from the MW-20 Bench frac tank to the Remedy-produced Water Conditioning Plant for treatment on an as needed basis and providing the water meets the Remedy-produced Water Conditioning Plant acceptance criteria. The transfer would occur through installed pipelines and pumps from the frac tank to the Remedy-produced Water Conditioning Plant.
- IRZ-SOP-12: Off-Site Trucking of Clean-in-Place Water from MW-20 Bench. This specification describes the procedures for transferring Clean-in-Place water from the frac tank at the MW-20 Bench to the truck fill station for subsequent off-site trucking and disposal when the water does not meet the Remedy-produced Water Conditioning Plant acceptance criteria. The transfer would occur through installed pipelines and pumps.
- Remedy-SOP-07: Secondary Containment Inspection and Maintenance at Buildings. This specification describes the procedures for the inspection and maintenance of secondary containment at buildings at the MW-20 Bench and the Remedy-Produced Water Conditioning Plant.
- RTP-SOP-05: Secondary Containment Operation in the Remedy-Produced Water Conditioning Plant. This specification describes the procedures for manual and automated operation of secondary containment within the Remedy-produced Water Conditioning Plant and associated areas. Secondary containment systems include containment trenches, sumps, sump pumps, and sump level switches with alarms to alert the operators in the event of a spill or leak.
- RTP-SOP-07: Manual Cleaning of Frac Tanks. This specification describes the procedures for the manual cleaning of frac tanks (influent tanks and conditioned water storage tanks) at the Remedy-produced Water Conditioning Plant using a pressure washer, portable pump, and/or a vacuum truck.
- RTP-SOP-08: Off-Site Trucking of Remedy-Produced Water. This specification describes the procedures for transferring conditioned water to the TCS truck fill station for off-site trucking and disposal. The process would use installed pipelines, pumps, and a hose.
- RTP-SOP-10: Disposal of Produced Water in Evaporation Ponds via the TCS Wastewater Tank Discharge Connection. This specification describes the procedures for transferring water from the Remedy-produced Water Conditioning Plant and secondary containment structures to the TCS evaporation ponds. The process would use installed pipelines and pumps.
- CHQ-SOP-01: Off-Site Hauling of Wastewater. This specification describes the procedures to transfer accumulated non-hazardous wastewater from the 1,000-gallon remedy-produced water tank at the Construction Headquarters yard at Moabi Regional Park to a subcontracted tanker truck. The transfer would use a transfer pump and hose.
- CHQ-SOP-02: Truck Decontamination. This specification describes the procedures for the decontamination of construction- or operation and maintenance-related trucks at the

decontamination pad located in the Construction Headquarters yard at Moabi Regional Park. Decontamination would use water under pressure to wash the trucks. Water transfer from the decontamination pad sump to a 1,000-gallon remedy-produced water tank would be automated and use installed pipelines and pumps.

- CHQ-SOP-05: Off-Site Hauling of Sewage. This specification describes the procedures for a vacuum truck to enter the Construction Headquarters yard at Moabi Regional Park and remove accumulated sewage from the subsurface sewage tanks. The process would require a licensed sewage vacuum truck, pump, and hose.

Based on the recent expansion of the Barstow Landfill and the Kettelman Hills Landfill, the minimal amount of non-hazardous waste stream generated by the Project, and diversion of recovered materials, construction, and operational impacts on non-hazardous solid waste facilities would be less than significant.

In addition to non-hazardous waste produced by the Project, operation of the Project would also produce hazardous waste. Hazardous wastes would potentially include soil cuttings and mud rotary well installation waste (drilling mud); and decommissioning rinse water. Investigation-derived waste materials that would likely be generated include groundwater, drill cuttings, and incidental trash. The decommissioning of the IM-3 Facility would generate up to 5,000 cubic yards of solid waste and up to 2 million gallons of liquid waste. The material would be disposed at a licensed hazardous waste disposal facility permitted to accept the waste. The 2011 Groundwater FEIR estimated that implementation of the Project would generate 300 cubic yards per year of hazardous waste requiring off-site disposal. Disposal of hazardous waste would occur either at the Kettleman Hills Landfill, or the Clean Harbors Buttonwillow Landfill. The Kettleman Hills Landfill is a chemical waste disposal and treatment site with a currently permitted capacity of 15.6 million cubic yards at the B-18 landfill (DTSC 2014). The Clean Harbors Buttonwillow Landfill is fully permitted to manage hazardous wastes and can handle waste in bulk (solids and liquids). The Buttonwillow Landfill has a permitted capacity of over 10,000,000 cubic yards, while the current constructed landfill capacity is 950,000 cubic yards. The estimated 300 cubic yards per year of hazardous waste generated by the Project would not exceed or substantially reduce the permitted capacity of either the Kettleman Hills Landfill or the Clean Harbors Buttonwillow Landfill. Additionally, the proposed Project has identified other hazardous wastes and non-hazardous wastes permitted facilities. In the event that PG&E intends to use a landfill or disposal facility other than the Kettleman Hills Landfill, or the Clean Harbors Buttonwillow Landfill, PG&E would notify DTSC of the change and verify that the intended facility is permitted to accept the waste.

Operational impacts on hazardous solid waste facilities would be less than significant.

Decommissioning

Because the decommissioning of the Final Groundwater Remedy Project would occur decades in the future, the final decommissioning procedures would be prepared in a future work plan to account for regulatory and technological changes. However, using current regulatory requirements, the Final Remedy Design describes the overall decommissioning procedures and Appendix B of the C/RAWP provides standard operating procedures for the decommissioning of wells; the sampling of demolition waste to identify the appropriate disposal methods; the shutdown of treatment systems; spill prevention, containment, and control; and waste disposal.

As discussed in Section 4.6, “Hazardous Materials” of this SEIR, PG&E is required to prepare and implement a Final Groundwater Remedy Decommissioning Plan. It includes the decommissioning specifications and procedures currently described in the Final Remedy Design, and requires updating to incorporate technology and regulatory changes, if any. In particular, the updated Final Groundwater Remedy Decommissioning Plan is required to check for updates to waste disposal acceptance criteria to identify the appropriate disposal or recycling facilities for the Final Groundwater Remedy infrastructure to be removed. Application of Mitigation Measure HAZ-3 Final Groundwater Remedy Decommissioning Plan, described in Section 4.6 “Hazards and Hazardous Materials” of this SEIR, would require preparation and implementation of this decommissioning plan, which will address potential landfill capacity impacts that may arise in the future during final decommissioning procedures.

With implementation of the **Mitigation Measure HAZ-3**, the impact would be reduced to less than significant.

Comparison of Impacts (Revised) to Groundwater FEIR Impact Analysis

The Groundwater FEIR determined that the Project waste stream associated with construction and operation and maintenance would not exceed the available daily capacity of relevant landfills, and therefore this impact would be less than significant. Details added to Final Remedy Design subsequent to the Groundwater FEIR indicate an increase in the Project waste stream related to construction activities. Projected waste streams generated during construction would be approximately 6,347 cubic yards, which is approximately 3,947 cubic yards of additional waste compared to the Groundwater FEIR. Non-hazardous wastes generated during operation and maintenance would remain the same as the Groundwater FEIR. Based on the recent expansion of the Barstow Landfill, there is adequate capacity to serve the increased construction-related waste stream for the Project. The Project would not result in any new significant impacts or substantially more severe impacts related to landfills identified in the Groundwater FEIR.

Result in wasteful, inefficient, or unnecessary consumption of energy, during Project construction or operation or did not incorporate renewable energy or energy efficiency measures into building design, equipment use, transportation or other Project features. The Project would consume energy, including electricity, natural gas, and fuels during Project construction, operation and maintenance, and decommissioning activities, which would not result in wasteful, inefficient, or unnecessary consumption of energy. This would result in a **less than significant impact**, as previously identified in the Groundwater FEIR.

Construction

Construction of the Final Groundwater Remedy Project would primarily result in the use of nonrenewable resources such as electricity, gasoline, diesel fuel, and oil for equipment and transportation vehicles, and would result in minimal amounts of electricity usage when compared to the operation and maintenance phase due to the kinds of equipment used. The proposed Project is anticipated to use about 149,283 gallons of diesel and 20,468 gallons of gasoline annually. This is 0.0057 percent of the State's usage in 2012 for diesel and 0.0001 percent for gasoline. The Project also includes a Future Activity Allowance (25 Percent Potential Future Activity Allowance plus 10 additional monitoring well boreholes), which would result in additional diesel and gasoline to power construction equipment. However, it should be noted that during the construction phase, equipment and vehicles would already be mobilized on-site and that the 25 Percent Potential Future Activity Allowance would generally not require 25 percent additional vehicles and equipment (requiring diesel and gasoline) on-site. Nevertheless, assuming a worst-case scenario, the Future Activity Allowance could result in in 90,886 gallons of diesel and 8,057 gallons of gasoline annually. This additional amount, if used, would represent a negligible increase in the State's usage. Therefore, the impact would be less than significant.

Operation & Maintenance

Operation of the Final Groundwater Remedy Project would primarily result in the use of nonrenewable resources such as electricity, gasoline, diesel fuel, and oil for equipment and transportation vehicles. The proposed Project is anticipated to use about 55,649 gallons of diesel and 46,705 gallons of gasoline annually. This is 0.0021 percent of the State's usage in 2012 for diesel and 0.0003 percent for gasoline.

The Final Remedy Design estimates a higher demand of electricity of up to 7.82 million KWh annually (an increase of 6.22 million KWh annually). The increase in power demand is primarily due to the development of system details that were not included in the Groundwater FEIR, such as the TCS Recirculation Loop, the Contingent Freshwater Pre-Injection Treatment System (FWPTS), the TCS Evaporation Ponds, and the Moabi Regional Park facilities (including the Construction Headquarters and Soil Processing Area). The Project includes various sources to achieve the electricity demand, including the use of on-site generators and solar panels, for operation of the Project. The provision of power through the use of solar panels and on-site generators would provide approximately 5.2 million kW/hour annually, which leaves an additional 2.62 million kWh capacity needed annually, both in California and in Arizona. The wells operating in Arizona would require 1.4 million kWh annually. In 2015, the Mohave Electric Cooperative has an annual consumption of approximately 929 million kWh. The Project demand would be 0.15 percent of the current consumption and therefore it would be within the current capacity. This leaves 1.32 million kWh during operational activities in California, which would be supplied by the City of Needles. The City of Needles in 2014 consumed approximately 52.46 million kWh, of which the 1.32 million kWh needed is approximately 2.5 percent of the total annual consumption. The Groundwater FEIR identified a net need of 1.6 million kWh, which could be supplied by the City of Needles. Therefore, the current surplus need of 1.32 million kWh would be within the supply capabilities of the City of Needles and the impact would be less than significant.

Operation of the proposed Project would also include a Future Activity Allowance, which could potentially increase the amount of electricity required for the Project. The Future Activity Allowance is anticipated to require 2.37 million kWh annual as a worst case scenario with 1.96 million kWh annually coming from the City of Needles and 0.41 million kWh annually coming from the Mojave Electric Cooperative. This additional electrical usage would be approximately 3.74 percent of the utility's 52.46 million kWh for the City of Needles and approximately 0.04 percent for of the 929 million kWh for the Mojave Electric Cooperative. These amounts would be accommodated within the utility's capacity, and as a result, impacts would be less than significant.

In addition, the Final Remedy Design included the integration of sustainability principles and practices into the design and implementation activities for the Project, using the Programmatic Sustainable Remediation Guidance developed in 2011 and revised in 2012 in consultation with representatives of DTSC. Details of the integrated principles and practices are provided in Chapter 4 of the Final Remedy Design. For energy use, the following BMPs were incorporated into the Final Remedy Design:

- Use energy generated from non-petroleum sources where possible, such as small photovoltaic solar panels at select remote well locations, Remedy-produced Water Conditioning Building, and Operations Building: This has been completed. Solar cells have been included in the Final Remedy Design, as previously described.
- Use of alternative fuels, e.g., biodiesel: This would be implemented during construction, operation and maintenance, and decommissioning activities. The nearest retail vender of biodiesel is Loves Travel Store at the intersection of Interstate 40 and Highway 95 about 10 miles east of the Station.
- Use energy efficient architectural elements: This has been completed, as described in the Final Remedy Design plans and specifications (Appendices C and D).
- Use energy efficient equipment and lighting: This has been completed, as described in the Final Remedy Design plans and specifications (Appendices C and D).
- Use EPANET water supply program to design the piping network and minimize energy consumption: This has been completed, as described in the Final Remedy Design plans and specifications (Appendices C and D).
- Locate conditioned water tank to allow for gravity flow to injection wells, minimize energy use: This has been completed; the tanks for the Remedy-Produced Water Conditioning System would be located at the Station, which is topographically higher than the surrounding area.
- Operation and maintenance activities will minimize energy use by optimizing equipment via routine maintenance and minimizing energy consumption during peak energy use periods: This has been completed. The O&M Manual (Appendix L of the Final Remedy Design) describes the maintenance activities.

During the design of process, systems, and equipment, the sustainability focus was also on reducing the overall remedial timeframe and thus reducing operation and maintenance requirements for water use, materials use, waste generation, energy use, air emissions generated, health and safety, and hazardous and potential impacts on biological resources.

In addition, The Final Remedy Design includes documentation and recordkeeping requirements to verify that the sustainability practices and BMPs developed during the design are implemented as designed. Section 4 of the Final Remedy Design outlines the record keeping requirements. Examples of record keeping include inspection check lists and reports, material receiving reports, and monitoring and test data. Since the employees constructing and implementing the Project would be required to adhere to best available engineering techniques, construction and design practices, and equipment operating procedures as identified in adopted work plans, the Project would not result in wasteful, inefficient, or unnecessary consumption of energy, during Project construction or operation and maintenance. Implementation of the sustainability factors and BMPs will be evaluated and scored during remedy construction, operation and maintenance, and decommissioning by PG&E. Impacts regarding the use of energy during construction and operation and maintenance would be less than significant.

Decommissioning

Decommissioning of the Final Groundwater Remedy Project would involve similar activities as construction, primarily resulting in the use of nonrenewable resources such as electricity, gasoline, diesel fuel, and oil for equipment and transportation vehicles, and would result in minimal amounts of electricity usage when compared to operation and maintenance. Decommissioning is anticipated to use the same amount of nonrenewable resources as construction: about 149,283 gallons of diesel and 20,468 gallons of gasoline annually. This is 0.0057 percent of the State's usage in 2012 for diesel and 0.0001 percent for gasoline. This amount, if used, would represent a negligible increase in the State's usage. Therefore, the impact would be less than significant.

Comparison of Impacts (Revised) to Groundwater FEIR Impact Analysis

The Groundwater FEIR estimated a demand of 1.6 million kWh of electricity annually, and identified potential sources of electricity for the Project to meet the demand of 1.6 million kWh needed to serve the proposed Project. Supplemental power included the use of a dedicated portable diesel fuel generator (generating approximately 320 kW) and the use of small solar panels. These sources of electricity would be used either individually or in combination to meet the electrical demands of the Project. The use of these on-site sources of electricity were determined to provide sufficient energy for the Project, and the impacts were determined to be less than significant.

The Final Remedy Design estimates a higher demand of electricity (up to 7.82 million KWh annually), which is an increase of 6.22 million kWh annually over the annual kWh provided in the Groundwater FEIR. The increase in power demand is primarily due to the development of system details that were not included in the Groundwater FEIR, such as the TCS Recirculation Loop, the FWPTS, the TCS Evaporation Ponds, and the Moabi Regional Park facilities. However, as discussed earlier, the Final Remedy Design also expanded various on-site sources of electricity, including the use of on-site generators and solar panels, which would provide approximately 5.2 million kWh annually, resulting in a balance of 2.62 million for operation and maintenance activities. The implementation of the Future Activities Allowance would add an additional demand of 2.37 million kWh annually. This total balance of 4.99 million kWh capacity needed annually would be provided by the Mohave Electric Cooperative (1.81 million kWh annually) and the City of Needles (3.18 million kWh annually). The power demand from the off-site providers is well within their respective capacities. In addition, PG&E would be required to implement Programmatic Sustainable Remediation Guidance energy-related BMPs detailed in Chapter 4 of the Final Remedy Design. As such, no significant impacts related to energy consumption would occur.

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4.9 Water Supply

4.9.1 Introduction

This section describes the reasonably foreseeable and potentially significant adverse environmental effects related to water supply in the Project Area for the Pacific Gas and Electric Company (PG&E) Topock Compressor Station Final Groundwater Remediation Project (Final Groundwater Remediation Project or proposed Project) as identified in the Project Description of this subsequent environmental impact report (SEIR). Specifically, this section considers the potentially significant adverse effects of the proposed Project during the construction, operation and maintenance, and decommissioning phases, as compared to those identified in the Topock Compressor Station Groundwater Remediation Project Final EIR (Groundwater FEIR; DTSC 2011), consistent with Public Resources Code Section 21166 and the California Environmental Quality Act (CEQA) Guidelines Sections 15162 and 15168, and including changes in impacts related to groundwater supplies and the availability of groundwater to the Project and other nearby users. Project impacts on water quality related to water supply are addressed in Section 4.6, “Hydrology and Water Quality,” of this SEIR.

4.9.2 Summary of 2011 Groundwater FEIR Water Supply Analysis

The water supply section of the Groundwater FEIR included a detailed discussion of the environmental setting and potential effects of the proposed remedy on water supply. Although largely programmatic, the Groundwater FEIR provided a detailed analysis of the construction and operation of physical facilities anticipated at that time to be necessary to implement the groundwater remedy. The Groundwater FEIR also included a project-level analysis of the conceptual technical methods selected for the final remedy. This SEIR incorporates the analysis in the Groundwater FEIR by reference and evaluates, on a project-specific level, the potential effects associated with construction and operation of the *Basis of Design Report/Final (100%) Design Submittal for the Final Groundwater Remedy, PG&E Topock Compressor Station, Needles, California* (Final Remedy Design; CH2M Hill 2015a) and the *Construction/Remedial Action Work Plan for the Final Groundwater Remedy* (C/RAWP; CH2M Hill 2015b) that were unknown at the time the analysis was conducted for the Groundwater FEIR. The Final Remedy Design is included in its entirety as Appendix BOD to this SEIR. Information included in the water supply analysis of the Groundwater FEIR is summarized in the following pages.

4.9.2.1 Setting Identified in the 2011 Groundwater FEIR

The following summarizes the setting relative to water supplies described in the Groundwater FEIR (DTSC 2011).

The Lower Colorado Water Supply Project

The Lower Colorado Water Supply Project (LCWSP) discussion in the Groundwater FEIR summarized the existing laws, judicial rulings, decrees, contracts, and agreements collectively known as the “Law of the River” that regulate the use of water from the Colorado River, including the basins through which the river flows. This body of law requires that water from the Colorado River only be diverted by entities with valid water contracts and establishes the legal apportionment of Lower Colorado River Basin water between the seven Colorado River Basin states, including California and Arizona. Depending on how close a given well is to the river and whether the aquifer is a dynamic part of the river's underflow, this body of law can include groundwater supply wells, as discussed later in this section. The river water supplies are completely allocated; no new water rights are available. These conditions have not changed since certification of the Groundwater FEIR.

Groundwater Diversions of Colorado River Water

As explained in the Groundwater FEIR, the United States Geological Survey in cooperation with Bureau of Reclamation developed an "accounting surface" methodology to identify wells outside the floodplain of the Lower Colorado River that yield water that will be naturally replenished with water from the river. Groundwater extracted by pumps located within the accounting surface would be naturally replenished by Colorado River water and thus a valid Colorado River Water contract with the Bureau of Reclamation is required in order to legally pump the water. All existing wells within the Project Area and those included as part of the proposed Project are within the Colorado River Water accounting surface, including the locations of the proposed freshwater supply wells. These conditions have not changed since certification of the Groundwater FEIR.

Existing Pacific Gas and Electric Company Entitlements and Usage

After the LCWSP was developed and pursuant to the contract with the Bureau of Reclamation, the City of Needles entered into a subcontract with PG&E to supply LCWSP water to the PG&E Topock Compressor Station (Station) in 2003. The subcontract was amended in 2004 to bring the total current contracted entitlement of LCWSP water for PG&E to 422 acre-feet per annum (afa) of consumptive use (equivalent to pumping a well at a rate of about 261 gallons per minute [gpm]). The points of diversion under the subcontract may be anywhere in the general vicinity of the Station property and are not restricted to a location on the PG&E-owned property itself. The Station currently uses water for operations via water supply wells in Arizona that is pumped across the Colorado River through piping mounted on a pipe bridge and then through an aboveground pipeline to two aboveground water tanks located south of the Station, where the water is stored for use on an as-needed basis for cooling towers, dust control, and other on-site purposes. Drinking water for use by employees at the Station is purchased by PG&E and trucked in by an outside purveyor (CH2M Hill 2007; DTSC 2011). Despite their location in Arizona, water diverted at these wells is counted as part of California's allocation because the water is used within California and now is included as part of the City of Needles' LCWSP entitlement under its contract with the Bureau of Reclamation.

PG&E uses LCWSP water extracted under its subcontract agreement with the City of Needles at the Station and at the Interim Measure 3 Groundwater Extraction and Treatment Facility (IM-3 Facility). The IM-3 Facility included four extraction wells in the floodplain portion of the Project Area, a treatment plant, and two injection wells, which inject treated groundwater into the alluvial aquifer. A substantial percentage (more than 95% in 2008 and 2009) of the water extracted for use at the IM-3 Facility was reinjected into the aquifer. The small percentage of water that is not reinjected into the groundwater table is contained in waste brine that is generated during the reverse-osmosis treatment process.

PG&E's actual annual consumptive use through 2011 was less than PG&E's full LCWSP entitlement of 422 afa and varies each year. The Groundwater FEIR stated that consumptive use at the Station fluctuated depending on facility operations and climate conditions, ranging from roughly 70 to 100 afa. The maximum usage was 110 afa. The IM-3 Facility had a net consumptive use (extraction less reinjection) of between 10 and 20 afa through 2011 but most recently was reported at a range of 0.2 to 4.3 afa (PG&E 2016).

Future Availability of Water

The Groundwater FEIR stated that the contract with the Bureau of Reclamation provides that if the quality of groundwater produced by the LCWSP wells is poorer than the quality of Colorado River water above Imperial Dam, the exchange could be halted. However, there have been no water quality problems to date and Metropolitan Water District has agreed to establish a trust fund to protect future LCWSP users should the increased pumping result in water quality deterioration at the well fields. Thus, at the time the Groundwater FEIR was certified, indications were that the LCWSP would continue to operate at the authorized capacity for the term of the PG&E-Needles subcontract.

The LCWSP subcontract between the City of Needles and PG&E expires in 2045, when the Needles-Reclamation LCWSP contract expires. However, The Needles-Reclamation LCSWP contains a renewal option for an additional 50 years. It is expected that the City of Needles will extend its LCWSP contract with the Bureau of Reclamation for an additional 50 years, thereby extending the subcontract as well. These conditions have not changed since certification of the Groundwater FEIR.

4.9.2.2 Impacts and Mitigation Measures Identified in the 2011 Groundwater FEIR

Impacts to water supply were addressed in the Groundwater FEIR, Volume II, Section 4.12. Below is a summary of the analysis and associated mitigation measures for water supply. The water use estimated in the Groundwater FEIR was estimated at 2 to 3 acre-feet per year for construction, a negligible amount during operation and maintenance, a decrease of 10 to 20 acre-feet per year for the decommissioning of the IM-3 Facility, and 2 to 3 acre-feet per year for the 1 year of decommissioning the entire Groundwater Remedy System. Overall, the Groundwater FEIR concluded a "no consumptive use" as all water used would be returned to the Colorado River Basin. However, Mitigation Measure WATER-1 was required, which required a hydraulic analysis during the design phase to ensure groundwater extraction would not negatively impact existing wells. As discussed in Section 3.6.2.5, "Water Usage" of the Project Description, the Final Remedy Design provides an updated more accurate description and estimation of water use, which now includes the consumptive use of water.

Groundwater FEIR Effects on Insufficient Water Supplies

The Groundwater FEIR concluded that the effects on water supply would be less than significant. PG&E's actual annual consumptive use through 2011 was less than PG&E's full LCWSP entitlement of 422 afa. Actual usage was between 80 and 120 afa (use at the Station plus IM-3 Facility use), leaving over 300 afa of entitlement that can be used to serve the proposed Project and/or other Station uses. Drinking water for workers is trucked in from other sources and is therefore not counted against PG&E's entitlement.

The Groundwater FEIR also considered potential sources of freshwater for injection into the upgradient edge of the treatment zones. The purpose of the freshwater injection would be to drive the contaminated water through the treatment zone, as well as contain the plume to within the treatment zones. The Groundwater FEIR assumed that the source of freshwater would be either from a new surface diversion from the Colorado River or from new groundwater wells within the Colorado River accounting surface in California or Arizona. The sources of freshwater were further evaluated subsequent to the Groundwater FEIR.

Groundwater FEIR Effects on Groundwater Supplies, Levels, or Recharge

The Groundwater FEIR concluded that the depletion of groundwater supplies, lowering of groundwater levels, or adverse impacts to recharge would be potentially significant. Although the proposed Project would not substantially deplete groundwater supplies, localized effects on the groundwater table near the freshwater extraction wells were found to be possible and impacts depended on pumping rates and the proximity and depths of other wells. The Groundwater FEIR included Mitigation Measure WATER-1, which required conducting a hydrologic analysis to ensure no localized impacts to groundwater supply. The hydrologic analysis has been conducted and the results are discussed below in Section 4.9.3, "Existing Setting."

4.9.3 Existing Setting

This section describes the physical water supply characteristics and environmental setting with regard to the Final Remedy Design, focusing on those areas where there have been changes made to the Project, changes in the circumstances surrounding the Project, or new information discovered since the Groundwater FEIR was certified (see Public Resources Code, Section 21166; CEQA Guidelines, Sections 15162 and 15168).

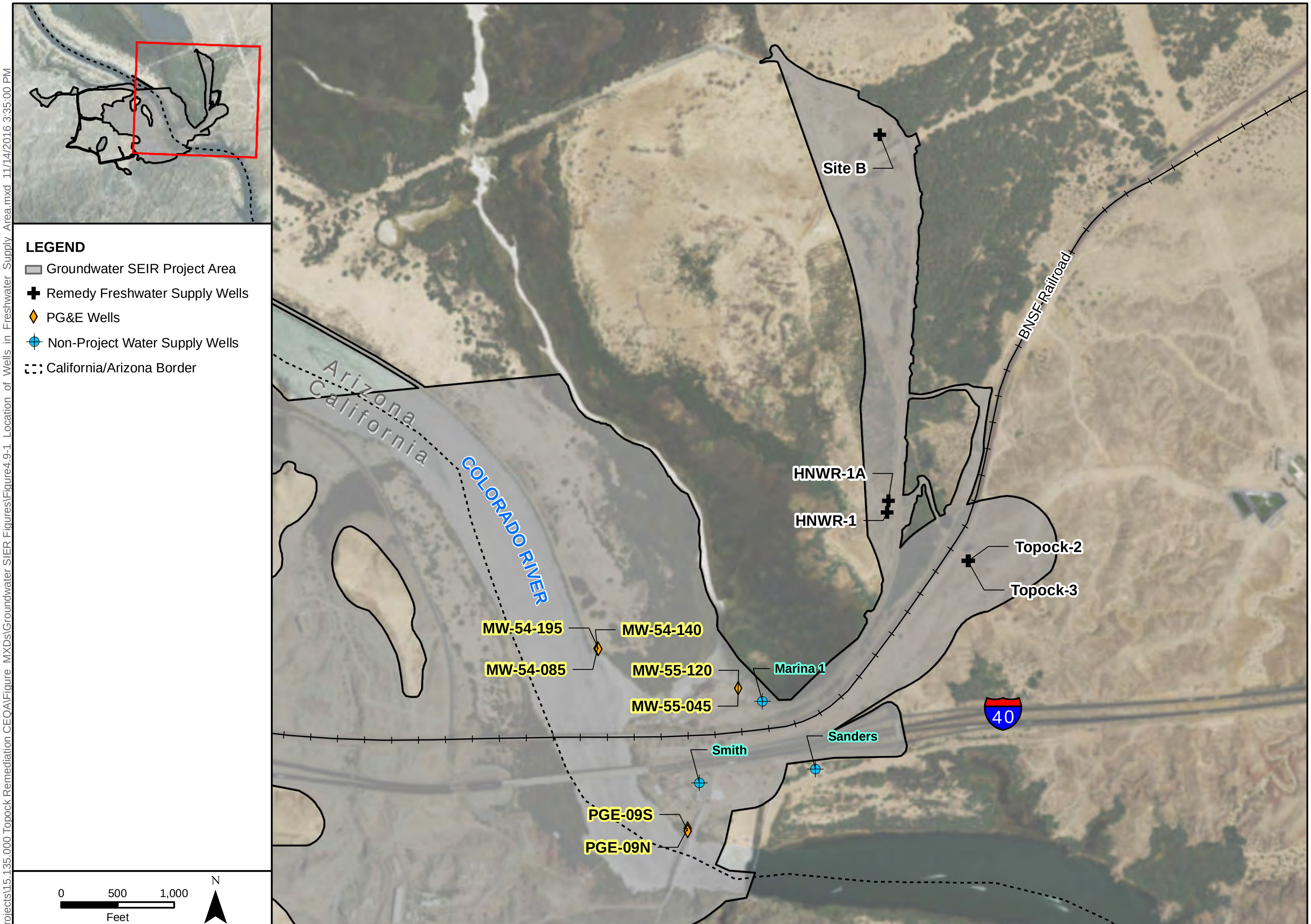
4.9.3.1 Results of Hydrologic Analysis

As required by Groundwater FEIR Mitigation Measure WATER-1, a hydrologic analysis of freshwater supply sources was conducted in 2012 to evaluate several freshwater supply options, which is included as a technical memorandum in the Final Remedy Design (CH2M Hill 2015a, Appendix J). Subsequent to the issuance of the 2012 freshwater technical memorandum, Wells HNWR-1A and Site B were installed within the Havasu National Wildlife Refuge (HNWR) in Arizona and two additional technical memoranda were prepared summarizing the results (CH2M Hill 2014, and included in Appendix N in the Final Remedy Design). The environmental impacts associated with the installation and testing of these wells was conducted through the *Topock*

Compressor Station Groundwater Remediation Project Environmental Impact Report Addendum No. 1 for Alternative Freshwater Source Evaluation Activities (DTSC 2013). The locations of the proposed freshwater supply wells, monitoring wells installed to monitor the potential impacts of the remedy (Wells MW-54, MW-55, and MW-56), and other nearby non-Project supply wells are shown in **Figure 4.9-1**. The water quality results are discussed in Section 4.6, "Hydrology and Water Quality," of this SEIR. The Final Remedy Design summarizes the results, as presented below (CH2M Hill 2015a).

Based on results from the alternative freshwater sources evaluation, Well HNWR-1 can supply enough water of sufficient quality to supply the groundwater remedy at the nominal flowrate of 450 gpm, but could not supply the potential maximum flow of 900 gpm. Therefore, wells HNWR-1A and Site B were installed and tested to determine their capacity and quality. See Figure 4.9-1 for the freshwater supply well locations. The testing indicated that both Well HNWR-1A and the well at Site B can supply the needed maximum flow of 900 gpm to serve the remedy. After reviewing the available options for a freshwater supply, PG&E has identified in the Final Remedy Design that Well HNWR-1A is their preferred primary freshwater source for the groundwater remedy, with Well HNWR-1 as a secondary source and the Topock-2/-3 and Site B wells as contingent sources. The Site B well is considered the least desirable contingency due to elevated levels of arsenic and hexavalent chromium above MCLs and California background levels in some samples. The secondary and/or contingent wells, which are already in place, would be brought online in the event that Well HNWR-1A is unable to supply a sufficient volume of water of appropriate quality to support the proposed Project, or in the event that the radius of influence of continual pumping of Well HNWR-1A extends to other nearby active non-Project supply wells and adversely affects their water supply or quality.

There are seven known non-Project water supply wells in the vicinity of and generally downgradient of Well HNWR-1A. The Topock-2 (active), Topock-3 (active), Marina-1 (unknown), Sanders (unknown), Smith (unknown), PGE-9N (inactive due to elevated salt content), and PGE-9S (inactive due to elevated salt content) wells are located about 900 to 3,500 feet southwest and southeast of Well HNWR-1A. In addition, two wells (MTS-1 and MTS-2) are located at the Kinder Morgan Mojave Topock Compressor Station, approximately 4,500 feet east of Well HNWR-1A, and non-Project Well GSRV-2 is located about 8,300 feet north of Well HNWR-1. However, these three wells would be generally in the upgradient direction. While the Topock-2 and Topock-3 wells are identified as contingent monitoring wells for the remedy, they currently supply water to the Station and Topock Marina. Aquifer pumping tests conducted in 2013 at the HNWR-1 and Site B wells suggest that pumping at the proposed 900 gpm rate is unlikely to substantially affect nearby local water supply wells (CH2M Hill 2014). The drawdown observed at the Topock-2 and Topock-3 wells during the aquifer pump test of Well HNWR-1 was less than 1 foot. The Topock-2 and Topock-3 wells are located closer to the proposed freshwater source supply wells than any of the other water supply wells, suggesting the effect on those other wells would also be less than 1 foot. Hydrologic analyses typically conclude that a decrease of 1 foot would not expose well screens or well pumps and therefore there would not adversely affect a well's ability to supply water.



Final Groundwater Remediation Project SEIR
Map Creation Date: 12/13/2016 Sources: ESRI Aerial, PG&E 2015

Location of Wells in Freshwater Supply Area

Figure 4.9-1

ESA North State Resources

Path: G:\Projects\15.135.000 Topock Remediation CEQA\Figure MXDs\Groundwater SIER Figures\Figure4.9-1 Location of Wells in Freshwater Supply Area.mxd 11/14/2016 3:35:00 PM

4.9.4 Regulatory Background

4.9.4.1 Federal

Federal Plans, Policies, Regulations, and Laws

The Colorado River is managed and operated under numerous compacts, federal laws, court decisions and decrees, contracts, and regulatory guidelines collectively known as the Law of the River. This collection of documents apportions the water and regulates the use and management of the Colorado River among the seven basin states and Mexico. The following is a synopsis of significant documents pertaining to the Project Area:

- The Colorado River Compact of 1922: This compact defines the relationship between the basin states.
- Boulder Canyon Project Act of 1928: This act apportioned to California the consumptive use of 4.4 million acre-feet per year of water from the Colorado River plus one-half of any surplus water that was unapportioned by the compact. This act required all users of the river to have a contract with the Secretary of the Interior.
- California Seven Party Agreement of 1931: This agreement helped settle the conflict between California agriculture and municipal interests over Colorado River water priorities by reaching consensus on the amounts of water to be allocated on an annual basis to each entity. (Note: This agreement did not take into account the existence of present perfected[1] and other water rights along the Colorado River.)
- 1964 U.S. Supreme Court Decree in *Arizona v. California*: The decree recognized present perfected water rights (pre-1929 rights), recognized Indian Winter and federally decreed rights, and affirmed the need to have a contract with the Secretary of the Interior.
- 1979, 1984, & 2000 Supplemental Decrees and the 2006 Consolidated Decree in *Arizona v. California*: Quantified the present perfected rights and the Indian Winter and federally established rights recognized in the 1964 decree.
- 1986 Lower Colorado Water Supply Project Act: Authorized Reclamation to construct the Lower Colorado Water Supply Project to make up to 10,000 afa of exchange water available to eligible entities for nonagricultural use along the Colorado River in California.
- December 2007 Record of Decision for Colorado River Interim Guidelines: This record of decision:
  - established rules for shortages, specifying who will take reductions and when they take them;
  - established operational rules for Lake Powell and Lake Mead;
  - established rules for surpluses for distribution of the extra water; and

[1] Present perfected right, as defined by the Supreme Court, means perfected water rights existing as of June 25, 1929, the effective date of the Boulder Canyon Project Act

- encouraged new initiatives for water conservation with mechanisms for water conservation credit.

4.9.4.2 State of California

Senate Bill (SB) 610, signed into law in 2001 (Chapter 643, Statutes of 2001), amended Sections 10910–10915 of the California Water Code. The law requires public water systems to prepare water supply assessments for residential projects with more than 500 dwelling units or development projects meeting certain criteria defined in the Water Code. The water supply assessment must determine whether available water supplies are sufficient to serve the demand generated by the project along with the region's reasonably foreseeable cumulative demand under average-normal-year, single-dry-year, and multiple-dry-year conditions, as projected over a 20-year period.

Consistent with the conclusion in the Groundwater FEIR, the proposed Project does not meet the Water Code definition of a project requiring a water supply assessment. However, the availability of a water supply adequate to serve the project was considered by DTSC and is discussed below in the impacts evaluation. DTSC's determination that a water supply assessment is not required for the Project is based on California Water Code Sections 10910–10915 (SB 610). The proposed project, for example, does not fall within the definition of a "project" under 10912, subdivision (a), which defines "project" as: (1) a proposed residential development of more than 500 dwelling units; (2) a proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space; (3) a proposed commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space; (4) a proposed hotel or motel, or both, having more than 500 rooms; (5) a proposed industrial, manufacturing, or processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area; (6) a mixed-use project that includes one or more of the projects specified in this subdivision; or (7) a project that would demand an amount of water equivalent to, or greater than, the amount of potable water required by a 500 dwelling unit project (California Water Code, Section 10912, subd. [a]). None of the above provisions have been found to apply to the Final Groundwater Remedy.

The proposed Project will not require any new water supplies from a public water system. The Final Groundwater Remedy would not result in any increase in potable water supply service, including service from a public water system such as the City of Needles. Thus, DTSC concluded that the provisions of SB 610, codified in California Water Code Section 10910, et seq., do not apply to the proposed Project.

4.9.4.3 Local

Other than the federal and state laws pertaining to water supply identified herein, there are no specific regional or local plans that would affect the water supply proposed Project.

4.9.5 Environmental Impacts

4.9.5.1 Thresholds of Significance

The discussion of water supply in this section follows the principles summarized above in the state portion of the Regulatory Background. Accordingly, this analysis looks at both the certainty of water supplies and the impacts that would result from those supplies. Based on the current (2016) CEQA Guidelines, Appendix G, the proposed Project would have a significant impact on water supply if it would:

- Have insufficient water supplies available to serve the Project from existing or permitted entitlements and resources, or require new or expanded entitlements; or
- 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 (i.e., the production rate of preexisting nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted).

The above-listed CEQA significance criteria have been split out from the standard Hydrology and Water Quality (Section 4.6 in this SEIR) CEQA significance criteria analysis and provided as a separate stand-alone section. Water Supply significance criteria are also included in the Modified Initial Study (see Appendix IS), which also explains why both criteria are carried forward for analyses in this section.

4.9.5.2 Approach to Analysis

This section presents a revised analysis per Public Resources Code Section 21166 and CEQA Guidelines Section 15162 governing conditions required for preparation of a SEIR, including substantial changes to the Project or circumstances under which the Project is taken that result in major revisions to the original FEIR. Subsequent to certification of the Groundwater FEIR, the Final Remedy Design was prepared, which included design details not available in 2011. This section outlines the approach to the potential water supply impacts based on the project specific information now available, as well as the additional information obtained regarding the existing environmental setting (see Section 4.9.3 which summarized the additional information included in the Final Remedy Design).

Some of the mitigation measures in this section refer to various plans or other documents that have been prepared and included in the Final Remedy Design for the groundwater remedy or are part of the project's federal requirements. Many of these plans and documents included in the Final Remedy Design were prepared to implement mitigation measures previously adopted as part of DTSC's January 31, 2011, decision approving Alternative E as the groundwater remedy (DTSC 2011). Appendix GWMM to this SEIR presents a comparison between the mitigation measures included in the Groundwater FEIR as reflected in the Mitigation Monitoring and Reporting Program approved by DTSC on January 31, 2011, and those presented in this SEIR for the Final Groundwater Remedy Project.

All plans and documents included in the Final Remedy Design and references in this SEIR are appended to this SEIR as Appendix BOD. In addition, the documents are available online at the following link: http://dtsc-topock.com/documents/cleanup-implementation/groundwater/remedy-design/remedial-design-documents.

Construction Impact Methodology

As discussed in Section 3.5.2.5 of this SEIR and Section 4.2.5 of the C/RAWP, water usage during construction would be for dust control, equipment decontamination, process water for well construction and development, hydrostatic testing of constructed pipelines, and other activities. The source of the water for use during construction would come from one of the five sources listed below in order of preference:

1. **Existing Station water supply system**. This supply would be accessed by a temporary storage and distribution system so interference with Station operations is minimized. The existing water supply pipe would be tapped and a temporary aboveground pipe (1- to 2-inch-diameter high-density polyethylene pipe) would convey water from the tap to a temporary freshwater storage tank staged in the vicinity of the turnout area outside east of the Station entry gate.
2. **Existing freshwater supply well in Arizona (HNWR-1A)**. This supply would be accessed either at the wellhead (typically, to support construction in Arizona) or through Pipeline B once constructed. Water would be pumped from the well using either a temporary pump/power supply (generator) or using the remedy equipment and power supply once constructed.
3. **Treated water from the IM-3 Facility**. Treated water from the IM-3 Facility would be accessed by the existing IM-3 storage and distribution system, or utilizing a temporary storage and supply system. This option would only be pursued following agency concurrence and DTSC approval of PG&E’s evaluation of the potential TDS impacts associated with the use of IM-3 Facility treated water for dust suppression during remedy construction control.
4. **Existing water supply for Moabi Regional Park**. This water supply is included as a contingency and would only be accessed as determined necessary and as authorized by the water supply operator. If implemented, a water supply station would be established in the Construction Headquarters/Long-Term Remedy Support Area using a storage and distribution system.
5. **Other commercially available supplies**. Water would be obtained, as necessary, from commercially available supplies including, but not limited to, Golden Shores Water Company and City of Needles. The water would be transported to the site via water truck.

It is anticipated that all of the water use during construction would come from the existing Station water supply system because of the limitations associated with the other sources. The proposed Project also includes a Future Activity Allowance for all Project infrastructure to be constructed (wells, pipelines, structures, etc.). Generally, the Future Activity Allowance includes two components: (1) an additional allowance for all Project infrastructure, established at up to 25 percent of the parameter set forth in the Final Remedy Design, and (2) up to 10 additional monitoring well boreholes to be installed in Arizona as part of the monitoring program.

Operation & Maintenance Impact Methodology

Subsequent to certification of the Groundwater FEIR, additional information was gathered regarding the available wells in Arizona, their ability to supply water to the Project, and the effects on nearby wells from the pumping of those supply wells (CH2M Hill 2012 and 2014). The additional information is summarized above in Section 4.9.3 and draws on the detailed discussion in the Final Remedy Design (CH2M Hill 2015a). As previously discussed, Well HNWR-1A has been selected by PG&E as the freshwater supply well for the Project based on its water quality and its ability to supply up to 900 gpm. However, the Final Remedy Design also notes that over the decades-long life of the Project, the well yield (supply) or water quality of Well HNWR-1A might change. To address this possibility, the Final Remedy Design has included the flexibility to use alternate wells including contingent freshwater supplies or blending of water, as needed. The contingent freshwater supply wells are shown on Figure 4.9-1, and include HNWR-1, Topock-2, Topock-3, and Site B. Potential reasons for using contingent freshwater supply wells are listed below:

- The well yield of Well HWNR-1A decreases to below desired flow rate (e.g., nominal 450 gpm; range 150 to 900 gpm).
- The water quality at Well HNWR-1A deteriorates to unacceptable levels. In particular, if the concentration of arsenic increases to and remains above the water quality objective of 10 micrograms per liter (μg/L).
- The pumping at Well HNWR-1A decreases groundwater levels at nearby active supply wells and exposes their well screens or significantly decreases their well yield.
- The pumping at Well HNWR-1A causes or threatens water quality deterioration at neighboring water supply wells.

The Final Remedy Design ranks the preference of the available wells in the following order: HNWR-1A, HNWR-1, Topock-2/-3, and Site B, but retains the flexibility for agencies to direct PG&E to use any combination that resolves water supply and/or water quality issues. For example, if the well yield of Well HNWR-1A decreases over time to below the current design maximum flow rate of 900 gpm, the volume could be supplemented with water from Well HNWR-1. If Well HNWR-1 is unable to provide the needed supplemental volume of water, the wells at Topock-2, Topock-3, or Site B could be used. The Topock-2 or Topock-3 wells could only partially supplement the potential maximum flow rate of 900 gpm. Since the Site B well contains elevated concentrations of arsenic and Cr(VI), water treatment might be required to reduce the concentrations of those constituents down to basin water quality objectives. Testing has indicated that the Site B well has the available well yield to entirely replace Well HNWR-1A, if need be. However, using the Site B well alone would require the use of the contingent treatment plant to treat elevated arsenic and possibly hexavalent chromium.

As discussed in Section 4.9.3, "Existing Setting," the hydrologic analyses suggest that pumping Well HNWR-1A at the proposed maximum 900 gpm rate is unlikely to substantially affect nearby non-Project water supply wells since the drawdown observed at the Topock-2 and Topock-3 wells during the 2013 aquifer pump test of Well HNWR-1 was less than 1 foot and the Topock-2 and

Topock-3 wells are located closer to the proposed freshwater source supply wells than any of the other active non-Project water supply wells (CH2M Hill 2014). This suggests that the effect on those other non-Project wells would also be less than 1 foot. Hydrologic analyses typically conclude that a decrease of 1 foot or less would not expose well screens or well pumps, and therefore there would not adversely affect the well yield of a given well.

Nonetheless, the Final Remedy Design also recognizes that the pumping of the freshwater well would continue for decades and aquifer conditions could change over time. Known non-Project water supply wells shown in Figure 4.9-1 are all generally located southwest and downgradient of Well HNWR-1A. As previously discussed, some of these wells are active. In addition, inactive wells could be returned to active service in the future. In the event that the pumping of Well HNWR-1A affects the well yield of active non-Project wells, the Project could reduce the impact to non-Project wells by reducing the volume of freshwater supplied by Well HNWR-1A and partially or entirely replacing that volume of water with freshwater from the Site B well. The Site B well is located farther away from most of the water supply wells and therefore would have less of an effect on those wells located to the southwest. The non-Project MTS-1 and MTS-2 wells are located upgradient and to the east of Well HNWR-1A and the non-Project Well GSRV-2 is located north and upgradient of Well HNWR-1A. The water supply of these three wells should not be affected by the pumping of any of the downgradient freshwater wells.

The Project groundwater monitoring program includes the HNWR area in order to monitor groundwater levels and water quality in the area where freshwater would be pumped. Wells MW-54, MW-55, and MW-56 have been installed at the locations shown on Figure 4.9-1, and have been incorporated in to the monitoring program. In addition, the freshwater supply well(s) will also be included in the monitoring program.

The following subsections present an analysis of the water supply impacts to groundwater supplies and other nearby supply wells should the Final Remedy Design be adopted by DTSC, and as compared to the Groundwater FEIR certified in 2011. The analysis assumes that the freshwater supply well(s) would be operated in compliance with all applicable regulations and work plans, and the impact would be considered less than significant if the proposed use of the freshwater supply well(s) would not result in any new or substantially more severe significant adverse impacts to groundwater supplies or other nearby non-Project water supply wells. The total use of water for the project and for other Station uses would be within the Station’s 422 acre-feet per year entitlement. All other operations-related impacts of the proposed Project are generally unchanged from what is presented in the Groundwater FEIR.

Decommissioning Impact Methodology

As discussed in the Final Remedy Design, the decommissioning process would occur decades in the future and would be subject to change based on information and conditions that would become available prior to and at the time of remedy decommissioning. Subsequent to publication of the Groundwater FEIR, some limited details were developed regarding the decommissioning of the Final Groundwater Remedy Project (see Section 3.8.2). The decommissioning activities would include the removal of infrastructure and the decommissioning process would require the use of water for the decontamination of equipment and materials. The amount of water that would be used for decommissioning of the IM-3 Facility is estimated at about 2.1 acre-feet, which would be within PG&E's entitlement, even with the 31.34 to 38.54 acre-feet of estimated use during remedy construction (see Table 3-5 in the Project Description). The amount of water that would be used for decommissioning of the Final Remedy is estimated at about 29 to 35 acre-feet, which would be within PG&E's entitlement. Upon decommissioning, the freshwater supply wells would no longer be used and there would be no continuing impact relative to freshwater supply. Because the sources of water already exist and the entitlement volume has not changed since certification of the Groundwater FEIR, decommissioning analysis relative to water supply is not needed for this section.

4.9.5.3 Impact Analysis

Increased Demand for Water Supplies. Although the Project would require the use of freshwater supplies from certain Arizona wells for injection upgradient of the Cr(VI) contaminant plume as well as for use during construction activities, the project would not substantially increase overall demand for water supplies. The additional demand for water supply in general would be **less than significant**, as previously identified in the Groundwater FEIR.

Construction

As discussed in the Groundwater FEIR, PG&E's actual annual consumptive water use through 2011 was less than PG&E's full entitlement of 422 acre-feet per year. Actual historical usage was between 80 and 120 acre-feet per year, leaving over 300 acre-feet per year of entitlement that can be used to serve the proposed Project and/or other Station uses. Drinking water for workers is trucked in from off-site sources and is not counted against PG&E's entitlement. As discussed in the Project Description for this SEIR, Section 3.6.2.5, "Water Usage," the use of water for construction and the decommissioning of the IM-3 Facility is estimated to be about 72 acre-feet per year (potentially up to 90 acre-feet per year with the Future Activity Allowance), as compared to 9.2 acre-feet per year as evaluated in the Groundwater FEIR. Added to the 80 to 120 afa for Station and IM-3 Facility use, the total usage is anticipated to be 170 to 210 afa. This amount is well within PG&E's 422 acre-feet per year of allotted capacity. Because the sources of water already exist and the entitlement volume has not changed since certification of the Groundwater FEIR, impacts related to construction water use are less than significant.

Operation & Maintenance

The Final Groundwater Remedy Project would require the injection of freshwater at the upgradient edge of the contaminant plume to drive the contaminated water through the treatment zone. This would increase the demand for water supplies and would be an adverse effect if the supply of water were to be insufficient for the Project requirements. The impact to non-Project water supplies is analyzed further below and in the following pages.

The modeling conducted for the Final Remedy Design concluded that a nominal 450 gpm (726 afa) would be a required for the freshwater injection and 900 gpm (1,453 afa) would be a potential maximum freshwater injection rate. As discussed in Section 4.9.3, "Existing Setting" of this SEIR, the pumping tests of the water supply wells in Arizona indicated that Well HNWR-1A would be able to supply either the desired nominal or the potential maximum pumping rate. In addition, as discussed above in Section 4.9.5.3, "Approach to Analysis," the Final Remedy Design includes the flexibility to use existing nearby contingent freshwater wells, either to supplement or replace the freshwater water provided by Well HNWR-1A. The contingent wells include Wells HNWR-1, Site B, Topock-2, and/or Topock-3, if needed. The existing freshwater wells in Arizona are more than capable of supplying the required freshwater supply volume. Therefore, the impact would be less than significant and no mitigation measures would be required.

Comparison of Operation & Maintenance Impacts (Revised) to Groundwater FEIR Impact Analysis

The Groundwater FEIR determined that water supply impacts associated with the Project would result in a potentially significant impact to nearby non-Project supply wells and, therefore, included Mitigation Measure WATER-1 which required conducting a hydrologic analysis. As previously discussed, the hydrologic analysis was conducted and verified that the freshwater supply wells in Arizona would provide a sufficient supply of freshwater (CH2M Hill 2015a, Appendices J and N) and would be unlikely to substantially affect nearby non-Project water supply wells, as analyzed further below. Therefore, the Project would not result in any new significant impacts or substantially more severe impacts relative to water supply than previously identified in the Groundwater FEIR and no mitigation measures would be required.

IMPACT WATER-1 **Depletion of Groundwater Supplies**. The Project would require the use of freshwater from water supply wells in Arizona. Localized effects on the groundwater table and the availability of groundwater supplies to other groundwater users near the freshwater water supply wells are possible. This impact would be **potentially significant**, as previously identified in the Groundwater FEIR. Note that impacts to the water quality of non-Project water supply wells in Arizona are analyzed in Section 4.6, "Hydrology and Water Quality."

Construction

As discussed in the Groundwater FEIR, PG&E's actual annual consumptive water use through 2011 was less than PG&E's full entitlement of 422 acre-feet per year. Actual historical usage was between 80 and 120 acre-feet per year, leaving over 300 acre-feet per year of entitlement that can be used to serve the proposed Project and/or other Station uses. Drinking water for workers is trucked in from off-site sources and is not counted against PG&E's entitlement. As discussed in the Project Description for this SEIR, Section 3.6.2.5, Water Usage, the use of water for construction and the decommissioning of the IM-3 treatment system is estimated to be about 72 acre-feet per year, and potentially up to 90 acre-feet if the Future Activity Allowance is needed, as compared to 9.2 acre-feet per year as evaluated in the Groundwater FEIR. Added to the 80 to 120 afa for Station and IM-3 Facility use, the total usage is anticipated to be 170 to 210 afa. This amount is well within PG&E's 422 acre-feet per year of allotted capacity. Because the sources of water already exist and the entitlement volume has not changed since certification of the Groundwater FEIR, impacts related to construction water use are less than significant.

Operation & Maintenance

As discussed in Section 3.6.1.7, "Freshwater Flushing," one or more freshwater supply wells would be used to inject freshwater upgradient of the treatment zones to drive the Cr(VI) plume through the treatment zones. The pumping of the freshwater supply wells in Arizona would create a cone of depression around the freshwater supply well(s) and would change the local groundwater flow directions. The change in groundwater flow directions could result in adverse effects on nearby non-Project water supply wells. Adverse effects from lowered groundwater levels in existing active groundwater supply wells can include cavitation[2] due to exposure of the well screen, water elevation declines that draw water below pump intakes, reduced well yields and pumping rates, and changes in groundwater quality potentially drawing lower-quality water toward the well. Adverse effects would only occur in active wells; inactive wells would not be considered for mitigation. This would result in a significant impact if the non-Project water supply wells were no longer able to supply water for their intended purposes.

As discussed in Section 4.9.3, "Existing Setting," of this SEIR, the hydrologic analysis of the water supply wells in Arizona indicated that the pumping of Well HNWR-1A, HNWR-1, or the Site B well would result in a drawdown at the Topock-2 and Topock-3 wells of less than 1 foot. Typically, a drawdown of 1 foot or less is considered a less than significant impact because a decrease of 1 foot would be unlikely to affect the well yield by exposing the well screen or well pump. The nearby non-Project supply wells are located further away than the Topock-2 and Topock-3 wells and are therefore even less likely to be affected. In addition, as discussed above in Section 4.9.5.3, "Approach to Analysis," the Final Remedy Design includes the flexibility to use existing nearby contingent freshwater wells, either to supplement or replace the freshwater water provided by Well HNWR-1A. However, the pumping of the freshwater well would continue for decades and aquifer conditions could change over time (CH2M Hill 2015a; Exhibit 3.3-2). Therefore, while overall supply of the groundwater aquifer is not an issue, it is still possible that the well yield and/or water quality of existing non-Project supply wells could be adversely impacted during the long-term operation and maintenance, and the impact would be potentially significant. To address the possibility of impacts to non-Project supply wells related to change in either quantity or quality, PG&E shall implement **Mitigation Measure HYDRO-6**, which is designed to address the protection of both water supply and water quality of nearby non-Project water supply wells. Mitigation Measure HYDRO-6 includes the required the measurement of groundwater levels in the area around the freshwater supply wells throughout the decades-long operation and maintenance phase of the Project, and mitigation for verified adverse impacts, if any. With implementation of the Mitigation Measure HYDRO-6, the water supply of the non-Project

[2] Cavitation in a water pump impeller is the result of a drop in pressure of a moving liquid through the impeller's opening. This reduced pressure causes bubbles to form, and as the pressure of the liquid continues to fluctuate and drop, the bubbles collapse. Implosions of these vapor pockets can be so rapid that a rumbling or cracking noise is produced, which sounds like rocks passing through the pump. The hydraulic impacts caused by the collapsing bubbles are strong enough to cause areas of fatigue on the metal impeller surfaces and a decrease or failure in pump performance may be noted, depending on the severity of the cavitation.

supply wells would be maintained or restored to pre-existing conditions (both supply and water quality) and the impact would be reduced to less than significant.

Comparison of Operation & Maintenance Impacts (Revised) to Groundwater FEIR Impact WATER-1 Analysis

The Groundwater FEIR concluded that the impacts from the depletion of groundwater supplies or lowering of groundwater levels would be potentially significant. Although the proposed Project would not substantially deplete groundwater supplies, localized effects on the groundwater table near the freshwater extraction wells are possible and impacts would depend on pumping rates and the proximity and depths of other wells. Groundwater FEIR Mitigation Measure WATER-1 required conducting a hydrologic analysis during the design phase to ensure that well extraction would not substantially adversely affect the production rates of existing nearby wells. The hydrologic analysis has been conducted as discussed in Section 4.9.3, "Existing Setting," of this SEIR. As previously discussed, the hydrologic analysis concluded that the pumping of water supply wells in the Arizona would be unlikely to adversely impact other nearby non-Project water supply wells. Nonetheless, the possibility of adverse effects on non-Project supply wells exists during the decades-long operation and maintenance phase and would be addressed through the implementation of Mitigation Measure HYDRO-6, described in Section 4.6, "Hydrology and Water Quality."

CHAPTER 5
Other CEQA Sections

This chapter presents the evaluation of other types of environmental impacts required by the California Environmental Quality Act (CEQA) that are not covered within the other chapters of this subsequent environmental impact report (SEIR) for the proposed Pacific Gas and Electric Company (PG&E) Topock Compressor Station Final Groundwater Remediation Project (Final Groundwater Remedy Project or proposed Project). The other CEQA considerations include environmental effects for which no mitigation is available to reduce the level of significance to less than significant, the irreversible and irretrievable commitment of nonrenewable resources as a result of the Project, and growth-inducing impacts of the Project.

5.1 Unavoidable Significant Impacts

As required by CEQA Guidelines Section 15126.2(b), an environmental impact report (EIR) must describe any significant impacts that cannot be avoided, including those impacts that can be mitigated but not reduced to a less than significant level. Where there are impacts that cannot be alleviated without imposing an alternative design, their implications and the reasons the project is being proposed, notwithstanding their effect, should be described. Chapter 4, "Environmental Analysis," of this SEIR describes the potential environmental impacts of the proposed Project and recommends mitigation measures to reduce impacts, where feasible. As discussed in this SEIR, implementation of the proposed Project would result in potential impacts that would be mitigated below a level of significance with implementation of mitigation measures for aesthetics, air quality, biological resources, hazards and hazardous materials, hydrology and water quality, utilities, service systems, and energy, and water supply. Significant and unavoidable impacts would remain to cultural resources and noise, even after implementation of mitigation measures. Cumulatively considerable significant and unavoidable impacts would occur to aesthetics, cultural resources, and noise, even after implementation of mitigation measures.

5.1.1 Aesthetics

Cumulative Aesthetic Impacts

The geographic scope for potential cumulative impacts to aesthetics includes the foreground, which is defined as the zone within 0.25 miles to 0.5 miles from the Project Area, and the middle-ground, which is a zone that extends from the foreground up to 3 to 5 miles.

Projects that have already been implemented or may occur in the foreseeable future in the Project Area that could impact cultural resources are described in Chapter 6, "Cumulative Impacts." The projects in the cumulative scenario have the potential to affect key views and sensitive aesthetic resources in the geographic scope, including projects at and in the immediate vicinity of the Station. Elements of these projects (such as ground disturbing activities; installation of infrastructure; and introduction of additional vehicles, equipment, and personnel) would be visible to affected viewers in the geographic scope, including recreational, vehicular, and Tribal viewer groups. The proposed Project would represent an incremental change that would substantially alter the composition or character of existing landscape views, when considered in addition to the anticipated impacts of other projects in the cumulative scenario, particularly the Soil Remediation and Potential Pilot Test Project. Thus, this impact would be cumulatively significant and the proposed Project's contribution to this impact would be cumulatively considerable (Impact CUM-1). This is a new significant cumulative impact from those identified in the Groundwater FEIR.

In order to reduce this impact, **Mitigation Measures AES-1** and **AES-2** shall be implemented (see Section 4.1 of this SEIR). Mitigation Measures AES-1 and AES-2 would reduce Project-level aesthetic impacts by including design requirements to ensure that Project facilities along the Colorado River and the associated scenic corridor do not significantly affect views. These measures would reduce the Project's contribution to significant cumulative aesthetic impacts; however, given overall cumulative changes to the visual resources, impacts would remain significant and unavoidable. One particular cumulative future project, the Soil Remediation and Potential Pilot Test Project, will also require compliance with CEQA, which will include consideration of that project's contribution to significant visual impacts and potential additional mitigation measures. However, for the purposes of this SEIR, the Project's contribution to this cumulative impact would remain cumulatively considerable (significant and unavoidable).

The Project is being proposed notwithstanding these effects because the Final Groundwater Remedy Project is necessary in order to clean up the groundwater contamination related to the historical release of chemicals at the Station, including into Bat Cave Wash and the East Ravine near the Station, in a manner that would be consistent with all applicable regulatory requirements and to do so within a reasonable period of time when compared between viable alternatives considered in the Groundwater FEIR.

5.1.2 Cultural Resources

Historical Resources

Topock Traditional Cultural Property (TCP)

DTSC has determined that implementation of the proposed Project would result in a substantial adverse impact on the National Register of Historic Places-eligible Topock Traditional Cultural Property (TCP). Direct impacts to the Topock TCP include: a three-fold increase in soil disturbance from that previously considered in the Groundwater FEIR, as well as a Future Activity Allowance; an approximately 12 percent increase in the number of boreholes from that previously considered in the Groundwater FEIR, as well as Future Activity Allowance for boreholes. New direct impacts, not analyzed in the Groundwater FEIR, could occur as a result of: the importing of groundwater potentially containing increased levels of arsenic from Arizona to California; construction and operation of the Construction Headquarters, Long-Term Remedy

Support Area and Soil Processing Area near Moabi Regional Park; the use of portable generators and lighting to accommodate limited nighttime work activities; and the use of staging areas.

Direct impacts resulting from the Final Remedy Design to each of the seven contributing elements and the overall setting of the Topock TCP, in addition to the other ongoing activities within the Topock TCP, could cause a substantial adverse change in the significance of the TCP as a result of the physical destruction and alteration to the characteristics of the property that convey its historical significance and qualify it for inclusion in the California Register of Historical Resources as defined in CEQA Guidelines Section 15064.5. The substantial adverse change to the contributing elements to the Topock TCP would result from ground-disturbing activity that would directly and adversely affect the soil, landforms, and unknown prehistoric archaeological resources; alteration of groundwater dynamics and introduction of imported groundwater that could directly and adversely affect the water; pruning or alteration of the natural growth of native and traditional plant species; and construction and operation of infrastructure that would result in significant visual intrusion to the Topock TCP viewshed. These activities would also materially affect the cultural values ascribed to the TCP by some Native American Tribes. Therefore, impacts to the historical resource identified as the Topock TCP would be significant (Impact CUL-1a). This is consistent with the conclusions presented in the Groundwater FEIR.

In order to reduce these impacts, **Mitigation Measures CUL-1a-1** through **CUL-1a-19** shall be implemented (see Section 4.4 of this SEIR). Implementation of Mitigation Measures CUL-1a-1 through CUL-1a-19 would reduce but not completely avoid the potential for significant impacts to the historical resources identified as the Topock TCP. The Project would result in the destruction or alteration of contributing elements which convey the historical significance of the Topock TCP. As a result, the impacts to the historical resource identified as the Topock TCP would remain significant and unavoidable.

The Project is being proposed notwithstanding these effects because the Final Groundwater Remedy Project is necessary in order to clean up the groundwater contamination related to the historical release of chemicals at the Station, including into Bat Cave Wash and the East Ravine near the Station, in a manner that would be consistent with all applicable regulatory requirements and to do so within a reasonable period of time when compared between viable alternatives considered in the Groundwater FEIR.

Historical Resources (other than the Topock TCP)

A total of 124 known historical resources are located within the Project Area, including many resources that had not yet been identified at the time of certification of the Groundwater FEIR in 2011. In addition, there are nine historical resources (CA-SBR-2910H/AZ I:15:156 (ASM)/AZ L:7:72 (ASM), CA-SBR-6693H/AZ I:14:334 (ASM) (A&P/AT&SF/BNSF), CA-SBR-11862H, CA-SBR-11939, CA-SBR-11997H, CA-SBR-13791H, AZ L:7:16 (ASM), P-36-027678, and Æ-Topock-210) other than the Topock TCP that overlap planned Project components within the Project Area and may be subject to additional disturbances.

Because the Project involves ground-disturbing activities, there is the potential for such activities to disturb known and unknown potentially significant resources qualifying as historical under CEQA. Direct and indirect impacts could occur as a result of: construction of the Construction Headquarters/Long-Term Remedy Support Area and Soil Processing/Clean-Soil Storage Area near Moabi Regional Park, not previously considered in the Groundwater FEIR; construction of an Operations Building and other improvements at the Transwestern Bench, not previously considered in the Groundwater FEIR; construction of a Carbon Amendment Building and other improvements at the MW-20 Bench, not previously considered in the Groundwater FEIR; an approximately 12 percent increase in the number of boreholes from that previously considered in the Groundwater FEIR, as well as Future Activity Allowance; an approximately 50 percent increase in roadway improvements from that previously considered in the Groundwater FEIR, as well as a Future Activity Allowance; and increased disturbance resulting from the fact that remedy pipelines are to be constructed underground (versus aboveground which was assumed in the Groundwater FEIR), which will result in approximately 127,500 linear feet of underground piping, plus a Future Activity Allowance, all of which would result in a substantially more severe significant impact on unknown historical resources than was previously identified in the Groundwater FEIR. Therefore, the Final Groundwater Remedy Project has the potential to impact known and unknown historical resources other than the Topock TCP through ground disturbance, increased activity, and introduction of new visual intrusions to the landscape would alter the setting of these resources, and this impact is considered significant (Impact CUL-1b/c). This is consistent with the conclusions presented in the Groundwater FEIR.

In order to reduce these impacts to known and unknown historic resources, **Mitigation Measures CUL-1b/c-1, CUL-1b/c-3, CUL-1b/c-4, CUL-1b/c-5, CUL-1b/c-6,** and **CUL-1b/c-7** shall be implemented (see Section 4.4 of this SEIR). These measures would reduce impacts to historical resources other than the Topock TCP by requiring archaeological monitoring, evaluation and treatment of inadvertent discoveries, avoidance and preservation in place, implementation of additional protective measures. However, even after mitigation, Project-related impacts to known and unknown historical resources other than the Topock TCP would be significant and unavoidable. This is consistent with the conclusions presented in the Groundwater FEIR.

The Project is being proposed notwithstanding these effects because the Final Groundwater Remedy Project is necessary in order to clean up the groundwater contamination related to the historical release of chemicals at the Station, including into Bat Cave Wash and the East Ravine near the Station, in a manner that would be consistent with all applicable regulatory requirements and to do so within a reasonable period of time when compared between viable alternatives considered in the Groundwater FEIR.

Unique Archaeological Resources

Since the certification of the Groundwater FEIR, the Project Area has been modified and additional studies conducted. As a result, a total of 117 known archaeological resources that could potentially qualify as unique archaeological resources under CEQA are located within the Project Area. There are five archaeological resources that are considered historical resources under

CEQA that may also qualify as unique archaeological resources (CA-SBR-11862H, CA-SBR-13791H, CA-SBR-11939, AZ L:7:16 (ASM), and Æ-Topock-210) that overlap planned Project components within the Project Area and may be subject to additional disturbances.

Because the Project involves ground-disturbing activities, there is the potential for such activities to disturb known and unknown potentially significant unique archaeological resources. Direct and indirect impacts could occur as a result of: construction of the Construction Headquarters/Long-Term Remedy Support Area and Soil Processing/Clean-Soil Storage Area near Moabi Regional Park; construction of an Operations Building and other improvements at the Transwestern Bench; construction of a Carbon Amendment Building and other improvements at the MW-20 Bench; and the construction of wells, underground pipelines, and roadway improvements, as well as part of the Future Activity Allowance. Therefore, the Final Groundwater Remedy Project has the potential to impact known and unknown unique archaeological resources through ground disturbance, increased activity, and introduction of new visual intrusions to the landscape would alter the setting of these resources, and this impact is considered significant (Impact CUL-2).

In order to reduce these impacts to known and unknown unique archaeological resources, **CUL-1b/c-1, CUL-1b/c-3, CUL1b/c-4**, **CUL-1b/c-5**, and **CUL-1b/c-6** shall be implemented (see Section 4.4 of this SEIR). These measures would reduce impacts to unique archaeological resources by requiring archaeological monitoring, evaluation and treatment of inadvertent discoveries, avoidance and preservation in place, implementation of additional protective measures. However, even after mitigation, Project-related impacts to known and unknown unique archaeological resources would be significant and unavoidable. This is consistent with the conclusions presented in the Groundwater FEIR.

The Project is being proposed notwithstanding these effects because the Final Groundwater Remedy Project is necessary in order to clean up the groundwater contamination related to the historical release of chemicals at the Station, including into Bat Cave Wash and the East Ravine near the Station, in a manner that would be consistent with all applicable regulatory requirements and to do so within a reasonable period of time when compared between viable alternatives considered in the Groundwater FEIR.

Human Remains

Implementation of the proposed Project could disturb human remains, including those interred outside of formal cemeteries. The lack of any identified human remains in the Project Area does not preclude the possibility that unknown human remains may be present given the length of human occupation of the area. Impacts to human remains could occur as a result of: construction of the Construction Headquarters/Long-Term Remedy Support Area and Soil Processing/Clean-Soil Storage Area near Moabi Regional Park; construction of an Operations Building and other improvements at the Transwestern Bench; construction of a Carbon Amendment Building and other improvements at the MW-20 Bench; and the construction of wells, underground pipelines, and roadway improvements, as well as part of the Future Activity Allowance associated with all proposed Project components. Therefore, the proposed Project has the potential to disturb human remains, and this impact would be significant (Impact CUL-4). This is consistent with the conclusions presented in the Groundwater FEIR.

In order to reduce these impacts, **Mitigation Measure CUL-4** shall be implemented (see Section 4.4). Mitigation Measure CUL-4 would reduce potential impacts to human remains through implementation of the requirements and protocols found in the CIMP and CHPMP, including notifying the appropriate Tribes regardless of land ownership. However, even after mitigation, impact to human remains is not reduced to a level below significance. As a result, any destruction or alteration of human remains to Native American Tribes in the extraordinary context of the Topock TCP would be significant. Therefore, impacts to human remains would remain significant and unavoidable. This is consistent with the conclusions presented in the Groundwater FEIR.

The Project is being proposed notwithstanding these effects because the Final Groundwater Remedy Project is necessary in order to clean up the groundwater contamination related to the historical release of chemicals at the Station, including into Bat Cave Wash and the East Ravine near the Station, in a manner that would be consistent with all applicable regulatory requirements and to do so within a reasonable period of time when compared between viable alternatives considered in the Groundwater FEIR.

Cumulative Cultural Resources Impacts

The geographic scope for cumulative impacts to cultural resources (i.e., historical resources, unique archaeological resources, unique paleontological resources or geological features, and human remains) consists of the Lower Colorado River Valley. The Lower Colorado River Valley contains a number of important sites of cultural and/or archaeological importance that are integral to the cultural traditions of Native American Tribes located throughout the region.

Projects that have already been implemented or may occur in the foreseeable future in the Project Area that could impact cultural resources are described in Chapter 6, “Cumulative Impacts.” The projects in the cumulative scenario have the potential to involve ground-disturbing activities that would directly impact significant cultural resources and paleontological resources. These projects may also bring additional people (e.g., work crews, residents, tourists) into the area that may result in increased rates of vandalism or OHV use that may directly or indirectly impact resources. These projects may also result in visual, auditory, and other environmental impacts that may adversely affect the Topock TCP. For these reasons, the combined impacts on cultural resources in the geographic scope would be considered cumulatively significant. When considered in combination with the impacts of other projects in the cumulative scenario, the Project’s incremental contribution to impacts on cultural resources including historical resources (including the Topock TCP), unique archaeological resources, unique paleontological resources or geologic features, and human remains would be cumulatively considerable (Impact CUM-2). This is consistent with the conclusions presented in the Groundwater FEIR.

In order to reduce these impacts, **Mitigation Measure CUL-1a-1** through **CUL-1a-19**; **Mitigation Measures CUL-1b/c-1, -3, -5, -6, and -7; Mitigation Measure CUL-3;** and **Mitigation Measures CUL-4** shall be implemented (see Section 4.4 of this SEIR). Although implementation of these Mitigation Measures would reduce the significance of the impacts to the degree feasible, the only method to fully mitigate these impacts would be complete avoidance of any future Project activity; therefore, no feasible mitigation exists that would reduce the Project's contribution to less than considerable. The Project's contribution to this significant cumulative cultural impact would be cumulatively considerable (significant and unavoidable). This is consistent with the conclusions presented in the Groundwater FEIR.

The Project is being proposed notwithstanding these effects because the Final Groundwater Remedy Project is necessary in order to clean up the groundwater contamination related to the historical release of chemicals at the Station, including into Bat Cave Wash and the East Ravine near the Station, in a manner that would be consistent with all applicable regulatory requirements and to do so within a reasonable period of time when compared between viable alternatives considered in the Groundwater FEIR.

5.1.3 Noise

Long-term Operational-Related Non-transportation Noise and Vibration Impacts

DTSC has determined that construction activities associated with the Future Activity Allowance that could occur during long-term operation and maintenance of the proposed Project could result in noise levels that exceed applicable standards. The Future Activity Allowance would involve construction of new wells, pipeline segments, and access roads during the operation and maintenance phase of the Project at locations that are presently unknown. The additional allowance would use the same equipment and procedures as those involved in the construction of the Project, and maximum noise impacts would be similar. However, the activities involved with the Future Activity Allowance would be more sporadic and intermittent as they would be performed based on unforeseen malfunctions or needs throughout the 30 year operation and maintenance phase of the Project.

Construction activities associated with the Future Activity Allowance during operation and maintenance could exceed thresholds resulting in significant impacts as the Future Activity Allowance activities would involve the same equipment as construction activities (see Table 4.7-14). Activities related to construction would have significant impact. Therefore, activities related to the allowance would be significant (Impact NOISE-1). This is consistent with the conclusions presented in the Groundwater FEIR.

In order to reduce this impact **Mitigation Measure NOISE-2** shall be implemented (see Section 4.7). Implementation of Mitigation Measure NOISE-2 would ensure that investigation equipment is properly maintained per manufacturer specifications and fitted with the best available noise suppression devices (e.g., mufflers, silencers, wraps) and ensure coordination with the Tribes; however, impacts related to the allowance would remain significant and unavoidable**.**

The Project is being proposed notwithstanding these effects because the Final Groundwater Remedy Project is necessary in order to clean up the groundwater contamination related to the historical release of chemicals at the Station, including into Bat Cave Wash and the East Ravine near the Station, in a manner that would be consistent with all applicable regulatory requirements and to do so within a reasonable period of time when compared between viable alternatives considered in the Groundwater FEIR.

Project-Generated Construction-Related Noise Levels

DTSC has determined that implementation of the proposed Project would result in intermittent construction activities associated boreholes, the Soil Processing/Clean-Soil Storage Area, pipelines, Staging Area 26 & 27, and the IM-3 Facility decommissioning, which would expose sensitive receptors to noise levels in excess of San Bernardino or Mohave County noise standards and/or result in a substantial increase in ambient noise levels.

In addition, the Future Activity Allowance would involve construction of new wells, pipeline segments, and access roads during the construction and operation and maintenance phases of the Project at locations that are presently not known. The additional allowance would use the same equipment and procedures as those involved in the construction of the Project, and maximum noise impacts would be similar. The Future Activity Allowance could result in construction of additional Project features during the initial 5-year construction phase of the Project and/or during the approximate 30-year operation and maintenance phase that constitutes active remediation. As shown in Table 4.7-14, activities related to construction would have significant impact. Therefore, project-generated construction-related noise levels are considered significant (Impact NOISE-3). This is consistent with the conclusions presented in the Groundwater FEIR.

In order to reduce this impact, **Mitigation Measure NOISE-2** shall be implemented (see Section 4.7 of this SEIR). Implementation of Mitigation Measure NOISE-2 would ensure that investigation equipment is properly maintained per manufacturer specifications and fitted with the best available noise suppression devices (e.g., mufflers, silencers, wraps) and ensure coordination with the Tribes; however, impacts to Project-generated construction-related noise levels would remain significant and unavoidable.

The Project is being proposed notwithstanding these effects because the Final Groundwater Remedy Project is necessary in order to clean up the groundwater contamination related to the historical release of chemicals at the Station, including into Bat Cave Wash and the East Ravine near the Station, in a manner that would be consistent with all applicable regulatory requirements and to do so within a reasonable period of time when compared between viable alternatives considered in the Groundwater FEIR.

Land Use Compatibility of Future Project Noise Levels with the Topock Traditional Cultural Property

DTSC has determined that implementation of the proposed Project would result in result in future noise (construction, operation and maintenance, and decommissioning activities) that could result in conflicts with land use compatibility that exceed San Bernardino County standards for Places of Worship or conflict with Native American values associated with the Topock TCP.

Noise levels resulting from construction, operation and maintenance, and decommissioning phases of the Project could result in noise levels that would exceed applicable San Bernardino County standards for a place of worship and could consequently result in a temporary substantial increase in ambient noise levels, especially if Project activities would occur during the nighttime hours. As a result, this impact would be significant (Impact NOISE-4). This is consistent with the conclusions presented in the Groundwater FEIR.

In order to reduce this impact **Mitigation Measure NOISE-1** and **NOISE-2** shall be implemented (see Section 4.7). Mitigation Measures NOISE-1and NOISE-2 would limit construction of Project features within 45 feet of sensitive receptors (Topock TCP), implement acoustic shields to limit noise to sensitive receptors, and require a disturbance coordinator. In addition, CUL-1a-12 would ensure specifically that accommodations for Tribal ceremonies are provided for during construction activities. However, due to the heightened sensitivity and use of the area, impacts are considered significant and unavoidable.

The Project is being proposed notwithstanding these effects because the Final Groundwater Remedy Project is necessary in order to clean up the groundwater contamination related to the historical release of chemicals at the Station, including into Bat Cave Wash and the East Ravine near the Station, in a manner that would be consistent with all applicable regulatory requirements and to do so within a reasonable period of time when compared between viable alternatives considered in the Groundwater FEIR.

Cumulative Noise Impacts

The geographic scope for cumulative noise impacts is the Project Area and areas immediately adjacent, due to the attenuating effects of noise. Implementation of the proposed Project, in combination with related projects in the geographic scope, could cause a substantial adverse increase related to short-term construction-related noise and vibration, as well as compatibility with noise levels at the Topock TCP.

Projects that have already been implemented or may occur in the foreseeable future in the Project Area that could impact noise are described in Chapter 6, “Cumulative Impacts.” Noise generated from the proposed Project could be compounded when taken in context with most other noise-generating projects in the geographic and temporal scope. The projects in the cumulative scenario have the potential to generate construction and/or operational noise in the geographic scope, particularly the Soil Remediation and Potential Pilot Test Project, which would be in close proximity to the Project and would be implemented during a similar timeframe. This impact is considered significant and the Project’s incremental contribution to noise impacts would be cumulatively considerable (Impact CUM-3). This is a new significant cumulative impact from those identified in the Groundwater FEIR.

In order to reduce this impact, **Mitigation Measure NOISE-3** shall be implemented (see Chapter 6 of this SEIR). Mitigation Measures NOISE-3, a new measure from what was identified in the Groundwater FEIR, would ensure that during implementation of the proposed Project and the Soil Remediation and Potential Pilot Test Project, noise measurement exceedances would trigger temporary barriers to reduce noise, and if unable to reduce noise adequately, the modification of either soil or groundwater remediation efforts near sensitive receptors. Although Mitigation Measure NOISE-3 would ensure reduction of cumulative noise impacts resulting from simultaneous construction of the proposed Project and the Soil Remediation and Potential Pilot Test Project, because the specific locations and timing of overlap is unknown, cumulative impacts would remain cumulatively considerable (significant and unavoidable).

The Project is being proposed notwithstanding these effects because the Final Groundwater Remedy Project is necessary in order to clean up the groundwater contamination related to the historical release of chemicals at the Station, including into Bat Cave Wash and the East Ravine near the Station, in a manner that would be consistent with all applicable regulatory requirements and to do so within a reasonable period of time when compared between viable alternatives considered in the Groundwater FEIR.

5.2 Significant Irreversible Environmental Changes that Would Be Caused by the Proposed Project

Section 21100(b)(2)(b) of the Public Resources Code and Section 15126.2(c) of the CEQA Guidelines require that an EIR analyze the extent to which the proposed project's primary and secondary effects would affect the environment and commit nonrenewable resources to uses that future generations would not be able to reverse. "Significant irreversible environmental changes" include the use of nonrenewable natural resources during the initial and continued phases of the project, should this use result in the unavailability of these resources in the future. Primary impacts and, particularly, secondary impacts generally commit future generations to similar uses. Also, irreversible damage can result from environmental accidents associated with projects. Irretrievable commitments of these resources are required to be evaluated in an EIR to ensure that such consumption is justified (CEQA Guidelines Section15126.2[c]).

Per Section 15126.2(c) of the CEQA Guidelines, a project would result in an irreversible and irretrievable commitment of resources if it:

- Involved a large commitment of nonrenewable resources;
- Created primary and secondary impacts that would generally commit future generations to similar uses;
- Involved uses in which irreversible damage would result from any potential environmental accidents associated with the project; or
- Proposed consumption of resources that were not justified (e.g., the project involves the wasteful use of energy).

The Final Groundwater Remedy Project is a long-term remediation project which is anticipated to last over 50 years. The Final Groundwater Remedy Project's active construction phase would occur for approximately 5 years, followed by approximately 30 years of active remediation, 10 years of long-terms monitoring, and up to approximately 20 years of arsenic monitoring. Over the

50-year lifetime of the Project, nonrenewable resources would be used, as explained in Chapter 3, “Project Description,” Section 4.8, “Utilities, Service Systems, and Energy.” Temporary increases in energy consumption would occur during Project construction, operation and maintenance, and decommissioning. These would include the use of nonrenewable resources such as electricity, gasoline, diesel fuel, and oil for equipment and transportation vehicles.

Specifically, the proposed Project is anticipated to use about 149,283 gallons of diesel and 20,468 gallons of gasoline annually during the 5-year construction period. This is 0.0057 percent of the State’s usage in 2012 for diesel and 0.001 percent for gasoline. The Project includes a Future Activity Allowance which would result in additional diesel and gasoline to power construction equipment. However, it should be noted that during the construction phase, equipment and vehicles would already be mobilized on-site and that the 25 Percent Potential Future Activity Allowance during the construction period would generally not require 25 percent additional vehicles and equipment (requiring diesel and gasoline) on-site. Nevertheless, assuming a worst-case scenario, an additional 90,866 gallons of diesel and 8,507 gallons of gasoline could be used for the Future Activity Allowance. During operational activities, the proposed Project is anticipated to use 55,649 gallons of diesel and 46,705 gallons of gasoline annually. This is 0.0021 percent of the State’s usage in 2012 for diesel and 0.0003 percent for gasoline. Decommissioning is anticipated to use the same amount of nonrenewable resources as construction. See Appendix ENERGY for calculations.

Operation and maintenance would require up to 7.82 million KWh annually of electricity, most of which would be powered by on-site generators and solar panels (5.2 million kW/hour annually). Operation of the proposed Project would also include a Future Activity Allowance, which could potentially increase the amount of electricity required for the Project. The Future Activity Allowance is anticipated to require up to 2.37 million kWh annual as a worst case scenario with 1.96 million kWh annually coming from the City of Needles and 0.41 million kWh annually coming from the Mojave Electric Cooperative. This additional electrical usage would be approximately 3.74 percent of the utility’s 52.46 million kWh for the City of Needles and approximately 0.04 percent for of the 929 million kWh for the Mojave Electric Cooperative. As a result, the project’s commitment of nonrenewable resources would be offset by renewable resources like solar power, and would be within the current regional supply, and would not represent a large irreversible commitment of resources.

The consumption and use of nonrenewable resources, as contemplated in CEQA Guidelines Section 15126.2, subdivision (c), is not considered irreversible, since resources are justified to ensure protection of the environment through remediation of the contaminated groundwater plume. The Project does not commit substantial amounts of resources compared to existing annual allotments, and the amount of energy and equipment to be used is limited to that needed for the remedy, so there is no irreversible commitment of nonrenewable resources or related significant impact.

Activities associated with the Final Groundwater Remedy Project could potentially disturb cultural resources within the Project Area. The following activities have the potential to uncover archaeological and paleontological resources, and human remains: construction of the Construction Headquarters/Long-Term Remedy Support Area and Soil Processing/Clean-Soil Storage Area near Moabi Regional Park; construction of an Operations Building and other improvements at the Transwestern Bench; construction of a Carbon Amendment Building and other improvements at the MW-20 Bench; and the construction of wells, underground pipelines, and roadway improvements, as well as facilities part of the Future Activity Allowance. Despite application of mitigation measures to reduce potential impacts to less than significant levels, including the priority to avoid cultural resources and preservation of resources in place, activities involving data recovery or capping of cultural resources discovered during soil investigation activities could result in irreversible losses. Data recovery requires removal of artifacts from their original context. Capping involves covering an archaeological site with fill such that Project activities could take place unimpeded over the area. Because both methods would disturb the overall Topock archaeological area to differing degrees, DTSC recognizes that there would be some irreversible and irretrievable impacts to cultural resources.

5.3 Growth Inducement

As required by CEQA, this SEIR must discuss ways in which the project could foster economic or population growth or the construction of additional housing, either directly or indirectly, in the surrounding area (CEQA Guidelines, Section 15126.2[d]). Induced growth is any growth that exceeds planned growth and results from new development that would not have taken place in the absence of a project. A project can be determined to have a growth-inducing impact if it directly or indirectly causes economic or population expansion through the removal of obstacles to growth or encourages or facilitates other activities that could significantly affect the environment; actions that are sometimes referred to as “growth accommodating.”

The proposed Project is located in eastern San Bernardino County, California. Southern California Association of Governments (SCAG) indicates that the population of San Bernardino County grew from 1,719,190 persons in 2000 to 2,111,258 in 2015 (U.S. Census Bureau 2016). This represents an increase of 392,068 persons, or a 23 percent increase over 15 years. Based on projections for San Bernardino County, population growth for the County is expected to continue at a rapid pace, increasing from 2015 to 2040 by approximately 29 percent (SCAG 2015). The City of Needles, located in California, is the closest urban community to the Project Area. Based on SCAG population data specific to Needles, the community experienced a much slower growth rate, from 4,830 persons in 2000 to 4,908 persons in 2014 (SCAG 2015). This represents an increase of 78 persons, or approximately a 1.6 percent increase. SCAG’s projections for San Bernardino County show continued population growth, increasing by almost 30% to over 2,731,321 by the year 2040 (SCAG 2015). Lake Havasu City in Arizona is also expected to grow approximately 28% from 52,527 to 66,968 persons in 2040. Mohave County is expected to grow approximately 36% from 205,716 to 280,765 persons by 2040.

The proposed Project would implement remediation efforts to clean up contaminated groundwater. Construction and treatment system start-up activities for the Final Groundwater Remedy Project would occur for approximately 5 years, including construction closeout.

Operation and maintenance would begin following the start-up of the various remedy systems, and would consist of approximately 30 years of active remediation followed by up to approximately 10 years of long-term monitoring and up to approximately 20 years of arsenic monitoring. During the construction phase, project mobilization would require approximately 80 workers in the Project Area for an estimated period of 4 months. Phase 1, lasting 19 months, and Phase 2, lasting 12 months, would require approximately 168 and 181 workers, respectively. Four technicians, four instrumentation specialists, and engineers would also be present during these two phases for functional testing.

Operation and maintenance of the groundwater remedy would require approximately 11 full-time employees or full-time equivalents (FTEs) for routine operation and maintenance of the groundwater remedy throughout the life of the Project, including two site managers and three groundwater monitors. Non-routine operation and maintenance activities would require a maximum of eight full-time FTEs for well rehabilitation and other non-routine activities such as well repairs and replacement. Decommissioning and removal of the IM-3 Facility and the Final Groundwater Remedy Project would require approximately 33 and 69 workers for a total of 15 and 12 months, respectively.

The proposed Project would implement remediation efforts to clean up contaminated groundwater in the Project Area. The proposed Project would not result in the creation of new residences on or adjacent to the Project Area. The anticipated employment, both direct and indirect, generated by the proposed project is presented in Chapter 3, “Project Description,” of this SEIR. It is anticipated that workers would commute to the Project Area from surrounding counties, including San Bernardino County and counties in Arizona, and no new residents would be required to construct the proposed Project. The few residents necessary for operation and maintenance would also commute from surrounding counties. No new residents are anticipated as a result of the activities associated with the proposed Project, so no increase in growth would occur as a result.

The Project Area is currently served by existing roadways, utilities, and public services. While there is the chance that the proposed Project could result in off-site infrastructure or service expansions related to electrical and water supply systems, which could serve other future development, due to the relatively isolated nature of the area, other limiting factors to development, and the projected growth forecasts, this additional electrical and water supply is not anticipated to result in substantial indirect growth, if any. For these reasons, implementation of the proposed Project would not result in primary or secondary environmental effects related to additional growth.

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CHAPTER 6
Cumulative Analysis

6.1 Introduction to the Cumulative Impacts Analysis

This chapter presents an analysis of the cumulative impacts of the proposed Pacific Gas and Electric Company (PG&E) Topock Compressor Station Final Groundwater Remediation Project (Final Groundwater Remedy Project or proposed Project) at the PG&E Topock Compressor Station (Station) and surrounding area (Project Area) in combination with other past, present, and reasonably foreseeable future projects within the Project Area and surrounding area that could cause related environmental impacts similar to those anticipated to occur under the proposed Project and discussed in this subsequent environmental impact review (SEIR). Similar to the Project impacts, cumulative impacts are also analyzed with regard to the potential for the proposed Project to contribute to new significant cumulative impacts or substantially more severe cumulative impacts than those identified as significant in the Topock Compressor Station Groundwater Remediation Project Final Environmental Impact Report (Groundwater FEIR; DTSC 2011).

California Environmental Quality Act (CEQA) Guidelines Section 15130 requires that an environmental impact report (EIR) shall discuss cumulative impacts of a project when the project's incremental effect is "cumulatively considerable." "Cumulative impacts" are defined as "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts." (CEQA Guidelines, Section 15355; see also Pub. Resources Code, Section 21083, subd. (b).) Stated another way, "a cumulative impact consists of an impact which is created as a result of the combination of the project evaluated in the EIR together with other projects causing related impacts." (CEQA Guidelines, Section 15130, subd. (a)(1) (emphasis added).) The definition of cumulatively considerable is provided in Section 15065(a)(3):

> "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.

According to Section 15130(b) of the CEQA Guidelines:

> [t]he discussion of cumulative impacts shall reflect the severity of the impacts and their likelihood of occurrence, but the discussion need not provide as great detail as is provided for the effects attributable to the project alone. The discussion should be guided by standards of practicality and reasonableness, and should focus on the cumulative

impact to which the identified other projects contribute rather than the attributes of other projects which do not contribute to the cumulative impact.

For purposes of this SEIR, the proposed Project would cause a cumulatively considerable and therefore significant cumulative impact if:

- The cumulative effects of other past, current, and probable future projects without the Project are not significant and the Project's incremental impact is substantial enough, when added to the cumulative effects, to result in a significant impact; or
- The cumulative effects of other past, current, and probable future projects without the Project are already significant and the Project would result in a cumulatively considerable contribution to the already significant effect. The standards used herein to determine whether the contribution is cumulatively considerable include the existing baseline environmental conditions, and whether the Project would cause a substantial increase in impacts, or otherwise exceed an established threshold of significance.

6.2 Geographic Scope

The geographic area affected by the proposed Project and its potential to contribute to cumulative impacts varies based on the environmental resource under consideration. Generally, the geographic area associated with the environmental effects of the Project as described in Chapter 4 define the boundaries of the area used for compiling the list of past, present and reasonably foreseeable future related projects considered in the cumulative impact analysis. The air quality analysis, however, includes consideration of regional air emissions (e.g., reactive organic gases [ROG]/nitrogen oxides [NO_x] and particulate matter [PM]) and therefore includes the entire air basin. Conversely, in the case of noise impacts, given the localized impact Area of Concern (AOC), a smaller more localized area surrounding the immediate Project Area is appropriate for consideration. **Table 6-1** presents the geographic areas included within this analysis for purposes of determining whether the Project's contribution to a particular impact would be cumulatively considerable and therefore significant. An explanation of the geographic scope selected for each resource is also briefly included below under the impact analysis.

TABLE 6-1
GEOGRAPHIC SCOPE OF CUMULATIVE IMPACTS ANALYSIS

Resource Issue	Geographic Scope
Aesthetics	The foreground zone that extends 0.25 miles to 0.5 miles from the Project Area and the middleground zone that extends from the foreground up to 3 to 5 miles
Agricultural Resources	Eastern San Bernardino County, California (Desert Regions)
Air Quality	Mojave Desert Air Basin; Global (greenhouse gases)
Biological Resources	Project Area and surrounding lands along with drainages that are connected to the Project Area, including the Colorado River
Cultural Resources	Lower Colorado River Valley
Energy Resources	Eastern San Bernardino County, California

TABLE 6-1
GEOGRAPHIC SCOPE OF CUMULATIVE IMPACTS ANALYSIS

Resource Issue	Geographic Scope
Geology and Soils	Project Area and areas immediately adjacent
Hazardous Materials	Mojave Desert Air Basin, watershed, groundwater basin, with focus on and in the vicinity of the Project Area
Hydrology and Water Quality	East Colorado River Basin (focus on downstream areas); Needles Valley groundwater basin
Land Use and Planning	San Bernardino County, California, and Mohave County, Arizona
Mineral Resources	Eastern San Bernardino County, California (Desert Regions)
Noise	Project Area and areas immediately adjacent
Population and Housing	Region (San Bernardino County, California, which includes the city of Needles, California, and neighboring Mohave County, Arizona)
Public Services	San Bernardino County, California
Recreation	Region (San Bernardino County, California, which includes the city of Needles, California, and neighboring Mohave County, Arizona, which includes the city of Lake Havasu City, Arizona.)
Transportation and Traffic	Park Moabi Road, Interstate 40 (I-40), and the National Trails Highway
Utilities, Service Systems, and Energy	Project Area and Eastern San Bernardino County, California
Water Supply	Lower Colorado River; Lower Colorado River Water Supply Project

6.3 Temporal Scope

This cumulative impact analysis considers other projects that have been recently completed, are currently under construction, or are reasonably foreseeable (e.g., for which an application has been submitted). Both short-term and long-term cumulative impacts of the proposed Project, in conjunction with other cumulative projects in the area, are evaluated in this chapter of the SEIR.

The major elements of the Project are (1) pre-construction, construction, and start-up (collectively referred to as construction), (2) operation and maintenance, and (3) decommissioning and restoration. The schedule and timing of the various phases of the proposed Project and other cumulative projects, however, is relevant to the consideration of cumulative impacts, given that the Project is a long-term groundwater remedy project. The cumulative impact analysis, therefore, pays particular attention to any cumulative projects with implementation schedules that could overlap with certain phases of the proposed Final Groundwater Remedy Project. The majority of the related projects included in this cumulative impact analysis and discussed in Section 6.4 are projects overseen by PG&E at the Station.

6.3.1 Pre-Construction, Construction, Start-Up

The pre-construction, construction, and start-up of the Project are estimated to occur over an approximately 5-year period, following the California Department of Toxic Substances Control (DTSC) and U.S. Department of the Interior (DOI) approval of the Final Remedy Design. This includes time for contracting, mobilization, construction, start-up, Interim Measure-3 (IM-3) shutdown, and construction closeout activities, among other activities, some of which are not entirely field construction activities in the strict sense.

Construction and start-up of the remedy will be in phases, each of which involves active construction and ground disturbance. The first phase is projected to include pre-construction activities and construction of the National Trails Highway (NTH) in situ reactive zone (IRZ) and associated supporting infrastructure, installation of high priority wells, and key mobilization and site preparation activities such as construction of the Construction Headquarters (CHQ). Following construction and associated functional testing of the NTH IRZ and supporting systems, the Interim Measure (IM) is proposed to be turned off, consistent with the terms of the Settlement Agreement with the Fort Mojave Indian Tribe (FMIT). The estimated duration for the first phase of construction and start-up is approximately 2.5 years. The second phase is projected to include construction of the remaining systems (River Bank Extraction Wells, Inner Recirculation Loop, Topock Compressor Station (TCS) Recirculation Loop, and freshwater injection), and associated supporting infrastructure, remaining monitoring wells, and associated pipelines, access roadways, controls, and electrical and mechanical systems. The estimated duration for the second phase of construction and start-up is approximately 12 months. Phase 2 may overlap the end of Phase 1 by a month or two, depending on the progress of construction.

6.3.2 Operation & Maintenance

Operation and maintenance would begin following start-up of the various remedy systems. Within approximately 1 to 3 years of the beginning of remedy start-up, which is when remedy components have been constructed, tested, and found to be operational. Currently, the anticipated duration is approximately 30 years of active remediation followed by up to approximately 10 years of long-term monitoring and up to approximately 20 years of arsenic monitoring, which would occur concurrently with the long-term monitoring for the first 10 years. This estimated timeframe does not account for additional time for monitoring that may be required if monitored natural attenuation is selected for portions of the plume and extends past the 10 years of long-term monitoring.

6.3.3 Remedy Decommissioning and Restoration

Decommissioning of the groundwater remedy infrastructure would begin following the attainment of the cleanup objectives and/or the determination that the remedy facilities are no longer needed (estimated at around 40 years). Decommissioning and restoration of remedy components is projected to occur decades in the future and would be affected by information and conditions that become available prior to and at the time of decommissioning and restoration. However, some restoration activities may begin earlier, for example, some restoration activities would begin during Phase 1 (e.g., restoration of disturbed areas after well installation activities have been completed, revegetation to offset habitat loss that could not be avoided during construction). The majority of the restoration activities would likely not be completed until after the groundwater remedy has been completed and the groundwater remedy components have been removed.

6.4 Method of Analysis

CEQA Guidelines Section 15130 provides that the following approaches can be used to adequately address cumulative impacts:

- Regional Growth Projections Method — A summary of projections contained in an adopted general plan or related planning document, or in a prior environmental document which has been adopted or certified, which described or evaluated regional or area wide conditions contributing to the cumulative impact. Any such planning document shall be referenced and made available to the public at a location specified by the Lead Agency; or
- List Method — A list of past, present, and probable future projects producing related or cumulative impacts, including, if necessary, those projects outside the control of the agency.

For the purpose of this SEIR, both approaches are used. This is due to the localized and specific nature of the proposed Project, the previously certified Groundwater FEIR, and because the Project Area is located in an area that has and will continue to experience some regional growth. This allows for a thorough, project-based cumulative analysis within the relevant geographic areas and timing of the proposed Project activities. This SEIR does not, however, reconsider the impacts previously considered as part of the Groundwater FEIR.

Consistent with CEQA, a two-step approach was used to analyze cumulative impacts. The first step was to determine whether the combined effects from the proposed Project and other projects would be cumulatively significant. This was done by adding the proposed Project's incremental impact to the anticipated impacts of other probable future projects and/or reasonably foreseeable development. Where the combined effect of the projects and/or projected development was determined to result in a significant cumulative effect, the second step was to evaluate whether the proposed Project's incremental contribution to the combined significant cumulative impact would be cumulatively considerable as required by CEQA Guidelines Section 15130, subdivision (a).

It should be noted that CEQA Guidelines Section 15064, subdivision (h)(4) states that "[t]he mere existence of significant cumulative impacts caused by other projects alone shall not constitute substantial evidence that the proposed project's incremental effects are cumulatively considerable." Therefore, it is not necessarily true that, even where cumulative impacts are significant, any level of incremental contribution must be deemed cumulatively considerable by the lead agency. If the proposed project's individual impact is less than significant, however, its contribution to a significant cumulative impact could also be deemed cumulatively considerable depending on the nature of the impact and the existing environmental setting. If, for example, a proposed project is located in an air basin determined to be in extreme or severe nonattainment for a particular criteria pollutant, a project's relatively small contribution of the same pollutant could be found to be cumulatively considerable. Thus, depending on the circumstances, an impact that is less than significant when considered individually may still be cumulatively considerable in light of the impact caused by all projects considered in the analysis.

6.4.1 Regional Growth Projections

The proposed Project is located within a region (San Bernardino County, California, and neighboring Mohave County, Arizona) that has experienced recent growth, and is also projected to experience population increases in the future. **Table 6-2** shows growth trends in the two counties as well as the city of Needles, California, and Lake Havasu City, Arizona.

Regional and localized growth has the potential to result in numerous environmental impacts such as traffic congestion, air quality degradation, biological habitat loss, water quality degradation, and other environmental changes. This cumulative analysis considers the regional growth trends shown in Table 6-2 and the more specific individual projects that are discussed in this chapter.

TABLE 6-2
REGIONAL GROWTH PROJECTIONS

	Year				Percent Change (2015–2040)
Jurisdiction	**2015**	**2020**	**2030**	**2040**	
California					
San Bernardino County, California[a]	2,111,258	2,399,219	2,858,202	2,731,321	29
Unincorporated San Bernardino County, California[b]	289,400 (2008)*	301,600	372,600 (2035)*	N/A	29 (2010–2030)
City of Needles, California[b]	5,658 (2008)*	6,000	8,000 (2035)*	N/A	41 (2010–2030)
Arizona					
Mohave County, Arizona[c]	205,716	220,678	250,599	280,765	36
Lake Havasu City, Arizona[c]	52,527	58,223	63,669	66,968	28

NOTE:
*SCAG dataset is presented for 2012 (instead of 2015) and for 2035 (instead of 2030).

SOURCES:
[a] California Department of Finance 2013; SCAG 2015
[b] San Bernardino County Economic Forecast
[c] Arizona Department of Administration 2016

6.4.2 List of Related Projects in the Vicinity

A summary of the projects identified at or within the general vicinity of the Project Area is provided in **Table 6-3** and shown in **Figure 6-1**. This is not intended to be an all-inclusive list of projects in the region, but rather a list of projects in the vicinity of the Project Area that may have some related environmental impact to the proposed Project and are: (1) recently completed, (2) currently under construction or implementation or beginning construction or implementation, (3) proposed and under environmental review, or (4) reasonably foreseeable.

The proposed Project is located near the Colorado River; thus, projects associated with federal agencies with interests along the river were considered as part of this analysis and included on the project list. While the Project Area is located in an unincorporated area of the County of San Bernardino (California) and Mohave County (Arizona), it is in the general vicinity of the city of Needles, California and Lake Havasu City, Arizona. For this reason, projects in each of the aforementioned jurisdictions are included in Table 6-3 as well. This analysis is based on information obtained from the U.S. Bureau of Reclamation (BOR); U.S. Bureau of Land Management (BLM); U.S. Fish and Wildlife Service (USFWS); California Department of Transportation (Caltrans); the County of San Bernardino and the city of Needles, California; the County of Mohave and Lake Havasu City, Arizona; and PG&E.

The existing infrastructure within the Project Area, including roads, bridges, railroads, and utilities are not included in the Table 6-3. These past projects in the vicinity of the proposed Project are part of the baseline/existing conditions that are considered throughout Chapter 4 of this SEIR. Likewise, the marinas in California and Arizona and nearby industrial facilities, such as the six natural gas transmission lines in the vicinity of the Project Area, are part of the baseline/existing conditions of this SEIR. Additionally, PG&E has conducted ongoing maintenance, investigation, and decommissioning projects for the past 12 years on-site, including tests and studies to evaluate technologies to reduce groundwater contamination. Some PG&E past projects have been included in Table 6.3 and described in Section 6.4.2.1 to the extent such information is relevant to the understanding of past activities which have occurred on-site, although the effects of those activities have become part of the existing environment (or "baseline") from which the potential effects of the proposed Project have been identified.

TABLE 6-3
LIST OF PROJECTS LOCATED AT OR WITHIN THE VICINITY OF THE PROPOSED PROJECT

Exhibit 6-1 Map Key	Project Name	Description of Project	Project Location	Land Owner/ Land Manager	Jurisdiction	Approximate Distance from Project Area (miles)	Implementation Status
1. PG&E							
1A	PG&E Gas Department Improvement Projects at Topock	Station and pipeline improvements based on available budget	Within the Station fenceline and surrounding PG&E facilities	PG&E	DOI/DTSC	On-site	2011-2016; Ongoing
1B	IM-3 Groundwater Extraction and Management	Interim groundwater treatment that provides extraction rate of 135 gallons per minute from extraction wells	North of Burlington Northern Santa Fe (BNSF) Railroad	PG&E	FMIT/DOI/DTSC	On-site	Construction 2004-2005; Operation and Maintenance Ongoing
1C	Groundwater Monitoring	Monitoring programs, including site-wide surface water monitoring and IM-3 performance monitoring	Immediate vicinity of the Station and in Arizona near Topock	PG&E	FMIT/DOI/DTSC / BOR/Havasu National Wildlife Refuge (HNWR)/ Caltrans	On-site	Ongoing

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Exhibit 6-1 Map Key	Project Name	Description of Project	Project Location	Land Owner/ Land Manager	Jurisdiction	Approximate Distance from Project Area (miles)	Implementation Status
1D	Well Maintenance and Decommissioning	Maintenance activities required to keep existing wells operational and/or in compliance with applicable regulatory standards	Station and surrounding areas	PG&E	DOI/DTSC/FMIT / Caltrans	On-site	Ongoing
1E	Soil Investigation Activities	Soil investigation activities to determine nature and extent of soil contamination on-site	Station and surrounding areas	PG&E	DOI/DTSC/FMIT / BNSF	On-site	Initial soil sampling completed 2016; 2016-2018 for as-needed data gaps bench-scale tests, pilot studies, geotechnical evaluations, and plant or biota sampling
1F	Soil Remediation and Potential Pilot Test Project	Remediation, as necessary, of contaminated soil in the Project Area. Could include excavation and off-site disposal; excavation and on-site treatment; soil flushing; solidification/ stabilization; in situ chemical reduction; capping; and/or institutional controls	Station and surrounding areas	PG&E	DOI/DTSC/ USFWS	On-site	Anticipated to begin no earlier than 2018
2. U.S. Bureau of Reclamation (BOR)							
2A	Lower Colorado River Multi-Species Conservation Program	Program to conserve and work toward recovery of endangered species and protect and maintain habitat along the Colorado River	Extends over 400 miles along Colorado River from Lake Meade to southerly international border with Mexico	Multiple federal agencies	Multiple federal agencies	Less than 1 mile	Ongoing
2B	Quarry Operations	Stockpiled materials are used by BOR for maintenance and construction of bank lines, river control structures, levees, canals, and reservoirs along the Lower Colorado River	Parcel located directly north of the Moabi Regional Park footprint	BOR	BOR	Approximately 1 mile	Ongoing
2C	Mohave Valley Conservation Area Backwater Project	Creation of backwater channel and associated backwater habitat connected to the Colorado River in Moabi Regional Park	Directly adjacent to the Colorado River North of I-40 and Pirate's Cove Restaurant & Bar.	BOR	BOR	Approximately 1 mile	Ongoing

TABLE 6-3
LIST OF PROJECTS LOCATED AT OR WITHIN THE VICINITY OF THE PROPOSED PROJECT

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3. U.S. Bureau of Land Management (BLM)							
3A	Cathodic Protection System	Installation of cathodic protection system for a gas pipeline by Southern California Gas. Recent testing conducted on gas pipeline and will involve additional repair work.	North of I-40 and west of Colorado River	BLM	BLM	Approximately 2,000 feet	Cathodic repair work completed in 2012; gas pipeline repair work planned to be completed by end of 2016.
4. U.S. Fish and Wildlife Service (USFWS)							
4A	Lower Colorado River National Wildlife Refuges Comprehensive Management Plan	Management plan for refuges along Lower Colorado River, including HNWR	30 river miles (300 miles of shoreline) within the HNWR between Needles, CA, and Lake Havasu City, AZ	USFWS	USFWS	Less than 1 mile	Plan approved in 2014; proposed actions pending federal approval as of 2016
4B	Topock Marsh Water Infrastructure Improvement Project on the HNWR	Replacement and rehabilitation of the HNWR main water delivery system for the Topock Marsh unit. Phase II involved non-gravity flow infrastructure.	Along floodplain of the Colorado River, with a small portion on BLM land	USFWS	USFWS/BLM	Less than 1 mile	Phase I completed in 2011; Phase II completed in 2014
4C	Sacramento Wash Improvements	Redirect flow from the Sacramento Wash through existing vegetation to restore historical drainage patterns of the wash	Within HNWR	USFWS	USFWS	Less than 1 mile	Environmental Assessment (EA) under development as of June 2016
5. California Department of Transportation (Caltrans)							
5A	Pavement Enhancement Project	Pavement Enhancement	Pavement activities along I-40 for approximately 3 miles	Caltrans District 8	San Bernardino County	Less than 1 mile	Completion targeted for September 2017
5B	I-40 Improvement Project	Regrading along 29.6 miles from 4.5 miles east of Homer Wash Bridge to the California/Arizona State Line. Realignment of existing I-40 and replacement of existing Colorado River Bridge	Along I-40, and immediately adjacent to Project Area; bridge replacement located east of Project area and terminates near Topock Road on Arizona side.	Caltrans District 8	San Bernardino County	Less than 1 mile	Project start-up targeted for 2023

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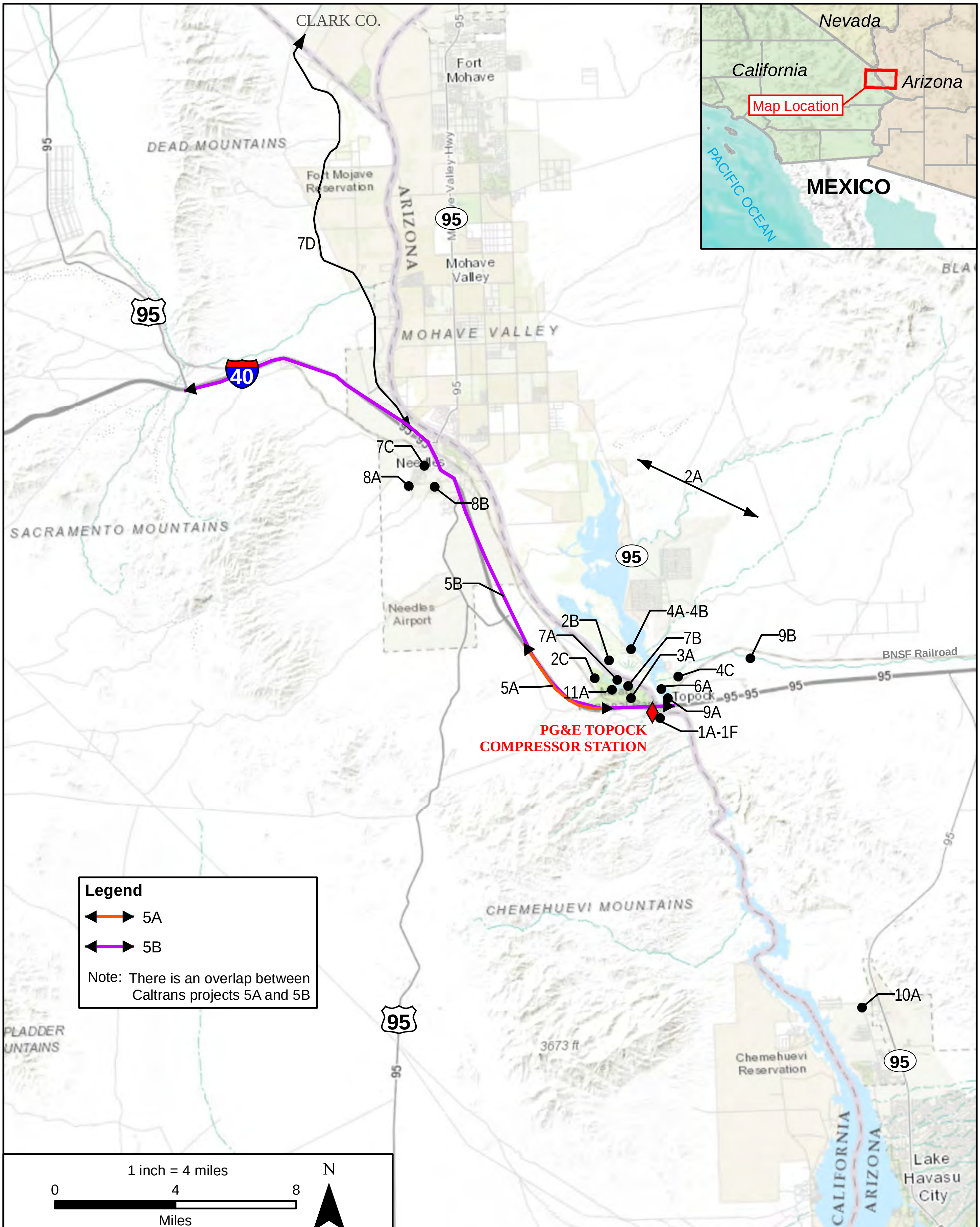
Exhibit 6-1 Map Key	Project Name	Description of Project	Project Location	Land Owner/ Land Manager	Jurisdiction	Approximate Distance from Project Area (miles)	Implementation Status
6. Arizona Department of Transportation (ADOT)							
6A	Oatman Highway Crossing at Sacramento Wash Project	Construction of a bridge as part of Oatman Highway (Historic Route 66) over the Sacramento Wash in Topock, Arizona, providing a 110-foot clear span that will pass the 2-year, 30-minute storm event for the abutments and superstructure.	Along Sacramento Wash	ADOT/Mohave County	ADOT/Federal Highway Administration (FHWA)	Less than 1 mile	Project initiated in February 2016
7. San Bernardino County							
7A	Moabi Regional Park Improvements	Construction utility hookups, sewer treatment plant facility, pavement, lane widening, and drainage improvements	Along Colorado River	San Bernardino County	San Bernardino County	1 mile	Sewer treatment plant completed in 2012; Remaining improvements pending as of 2016
7B	Pirate Cove Resort	667 additional recreational vehicle (RV) and/or cabin sites; off-highway vehicle (OHV) area	Along Colorado River and immediately adjacent to Project Area, north of NTH.	San Bernardino County	San Bernardino County	Less than 1.5 miles from the Station	OHV Area completed in 2013; RV/schedule for cabins is pending as of 2016
7C	Verizon Wireless Communication Facility	Installation of an antenna on an existing 157 foot pole and construction of an equipment shelter	City of Needles, west of U.S. Route 95 (US 95)	San Bernardino County	San Bernardino County	10 miles	Permit was submitted in 2013; implementation schedule pending as of 2016
7D	Needles Highway Improvement Project	Improvement and/or rehabilitation along a 16-mile corridor of the Needles Highway. Project includes two phases (Phase N and Phase 1A). The N phase would take one and a half months to complete (surface rehabilitation) and Phase 1 will take 3 months (Realignment and Horizontal work).	16-mile corridor improvement area from N" Street in City of Needles to California/ Nevada state line	San Bernardino County	San Bernardino County/Caltrans/ Federal Highway Administration	12 miles	Phase N scheduled to begin in early 2017. Phase 1A will begin in Spring of 2017.
8. City of Needles, California							
8A	I-40 Needles Connection Project	Roadway and bridge improvements along various streets and roads in City of Needle to improve traffic flows.	Alignment of various local streets in City of Needles with connections to I-40	City of Needles	City of Needles	10 miles	Planning completed in 2009; Construction planned to start in late 2016/early 2017
8B	ATP Concrete Sidewalks Project	Street improvement project	City of Needles, north of Project Area	City of Needles	City of Needles	10 miles	2016-2017

TABLE 6-3
LIST OF PROJECTS LOCATED AT OR WITHIN THE VICINITY OF THE PROPOSED PROJECT

Exhibit 6-1 Map Key	Project Name	Description of Project	Project Location	Land Owner/ Land Manager	Jurisdiction	Approximate Distance from Project Area (miles)	Implementation Status
9. Mohave County, Arizona							
9A	Topock Marina Improvements	Construction of a new restaurant (Phase I) and hotel (Phase II)	Approximately 5.6 acres along Colorado River, north of Project Area	Mohave County	Mohave County	Less than 1 mile	Phase I completed in 2013; Phase II schedule is undetermined as of 2016
9B	Sterling Solar Project	Development of a solar power generation facility	To be situated on approximately 10,000 acres	Mohave County	Mohave County	Approximately 5 miles	Zoning approved in 2012; implementation schedule is undetermined as of 2016
10. Lake Havasu City, Arizona							
10A	Airport Business Park	Development of a light industrial business park development	Approximately 80 acres	Lake Havasu City/Private Development Partnerships	Lake Havasu City	Approximately 14 miles	Phase 1 completed in 2013. Phase 2 on hold as of 2016
11.Southwest Gas							
11A	Distribution System Upgrades	Upgrade to existing distribution system that runs along the Colorado River up to Laughlin.	Improvements limited to Moabi Regional Park area	San Bernardino County	San Bernardino County	1 mile	Construction completed in December 2011



Final Groundwater Remediation Project SEIR
Created By Parus Consulting, Inc.
Map Creation Date: 11/9/2016
Background Sources: ESRI Topographic & Terrain

Location of Cumulative Projects

Figure 6-1

The following further describes each of the cumulative projects (listed above in Table 6-3) that were considered in this SEIR as part of the cumulative impacts analysis. PG&E activities at the Station are described first, followed by a description of activities by agencies and other parties.

6.4.2.1 PG&E Topock Compressor Station Projects

PG&E Gas Department Improvement Projects at Topock (1A)

PG&E's Gas Department staff regularly develops an annual "wish list" of improvement projects involving Station infrastructure and nearby pipeline infrastructure. These projects are implemented based on the availability of funding and the priority assigned to the projects. The projects described here are limited to the existing footprint of the Station and the nearby PG&E gas pipeline infrastructure and do not involve new facilities or the expansion of plant operations or capabilities.

The following are the Station's current and reasonably foreseeable future projects (past projects, such as the original development of the Station, are accounted for in the description of the existing conditions presented throughout this SEIR):

- Hydrotested nearly two (2) miles of Line 300A from the Station to the west;
- Repaired three soil transitions on Line 300A pipeline segments to the west of the Topock Compressor Station Evaporation Ponds (TCS Evaporation Ponds);
- Installed two new deep well cathodic protection anodes just to the north of the Transwestern Intertie Station;
- Install a new foundation for compressor engine K-4 within the Compressor Building (anticipated in the fall of 2016); and
- The Arch Bridge will be retrofitted with reinforcing structural components (anticipated in the fall of 2016).

The following projects are planned for 2017:

- Construct a new building near the Tech Shop to house new air compressors;
- Replace gas detectors in the Auxiliary Building;
- Install a new foundation for compressor engine K-2 within the Compressor Building;
- Replace valves and piping for a valve nest;
- Modify Station piping and valves to accommodate cross-tie, low flow, flow meters, and in-line inspection needs;
- Begin construction on Station switchgear to accommodate connection to Remedy power distribution system; and
- Begin construction of additional power generation units within the Auxiliary Building.

IM-3 Groundwater Extraction and Management (1B)

PG&E implemented operation of a groundwater remediation facility to address hydraulic control of contaminated groundwater and prevent contaminated groundwater from entering the Colorado River. The treatment facility, known as the IM-3 Facility, was designed to treat 135 gallons per minute (gpm) with a maximum capacity of 150 gpm. Three Board Orders (Board Order No. R7-2004-0080, Board Order No. R7-2004-0103, and Board Order No. R7-2004-0100) were approved by the Regional Water Quality Control Board addressing the remediation facility. The Board Orders have since expired and the continued operation of the IM-3 Facility is under DOI oversight of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) exemption. PG&E is currently operating the IM-3 Facility which is located north of the BNSF Railroad. The IM-3 Facility consists of groundwater extraction for hydraulic control of the groundwater plume boundaries in the Colorado River floodplain; treatment of extracted groundwater, and reinjection of treated water. Operation of the current groundwater treatment and injection system began in July 2005. The groundwater pumping, transport, and disposal activities are considered an IM pursuant to Section IV.A of the Corrective Action Consent Agreement (CACA) entered into by PG&E and DTSC.

Currently, the IM-3 Facility includes a groundwater extraction system (four installed extraction wells: TW-2D, TW-3D, TW-2S, and PE-1), conveyance piping, a groundwater treatment plant, and an injection well field for the discharge of the treated groundwater. Of the four extraction wells, TW-3D is the primary well and is supplemented by the other wells as needed. The groundwater treatment system is a continuous, multi-step process that involves reduction of hexavalent chromium (Cr[VI]) to the less soluble trivalent form (trivalent chromium (Cr[VI]); precipitation and removal of precipitate solids by clarification and microfiltration; and lowering the naturally occurring total dissolved solids (TDS) using reverse osmosis. Treated groundwater is returned to the aquifer through an injection system consisting of two injection wells, IW-2 and IW-3. Ongoing maintenance activities include treatment plant maintenance, pipeline maintenance, and well maintenance.

Groundwater Monitoring (1C)

PG&E conducts continual monitoring at the Station and surrounding areas, which was initiated as part of a Resource Conservation and Recovery Act (RCRA) and the CERCLA facility investigation/remedial investigation groundwater investigation. The three monitoring programs include a Site-wide Groundwater Monitoring Program, Site-wide Surface Water Monitoring Program, and IM-3 Performance Monitoring Program. Monitoring wells that are part of the Groundwater monitoring Program are sampled at frequencies ranging from monthly to quarterly, semi-annually, annually, and bi-annually. Site-wide Surface Water Monitoring Program samples are collected on a quarterly basis, with an additional winter low river level event.

The complete Groundwater Monitoring Program includes 143 groundwater monitoring wells, which consist of:

- One hundred twenty-four monitoring wells in California
- Eight monitoring wells in Arizona

- Four water supply wells at Moabi Regional Park
- Two active IM-3 extraction wells
- Five test wells

The Surface Water Monitoring Program consists of:

- Ten river channel surface water monitoring locations
- Four shoreline surface water monitoring locations
- Two other surface water monitoring locations

Well Maintenance and Decommissioning (1D)

The existing well network at the Project Area is comprised of wells associated with the groundwater remedy, which includes some wells that were initially constructed as part of past Station operations. Well maintenance tasks outside of those anticipated as part of the future operation of the groundwater remedy subject of this SEIR, which are required to maintain well operation and/or condition in accordance with regulatory requirements, have included repair of existing monitoring wells (e.g., MW-38S and MW-38D) and the decommissioning of historic wells associated with past Station operations that were not suitable for monitoring network incorporation (e.g., TCS-4, and potentially other wells). Detailed description of current and potential future well maintenance activities are provided in the following descriptions.

Well TSC-4 Decommissioning

Based on the findings of reconnaissance activities performed in 2013 and 2014 (as described above), a work plan was developed to decommission well TCS-4. DOI approval of, and DTSC concurrence with, the work plan was received by PG&E on December 15, 2015. The work plan was implemented in February and March 2016 and included the following primary field activates:

- Exposing the well head through excavation such that it could be modified to facilitate well decommissioning. Opportunistic soil samples were collected from the sidewalls of the excavation to supplement the Topock Soil Resource Conservation and Recovery Act Facility Investigation and Remedial Investigation Report (RFI/RI) investigation data set.
- The well was decommissioned by perforating the casing, clearing any remaining blockages within the well casing, and injecting neat cement sealing material. This work was conducted using a rotosonic drill rig.
- Decommissioning the well head 5 feet below ground surface in accordance with applicable well standards.

Management of Historic TCS Wells

A May 22, 2014 letter from DTSC and July 18, 2014 response from PG&E identified additional work that will be conducted to address certain historic well(s) associated with past Station operations. Tasks that might be required to address the location and/or condition of historic wells include non-intrusive surface geophysical surveys, potholing to verify the results of the geophysical surveys, evaluations with well casings and/or well decommissioning. This work is planned for 2016, or in subsequent years, as historic wells are identified.

Monitoring Well Repair and Maintenance

As part of the standard operating procedure for well sampling, monitoring wells are inspected each time the wells are sampled. Necessary repairs and maintenance activities will be implemented to ensure the physical integrity of the wells to the extent possible. Such activities could include replace lock, reinforce or replace concrete well pads/ protective bollards, repair the aboveground portion of a well casing, etc.

Soil Investigation Activities (1E)

2008 Part A Soil Investigation

The Part A soil investigation addresses 15 Solid Waste Management Unit (SWMU), AOCs, and other Undesignated Areas (UAs) outside the Station fence line. Additional sampling was performed in 10 of the 15 areas, and only un-intrusive investigation in 1 of the 10 areas. Field activities for the Soil Part A Phase 1 soil investigation were implemented between August and November 2008. The Part A Phase 1 soil investigation encompassed the following 10 investigation areas outside of the Station fence line:

- SWMU 1 – Former Percolation Bed
- AOC 1 – Area Around Former Percolation Bed
- AOC 4 – Debris Ravine
- AOC 9 – Southeast Fence Line
- AOC 10 – East Ravine
- AOC 11 – Topographic Low Areas
- AOC 12 – Fill Areas
- AOC 14 – Railroad Debris Area
- UA 1 – Pipeline Disposal Area
- UA 2 – Former 300B Pipeline Liquids Tank Area

In total, 659 soil samples, 7 white powder material samples, and 4 debris/wood samples were collected (sample counts do not include duplicate samples collected for quality control purposes). Two samples were also collected from one location in an area of Bat Cave Wash where soil is transitioning into sediment near the mouth of Bat Cave Wash. DTSC also directed the collection of three soil samples of white powder at locations in AOC 10.

2015/2016 Soil Investigation Activities

Soil investigation activities conducted within the Project Area indicate that contaminants have been released to soils through past management practices such as those associated with hazardous materials handling/disposal, waste discharges, spills, and leaks of cooling water and other fluids at the Station. On August 24, 2015, DTSC approved the Topock Soil Investigation Project based on the Topock Compressor Station Soil Investigation Project FEIR (August 2015). The primary purpose of the Soil Investigation Project is to gather sufficient soil samples to be able to reliably characterize the nature and extent of soil and sediment contamination within the Project Area. The soil investigation project includes soil sampling and analysis as described in the Soil Work Plan (CH2M Hill 2013), and the potential need for additional activities such as bench scale tests, pilot studies, and geotechnical evaluations to support a future Soil Corrective Measures Study/Feasibility Study (Soil CMS/FS) and plant or other biota sampling activities to support an ecological risk assessment within, and in the vicinity of, the Station.

The Soil Work Plan sampling began in November 2015 and continued through March 2016. Additional activities, similar to those described above associated with investigation have not yet been completed, and will depend on the results of soil sampling. If additional activities are to be completed, they would occur from 2016 to 2018. In addition, DTSC might need to conduct additional borings beyond the scope of the analysis that was included in the Soil Investigation Project FEIR; if this is determined necessary, compliance with CEQA, which may involve preparation of an addendum, would be conducted. All work would be conducted within the timeframe mentioned above. Implementation of the Soil Investigation Project will provide DTSC with sufficient data for the completion of the RFI/RI process that is consistent with state and federal guidance for site investigations and would support evaluation of possible soil cleanup action(s) if determined necessary. The results of the investigation activities will be compiled and combined with past Station investigation data sets for the preparation of the Final RFI/RI Report Volume 3 (Soil), which will enable the evaluation and selection of corrective measures, if necessary, in a future Soil CMS/FS. If any soil remedy is proposed, it would be implemented following completion of the Soil CMS/FS and associated environmental review as required by CEQA.

Soil Remediation and Potential Pilot Test Project (1F)

With the soil data gaps evaluation associated with the Soil Investigation Activities (1E) still ongoing and soil risk assessment still forthcoming, key information that will influence potential remediation methods and timeframes is unknown at this time. For the purposes of this analysis, it is assumed that early phases of soil remediation (likely pilot studies) could overlap with the construction activities associated with the proposed Project. Although type(s) of soil remediation is reasonably foreseeable, the scope and process of the remediation are not. For informational purposes, potential remediation methods and technologies are described below.

Potential Remediation Methods and Technologies

Cleanup of chemicals of concern in soils at and around the Topock site could be accomplished using a variety of remediation methods and technologies. In consideration of the multiple separate SWMUs and AOCs with varying historical uses, different potential contaminants, and variation in the extent of soil contamination (notably depth below the ground surface), soil remediation may require multiple methods or technologies, and the remedial technology or combination of technologies may not be the same at each SWMU/AOC. However, based on the factors mentioned above, the remedial methods/technologies that are likely to be most appropriate for cleanup of soil are assumed to consist of the following:

- Excavation and off-site disposal;
- Excavation and on-site treatment;
- Soil flushing;
- Solidification/stabilization;
- In situ chemical reduction;
- Capping; and
- Institutional controls.

The following sections describe each of these potential soil remediation methods/technologies and the estimated range of scenarios for each.

Excavation and Off-Site Disposal

Excavation and off-site disposal involves the physical removal of contaminated soil from the source area and transportation of the soil to an approved and permitted disposal site (landfill), treatment facility, or recycling facility. Contaminants and their concentrations in the soil will determine the disposal requirements, and which landfills and/or treatment or recycling facilities are permitted for final treatment, disposal, or reuse of the soil.

Excavation and On-Site Treatment

This technology involves excavation of contaminated soil and treatment of the excavated soil, typically within the area of contamination at the site, rather than at an off-site treatment facility. Different treatment methods may be considered depending on the type of contaminants present. The soil would be excavated, with the excavated soil transported as necessary to the on-site treatment area. Soil treatment depends on the contaminant(s) present and the contaminant(s) concentration. Possible treatment methods for different types of contaminants include:

- Petroleum hydrocarbons and other organic compounds—soil (i.e., compost-like) piles for biodegradable organic compounds and soil washing;
- Metals (including chromium)—soil washing; and
- Cr(VI) —chemical reduction.

A description of potential on-site technologies for soil treatment is provided below.

Soil Piles: Soil piles are an ex situ treatment method that have typically been applied for the biotreatment of contaminated soil, notably soil containing hydrocarbon.

Soil Washing: Soil washing is an ex situ process that uses liquids (usually water and sometimes water with chemical additives) and a mechanical scrubbing process to separate contaminants from soil. The scrubbing combined with physical and chemical processes removes contaminants from the soil and concentrates contaminants into a smaller volume of treatment residue. This residue stream can be further treated on-site or transported to an off-site treatment, recycling, or disposal facility.

Chemical Reduction: Chemical reduction is an ex situ technology for treating oxidized contaminants, such as materials containing Cr(VI), that involves the addition of a chemical reducing compound to the soil to enhance a chemical oxidation–reduction reaction and reduce the contaminant forming a less hazardous, less mobile, or inert compound, such as the reduction of Cr(VI) to Cr(III) and/or other inorganic or organic compounds subject to reduction.

Soil Flushing

Soil flushing is an in situ treatment technology that is commonly used in combination with a groundwater remedial technology. The soil flushing process involves infiltrating water, with or without additives (such as surfactants), through contaminated soils to flush (in situ wash) contaminants from the soil into the underlying groundwater for collection by downgradient wells that are extracting groundwater and/or for treatment within downgradient in situ treatment zones for groundwater. Additives are typically surfactant compounds that enhance the solubility of the contaminants and improve the efficiency of the flushing process.

Soil flushing is typically coupled with groundwater treatment to allow contaminants flushed from soil to be addressed by the groundwater remediation system(s).

Infiltrated water with additives and desorbed contaminants that are flushed into the underlying groundwater may need treatment to meet the objectives of the groundwater remedial action. Water used for infiltration in the soil flushing may be from an off-site or an on-site source.

Solidification/Stabilization

Solidification/stabilization reduces mobility of contaminants in the environment through both physical and chemical means. Solidification generally refers to a physical process where a semisolid material such as soil is treated, which results in a solid matrix with greater compressive strength, lower permeability, and the encapsulation of contaminants. Stabilization typically refers to a chemical process that actually binds the matrix of the contaminant such that its constituents are immobilized. Both processes tend to trap or immobilize contaminants within their “host” medium. Typical binding/stabilizing agents include Portland cement, pozzolanic binders (a siliceous or aluminosiliceous material, which form a cement-like solid when combined with materials containing calcium hydroxide), and various kiln dusts. Most of these materials are highly alkaline and form a solidified matrix when mixed with the contaminated soil. Leachability testing is typically performed to measure the degree that the contaminant is immobilized following treatment.

Solidification and stabilization can be performed in situ or ex situ. The ex situ method involves excavation and staging of the soil, screening to remove larger diameter material or other material not suitable to the solidification/stabilization treatment, blending binding agents and water with the excavated soil, and stockpiling treated soil for testing prior to off-site disposal or placement back in the excavation. The in situ method involves injection or mixing of stabilizing agents into soils, addition of water if necessary, and in-place mixing with equipment such as the bucket of a backhoe or track hoe to thoroughly mix and stabilize the soils in place.

In situ solidification/stabilization or ex situ solidification/stabilization that is returned to the excavated area may not be suitable for all future land uses. Depending on future land use, additional material may be placed at the surface, such as part of site restoration as a vegetation layer or asphalt/concrete.

In Situ Chemical Reduction

In situ chemical reduction applies to Cr(VI) or other oxidized chemicals that, when reduced, have a much lower potential environmental and/or human health risk. Application of this technology involves the addition of reagents to react with targeted constituents in soil resulting in a chemical reaction that reduces oxidation. This reaction converts hazardous contaminants to compounds that are nonhazardous or less toxic and more stable, less mobile, and/or inert.

Reductants can be introduced in either liquid or gaseous form. When using liquid reductants, this process would be similar to soil flushing described above except that only a fraction of the contaminant would be flushed to the groundwater. Much of the contaminant would be reduced by contact with the reductant within the unsaturated zone. In situ reduction using gaseous injection would involve injecting a gaseous reductant, such as sulfur dioxide or methane, into a network of wells.

Capping

Capping involves the construction of an engineered cover or a capping system on top of the contaminated soil area to contain and minimize exposure of the soil contaminants to the environment and to humans. A capping system may consist of liners and covers or only a cover system. If the soil contamination is not deep and control of leachate and/or downward migration is an objective of the remediation, liners can be installed on the bottom and sides using natural (low permeability soil or clay) and/or synthetic barriers to prevent liquids and waste from migrating into underlying soils. Engineered covers, constructed of synthetic membrane liners, low permeability soils, and/or concrete, asphalt, or other building materials are installed on top of the contaminated soil area to keep water (surface water or precipitation) from infiltrating the contaminated soil while maintaining a protective cover to secure the materials in place and prevent humans or burrowing animals from contacting the contaminated soil. If infiltration is not of concern, the cover can be constructed of permeable materials of sufficient depth to prevent contact between potential receptors and contaminated soil.

Construction of a cap does not reduce toxicity, mobility, or volume of contaminated soil, but the cap does mitigate migration and direct exposure to human and ecological receptors. The effective life of the capping system can be extended by long-term inspection and maintenance. In addition, precautions must be taken to ensure that the integrity of the cap is not compromised by current or future land use activities. Therefore this technology is assumed to include long-term management and institutional controls to supplement the remedial technology.

Institutional Controls

Land use controls or other forms of institutional controls are expected be incorporated into the remedial alternative development. Controls are likely to include restrictions on residential or other sensitive uses, restrictions on the use of groundwater and development of water supplies associated with technology used for soil remediation, and access restrictions such as road closures or vehicular barriers.

6.4.2.2 U.S. Bureau of Reclamation

Lower Colorado River Multi-Species Conservation Program (2A)

The Lower Colorado River Multi-Species Conservation Program (LCR MSCP) is a long-term multiagency effort to conserve and work toward the recovery of endangered species, and protect and maintain wildlife habitat on the Lower Colorado River. This 50-year plan was completed in 2005 and is currently being implemented to create more than 8,100 acres of riparian, marsh, and backwater habitat for 4 listed species and 16 other species native to the Lower Colorado River. The program extends over 400 miles along the Lower Colorado River from Lake Mead to the U.S.–Mexico Southerly International Border and includes the full pool elevations of Lakes Mead, Mohave, and Havasu and the historic floodplain of the river. This program includes various current and planned activities within the reach of the Colorado River (Reach 3) that is located just east of the Station. The Beal Lake Conservation Area is an LCR MSCP project on the Arizona side of the Colorado River northwest of the Project Area within Reach 3. The conservation project was completed in 2012, and monitoring activities were initiated to manage the conservation objectives, including water quality and plankton monitoring, and periodic remote sensing to track the small population of Razorback Sucker. Monitoring efforts were completed in 2014. Future monitoring objectives post-2014 will be dictated by management recommendations (BOR 2013). The Insectivore Prey Base Abundance and Diversity on Conservation Areas project includes surveys to determine the presence of insect and arachnid species within the Topock Marsh and Beal Lake Conservation Area. Following ongoing research and monitoring priorities, this study was cancelled (BOR 2016b). In 2015 the BOR started planning a backwater project on a parcel north of the Moabi Regional Park footprint as part of the LCR MSCP. This project would involve land-based excavation, which would break the levee and run a channel into the Moabi Regional Park footprint, creating habitat along the channel. Project construction is expected to start in 2017 and continue for a two-to three-year period (BOR 2016b).

Quarry Operations (2B)

The BOR operates quarry sites intermittently (when needed) along the Lower Colorado River, including one directly north of the Moabi Regional Park footprint (Section 7 Quarry – California Side), as stockpiles for riprap and other bank-line materials (BOR 2016a). The stockpiled materials are used by BOR for maintenance and construction of bank-lines, river control structures, levees, canals, and reservoirs along the Lower Colorado River. Quarry operations for the Manchester Quarry were recently closed in 2015 (BOR 2016b).

Mohave Valley Conservation Area Backwater Project (2C)

The BOR has proposed to excavate soil to create approximately 50 acres of backwater channel and associated backwater habitat on a 149-acre portion of a vacant parcel located approximately 1 mile northwest of the Project Area on the west side of the Colorado River. The backwater channel would be connected to the Colorado River by the construction of inlet and outlet water control structures. The Project would be carried out in the following four phases: Vegetation Clearing, Excavation and Construction, Establishment/Re-Vegetation; and Habit Management, Operations, and Maintenance. The improvements are planned to begin in 2017 for an approximate two-to-three year construction period (BOR 2016b).

6.4.2.3 U.S. Bureau of Land Management

Cathodic Protection System (3A)

The Southern California Gas Company installed a cathodic protection system along approximately 235 feet of gas pipeline, to control corrosion of the pipeline in 2012. This protection system comprises a 500-foot well that would connect to the gas pipeline. A buried underground anode wire was connected to a small rectifier to relay the electrical current from an existing power pole to the gas pipeline. Recently, Southern California Gas Company conducted additional testing on the gas pipeline and is expected to complete repairs of the gas pipeline by the end of 2016 (BLM 2016).

6.4.2.4 U.S. Fish and Wildlife Service

Lower Colorado River National Wildlife Refuges Comprehensive Management Plan (4A)

The USFWS, in cooperation with BOR, prepared a comprehensive management plan (CMP) for the four National Wildlife Refuges that are located along the Lower Colorado River. This includes the HNWR, which is located along the Colorado River and is adjacent to the Station. This planning effort integrated three perspectives to result in a holistic management approach for the Lower Colorado River refuges over the 20-year planning period from 1994 to 2014. The plan includes a:

- Broad perspective for the Area of Ecological Concerns;
- Narrower perspective for refuge-related policy issues that affect the four refuges; and
- Focused perspective for management-related activities and strategies that affect defined management units and subunits.

There is no current funding in place to update the CMP; however, components of the plan will likely be used in future management decisions (USFWS 2014). USFWS is currently awaiting direction and funding from Congress in order to move forward with the CMP (USFWS 2016b).

Topock Marsh Water Infrastructure Improvement Project on the Havasu National Wildlife Refuge (4B)

The USFWS plans to replace and rehabilitate approximately 63 acres of the HNWR's main delivery system for the Topock Marsh Unit of the Refuge. The project is located within the historic floodplain of the Colorado River, with a small portion on BLM land. BOR is acting as a cooperating agency under the National Environmental Policy Act (NEPA) for this project. This project would improve the HNWR's capacity to control delivery of water to the Topock Marsh Unit, with environmental benefit to at least 4,000 acres of refuge land. Phase I of the project was completed in the fall of 2011 and includes gravity flow infrastructure consisting of the following components: a fire break canal, fire break canal water diversion structure, fire break canal terminus water control structure, farm ditch water diversion structure, and Topock inlet canal (internal water control structure). Phase II was completed in 2016 based on engineering studies as part of the design phase and involved non-gravity flow infrastructure (USFWS 2016a).

Sacramento Wash Improvements (4C)

The USFWS and HNWR plan to redirect flow from the Sacramento Wash through the existing vegetation to restore historical drainage patterns of the wash along Oatman Highway. The primary purpose of this project is to restore Sacramento Wash to its historical drainage pattern in order to reduce the significant sediment transported and deposited at the Sacramento Wash. Through reducing sedimentation and improving the water quality, this project will improve habitat within Topock Marsh. This project will also improve water quality of the water ultimately the Colorado River. The project would include the removal of the existing dike to redirect flows to restore historical drainage patterns of Sacramento Wash; excavation of three channels to convey flows west of Oatman Highway; and construction of a training dike near the historical wash crossing; and removal of vegetation required for construction (Needles Desert Star 2016).

6.4.2.5 California Department of Transportation

I-40 Pavement Enhancement Project (5A)

Caltrans (District 8) is planning to conduct pavement enhancement activities along I-40 and US 95 from Havasu Lake Road to Needles (EA #1G69). The pavement enhancement activities are planned to begin in September 2017. The portion of pavement activities planned along the I-40 would extend for 3 miles, beginning west of west of Park Moabi Road and adjacent to the Station. The project will take approximately ten days to complete (Caltrans 2016).

I-40 Improvement Project (5B)

Caltrans (District 8) is proposing two separate projects along I-40 which include regrading activities along 29.6 miles of the existing I-40 median, from 4.5 miles east of Homer Wash Bridge to the California/Arizona State Line (EA-OR142). The portion of regrading activities planned along I-40 would be located immediately north of the Station and within the Project Area. The second project includes the proposed replacement of the Colorado River Bridge (EA-OR380K). The existing Colorado Bridge is located east of the Station (Caltrans 2016). The projects are scheduled to start construction in 2023.

6.4.2.6 Arizona Department of Transportation

Oatman Highway Crossing at Sacramento Wash Project(6A)

ADOT is proposing the construction of a bridge over the Sacramento Wash in Topock, Arizona. The new crossing will provide a 110-foot clear span over the Sacramento Wash. Project construction was initiated in February of 2016 (USDOT 2016).

6.4.2.7 San Bernardino County

Moabi Regional Park Improvements (7A)

San Bernardino County is implementing improvements to the Moabi Regional Park north of the Station. Improvements include full utility hookups at the recreational vehicle campsites, improvements to the existing sewer treatment facility at Moabi Regional Park and replacing existing structures in and around the main entrance including pavement, lane widening, and drainage. The improvements to the sewer treatment facility were completed in 2012; however, the work to the main entrance of the park and utility hookups has been delayed. Based on information provided by the County of San Bernardino, project initiation for the park improvements and utility hookups is still pending (County of San Bernardino Regional Parks 2016).

Pirate Cove Resort (7B)

Pirate Cove Resort is a vacation resort that features 14 waterfront cabins, a 300-slip marina, commercial and restaurant development (bar and grill), RV hookups, and recreational vehicle sites. The Pirate Cove Resort also has camping sites and offers water activities, including boating, jet and water skiing, kayaking, canoeing, and swimming on the Colorado River. The Pirate Cove Resort is located within the boundary of Moabi Regional Park at 100 Park Moabi Road, in Needles, California, and was opened to the public in May 2009. The Moabi Regional Park is leased land that falls under the purview of the BLM. The Pirate Cove Peninsula Master Plan identifies 667 additional RV and/or cabin sites to be constructed over six phases (County of San Bernardino 2012). No construction has begun on the facilities proposed as part of the Pirate Cove Master Plan (BLM 2016). In 2013, an OHV area was partially opened to the public. When fully opened, the OHV area will not constitute the full 146.5 acres as planned for in the Pirate Cove Peninsula Master Plan (BLM 2016).

Verizon Wireless Communication Facility (7C)

In 2013, Verizon Wireless submitted a site plan permit to San Bernardino County to collocate an antenna on an existing AT&T monopole in Needles, California, along the west side of Highway 95. This would involve installation of an antenna on an existing 157-foot pole originally installed by AT&T, and construction of an equipment shelter.

Needles Highway Improvement Project (7D)

The Needles Highway Improvement Project involves the improvement and/or rehabilitation of a 16-mile corridor of the Needles Highway, from Needles north to the California/Nevada state line. The project would accommodate existing and reasonable forecast travel demand as safely as possible. Phase N of the project includes surface rehabilitation and is anticipated to begin in early 2017. Resurfacing activities will take approximately 1.5 months. The County of San Bernardino is currently obtaining environmental permit approvals for Phase 1A of the project, which includes realignment and horizontal work. The improvements will occur on an approximately 1.5 mile portion of the highway, extending from the City of Needles up to Park Road (County of San Bernardino Public Works 2016).

6.4.2.8 City of Needles

I-40 Connection Project (8A)

The I-40 Connection project is a street improvement project that will align existing streets in the City of Needles with connections to I-40, thereby improving traffic flow. The project would improve truck-turning radius at various intersections, improve signal placement and pavement. Final design and construction bid materials are currently being prepared (City of Needles 2016).

ATP Concrete Sidewalks Project (8B)

The City of Needles obtained funding through the Active Transportation Program (ATP) to improve existing street network. This street improvement project would construct concrete sidewalks along select streets. Project construction is expected to begin in late 2016 (City of Needles 2016).

6.4.2.9 Mohave County

Topock Marina Improvements (9A)

Topock Marina is a 20-acre facility located along the Colorado River approximately one-half mile north of I-40. The marina owners submitted a site plan to Mohave County, in August 2010, to develop a 102-room, four-story hotel and a three-story restaurant with retail uses on approximately 5.6 acres of the site. The project was approved on January 11, 2013. The retail and restaurant buildings, and swimming as pool part of Phase I, were constructed in 2013 (Mohave County 2016). Phase II includes plans for the hotel; however, as of 2016 no site plans for subsequent phases have been submitted to the county for approval, and construction has not yet been implemented (Mohave County 2016).

Sterling Solar Project (9B)

The Sterling Solar Project was initially a proposed master-planned community located north of I-40 approximately three miles from the California/Arizona state line and five miles northeast of the Project Area. The Sterling Solar Project was replaced by a proposed concentrated solar development on the same property. Conditional zoning approvals were issued in 2012 for this solar development; however, as of 2016 the project has not yet been implemented (Mohave County 2016).

6.4.2.10 Lake Havasu City

Airport Business Park (10A)

The Airport Business Park (10A) is an approximately 80-acre light industrial business park development. Phase I was completed in 2013, which consists of approximately 19 acres of retail space. Phase II of the project would include a motor sports facility. A site plan was approved for Phase II in 2013; however, the project is currently on hold (Lake Havasu City 2016).

6.4.2.11 Southwest Gas

Distribution System Upgrades (11A)

Southwest Gas operates a gas pipeline that runs along the Colorado River in the vicinity of the Project Area, terminating in Laughlin, Nevada. Southwest Gas completed upgrades in 2011 to a portion of the pipeline segment in Moabi Regional Park, approximately 1 mile from the Station.

6.5 Analysis of Cumulative Impacts

As previously described in Section 6.2 of this chapter, the cumulative scenario under each environmental discipline differs depending upon the resource and the potential area of effect. For example, the cumulative conditions for regional air quality account for impacts within the entire Mojave Desert Air Basin (MDAB) because air quality impacts occur on a regional scale, while the cumulative impacts for noise would be limited to a more local scale for activities in the vicinity of the Project Area. The cumulative setting and analysis for each discipline are discussed in the following pages.

Consistent with CEQA, a stepped approach was used to analyze cumulative impacts. The first step was to determine whether the combined effects of the probable projects within the geographic scope of an environmental issue area would result in a cumulatively significant impact. Then, the Project's incremental impact was added to the anticipated effects of these probable projects. The final step was to evaluate whether the proposed Project's incremental contribution to the combined effect would be cumulatively considerable, as required by CEQA Guidelines Section 15130, Subdivision (a).

The amount of infrastructure (number of wells, length of pipeline, built structures, etc.) analyzed in the Groundwater FEIR, when considered in addition to other projects in the cumulative scenario, resulted in cumulatively considerable impacts to cultural resources even after implementation of mitigation measures. All other resource areas analyzed in the Groundwater FEIR were found not to be cumulatively considerable (less than significant). The cumulative impacts identified in the Groundwater FEIR are not considered again in this cumulative impact analysis; all analysis presented in this chapter reflects the changes and modifications presented in the Final Remedy Design and Project as proposed in this SEIR.

6.5.1 Aesthetics

The geographic scope for potential cumulative impacts to aesthetics includes the foreground, which is defined as the zone within 0.25 miles to 0.5 miles from the Project Area, and the middle-ground, which is a zone that extends from the foreground up to 3 to 5 miles. In desert areas, such as the vicinity of the proposed Project, landscape detail is typically most noticeable and objects generally appear most prominent when seen in the foreground. At middle-ground viewing distances, the texture of landscape features such as of rock outcropping surfaces and vegetation as well as built elements may be noticeable but are increasingly unrecognizable. At background viewing distances, which would extend from about 3 to 5 miles from the Project Area to infinity, visible detail is limited to landscape patterns or visual contrasts. Consideration is given to background views; however the effects of the proposed Project activities and any associated changes in visual contrast would generally be visible at foreground viewing distances and not beyond 3 to 5 miles from the Project Area.

As described in Section 4.1.2.1, the Project Area is located at the southern end of the Mohave Valley where the Colorado River meets the Chemehuevi Mountains and veers east past the dramatic Needles rock formations. The visual character of the landscape within the Project Area and surrounding vicinity is portrayed in terms of the contrasts between natural and constructed elements: steep rocky slopes south of the Station giving way to the meandering bank of the river and Topock Marsh, along with the HNWA, to the north and east, with the western portion of the Project Area surrounded by largely undeveloped alluvial plateaus and shallow drainage washes. In addition to the Station, visible built features traversing the Project Area included I-40, the BNSF rail line and natural gas transmission facilities, along with related infrastructure including steel bridges, pipelines, roadbeds and engineered cut slopes. Developed land in the vicinity of the Project Area includes Moabi Regional Park, a mobile home development, and a recreation facility, both located immediately northwest of the Project Area.

When combined, projects in the cumulative scenario listed above (Table 6-3) have the potential to affect key views and sensitive aesthetic resources in the geographic scope. In particular, this includes projects at and in the immediate vicinity of the Station. Particularly relevant to the immediate visible Project Area is implementation of the Soil Remediation and Potential Pilot Test Project (1F), which could involve substantial earthwork, and which could also overlap with construction activities associated with the proposed Project. Additionally, projects along the Colorado River in San Bernardino and Mohave Counties, which include the BLM Quarry Operations (2B), the Mohave Valley Conservation Area Backwater Project (2C), the Topock Marsh Water Infrastructure Improvement Project on the HNWR (4B), Sacramento Wash Improvements (4C), Moabi Regional Park Improvements (7A), the Pirate Cove Resort (7B), the Topock Marina Improvements (9A), and the Distribution System Upgrades (11A). These projects are all within the 3 to 5 mile viewing distance and could cumulatively affect existing scenic resources.

Elements of these projects (such as ground disturbing activities; installation of infrastructure; and introduction of additional vehicles, equipment, and personnel) would be visible to affected viewers in the geographic scope, including recreational, vehicular, and Tribal viewer groups. Depending on the project element and viewing location, intervening landscape elements, and other factors, such as the presence of vegetation, screening could minimize the actual visibility. The projects anticipated at the Moabi Regional Park (7A), the Havasu National Wildlife Refuge (4B), the Pirate Cove Resort (7B), and the Verizon Wireless Communication Facility (7C) are fairly minimal in the context of existing development, but could be highly visible to sensitive recreational viewers along the Colorado River and to Tribal viewer groups. Similarly, the hotel and restaurant proposed as part of the Topock Marina Improvements (9A) could be more substantial in nature and of more visual contrast compared to the surroundings. These recreational developments are of a nature that is consistent in the region and are not anticipated to result in visual effects that would be significant, either in combination with other projects or individually.

There is a potential that the construction phase of the Project could overlap with the Soil Investigation Activities (1E). In addition, based on the results of the investigation activities, a soil remedy may be required (1F), which could involve extensive amounts of soil disturbance in the Project Area, depending on the type of soil remedy selected after completion of the Soil Investigation Activities and additional environmental review. There is the potential for the Soil Remediation Project, once approved, and the proposed Project to overlap, though it would most likely be nearing the completion of Project construction and initial soil remediation activities (i.e., pilot tests, which are less intensive in nature). The potential soil remedy, if needed and depending on the type of remedy selected as outlined in Section 6.4.2.1 above, could result in substantial visual changes to the Project Area in combination with those visual changes associated with the proposed Project. Project-related visual changes would be in place through decommissioning and likely could extend beyond. It is not known how long a soil remedy would take, but it could commence during the 5-year construction schedule for the proposed Project, and have long-lasting visual changes that could be considered significant.

When added to the cumulative scenario described above, the effects of the proposed Project would contribute incrementally to the cumulative impacts on aesthetic resources. As documented in the set of Figures 4.1-5 through 4.1-16 visual simulations, and summarized in Table 4.1-5, the proposed Project would represent an incremental change that would substantially alter the composition or character of existing landscape views, when considered in addition to the anticipated impacts of other projects in the cumulative scenario, particularly the Soil Remediation and Potential Pilot Test Project. The Project's incremental contribution to aesthetic impacts and, particularly with respect to the potential to substantially degrade the existing visual character or quality of the site and its surroundings, is considered cumulatively considerable and a significant cumulative impact. This is a new significant cumulative impact from those identified in the Groundwater FEIR.

Mitigation Measures AES-1 and AES-2 include design requirements to ensure that development and alterations along the Colorado River and the associated scenic corridor do not significantly affect views. These measures would reduce the Project's contribution to significant cumulative aesthetic impacts but not to a level of less than significant. In addition, the Soil Remediation and Potential Pilot Test Project (1F) would also require compliance with CEQA, including preparation of an EIR and consideration of that project's contribution to significant visual impacts which could impose additional specific mitigation measures that would be highly dependent on the locations and types of remediation that are implemented. However, it is assumed that cumulative impacts would remain significant and unavoidable.

IMPACT CUM-1 **Cumulatively Considerable Impacts to Aesthetic Resources.** Implementation of the proposed Project, in combination with other projects in the geographic scope, could cause a substantial adverse change to scenic vistas, scenic resources, and the existing visual character and quality of the site and its surroundings. This impact would be **cumulatively significant** and the proposed Project's contribution to this impact would be **cumulatively considerable**.

Timing:	Implementation of AES-1 and AES-2 prior to and during construction, operations and maintenance, and decommissioning.
Responsibility:	PG&E would be responsible for the implementation of these measures. DTSC would be responsible for ensuring compliance.
Significance after Mitigation:	The impact would be **significant and unavoidable** after implementation of the mitigation measures detailed above. The Project, in combination with other projects causing related visual impacts in the area, would contribute considerably to a cumulatively significant impact to aesthetic resources.

6.5.2 Agriculture and Forestry Resources

The geographic scope for agricultural resources is Eastern San Bernardino County where agricultural activities would be similar. As explained in the Modified Initial Study (Appendix IS), the Project would have no impact with respect to Farmland, Williamson Act contracts, land zoned for agricultural use, forest land, or timberland. Therefore, it could not contribute to cumulative effects related to these resources (no impact).

6.5.3 Air Quality

Cumulative air quality impacts must be considered from different perspectives of scale and type of activity depending on the air pollutant being considered. The following discussion describes impacts associated with short-term Project-related activities and greenhouse gas (GHG) emissions.

6.5.3.1 Short-Term Project-Related Impacts

The geographic scope for potential cumulative impacts to air quality from short-term Project-related impacts is the MDAB, which is the air shed the Project Area is located in. The MDAB comprises the eastern portion of Kern County, the northeastern portion of Los Angeles County, all of San Bernardino County, and the eastern portion of Riverside County.

The MDAB is in nonattainment status for ozone, Particulate Matter 10 (PM_{10}), and Particulate Matter 2.5 ($PM_{2.5}$) within a portion of San Bernardino County. However the Project does not fall within the MDAB nonattainment area for $PM_{2.5}$. This is a result of the cumulative development in the basin, as well as transport of pollutants from other basins. The Mojave Desert Air Quality Management District (MDAQMD) has established daily significance thresholds for criteria pollutants and ozone precursors for projects within San Bernardino County designed to reduce the impacts of development on the air quality of the region. To this end, the Project-related thresholds have been established to ensure that if they are not exceeded, then there is no potential for the Project to result in regional emissions above the state or federal thresholds, or significant increases in daily/annual emissions where existing conditions already exceed the thresholds. Since these state and federal thresholds are cumulative in nature, and the MDAQMD thresholds were developed to ensure/enable compliance with these state and federal thresholds, then project compliance with MDAQMD thresholds would ensure a project does not have the potential to result in a cumulatively significant impact on air quality.

In addition, San Bernardino County is currently designated as a nonattainment area for ozone and PM_{10} due to the cumulative projects in the county. Projects in the cumulative scenario, in particular, projects at the Station (1A through 1F) and the projects along the Colorado River in San Bernardino and Mohave counties, which include the BLM Quarry Operations (2B), the Mohave Valley Conservation Area Backwater Project (2C), the Topock Marsh Water Infrastructure Improvement Project on the Havasu National Wildlife Refuge (4B), Sacramento Wash Improvements (4C), Moabi Regional Park Improvements (7A), the Pirate Cove Resort (7B), the Topock Marina Improvements (9A), and the Distribution System Upgrades (11A), could contribute to air quality impacts in the geographic scope through the generation of criteria pollutants from activities such as vegetation clearing; earth-moving activities; dust entrainment from travel by equipment, trucks, and employee vehicles (especially on unpaved surfaces); and exhaust from equipment, trucks, and employee vehicles. For these reasons, the existing combined air quality conditions within the geographic scope of the air basin are considered cumulatively significant with respect to Ozone and PM_{10}.

When added to the existing environment and cumulative scenario described above, the effects of the proposed Project would contribute incrementally to the cumulative impacts on air quality, but the incremental contribution would not be cumulatively considerable. As described in Section 4.2, "Air Quality," the proposed Project would violate the MDAQMD air quality standard for oxides of nitrogen (NO_x) during construction and decommissioning activities which would result in significant impacts, but would not exceed daily or annual thresholds of significance for other criteria pollutants (volatile organic compounds [VOCs] or reactive organic gases [ROG]; PM_{10}; $PM_{2.5}$; carbon monoxide [CO]; and oxides of sulfur [SO_x]). The proposed Project would violate the MDAQMD NO_x air quality standard; therefore it could result in a cumulatively considerable net increase for this pollutant (NO_x) without mitigation. Mitigation Measure AIR-1a would reduce NO_x emissions to below regulatory thresholds for all construction activities and therefore, with mitigation would result in less than cumulatively considerable impacts.

As demonstrated in Section 4.2 "Air Quality" of this SEIR, operational emissions are shown to have less than significant impacts with respect to all criteria pollutants. Therefore, the incremental increase in emissions from operation of the Project would not be cumulatively considerable. The proposed Project would not emit CO in quantities that would pose health effects. Further, the duration of construction and decommissioning of the proposed Project would constitute a small percentage of the total 70-year sensitive receptor exposure period for toxic air contaminants.

Therefore, when considered in conjunction with the MDAQMD project thresholds as well as the anticipated impacts of other projects in the cumulative scenario, the Project's incremental contribution to air quality impacts would not be cumulatively considerable (less than significant).

6.5.3.2 Greenhouse Gas Emissions

GHG emissions are inherently a cumulative concern, in that the significance of GHG emissions is determined based on whether such emissions would have a cumulatively considerable impact on global climate change; therefore, the geographic scope of cumulative impacts related to GHG emissions and climate change is global. Because GHG emissions, as discussed in Section 4.2 of this SEIR, are considered cumulative pollutants, the cumulative analysis reflects that of the Project analysis. Therefore, the discussion here summarizes the GHG emissions analysis as presented in Section 4.2.

The proposed Project would contribute GHG emissions during construction and decommissioning primarily through exhaust from equipment, trucks, and employee vehicles, and during operations primarily through electricity consumption and solid waste generation. This would result in an incremental contribution to global climate change and, when combined with the cumulative contributions of all other sources of GHGs, would contribute to climate change. As discussed in Section 4.2.5.3, the combined operational emissions plus the amortized construction-related emissions would result in a net emissions increase of approximately 5,979 metric tons per year of CO_2 equivalents (CO_2e), or approximately 179,380 MT CO_2e over the life of the Project. This would not exceed the MDAQMD's threshold of 90,719 metric tons per year of CO_2e.[1]

Because the Project would not exceed the MDAQMD threshold for emissions of GHGs, it would not result in GHG emissions that would conflict with California's ability to achieve 1990 levels of GHG emissions by 2020 as required by Assembly Bill (AB) 32 and would be consistent with all other applicable plans, policies, and regulations. It also would not result in a substantial increase in GHG emissions or exceed a threshold of significance adopted by the MDAQMD. Therefore, the Project's incremental contribution to GHG emissions would not be cumulatively considerable, and would not present a significant cumulative impact (less than significant).

6.5.4 Biological Resources

The geographic scope for biological resources consists of the Project Area and surrounding lands along with drainages that are connected to the Project Area, including the Colorado River. The limits of the geographic scope were determined based on the presence of contiguous habitat types supporting, or capable of supporting, the sensitive biological resources potentially affected by the Project. This setting generally consists of a mix of disturbed and relatively pristine natural landscape that supports a variety of biological communities consisting predominantly of upland desert scrub interspersed with desert washes.

The projects considered in this cumulative analysis have varying effects on biological resources in the geographic scope, ranging from direct adverse impacts on sensitive species and habitat, to beneficial impacts resulting from implementation of conservation measures and land management practices. Impacting activities from projects included in Table 6-3 would include, but are not

[1] While the 100,000 ton (90,719 MT) CO_2e MDAQMD annual threshold is not as conservative as the Federal reporting limit of 25,000 MT CO_2e annually or the SCAQMD's 10,000 MT CO_2e annual threshold, the Project would still be below both of these thresholds.

limited to, activities at the Station (1A through 1F), Quarry Operations (2B), Cathodic Protection System (3A); Moabi Regional Park Improvements (7A); Pirate Cove Resort (7B); Topock Marina Improvements (9A); Distribution System Upgrades (11A).

Because these activities are anticipated to or have occurred within or near naturalized areas or undisturbed habitats, potential impacts to biological resources would include removal and/or disturbance to water, riparian, or sensitive habitats protected by federal or state regulations; removal and/or damage to special-status plants, including indigenous plants of biological and cultural significance; injuring, killing, harassing, or otherwise harming special-status wildlife, including desert tortoise; ring-tailed cat; Yuma clapper rail, southwestern willow flycatcher, and other nesting birds and raptors; Nelson's bighorn sheep; special-status bat species; and disruption of native wildlife nursery sites wildlife movement corridors. Within the geographic scope, the aforementioned projects contribute only a limited amount of development and activity compared with the overall amount of undisturbed and available open space.

Other projects, such as the LCR MSCP (2A), the Mohave Valley Conservation Area Backwater Project (2C), the LCR National Wildlife Refuges CMP (4A), and Topock Marsh Water Infrastructure Improvement Project on the HNWR (4B), have contributory beneficial effects to biological resources. The LCR MSCP is a program implemented and overseen by multiple federal agencies to conserve and work toward recovery of endangered species and protect and maintain habitat along the Colorado River. The Mohave Valley Conservation Area Backwater Project (2C) entails creation of a backwater channel and associated backwater habitat connected to the Colorado River in Moabi Regional Park. The CMP at HNWR is a management plan overseen by USFWS for wildlife refuges along Lower Colorado River, including the HNWR. The Topock Marsh Water Infrastructure Improvement Project includes the replacement and rehabilitation of the HNWR main water delivery system for the Topock Marsh unit. These projects provide stipulations for habitat restoration, creation of new habitat, augmentation of existing wildlife populations, protection and monitoring of existing habitat for special-status species, and protection of special-status species and their habitats within the geographic scope, among others. Because of the limited amount of development and activity proposed within the geographic scope and the implementation of the aforementioned beneficial projects, the combined effects to biological resources from the projects listed in Table 6-3 would not be considered cumulatively significant.

The effects of the proposed Project, in combination with other cumulative projects in the geographic scope, would contribute incrementally to impacts on biological resources. As described in Section 4.3.5.3 of this SEIR, the proposed Project would have potentially significant impacts, including potential fill of ephemeral non-wetland waters under U.S. Army Corps of Engineers (USACE) and California Department of Fish and Wildlife (CDFW) jurisdiction; direct disturbance of and loss of habitat for special-status birds, desert tortoise, ring-tailed cat, Nelson's bighorn sheep, special-status bats, and special status plants; and substantial interference nursery sites (i.e., active maternity roosts for special-status bat species). Mitigation measures have been identified for the proposed Project to avoid and/or minimize impacts to biological resources (Mitigation Measures BIO-1a, BIO-1b, BIO-2b through BIO-2h, and HYDRO-1). These measures would be implemented during planned activities, as well as implementation of any unplanned facilities associated with the Future Activity Allowance.

Mitigation Measures BIO-2a and BIO-2b, which require on-site restoration and compensation to address temporal loss of jurisdictional features, would reduce potentially significant impacts to ephemeral non-wetland waters under USACE and CDFW by ensuring no net loss of jurisdictional resources in the region. Mitigation Measure HYDRO-1 would reduce potentially significant indirect impacts on fish species and their aquatic habitat by requiring implementation of best management practices (BMPs) to reduce water quality impacts related to erosion and pollutant runoff. Mitigation Measures BIO-2b through BIO-2h would reduce potentially significant impacts to special-status species, including special-status birds, desert tortoise, ring-tailed cat, Nelson's bighorn sheep, special-status bats, and special status plants, by requiring seasonal avoidance where necessary, establishing avoidance buffers around known occurrences, and other impact minimization measures (e.g., 20 mile-per-hour speed limit on access roads).

Overall, mitigation measures requiring implementation would ensure, at a minimum, no-net-loss of habitat value or function and avoidance and minimization of disturbance to special-status species would reduce impacts associated with the proposed Project to a less than significant level. Therefore, when considered in addition to the anticipated impacts of other projects in the cumulative scenario, the Project's incremental contribution to impacts to biological resources would not be cumulatively considerable (less than significant).

6.5.5 Cultural Resources

The geographic scope for cumulative impacts to cultural resources (i.e., historical resources, unique archaeological resources, unique paleontological resources or geological features, and human remains) consists of the Lower Colorado River Valley. This geographic scope of analysis is appropriate because the historical resources, unique archaeological resources, and human remains within this area are linked or connected to the five Interested Tribes, all of whom have a vested interest in the Project Area. For paleontological resources, the geographic scope of analysis is appropriate because the formations within this area are expected to be similar. The Topock Traditional Cultural Property (Topock TCP), although its full geographic boundary is currently undefined, likely comprises a large part of the geographic cumulative scoping area, and, as such, there are undoubtedly many archaeological resources, landforms, water sources, and similar features that contribute to the Topock TCP. For paleontological resources, similar geology within this vicinity would likely yield fossils of similar sensitivity and quantity. The temporal scope for cumulative impacts to cultural resources encompasses both short-term and long-term cumulative impacts of the proposed Project, in conjunction with other cumulative projects in the area.

The Project Area and surrounding vicinity contains a significant archaeological and historical record that, in many cases, has not been well documented or recorded. The Lower Colorado River Valley contains a number of important sites of cultural and/or archaeological importance that are integral to the cultural traditions of Native American Tribes, and their relationship to the Colorado River. These resources include, but are not limited to, archaeological sites, geoglyphs, rock art, trails, and dance paths/circles. There are also important historic-period resources, such as Route 66 and its associated features and archaeological sites, located throughout the region. In addition, geological units with moderate to high paleontological sensitivity, such as Quaternary

Alluvium, the Bouse Formation, and the Chemehuevi Formation, have yielded significant vertebrate and microvertebrate fossils in the surrounding vicinity. Thus, there is a potential for ongoing and future development projects in the Project vicinity to disturb areas that may contain cultural resources.

Many of the cultural resources within the geographic scope have already been subjected to impacts as a result of past projects, including the introduction of transportation, energy, and recreational facilities, expansion of population centers, flood control management and water supply, as well as through construction of the PG&E projects at the Station and within surrounding areas and other ground-disturbing activities undertaken in developing the Final Groundwater Remedy Project. Projects undertaken before environmental laws such as CEQA were in place may not have considered, or mitigated, significant impacts to cultural resources, and may have resulted in damage to important cultural resources such as geoglyphs, trails, and other resources that retain significant cultural value to Interested Tribes, as well as historic-period resources, paleontological resources, and human remains. Projects that have already been implemented or may occur in the foreseeable future at or near the Project Area could impact cultural resources. These projects include PG&E projects at the Station (1A through 1F), BLM Quarry Operations (2B), the LCR National Wildlife Refuges CMP (4A), the Topock Marsh Water Infrastructure Improvement Project on the HNWR (4B), Sacramento Wash Improvements (4C), Moabi Regional Park Improvements (7A), Pirate Cove Resort (7B), Topock Marina Improvements (9A), the Sterling Solar Project (9B), and Distribution System Upgrades (11A). These projects have the potential to involve ground-disturbing activities that would directly impact significant cultural resources. These projects may also bring additional people (e.g., work crews, residents, tourists) into the area that may result in increased rates of vandalism or OHV use that may directly or indirectly impact resources. These projects may also result in visual, auditory, and other environmental impacts that may adversely affect the Topock TCP. For these reasons, the combined impacts on cultural resources in the geographic scope would be considered cumulatively significant. This conclusion is consistent with the certified Groundwater FEIR which also found a significant and unavoidable impact to cultural resources.

When considered in combination with the impacts of other projects in the cumulative scenario, the proposed Project's incremental contribution to impacts on cultural resources including historical resources (including the Topock TCP), unique archaeological resources, unique paleontological resources or geologic features, and human remains would remain cumulatively considerable and therefore significant. Although Mitigation Measures CUL-1 through CUL-4 which are described in detail in Section 4.4, "Cultural Resources," would reduce the significance of the impacts to the degree feasible, the only method to fully mitigate these impacts would be complete avoidance of any future project activity; therefore, no feasible mitigation exists that would reduce the Project's contribution to less than considerable. The Project's contribution to this significant cumulative cultural impact would remain cumulatively considerable (significant and unavoidable).

IMPACT CUM-2	**Cumulatively Considerable Impacts to Cultural Resources.** Implementation of the proposed Project, in combination with other projects in the geographic scope, could cause a substantial adverse change in the significance of the historical resource identified as the Topock TCP; cause a substantial adverse change in the significance of unknown historical or unique archaeological resources; result in a substantial adverse change to a unique paleontological resource or unique geologic feature; and disturb human remains, including those interred outside of formal cemeteries. This impact would be **cumulatively significant** and the proposed Project's contribution to this impact would remain **cumulatively considerable** as identified in the Groundwater FEIR.

Timing:	Implementation of CUL-1 through CUL-4 prior to and during construction, operation and maintenance, and decommissioning.
Responsibility:	PG&E would be responsible for the implementation of these measures. DTSC would be responsible for ensuring compliance.
Significance after Mitigation:	The impact would remain **significant and unavoidable** after implementation of the mitigation measures detailed above. The Project in combination with other projects in the area would continue to contribute considerably to a cumulatively significant impact to the integrity of those physical characteristics that convey the significance of the Topock TCP and to historical resources unique and important to the region.

6.5.6 Geology and Soils

As explained in the Modified Initial Study (Appendix IS), the Project would have less than significant impacts after implementation of mitigation measures with respect to geology and soils. The geographic scope of the cumulative impact analysis for geology and soils includes the Project Site and areas immediately adjacent. The projects listed in Table 6-3 that have the potential to impact geology and soils include certain PG&E projects at the Station (1A, 1E and 1F), Quarry Operations (2B), Mohave Valley Conservation Area Backwater Project (2C), Sacramento Wash Improvements (4C), Moabi Regional Park Improvements (7A), Pirate Cove Resort (7B), Topock Marina Improvements (9A), and the Distribution System Upgrades (11A). These projects, in particular projects 1E and 1F, would potentially result in substantial earthmoving activities as it relates to soil remediation and investigation activities, and would contribute to a significant cumulative impact to soil erosion in the Project Area. The proposed Project also has the potential to result in increased soil erosion from wind and water during construction activities. The magnitude of this potential impact would be reduced by implementation of Mitigation Measure GEO-1a, which would include grading and erosion control plans, a stormwater pollution prevention plan, and consistency with local policies. These are standard requirements for construction sites and would be required for all other projects that would be located in the Project Area. Although the proposed Project may contribute incrementally to cumulative erosion impacts, adherence to standard construction practices and requirements would limit the magnitude of cumulative impacts from this Project and other future projects. Project impacts involving differential compaction of soils and potential alterations of drainage patterns and erosion have been identified. This potential impact would be mitigated to less than significant levels through the implementation of Mitigation Measure GEO-1b. Considering the other projects that may be implemented at the Station, there is the potential for cumulative impacts to occur when the various PG&E projects are considered from a cumulative perspective. However, each of these individual projects would likely require implementation of similar measures and would be required to be in compliance with county standards, thereby reducing the potential for these potential impacts to be significant from a cumulative perspective.

With implementation of Project-specific Mitigation Measures GEO-1a and GEO-1b (see Appendix IS), the proposed Project's contribution to the overall cumulative effect would be reduced. Therefore, cumulative impacts related to differential compaction of soils and potential alterations of drainage patterns and erosion would be less than significant. The Project would not cause any impacts related to expansive or unstable soils or subsidence and would therefore not contribute to any cumulative impacts. As described in Section 4.6.5.3, the Project would implement standard operating procedures (SOPs) and BMPs, as well as adhere to the substantive provisions of the state Construction General Permit to avoid and/or minimize the potential for impacts related to extensive soil excavation, alteration of drainage patterns and erosion quality. These provisions would become conditions of approval for the Project. Therefore, when considered in addition to the anticipated impacts of other projects in the cumulative scenario, the Project's incremental contribution to soil disturbance, drainage and erosion impacts would not be cumulatively considerable (less than significant). Additionally, the Project is not located in proximity to a known earthquake fault; the Project Site is not located in a geologic unit or soil that is unstable; and the Project Site is not located on expansive soils. Therefore, the Project would not contribute to or combine with the impacts of other projects in the cumulative scenario to cause significant cumulative impacts related to these criteria (no impact).

6.5.7 Hazards and Hazardous Materials

The geographic scope of the cumulative impact analysis for hazards and hazardous materials includes the Project Site and areas immediately adjacent. The geographic scope would also include transportation haul routes used for the transportation of hazardous materials to and from the Project Area including the disposal of hazardous soils and building debris. Note that air quality impacts are addressed in Section 6.5.3, "Air Quality," and water quality impacts address in Section 6.5.8, "Hydrology and Water Quality."

Several cumulative projects in the geographic scope could cause impacts related to hazards or hazardous materials. The PG&E projects are restricted to the area local to the Station, and would not be expected to be compounded by other projects in the area due to the physical separation. In addition, the investigation and construction activities are temporary and localized. The BOR LCR MSCP (2A) Quarry Operations (2B) would require the use of vehicles for transport of workers, materials, and equipment but would not include construction activities. The Cathodic Protection System (3A) to install cathode protection wiring was completed in 2012. The LCR National Wildlife Refuges CMP (4A) is a management plan that would only require trucks to transport workers and equipment; no construction activities are proposed. The Moabi Regional Park Improvements (7A) would include the construction of roads and utility hookups associated with a previously completed sewer treatment plant improvements. Although not yet scheduled, the work would include asphalt pavement, fuels, lubricants and oils, and paint, and the paving equipment and support trucks for equipment, materials, and workers. The Pirate Cove Resort (7B) would add RV and cabin sites and would include grading and paving equipment using fuels, lubricant cleaners, and paint. The Topock Marina Improvements (9A) would involve construction of a hotel and restaurant. Although no plans have been submitted, the future construction would require construction equipment and support trucks, workers, and materials, including fuels and lubricants, paints, and cleaners. These projects could result in the release of hazardous materials from the use of equipment (fuels, oils and grease, solvents). Those projects that are expected to occur within a similar time frame as the proposed Project would result in an increased potential for the release of hazardous materials. Cumulative hazards and hazardous materials impacts could occur if activities related to the Project combined with the activities of other existing and proposed cumulative projects such as simultaneous accident conditions along the haul route from the Project Area or further out on I-40. Although the potential exists for releases to occur in connection with the proposed Project and other cumulative projects, there is no way of predicting whether any such releases would occur or whether they would occur in a way that could be considered cumulatively considerable. The likelihood that more than one of the cumulative projects would have a substantial hazardous materials release that affects the same resources within the same temporal period is relatively low.

Hazards from the routine use or accidental release of hazardous materials, hazardous materials that would be used on the Project Area are described in the impacts discussion for Impact HAZ-1. In the event of a release, state and local hazardous materials regulations and standards, which are described in the Regulatory Background for each resource section, have been established to address and reduce the potential for such impacts to occur and to establish response plans to limit the extent of releases that do occur. The Project and the listed cumulative projects would all be required to comply with the same applicable provisions of these laws and regulations. Through compliance with these requirements, the potential for releases of hazardous materials would be reduced and the required responses would limit the extent of releases largely to the individual sites. In addition, the U.S. Department of Transportation (DOT) regulations that provide required procedures for the containerization and transportation of hazardous materials that apply to the proposed Project would also apply to each of the cumulative projects. Each of the cumulative projects would also be required to prepare and implement a Health and Safety Plan and a Hazardous Materials Business Plan that would describe the requirements for the proper containerization and transportation of hazardous materials.

When added to the cumulative scenario described above, the effects of the proposed Project would not substantially contribute incrementally to the cumulative impacts on hazards and hazardous materials. Therefore, when considered in addition to the anticipated impacts of other projects in the cumulative scenario, the Project's incremental contribution to hazards and hazardous materials impacts would not be cumulatively considerable (less than significant).

In terms of an increased risk of wildland fire, the California Department of Forestry and Fire Protection fire hazard severity zone map identifies the Project Area and its surroundings in the lowest level of its fire hazard severity zones, which is the lowest possible risk category. Nonetheless, wildfires are possible as demonstrated by the wildland fire that originated on April 6, 2016, 10 miles southeast of Needles and 2 miles west of Golden Shores. The fire was fueled by riparian fuels including Salt Cedar. Although this fire demonstrates the ability for riparian areas within the Project Area to burn, no permanent residences are proposed as part of the Project that would result in loss, injury or death. While workers would be on-site intermittently for the duration of construction, operation, and decommissioning activities, the proposed facilities would not pose an increase in threat due to wildland fires. In addition, as discussed in Section 4.5, "Hazards and Hazardous Materials," the California Vehicle Code requires spark arrestors on off-highway vehicles. Therefore, the Project would not result in new significant impacts or substantially increase the severity of impacts previously identified in the Groundwater FEIR. Cumulative projects in the geographic scope (see Table 6-3) that involve the use of mechanized equipment with internal combustion engines could cause a wildfire and expose people or structures to wildfire risk. However, the cumulative projects would also be required to comply with the substantive provisions of federal and state regulations and the relative low level of fire hazard severity in the area of these projects would ensure that the combined effects of these projects is less than significant. The Project would also adhere to provisions of federal and state regulations that address potential wildland fire impacts, even with the low level of fire risk. Thus, the Project's incremental contribution to wildland fire impacts would not be cumulatively considerable (less than significant).

6.5.8 Hydrology and Water Quality

The geographic scope for potential cumulative impacts to hydrology and water quality is the East Colorado River Basin (focused on downstream areas) for surface water resources, and the Mojave Valley Groundwater Basin, Needles Subbasin (California), and Sacramento Valley Groundwater Basin (Arizona) for groundwater resources. The area around the Station is drained by a network of ephemeral washes that eventually flow into the Colorado River to the east of the Project Area. The section of the Colorado River in the vicinity of the Project Area is not on the list of impaired water bodies required by Section 303(d) of the federal Clean Water Act and therefore does not have any established Total Maximum Daily Loads (TMDLs).

Certain PG&E projects (1A, 1E and 1F), the Quarry Operations (2B), the Mohave Valley Conservation Area Backwater Project (2C), the Topock Marsh Water Infrastructure Improvement Project on the HNWR (4B), Sacramento Wash Improvements (4C), Moabi Regional Park Improvements (7A), and Pirate Cove Resort (7B) could result in impacts to hydrology and water quality through ground disturbing activities, infrastructure development, discharge activities, and leaks or spills from equipment and vehicles (fuels, oils and grease, solvents). The PG&E projects, however, are restricted to the area local to the Station, and would not be expected to be compounded by other projects in the area due to the physical separation. The Quarry Operations (2B) include the maintenance and construction of improvements to river control structures, which in the long-term will improve water quality of the river. The Sacramento Wash Improvements

(4C), the future hotel and restaurant part of the Pirate Cove Resort (7B), and the paving and utility hookups for the Moabi Regional Park Improvements (7A) would all consist of ground-disturbing activities with limited footprints. All of these cumulative projects would require the short-term use of equipment (e.g., drilling rigs, support trucks) and some chemicals (e.g., fuels, oils, lubricants, paint, cleaners) during construction. However, all of the cumulative projects would be required to meet applicable local, state, and federal laws intended to avoid and minimize impacts to hydrology and water quality. In particular, the projects would be required to comply with construction general permits in both California and Arizona that would require controlling site runoff from construction sites through the use of BMPs and stormwater pollution prevention plans (SWPPPs). With proper adherence to these regulations and proper construction site management using BMPs, there is no anticipation that concurrent construction of the cumulative projects listed in Table 6-3 would result in cumulative impacts.

During the construction phase, the proposed Project would include use of fuel, lubricants, paint, glue, and solvents, and an increase in the volume of disturbed soil that could result in additional erosion/water quality impacts in combination with other cumulative projects in the geographic scope, which would contribute incrementally to impacts on hydrology and water quality. The Project would implement SOPs and BMPs, as well as adhere to the substantive provisions of the state Construction General Permit to avoid and/or minimize the potential for impacts related to hydrology and water quality. These provisions would become conditions of approval for the Project if the Project is approved. Therefore, when considered in addition to the anticipated impacts of other projects in the cumulative scenario, the Project's incremental contribution to hydrology and water quality would not be cumulatively considerable (less than significant).

6.5.9 Land Use and Planning

As explained in the Modified Initial Study (Appendix IS), the Project would have no impacts with respect to land use and planning. The geographic scope for land use and planning is San Bernardino County and eastern parts of Mohave County, Arizona, to encompass any potential large-scale planning efforts with multiple federal and state agency oversight. The Project would have no impact with respect to the physical division of an established community, or any conflict with applicable land use plans or policies or with adopted habitat conservation plans or natural community conservation plans. Therefore, it could not cause or contribute to cumulative effects related to these land use and planning issues (no impact).

6.5.10 Mineral Resources

As explained in the Modified Initial Study (Appendix IS), the Project would have no impacts with respect to mineral resources. The geographic scope for cumulative impacts analysis to mineral resources is eastern San Bernardino County (Desert Regions) where the geologic mineral resources and users of the resources are similar.

The Project Area is classified as a Mineral Resource Zone (MRZ)-4, which is defined as an area where geologic information does not rule out either the presence or absence of mineral resources. Sand and gravel, known as "saleable mineral resources" within the MRZ-4 designation are known to exist at the Project Area and surrounding areas. Metallic, rare, and leasable minerals may also be present, but their existence in the Project Area is unknown at this time. No other mineral resource extraction activities occur within the areas adjacent to the Project Area. The BOR currently utilizes quarry sites along the Lower Colorado River, including one directly north of the Moabi Regional Park footprint, as stockpiles for riprap and other bankline materials (2B). The stockpiled materials are used by BOR for maintenance and construction of banklines, river control structures, levees, canals, and reservoirs along the Lower Colorado River. No other saleable mineral resources are mined or anticipated to be mined within the geographic scope. The Quarry Operations (2B) would not impact mineral resources in the area because the location is only used to stockpile fill materials. For these reasons, the combined effects to mineral resources within the geographic scope would not be considered cumulatively significant.

The effects of the proposed Project, in combination with other cumulative projects in the geographic scope, could contribute incrementally to mineral resource issues. Although there is the potential for some mineral resources to exist in and around the Project Area, the potential is limited; therefore the proposed Project would not significantly reduce the availability of known mineral resources. There are no mining claims on or immediately adjacent to the Project Area and none permitted on the federal lands located within the Project vicinity. The Project would have very minor impacts with respect to the loss of availability of a locally important mineral resource recovery site. Therefore, this impact is not cumulatively significant and the proposed Project would not cause or contribute to cumulative effects related to mineral resources (less than significant).

6.5.11 Noise

The geographic scope for cumulative noise impacts is the Project Area and areas immediately adjacent, due to the attenuating effects of noise. Noise is generated from an activity that is in turn experienced by receptors close to the noise source. Noise from the Station activities comprises a component of the overall noise environment in combination with other noise sources in the area, such as traffic noise from I-40 and train operations on the BNSF railway line.

The projects listed in Table 6-3 that have the potential to generate construction and/or operational noise in the geographic scope include the PG&E projects (1A through 1F), Quarry Operations (2B), Pavement Enhancement Project (5A), I-40 Improvement Project (5B), Mohave Valley Conservation Area Backwater Project (2C), Topock Marsh Water Infrastructure Improvement Project on the HNWR (4B), Sacramento Wash Improvements (4C), Moabi Regional Park Improvements (7A), Pirate Cove Resort (7B), the Topock Marina Improvements (9A), and the Distribution System Upgrades (11A).

In particular, overlapping work at and in the vicinity of the Station could result in increased cumulative noise for activities that occur simultaneously and within 500 feet of the Project Area. As such, the combined noise effects from the projects listed in Table 6-3 within the geographic scope of the noise analysis could be cumulatively significant on sensitive receptors. The effects of the proposed Project, in combination with other cumulative projects in the geographic scope, would contribute incrementally to noise and vibration impacts. The analysis for the proposed

Project indicates that significant groundborne vibration impacts and project-generated construction-related noise levels would result from construction. In addition, the proposed Project would generate noise that could expose the Topock TCP (a place of worship for Native Americans) to levels that exceed the County's standards or would conflict with Native American values associated with this resource.

Noise generated from the proposed Project could be compounded when taken in context with most other noise-generating projects in the geographic and temporal scope. In particular, activities associated with the PG&E soil investigation activities (1E) and soil remediation activities (1F), the Pavement Enhancement Project (5A), and the I-40 Improvement Project (5B), which would all be in close proximity to the Project and are likely to be implemented during a similar timeframe. While these activities are only expected to overlap with the Project for a short period of time, the Project's incremental contribution to noise impacts could be cumulatively considerable and therefore significant considering the projects in the cumulative scenario. This is a new significant cumulative impact from those identified in the Groundwater FEIR.

Mitigation Measures NOISE-1 and NOISE-2 have been identified to reduce construction-related noise and vibration impacts associated with the Groundwater Remedy Project. Mitigation Measure NOISE-2 would require construction equipment specifications and restrictions to reduce noise impacts to sensitive receptors, and Mitigation Measure NOISE-1 would site Project wells away from sensitive receptors. Both mitigation measures would require a disturbance coordinator to manage noise and vibration complaints. These measures would reduce the Project's contribution to significant cumulative noise and vibration impacts; however, impacts would remain significant even after mitigation.

The following Mitigation Measures NOISE-3 is a new measure from what was identified in the Groundwater FEIR that has been identified to reduce the potential for cumulative noise impacts associated with the PG&E efforts directly within the Project Area. The measure would ensure that during implementation of the proposed Project and the Soil Remediation and Potential Pilot Test Project (1F), noise measurement exceedances would trigger temporary barriers to reduce noise, and if unable to reduce noise adequately, the modification of either soil or groundwater remediation efforts near sensitive receptors. Mitigation Measure NOISE-3 would ensure that the cumulative noise impacts resulting from simultaneous construction of the proposed Project and the Soil Remediation and Potential Pilot Test Project; however because the specific locations and timing of overlap is unknown, impacts are considered significant and unavoidable.

IMPACT CUM-3 **Cumulatively Considerable Impacts Related to Noise and Vibration.** Implementation of the proposed Project, in combination with Soil Remediation Activities in the Project Area that are in the geographic scope, could cause a substantial adverse increase related to short-term construction-related noise and vibration, as well as compatibility with noise levels at the Topock TCP. This impact would be **cumulatively significant** and the proposed Project's contribution to this impact would be **cumulatively considerable**.

Mitigation Measure NOISE-3: Cumulative Noise Increases from Remedial Activities (New Measure). Coordination between teams implementing soil remedial activities (including investigation, pilot testing, and remediation) and groundwater remediation shall occur as to avoid cumulative noise impact to any sensitive receptor. If concurrent activities must occur near common sensitive receptors, real time noise measurements of representative activities shall be conducted by a qualified acoustical consultant (or contractor trained by an appropriate qualified acoustical consultant) at the nearest noise-sensitive land use with a sound level meter that meets the standards of the American National Standards Institute (ANSI Section S14 1979, Type 1 of Type 2). If exceedances are not observed, monitoring can be discontinued. If exceedances are experienced, temporary barriers shall be erected as close to the construction activities as feasible, breaking the line of sight between the source and receptor where noise levels exceed applicable standards. If noise cannot be effectively mitigated, one or more of the concurrent activities shall be modified to result in appropriate noise levels.

Timing:	Implementation of NOISE-3 prior to and during construction, operation and maintenance, and decommissioning.
Responsibility:	PG&E would be responsible for the implementation of these measures. DTSC would be responsible for ensuring compliance.
Significance after Mitigation:	The impact would remain **significant and unavoidable** after implementation of the mitigation measures detailed above. The Project in combination with other projects in the area would continue to contribute considerably to a cumulatively significant impact related to construction noise and vibration.

6.5.12 Population and Housing

As explained in the Modified Initial Study (Appendix IS), the Project would have no impacts with respect to population and housing. The geographic scope for cumulative impacts to population and housing is the larger region in which the Project is located where Project employees are expected to originate from: San Bernardino County, California, which includes the city of Needles, California, and neighboring Mohave County, Arizona which includes the city of Lake Havasu City, Arizona.

The population in San Bernardino County is anticipated to grow 67 percent by 2040. The City of Needles is anticipated to grow 41 percent by 2030. In Arizona, Mohave County is anticipated to grow 73 percent by 2040 while Lake Havasu City is anticipated to grow 28 percent within the same timeframe. Regional growth projections indicate that the area surrounding the proposed Project will experience significant growth within the next 20-30 years.

The majority of the projects included in the cumulative scenario are infrastructure projects involving a limited permanent employee base. No current projects are planned in the vicinity of the proposed Project that would support population increase. The Moabi Regional Park Improvements (7A) involve infrastructure improvements that would enhance the overall population's experience within the regional park; however no full-time residential structures would be built. The Pirate Cove Resort (7B) would involve 667 RV sites and/or cabin sites. These additions would not support year-round residential units and would not generate the need for new housing. The Topock Marina Improvements (9A) would involve construction of a restaurant and hotel. The Distribution System Upgrades (11A), which is completed, involved replacement of existing pipeline infrastructure in the Project vicinity. Similarly, the Project would support temporary recreational users and not provide year-round residential units, thereby not inducing substantial population growth. For these reasons, the combined effects to population and housing within the geographic scope would not be considered cumulatively significant.

The effects of the proposed Project, in combination with other cumulative projects in the geographic scope, would not contribute incrementally to population- or housing-related issues. The proposed Project does not involve displacement of existing housing or people. Construction for the Project would last approximately 5 years, and it is estimated that the operation and maintenance phase will take place over about 40 years, with the decommissioning phase following. As shown within Table 3-10 of the Project Description of this SEIR, the construction phase of the Project would require approximately 349 temporary employees. Some of these workers would only be at the Project Area for activities lasting 2-3 months. The operation and maintenance phase of the Project would require 10-12 employees over about 40 years. During the decommissioning phase, the Project would employ about 102 people. The limited duration of the construction and decommissioning phases of the Project and the temporary nature of employees during these phases would not result in population growth, the displacement of housing or people, or the need for new housing. The limited number of employees during the operation and maintenance phase would also not result in population growth, the displacement of housing or people, or the need for new housing. Therefore, this impact is not cumulatively significant and the proposed Project could not cause or contribute to cumulative effects related to population and housing issues (less than significant).

6.5.13 Public Services

As explained in the Modified Initial Study (Appendix IS), the Project would have no impacts with respect to public services. The geographic scope for cumulative impacts to public services is the larger region in which the Project is located and services are provided, which is San Bernardino County, California.

Public services in the vicinity of the Project Area and surrounding areas are provided by local agencies. Fire protection is provided by the San Bernardino County Fire Department on a contract basis to the City of Needles which operates as the City of Needles Fire Department. The Needles Fire Department serves the Project Area. Police protection is provided by the San Bernardino County Sheriff's Department. The Needles Unified School District serves approximately 6,000 square miles in eastern San Bernardino County. Moabi Regional Park, the Colorado River, and the National Wildlife Refuge provide recreational opportunities near the Project Area. The majority of the projects included in this cumulative scenario are infrastructure projects involving a limited permanent employee base. None of the projects are commercial or residential projects that would require increased public services to the area. For these reasons, the combined effects to public services within the geographic scope would not be considered cumulatively significant.

The effects of the proposed Project, in combination with other cumulative projects in the geographic scope, would not contribute incrementally to impacts on public services. Construction for the Project would last approximately 5 years, and it is estimated that the operation and maintenance phase will take place over about 40 years and decommissioning following. As shown within Table 3-10 of the Project Description of this SEIR, the construction phase of the Project would require approximately 349 temporary employees. Some of these workers would only be at the Project Area for activities lasting 2-3 months. The operation and maintenance phase of the Project would require 10-12 employees over about 40 years. During the decommissioning phase, the Project would employ about 102 people. The limited duration of the construction and decommissioning phases of the Project and the temporary nature of employees during these phases would not result in population growth, the displacement of housing or people, or the need for new housing. The limited number of employees during the operation and maintenance phase would also not result in population growth, the displacement of housing or people, or the need for new housing. The proposed Project does not include residential development and would not bring enough, full-time employees to the Project Area to require the expansion of public facilities. Because the Project would not create impacts with respect to new or physically altered fire protection, police protection, school, parks, or other public service facilities, it would not contribute to or combine with the impacts of other projects in the cumulative scenario to cause significant cumulative impacts related to these services. Therefore, this impact is not cumulatively significant and the proposed Project could not cause or contribute to cumulative effects related to public services (less than significant).

6.5.14 Recreation

As explained in the Modified Initial Study (Appendix IS), the Project would have no impacts with respect to recreation. The geographic scope for cumulative impacts to recreation is the larger region in which the Project is located where Project where employees are expected to originate from: San Bernardino County, California, which includes the city of Needles, California, and neighboring Mohave County, Arizona which includes the city of Lake Havasu City, Arizona.

The recreational opportunities in the vicinity of the Project Area include the Moabi Regional Park, The Pirates Cove Resort along the Colorado River, the Colorado River itself, and the Havasu National Wildlife Refuge. The majority of the projects included in this cumulative scenario are infrastructure projects involving a limited permanent employee base. No current projects are planned in the vicinity of the proposed Project that would increase population in such a way as to induce substantial deterioration of existing recreational facilities. The Moabi Regional Park Improvements (7A) involve infrastructure improvements that would enhance the overall population's use of the regional park; no degradation of the existing park would occur. The Pirate Cove Resort (7B) would involve 667 additional RV sites and/or cabin sites. These additions would provide for planned increase of recreational facilities offered; however the increase would not result in substantial physical deterioration of the site. The Topock Marina Improvements (9A) involves construction of a restaurant and hotel. Similarly, the proposed Project would not substantially increase the use of neighborhood and regional parks to the point of substantial degradation. For these reasons, the combined effects to recreation from the projects listed in Table 6-3 within the geographic scope would not be considered cumulatively significant.

The effects of the proposed Project, in combination with other cumulative projects in the geographic scope, would not contribute incrementally to impacts to recreation. The proposed Project would not generate enough additional residents to the area to increase the use of existing neighborhood and regional parks or other recreational facilities. The Project does not propose construction of any new recreational facilities. The proposed Project would not introduce facilities that would preclude existing recreational uses that occur on the Colorado River or the National Wildlife Refuge, which includes boating, wildlife observation and photography, education and interpretation, hunting, and fishing. Therefore, this impact is not cumulatively significant and the proposed Project could not cause or contribute to cumulative effects related to recreation (less than significant).

6.5.15 Transportation and Traffic

As explained in the Modified Initial Study (Appendix IS), the Project would have less than significant impacts with respect to transportation and traffic. The geographic scope for cumulative impacts to transportation and traffic is Park Moabi Road, I-40, and the National Trails Highway. Traffic conditions in the geographic scope are operating within an acceptable range. The Park Moabi Road segments north and south of I-40 are well below San Bernardino County's threshold of 7,000 average daily traffic (ADT). The two Park Moabi Road/I-40 intersections under existing conditions (in Year 2016) are operating within the 0–10 seconds/vehicle range (Level of Service [LOS A]) during the A.M. and P.M. peak hours, and below the County threshold of 15 to 25 seconds (LOS C).

The projects in this cumulative scenario are a mixture of infrastructure, roadway improvement and recreational projects. The infrastructure and roadway projects, including the PG&E projects at the Station (1A through 1F), particularly the Soil Remediation and Potential Pilot Test Project (1F) would involve a substantial amount of truck trips to and from the Project Area. The majority of those projects is ongoing and contributes to the traffic baseline; however, the Soil Remediation and Potential Pilot Test Project (1F) could be constructed during the construction phase of the proposed Project, and could involve truck trips, depending on the type of soil remedy selected.

The Pirate Cove Resort (7B) would involve 667 RV sites and/or cabin sites. Currently, up to 663 RV sites can be utilized on peak weekends. Construction would involve worker and truck trips; however operation of the recreational site would increase the vehicles that can be accommodated by the site by only 4 vehicles, and no additional operational impacts are anticipated (County of San Bernardino 2012). The Topock Marina Improvements (9A) involves construction of a restaurant and hotel. Construction and operational traffic are anticipated to increase as a result of this project. The Sterling Solar Project (9B) would involve construction of solar generating facilities that would increase construction employee-related traffic in Mohave County, AZ. The Airport Business Park (10A) would construct a light industrial business development park, which would include construction and operational traffic increases in Lake Havasu City. It is assumed that workers for all projects in the cumulative scenario listed in Table 6-3 would drive one vehicle to and from work each day, and would arrive during the morning peak period (7:00 A.M. to 9:00 A.M.) and depart during the evening peak period (4:00 P.M. to 6:00 P.M.). Most workers would drive to projects in the cumulative scenario from nearby communities, including Needles, Laughlin, and Lake Havasu City. In addition, six transportation projects, the Pavement Enhancement Project (5A), the I-40 Improvement Project (5B), the Oatman Highway Crossing at Sacramento Wash Project (6A), the Needles Highway Improvement Project (7D), the I-40 Needles Connection Project (8A), and the ATP Concrete Sidewalks Project (8B) would contribute to the cumulative traffic baseline during construction. Once operational, these projects would alleviate traffic conditions in and around the Project Area. Due to the relative distance between these roadway improvement projects from each other and from the Project Area, and given the timeframes proposed in Table 6-3, the combined effects to transportation and traffic from the projects listed in Table 6-3 within the geographic scope would not be considered cumulatively significant.

The effects of the proposed Project, in combination with other cumulative projects in the geographic scope, would contribute incrementally to transportation and traffic impacts. Based on the maximum work scenario, the proposed Project is projected to generate 76 inbound vehicle trip ends and zero (0) outbound vehicle trip ends during the weekday AM peak hour, and zero (0) inbound vehicle trip ends and 58 outbound vehicle trip ends during the weekday PM peak hour. This results in 166 vehicles on a daily basis during construction, up to 104 vehicles on a daily basis for operation and maintenance, and up to 63 vehicles on a daily basis during decommissioning activities.

The construction traffic generated as a result of the proposed Project would occur for up to 5 years, which would be short-term, consistent with the length of Project activities, and intersections and roadway segments would continue to operate below County thresholds during Project activities. The addition of 104 vehicles on a daily basis generated during the 30 years of operations would be minimal. As a result, the Project would not add traffic to a roadway segment or intersection that would degrade the operation to an unacceptable level, or conflict with any applicable plan establishing measures of effectiveness of performance of the circulation system. Therefore, when considered in addition to the anticipated impacts of other projects in the cumulative scenario, the Project’s incremental contribution to transportation and traffic impacts would not be cumulatively considerable (less than significant).

6.5.16 Utilities, Service Systems, and Energy

The geographic scope for cumulative impacts to utilities, service systems, and energy resources is the local and regional utility service provider service areas in eastern San Bernardino County, California. The Project is not located in an incorporated city; no municipal laws or regulations related to utilities and service systems are applicable to the proposed Project. Therefore, it would not cause or contribute to significant cumulative impacts in these criteria.

The Project Area and vicinity are located within unincorporated San Bernardino County. Solid waste in the Project vicinity is managed by Allied Waste, a refuse handler in Bullhead City, Arizona. The nearest hazardous waste disposal sites are the Kettleman Hills Landfill in Kings County, California, and the Clean Harbors Buttonwillow Landfill in Buttonwillow, California. Water supply in the Project vicinity is provided by a combination of private and municipal groundwater wells. Public utilities serving the Needles area are managed by the Needles Public Utility Authority, which oversees electricity and groundwater supply and the Needles Wastewater Department, which oversees wastewater and sewer services. The Project Area in California is also currently served by PG&E's on-site generation of electricity and use of natural gas for fuel. The Mohave Electric Cooperative would supply power for the freshwater supply well in Arizona. There is no municipal sewer system in the vicinity of the Project Area; the Moabi Regional Park's wastewater treatment facility, which is the largest facility near the Project Area in California, consists of a raw sewage lagoon treatment system. Wastewater at the Project Area is processed on-site, or trucked off-site when necessary.

PG&E is currently disposing of both on-site hazardous and non-hazardous wastes at the Kettleman Hills Landfill and the Clean Harbors Buttonwillow Landfill. As discussed in Section 4.8, "Utilities, Service Systems, and Energy" of this SEIR, the following landfills have capacity and are available to accept wastes.

- Kettleman Hills Landfill (hazardous waste disposal)
- Clean Harbors Buttonwillow Landfill (hazardous waste disposal)
- Mohave Valley Landfill (non-hazardous waste disposal)
- Landers Sanitary Landfill (non-hazardous waste disposal)
- Barstow Sanitary Landfill (non-hazardous waste disposal)
- California Street Landfill (non-hazardous waste disposal)
- Victorville Sanitary Landfill (non-hazardous waste disposal)

The PG&E projects at the Station (1A through 1F) would utilize these landfills. Water would be supplied via existing entitlements specific to the Project Area, and wastewater would be treated using on-site facilities. Electricity would be provided by the Needles Public Utility Authority (City of Needles) electrical distribution system or self-generated by the Station. The Moabi Regional Park Improvements (7A) and the Pirate Cove Resort (7B) would utilize the same solid waste disposal services and electricity provider. As stated above, the Moabi Regional Park includes its own wastewater treatment facility and water wells. The cumulative projects listed above would generally be served by individual water and wastewater treatment facilities that would not be affected by other cumulative projects. However, solid waste would be generated for disposal and electricity would be consumed by the same utilities, both of which could contribute incrementally to impacts to landfills and electricity generation, but would not be considered cumulatively considerable. As noted above, there are a number of landfills all with available capacity to accept waste, and much of the electrical usage by the Project would be generated on-site by the Station. For these reasons, the combined effects to utilities and service systems from the projects listed in Table 6-3 within the geographic scope would not be considered cumulatively significant.

Construction, operation and maintenance of the proposed Project would result in the installation of three septic tanks, each with a capacity of 10,000 gallons. No leach fields would be constructed; the sanitary waste would be hauled to an off-site sanitary and septic waste facility.

The estimated total volume of remedy-produced water produced during operation of the proposed Project is 7.6 MG per year. Water not managed on-site due to quality or quantity issues would be transported off-site to a permitted facility for treatment, disposal or reuse. Because this effluent is disposed of by the wastewater contractor and handled consistent with applicable requirements and regulations, it is assumed that it would not exceed applicable water treatment standards and does not exceed existing treatment capacity.

Nonhazardous incidental wastes such as trash and construction debris generated during construction (empty cement and sand bags, pallets and scrap material, empty drink and food containers, and plastic sheeting) would typically be either hauled off-site at the end of the day or placed in dumpsters or roll-off bins that would be hauled off-site periodically by truck to an appropriately permitted municipal solid waste or recycling facility located within approximately 200 miles of the Project Area. The maximum projected waste stream for the Project is approximately 6,347 cubic yards which would not exceed the available capacity of the Mohave Valley Landfill. As noted above, there are four additional nonhazardous waste facilities that could also accept the solid waste if needed. Hazardous waste would be disposed of at either Kettleman Hills or Clean Harbors Buttonwillow landfill, both of which have 6,000,000 cubic yards and 9,000,000 remaining capacity. Solid waste generated during operation and maintenance would include incidental trash (i.e., used personal protective equipment, empty drums, bottles, and cans, paper bags, cardboard boxes, basic household and office debris, food containers, and other routine waste) generated by personnel, and construction materials from repair of constructed facilities. Based on current Project design information, the projected waste streams of non-hazardous waste for the Project would be 520 cubic yards per year. Based on current and foreseeable landfill capacities, these waste streams are anticipated to be minimal and not exceed the available capacity at existing landfills.

Therefore, when considered in addition to the anticipated impacts of other projects in the cumulative scenario, the Project’s incremental contribution to impacts to utilities and public services would not be cumulatively considerable (less than significant).

6.5.17 Water Supply

The geographic scope for cumulative impacts to water supply is the Lower Colorado River and the Lower Colorado River Water Supply Project (LCWSP), the East Colorado River Basin (focus on downstream areas), the Mojave Valley Groundwater Basin, Needles Subbasin (California), and the Sacramento Valley Groundwater Basin (Arizona). Water supply for the proposed Project is from the Lower Colorado River, and is administrated through the LCWSP. The Station currently uses water for operations that comes from water supply wells in Arizona and is pumped across the Colorado River to two aboveground water tanks located south of the Station. Water diverted at these wells is counted as part of California’s LCWSP water allocation because the water is used in California, and water removed from the wells is recharged naturally by the Colorado River and the Sacramento Valley Basin.

The PG&E projects at the Station (1A through 1F) would utilize water included in PG&E's existing annual entitlement. Other projects included in Table 6-3 that could potentially impact water supply include the Pirate Cove Resort (7B) which includes expansion that would increase the water demand of the facility, the Topock Marina Improvements (9A), which include the addition of a restaurant, and the Airport Business Park (10A), which would include the addition of businesses that would increase water demand. The cumulative projects listed above would generally be served by individual water facilities separate from the station's water allocation that would not be affected by other cumulative projects. For this reasons, the combined effects on water supply from the projects listed in Table 6-3 within the geographic scope would not be considered cumulatively significant.

Implementation of the proposed Project would require an amount of water during the construction, operation and maintenance, and decommissioning phases that is less than PG&E's full entitlement of 422 acre-feet per year. Because the Project does not require substantial amounts of water and would not generate a demand for water that exceeds existing entitlements, the Project does not make a considerable contribution to cumulative impacts on water supply. Water supply impacts associated with the Project could result in a potentially significant impact to nearby non-Project supply wells and, therefore, Mitigation Measure HYDRO-6 is required, which involves measurement of groundwater levels in the area around the freshwater supply wells throughout the decades-long operation and maintenance phase of the Project. With implementation of Mitigation Measure HYDRO-6, which would reduce the proposed Project's impacts to less than significant, the Project's potential contribution to impacts on water supply would not be cumulatively considerable (less than significant).

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CHAPTER 7
Alternatives to the Proposed Project

7.1 Introduction

This chapter presents the alternatives analysis as required by the California Environmental Quality Act (CEQA) for the proposed Pacific Gas and Electric Company (PG&E) Topock Compressor Station Final Groundwater Remediation Project (Final Groundwater Remedy Project or proposed Project) as specifically defined in the *Basis of Design Report/Pre-Final (100%) Design Submittal for the Final Groundwater Remedy, PG&E Topock Compressor Station, Needles, California, November* (Final Remedy Design; CH2M Hill 2015a). The Final Remedy Design and its associated appendices A through L, as well as the *Construction/Remedial Action Work Plan for the Final Groundwater Remedy* (C/RAWP; CH2M Hill 2015b) and its associated appendices A through X, are incorporated by reference throughout this subsequent environmental impact report (SEIR) and are found collectively as Appendix BOD as an electronic appendix to this SEIR. The Final Groundwater Remedy Project is being undertaken at the PG&E Topock Compressor Station (Station) and surrounding area (Project Area).

The proposed Project has been described and analyzed in the previous chapters of this SEIR with an emphasis on new potentially significant adverse environmental impacts or a substantial increase in significant impacts previously identified in the Topock Compressor Station Groundwater Remediation Project Final Environmental Impact Report (Groundwater FEIR; DTSC 2011), as well as any additional feasible mitigation measures needed to avoid or reduce those impacts. The proposed Project as analyzed in the SEIR is the outcome of a multi-year collaboration between the California Department of Toxic Substances Control (DTSC), as the lead agency, PG&E, the U.S. Department of the Interior (DOI), Interested Tribes, landowners, and other stakeholders. This chapter's purpose is to describe and analyze a range of reasonable alternatives that could feasibly attain most of the proposed Project's objectives while avoiding or substantially lessening one or more of the significant adverse impacts of the Project (CEQA Guidelines, Section 15126.6[a]). This chapter evaluates the respective alternatives' impacts and compares the potential impacts of the alternatives with those of the proposed Project. Based on this analysis, this chapter also identifies the environmentally superior alternative. Finally, it describes other alternatives that were considered but eliminated from detailed consideration and the reasons for their elimination.

7.2 Requirements for Alternatives Analysis

CEQA does not prescribe fixed rules governing the type of alternatives to a project that should be analyzed in an environmental impact report (EIR); the nature of alternatives varies depending on the context of the project being analyzed. As expressed by the California Supreme Court: "CEQA establishes no categorical legal imperative as to the scope of alternatives to be analyzed in an EIR. Each case must be evaluated on its facts, which in turn must be reviewed in light of the statutory purpose" (*Citizens of Goleta Valley v. Board of Supervisors* (1990) 52 Cal.3d 553, 564).

Section 15126.6(a) of the CEQA Guidelines provides that:

> [a]n EIR shall describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives. An EIR need not consider every conceivable alternative to a project. Rather it must consider a reasonable range of potentially feasible alternatives that will foster informed decision making and public participation. An EIR is not required to consider alternatives which are infeasible. The lead agency is responsible for selecting a range of project alternatives for examination and must publicly disclose its reasoning for selecting those alternatives. There is no ironclad rule governing the nature or scope of the alternatives to be discussed other than the rule of reason.

Under these principles, an EIR needs to describe and evaluate only those alternatives necessary to permit a reasonable choice and "to foster meaningful public participation and informed decision making" (CEQA Guidelines Section 15126.6[f]). Consideration of alternatives focuses on those that can either eliminate significant adverse environmental impacts or substantially reduce them; alternatives considered in this context may include those that are more costly and those that could impede to some degree the attainment of the project objectives (CEQA Guidelines Section 15126.6[b]). CEQA does not require the alternatives to be evaluated at the same level of detail as the proposed project. Rather, the discussion of alternatives must include sufficient information about each alternative to allow "meaningful evaluation, analysis, and comparison with the proposed project" (CEQA Guidelines Section 15126.6[d]).

The range of alternatives required in an EIR is therefore governed by a "rule of reason" that requires an EIR to set forth only those alternatives necessary to permit a reasoned choice (CEQA Guidelines Section 15126.6 [f]). An EIR need not consider every conceivable alternative to a project. Alternatives may be eliminated from detailed consideration in the EIR if they fail to meet most of the basic project objectives, are not feasible, or do not avoid or substantially lessen any significant environmental effects (CEQA Guidelines Section 15126.6[c]). Moreover, under CEQA, a lead agency may structure its alternatives analysis around a reasonable definition of a fundamental underlying purpose, and need not study alternatives that cannot achieve that basic goal (*In re Bay-Delta Programmatic Environmental Impact Report Coordinated Proceedings* [2008] 43 Cal.4th 1143, 1165).

CEQA also requires that alternatives evaluated in an EIR be potentially feasible. Feasible is defined in CEQA as "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors" (PRC Section 21061.1). The CEQA Guidelines elaborate that factors that may be taken into account when addressing the feasibility of alternatives include site suitability, economic viability, availability of infrastructure, other plans or regulatory limitations, and jurisdictional boundaries and whether the proponent can reasonably acquire, control, or otherwise have access to the alternative site (CEQA Guidelines Section 15126.6[f]). Finally, alternatives should also avoid or substantially lessen one or more significant environmental impacts that would occur under the proposed project.

In addition to the requirements described above, CEQA requires evaluation of the "No Project Alternative," which analyzes the environmental effects that would occur if the project were not to proceed (CEQA Guidelines Section 15126.6[e]). The purpose of describing and analyzing the No Project Alternative is to allow DTSC the opportunity to compare the impacts of approving the proposed Project with the impacts of not approving the proposed Project. An EIR is also required to identify the environmentally superior alternative. "If the environmentally superior alternative is the No Project Alternative, the EIR shall also identify an environmentally superior alternative among the other alternatives" (CEQA Guidelines Section 15126.6[e]).

7.3 Background

The Groundwater FEIR, certified on January 31, 2011 (SCH No. 2008051003), provided both a programmatic and, in certain instances, a project-level analysis for the conceptual technical methods selected for the final remedy that would remediate contaminated groundwater at the Station. In accordance with Section 15126.6 of the CEQA Guidelines, a range of reasonable alternative remedy options that could feasibly accomplish most of the basic project objectives was considered in the Groundwater FEIR. The *Final CMS/FS for Solid Waste Management Unit 1 (SWMU 1)/Area of Concern 1 (AOC 1) and AOC 10* (Final CMS/FS) presented the identification and evaluation of various remedial alternatives to address the remedial action goals for groundwater contamination associated with the historic discharges to Bat Cave Wash—Solid Waste Management Unit (SWMU) 1/Area of Concern (AOC) 1—and within AOC 10 (East Ravine) at the Station.

The rationale for DTSC's consideration of alternatives was based on DTSC's review and participation in the Final CMS/FS process, which provided an exhaustive consideration of potential options and technologies for remediation of the contaminated groundwater plume while meeting the Remedial Action Objectives (RAOs) and other requirements, including the applicable statutory requirements of the Resource Conservation and Recovery Act of 1976 (RCRA) and the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and the associated Corrective Action Consent and Administrative Consent Agreements for Topock. As such, the range of alternatives considered in the Groundwater FEIR was based on feasible remediation alternatives that fell within the parameters of the RAOs identified in the Final CMS/FS.

The Final CMS/FS identified Alternative E – In Situ Treatment with Freshwater Flushing as the proposed final remedy, which was selected by DTSC upon adoption of the Groundwater FEIR in 2011, because it would achieve the RAOs while substantially reducing, through chemical change and physical precipitation, the amount of hexavalent chromium (Cr[VI]) in the groundwater (which is the principal threat in groundwater at the site). The selected technology was also identified as the preferred alternative among the nine alternatives evaluated in the Groundwater FEIR and CMS/FS, to complete cleanup in a reasonable time frame while achieving best balance with the adverse effects to cultural resources and biological resources than other alternatives considered. DTSC's selection of Alternative E – In Situ Treatment with Freshwater Flushing was due in part to its acceptance by certain Tribal members and stakeholders who objected to other treatment options during the CMS/FS phase of the remedy investigation pursuant to the community acceptance criterion of the National Contingency Plan as codified in 40 CFR, Section 300.430 e(9)(I).

In full, implementation of the selected groundwater remedy (Alternative E) would consist of several phases, including design, construction and start-up, operation and maintenance, decommissioning, and restoration. The remedial design phase is now complete and resulted in the proposed Project that is the subject of this SEIR. The proposed Project is a culmination of an extensive preliminary (30%), intermediate (60%), pre-final (90%), and final design (Final Remedy Design) process, undertaken by PG&E as directed by DTSC and DOI with review and comment by stakeholders, including Native American Tribes. Tribal involvement was integral to the design process in all stages. DTSC and DOI have issued direction to PG&E prior to the start of each stage of the Project design, and at various times throughout the process.

On November 18, 2011, PG&E submitted the Draft Basis of Design Report/Preliminary (30%) Design Submittal (CH2M Hill 2011) for review and comment. More than 300 comments were received. Comment resolution occurred from late February through mid-May 2012. Technical Working Group (TWG) meetings were held to discuss the responses to comments.

On April 5, 2013, PG&E submitted the revised 60% Basis of Design (BOD) (CH2M Hill 2013) for review and comment. The comment period was approximately 4.5 months, from April 8 through August 23, 2014. More than 800 comments were received. Comment resolution occurred over a 7.5-month period from early September 2013 through mid-April 2014. Multiple venues for discussion and resolution of comments were held, including monthly TWG meetings, site walks, and ad hoc meetings.

On September 8, 2014, PG&E submitted the revised 90% BOD (CH2M Hill 2014) for review and comment. Based on DTSC direction, a supplement to the 90% BOD (Supplemental 90% BOD; CH2M Hill 2015c) was submitted on February 5, 2015, to present additional information regarding certain items included in the 90% BOD. The comment period for the 90% BOD and Supplemental 90% BOD was approximately 6.5 months, from September 10, 2014, through April 2, 2015. More than 1,210 comments were received. Discussion and resolution of comments occurred over a 4-month period from early April 2015 through end of August 2015.

After DTSC and DOI issued final design directives (i.e., directives for proceeding with the final design) to PG&E, on November 18, 2015, PG&E submitted the Final BOD, referred to as the Final Remedy Design (which includes the Operation & Maintenance Manual as Appendix L), and the Construction/Remedial Action Work Plan (C/RAWP; CH2M Hill 2015b) to DTSC and DOI for approval consideration. This Draft SEIR is based on the Final Remedy Design and C/RAWP, which reflect modifications and clarifications by PG&E as a result of the collaborative and iterative design process.

This multi-year collaborative process has allowed DTSC to foster meaningful Tribal and stakeholder participation and informed decision making throughout the development of the Project, resulting in continuous refinement of the Project to avoid or lessen impacts, while also addressing many of the concerns of stakeholders, Tribal, and trustee and responsible agencies. This alternatives analysis is therefore focused on specifically reducing the identified significant environmental impacts of the Project (per the intent of CEQA), and does not revisit the alternatives previously considered in the 2011 EIR or those suggested during the Project's design phase which are not potentially feasible or which would involve substantially redesigning the Project.

7.4 Alternatives Selection

This section describes the basis for determining the range of CEQA alternatives and identifies the specific alternatives that are analyzed in this SEIR.

7.4.1 Project Objectives

As presented in Chapter 3, "Project Description" of this SEIR, the objectives of the proposed Project, reiterated below, are consistent with the objectives of the Groundwater FEIR certified in 2011. These objectives were used in the identification and selection of alternatives. As noted above, an EIR need only consider alternatives that would feasibly accomplish most of the Project's basic objectives.

The following are the Project RAOs for groundwater:

- Reduce the mass of total chromium (Cr[T]) and Cr(VI) in groundwater at the Project Area to achieve compliance with the applicable or relevant and appropriate requirements,[1] which will be achieved through the cleanup goal of the regional background concentration of 32 µg/L of Cr(VI).
- Ensure that the geographic location of the target remediation area (contaminated groundwater plume) does not permanently expand following completion of the final remedy.
- Prevent ingestion of groundwater as a potable water source having Cr(VI) in excess of the regional background concentration of 32 micrograms per liter (µg/L).
- Prevent or minimize migration of Cr(T) and Cr(VI) in groundwater to ensure concentrations in surface water do not exceed water quality standards that support the designated beneficial uses of the Colorado River (11 µg/L Cr[VI]).

[1] CERCLA Section 121 requires cleanups to meet ARARs: any "legally applicable or relevant and appropriate standard, requirement, criteria or limitation" that has been promulgated under federal or state environmental laws. The ARARs include such things as the federal and state "Safe Drinking Water Act" and the Solid Waste Control Act's land disposal restrictions.

In addition to the objectives stated above, the following objectives were defined by DTSC pursuant to CEQA Guidelines Section 15124(b):

- Provide consistency with the Remedial Design/Remedial Action Consent Decree between PG&E and the United States which was approved by the U.S. District Court for the Central District of California (November, 2013), the DOI/DTSC Memorandum of Understanding concerning the coordination in overseeing the implementation of the groundwater response action (November 22, 2011), and any other legal agreements applicable to the Project, including the 2006 and 2012 Settlement Agreements entered into between DTSC and the Fort Mojave Indian Tribe (FMIT).
- Achieve the cleanup levels or performance goals delineated in the DTSC's Statement of Basis and the DOI's Record of Decision for the final groundwater remedy.
- Protect biological, historical, and cultural resources by minimizing ground disturbance to the extent feasible.
- Minimize aesthetic impact to the extent feasible by limiting the amount of aboveground infrastructure.
- Consider public safety, ensuring efficiency, compliance with health and safety standards.
- Ensure remedy achieves compliance with RAO's within a reasonable time frame as required by California State Water Resources Control Board Resolution No. 92-49.

7.4.2 Summary of Significant Impacts

As stated in the CEQA Guidelines, alternatives to a project must substantially lessen or avoid any of the significant environmental impacts associated with the project. **Table 7-1** summarizes the Project's new significant impacts and any substantial increase in significant impacts identified in the Groundwater FEIR. Table 7-1 also shows where potentially significant impacts have been reduced to a level of less than significance with mitigation implementation, or where impacts remain significant and unavoidable even with implementation of mitigation). Table 7-1 also includes impacts resulting from the proposed Project that are cumulatively considerable, which have been identified in Chapter 6, "Cumulative Analysis."

TABLE 7-1
SUMMARY OF SIGNIFICANT EFFECTS OF THE PROPOSED PROJECT

Impacts	Significant and Unavoidable	Less than Significant after Mitigation
Direct and Indirect Impacts		
Aesthetics		
Impact AES-1*:* **Substantial Adverse Effects on Scenic Vistas.** The proposed Project could introduce additional wells, roads, pipelines, and other associated infrastructure, including the Future Activity Allowance, which could have a substantial adverse effect on a scenic vista.		X
Impact AES-2: Substantial Damage to Scenic Resources within a Scenic Corridor. The proposed Project could introduce new features in the Colorado River floodplain, at the Topock Compressor Station (TCS) Evaporation Ponds, and near the existing HNWR-1A well site in Arizona that could adversely impact scenic resources within a scenic corridor.		X
Impact AES-3: **Substantial Degradation of Existing Visual Character or Quality.** The proposed Project could introduce additional wells, roads, pipelines, and other associated infrastructure, including the Future Activity Allowance, which could substantially degrade existing visual character or quality.		X
Impact CUM-1: Cumulatively Considerable Impacts to Aesthetic Resources. Implementation of the proposed Project, in combination with other projects in the geographic scope, could cause a substantial adverse change to scenic vistas, scenic resources, and the existing visual character and quality of the site and its surroundings.	X	
Air Quality		
Impact AIR-1: Short-term Construction-Related Emissions of Criteria Pollutants and Precursors. The proposed Project could violate the Mojave Desert Air Quality Management District air quality standards for NO_X during construction activities.		X
Impact AIR-2: Result in a Cumulatively Considerable Net Increase. The proposed Project could result in a cumulatively considerable net increase in criteria pollutant emissions with respect to NOx emissions during construction activities.		X
Biological Resources		
Impact BIO-1: Potential Fill of Wetlands and Other Waters of the United States/California, and Disturbance or Removal of Riparian Habitat. Implementation of the proposed Project could result in disturbance to ephemeral waters under United States Army Corps of Engineers and California Department of Fish & Wildlife (CDFW) jurisdiction.		X
Impact BIO-2: **Direct Disturbance of and Loss of Habitat for Special-Status Birds, Desert Tortoise, Ring-Tailed Cat, Nelson's Bighorn Sheep, Special-Status Bats, Northern Mexican Gartersnake, and Special-Status Plants.** Implementation of the proposed Project could affect special-status species either directly or through habitat modifications.		X
Impact BIO-3: **Fish Mortality, Interference with Spawning Habitat, and Other Adverse Aquatic Effects.** Increased sedimentation and turbidity, the release of contaminants, and standing during construction activities could also adversely affect fish habitat and movement in the Colorado River.		X

TABLE 7-1
SUMMARY OF SIGNIFICANT EFFECTS OF THE PROPOSED PROJECT

Impacts	Significant and Unavoidable	Less than Significant after Mitigation
Impact BIO-4: **Substantial Interference with Fish or Wildlife Movement Corridors or Nursery Sites.** The Project could impede the use of bat maternity roosts, which are considered a type of native wildlife nursery site. Modifying, destroying or impeding the use of active maternity roosts of special-status bat species could result in substantial interference to the species reproduction and distribution.		X
Cultural Resources		
Impact CUL-1: Cause Substantial Adverse Change in the Significance of a Historical Resource as Defined in CEQA Guidelines Section 15064.5. Construction, operation and maintenance, and decommissioning activities of the proposed Project could result in substantial adverse changes to historical resources in the Project Area, including: (1) the Topock Traditional Cultural Property (TCP); (2) other historical resources listed in Table 4.4-2; and (3) historical resources that could be identified during construction. Impacts could occur through ground disturbance and other Project-related activities or through the introduction of out-of-character visual or auditory intrusions to historical resources that gain their significance in part because historical associations or aesthetic values.	X	
Impact CUL-2: Cause a Substantial Adverse Change in the Significance of a Unique Archaeological Resource. Many of the cultural resources listed in Table 4.4-3 may meet the CEQA criteria for a unique archaeological resource. Construction, operation and maintenance, and decommissioning activities of the proposed Project could result in substantial adverse changes to one or more unique archaeological resource in the Project Area through ground disturbance and other project-related activities.	X	
Impact CUL-3: Directly or Indirectly Destroy a Unique Paleontological Resource or Site or Unique Geologic Feature. Construction, operation and maintenance, and decommissioning activities of the proposed Project could result in substantial adverse changes to a unique paleontological resource or unique geologic feature in the Project Area through ground disturbance and other project-related activities.		X
Impact CUL-4: Disturb Any Human Remains, Including Those Interred Outside of Formal Cemeteries. Ground-disturbing activities required for all project phases may disturb as-yet undiscovered human remains, including Native American burial remains (i.e., human remains and grave goods).	X	
Impact CUM-2: Cumulatively Considerable Impacts to Cultural Resources. Implementation of the proposed Project, in combination with other projects in the geographic scope, could cause a substantial adverse change in the significance of the historical resource identified as the Topock TCP; cause a substantial adverse change in the significance of unknown historical or unique archaeological resources; result in a substantial adverse change to a unique paleontological resource or unique geologic feature; and disturb human remains, including those interred outside of formal cemeteries.	X	

TABLE 7-1
SUMMARY OF SIGNIFICANT EFFECTS OF THE PROPOSED PROJECT

Impacts	Significant and Unavoidable	Less than Significant after Mitigation
Hazards and Hazardous Materials		
Impact HAZ-1: **Spills or Releases of Contaminants during Construction, Operation and Maintenance, and Decommissioning Activities from Routine Transport, Use, and Disposal or the Reasonably Foreseeable Accidental Release of Hazardous Materials that could Expose Workers, the Public, or the Environment.** Construction, operation and maintenance, and decommissioning of the proposed Project could result in the potential release of hazardous materials during use or delivery of hazardous materials as a result of component failure (e.g., valve, flange, or pipe), tank failure, or human error (e.g., tank overfilling).		X
Hydrology and Water Quality		
Impact HYDRO-1: **Exceedance of Water Quality Standards, Violation of Waste Discharge Requirements, or Degradation of Water Quality.** The ground disturbing activities associated with constructing the Final Groundwater Remedy Project, use of carbon substrate to be injected into the aquifer or the use of Arizona freshwater, the generation of byproducts above water quality objectives, the discharge of remedy-produced water to the TCS Evaporation Ponds, and runoff associated with the soils stockpiling could result in the exceedance of water quality standards, violation of waste discharge requirements, or substantial degradation of water quality.		X
Impact HYDRO-2: **Drainage Pattern Alterations.** The proposed Project would require the construction of wells, piping corridors, buildings, and associated infrastructure that could alter the existing drainage system that could result in a substantial increase of erosion and siltation or flooding on and off the Project Area.		X
Impact HYDRO-3: Polluted Stormwater Runoff. The proposed Project does not include discharge to an existing or planned stormwater drainage system. The Project does have the potential to contribute substantial additional sources of polluted runoff if materials and operations are not properly handled.		X
Noise		
Impact NOISE-1: **Long-Term Operational-Related Non – Transportation Noise and Vibration Impacts.** Construction activities associated with the Additional Activity Allowance that could occur during long-term operation and maintenance could result in noise levels that exceed applicable standards.	X	
Impact NOISE-2: **Groundborne Vibration Impacts Caused by Construction Activities.** Implementation of the proposed Project would result in the exposure of sensitive receptors to groundborne vibration levels that exceed the applicable standards of the San Bernardino County Development Code (83.01.090) and the Mohave County Zoning Ordinance. These groundborne vibration levels could result in annoyance or architectural/structural damage.		X
Impact NOISE-3: Project-Generated Construction-Related Noise Levels. Implementation of the proposed Project would result in intermittent construction activities associated with the installation of new wells, roadways, water conveyance, utilities, water filtration facilities, and structures. These construction activities could potentially expose sensitive receptors to noise levels in excess of the applicable noise standards and/or result in a substantial increase in ambient noise levels.	X	

TABLE 7-1
SUMMARY OF SIGNIFICANT EFFECTS OF THE PROPOSED PROJECT

Impacts	Significant and Unavoidable	Less than Significant after Mitigation
Impact NOISE-4: **Land Use Compatibility of Future Project Noise Levels with the Topock Traditional Cultural Property.** Implementation of the proposed Project could result in future noise (construction, operation and maintenance, and decommissioning activities) that could result in conflicts with land use compatibility that exceed San Bernardino County standards for Places of Worship or conflict with Native American values associated with the Topock TCP.	X	
Impact CUM-3: Cumulatively Considerable Impacts Related to Noise and Vibration. Implementation of the proposed Project, in combination with Soil Remediation Activities in the Project Area that are in the geographic scope, could cause a substantial adverse increase related to short-term construction-related noise and vibration, as well as compatibility with noise levels at the Topock TCP.	X	
Utilities and Service Systems and Energy		
Impact UTIL-1: **Potential to Exceed Wastewater Treatment Requirements or Require a New Wastewater Facility.** The proposed Project includes several wastewater improvements in order to operate successfully that would not exceed requirements or require new facilities. The proposed Project does, however, include two new septic tank systems that could exceed requirements or require new facilities.		X
Impact UTIL-2: Potential to Exceed Landfill Capacity. The Project would generate incidental non-hazardous waste and hazardous waste during construction and operation activities, which would not exceed the available daily capacity of relevant landfills. Decommissioning of the Project, including the IM-3 Facility, would generate a variety of construction debris, including concrete, metal sheeting, and pipe, which could exceed the available daily capacity of relevant landfills.		X
Water Supply		
Impact WATER-1: **Depletion of Groundwater Supplies.** The Project would require the use of freshwater from water supply wells in Arizona. Localized effects on the groundwater table and the availability of groundwater supplies to other groundwater users near the freshwater water supply wells are possible.		X

7.5 Alternatives Considered and Rejected

After completing a review of the proposed Project, as presented in Chapter 4, "Environmental Analysis" of this SEIR, along with all of the potentially significant adverse environmental impacts, this SEIR reflects consideration of a total of seven alternatives, in addition to the No Project Alternative, initially considered for evaluation. It should be noted that several of the alternatives presented in this section grew out of the iterative design review process. Of these, it was determined that three of the Project alternatives would: (1) meet most of the Project's objectives, (2) be considered potentially feasible, and (3) would avoid or substantially reduce one or more potentially significant impacts of the proposed Project. The alternatives considered but rejected from further consideration for being not feasible are described below. As required by CEQA, the No Project Alternative is described and analyzed in Section 7.6.4.

7.5.1 Alternative Remedial Technology

Nine alternative remedial technologies were evaluated in the 2011 Groundwater FEIR following DTSC's review and participation in the Final CMS/FS process. The remedy selection and design process provided an exhaustive consideration of all potential options and technologies for remediation of the contaminated groundwater plume while meeting the RAOs and other requirements, including the applicable statutory requirements of RCRA/CERCLA and the associated Corrective Action Consent and Administrative Consent Agreements for Topock. Section 21154 of the California Public Resources Code prescribes that "[w]henever any state agency, board, or commission issues an order which requires a local agency to carry out a project which may have a significant effect on the environment, any [EIR] which the local agency may prepare shall be limited to consideration of those factors and alternatives which will not conflict with such order". The reasoning behind DTSC's selection of alternatives is consistent with this mandate to local agencies, in that DTSC's decision whether to pursue the proposed Project and the selection of alternatives must not conflict with the applicable provisions of RCRA/CERCLA and the Consent Agreements issued for the Project site. The nine remedial technologies identified in the CMS/FS included the following:

- Alternative A – No Action
- Alternative B – Monitored Natural Attenuation (MNA)
- Alternative C – High-volume In-situ Treatment
- Alternative D – Sequential In-situ Treatment
- Alternative E – In-situ Treatment with Fresh Water Flushing
- Alternative F – Pump and Treat
- Alternative G – Combined Floodplain In-situ/Pump and Treat
- Alternative H – Combined Upland In-situ/Pump and Treat
- Alternative I – Continued Operation of Interim Measure

The screening of these remedial technologies was accomplished in three steps under the RCRA/CERCLA process. The first step in the process involved screening an initial list of technologies and process options against the criterion of technical implementability. This first screening eliminated those technologies or process options that are not applicable or not implementable because of the type and extent of contaminants and/or site characteristics found at the site. A second screening of the remaining process options against the criteria of effectiveness, implementability (both technical and administrative), and relative cost further reduced the list of remedial alternatives through a formal evaluation process. The last step involved selecting representative process options for each technology type to simplify the subsequent development and evaluation of remedial alternatives. The CMS/FS also ranked the nine alternatives using the following criteria:

- Protection of human health and the environment, attain media cleanup goals, and control sources of releases

- Compliance with applicable or relevant and appropriate requirements (ARARs)
- Long-term effectiveness, permanence, and reliability
- Reduction of toxicity, mobility, or volume of containment through treatment
- Short-term effectiveness
- Implementability
- Cost
- State/support agency acceptance
- Community acceptance

Using this ranking system, Alternatives C, D, E, F, G, and H ranked high because they would all provide for protection of human health from exposure due to use of groundwater as a drinking water supply in both the short term and long term and would protect the Colorado River as a result of floodplain cleanup and/or through hydraulic control. Alternatives C, D, E, F, G, and H also ranked high because the DOI determined that as a threshold matter; none of these alternatives could be eliminated based on the alternative's inability to satisfy cultural resources ARARs or the National Wildlife System Administration Act.

After thorough consideration through the CMS/FS and Groundwater FEIR process, DTSC selected Alternative E – In Situ Treatment with Freshwater Flushing because it would achieve the RAOs while substantially reducing, through chemical change and physical precipitation, the amount of Cr(VI) in the groundwater (which is the principal threat in groundwater at the site). The selected technology (now the proposed Project) was determined to complete cleanup in a reasonable time frame while achieving best balance with the adverse effects to cultural resources and biological resources than other alternatives considered. Furthermore, Alternative E met both the threshold criteria of (1) protecting human health and the environment, attaining media cleanup goals (over a reasonable timeframe), and controlling sources of releases, and (2) compliance with the identified chemical-, location-, and action-specific applicable or relevant and appropriate requirements (ARARs).

The other alternative remedial technologies were rejected for the following reasons for either their inability to meet the basic project objectives or for their feasibility.

Project Objectives. Although the other alternative remedial technologies would meet most of the project objectives, including the reduction of the mass of Cr(T) and Cr(VI) in groundwater at the Project Area, the alternatives were determined to result in greater ground disturbance or result in longer cleanup timeframes. For example, Alternative D - Sequential In-situ Treatment, would have more wells but fewer pipelines, and would generate more in-situ treatment by-products than Alternative E. Alternative B – MNA, was rejected because of the long time required to attain cleanup goals, long-term use of institutional controls, and the uncertainty of the treatment effectiveness.

Feasibility. Since the certified Groundwater FEIR included the evaluation of several alternative remedial technologies, which were deemed either as not feasible, not meeting project objectives, or resulting in greater impacts than the proposed Project, alternative remedial technologies were rejected from further analysis in this SEIR.

Given the thorough investigation and evaluation of other potential remedial alternatives through the development of the certified Groundwater FEIR, the CMS/FS, and the joint decision between DTSC and DOI in 2011 to select Alternative E – In Situ with Freshwater Flushing, for which the CEQA statute of limitations has run and all prior litigation has been settled, it is not necessary for this SEIR to consider or revisit other remedial technologies as viable alternatives to the proposed Project.

7.5.2 Colorado River Freshwater Source Alternative

The Groundwater FEIR evaluated three separate options for a freshwater supply source including the use of surface water from the Colorado River. Based on the Final CMS/FS evaluation, this option would obtain water from the Colorado River and would have sufficient capacity and low concentrations of arsenic and dissolved salts. The use of Colorado River water could be done either by taking water directly from the river through an intake structure on the river bank, or by extracting water from beneath the river bottom through an infiltration gallery.

Water drawn directly from the river via an intake structure would likely require filtration and disinfection prior to injection into the aquifer, which would require filters and chemical feed equipment that would increase the size and amount of remedial infrastructure to be constructed and maintained. Organic carbon would potentially need to be removed from the river water prior to injection, which is difficult to remove using conventional water treatment methods. The additional construction footprint needed for the direct river intake infrastructure would also disturb a larger area than would the Project.

Use of a shallow infiltration gallery beneath the river bottom would avoid the need for filtration and disinfection of water from a direct river intake. Under this option, the sand in the river bottom would provide filtration, removing suspended solids and microbes. However, the groundwater in the shallow zone beneath the river contains water that is geochemically reduced and contains elevated concentrations of iron and manganese, which could foul the injection wells. It is also likely that a conditioning system would be needed, at least during the first few years, to remove iron and manganese from groundwater that is extracted from more reduced portions of the aquifer beneath the river such that the potential for fouling of the associated injection wells is minimized.

Project Objectives. Although most of the objectives of the Project would be met by this alternative, greater biological resource impacts are associated with this option due to the implementation and operation of the river intake structure/shallow infiltration gallery and potential direct impacts to special status fish species that occur in the Topock area, specifically the razorback sucker and the bonytail chub. Both are federally-listed and state-listed as endangered species; the razorback sucker is also a California Fully Protected Species. The CDFW indicated that approval of a fish screen and intake structure that would avoid incidental take of the razorback sucker may be difficult to obtain. Additional infrastructure impacts would also occur with the construction of necessary water treatment facilities to remove suspended solids, potentially organic carbon, and disinfection to remove microbes required prior to injection to protect wells.

Feasibility. Because this Freshwater Source alternative would result in new and more severe significant impacts to aquatic resources, and there is uncertainty of the treatment effectiveness, this alternative was rejected for not being potentially feasible and therefore warranting of a full alternative analysis in the SEIR.

7.5.3 Elimination of Project Components in the Moabi Regional Park Area

The proposed Project includes a Construction Headquarters and Long-Term Remedy Support Area, Temporary Construction Laydown Area, and Soil Processing Area/Clean Soil Storage Area near Moabi Regional Park that were not considered in the Groundwater FEIR. These facilities would be located in areas that were identified in the Groundwater FEIR as a potential location for one or more freshwater wells to be used in the remedy; however the location for the proposed facilities represents a larger area which required the SEIR Project Area to be increased.

This alternative would require: (1) eliminating soil storage on-site and exporting all or a significant majority of excavated materials off-site, and (2) relocating the Construction Headquarters and Long-Term Remedy Support Area and laydown areas to another location. The elimination of soil storage at Moabi Regional Park is addressed in Section 7.6.2 below. The only potential location identified in the Project Area for the Construction Headquarters and Long-Term Remedy Support Area would be the Transwestern Bench (TW Bench), as was shown in the 60% BOD. However, PG&E has indicated that there is not enough room at the TW Bench to accommodate the current needs for the Headquarters and Long-Term Remedy Support Area and laydown areas. As a result, the Construction Headquarters and Long-Term Remedy Support Area would need to be located off-site.

Project Objectives. The objectives of the Project would mostly be met by this alternative. One of the project objectives is to “consider public safety” and to “ensure efficiency,” which would not be met if the main Construction Headquarters and Long-Term Remedy Support Area were to be located farther from the Project activities, which would require longer worker trips, increased potential for hazardous material spills, and increased construction duration, etc. In addition, locating the Construction Headquarters and Long-Term Remedy Support Area near the TW Bench would increase visual impacts, and potentially biological resource impacts, in the Colorado River floodplain.

Feasibility. Because of the geographic site constraints and engineering infeasibility of including the Construction Headquarters and Long-Term Remedy Support Area at the TW Bench, and increased aesthetic and biological resource impacts, this alternative was rejected from further consideration in the SEIR.

7.5.4 Reduction of Project Footprint and Project Components

The Final Remedy Design evaluated in this SEIR is a culmination of an extensive preliminary (30%), intermediate (60%), pre-final (90%), and final (100%) design process, undertaken by PG&E as directed by DTSC and DOI with review and comment by stakeholders. For a summary of the design submittals, and summary of number of comments received and review time, refer to Chapter 2, "Introduction" of this SEIR, Subsection 2.4.6. Each subsequent design submittal went through extensive revision after stakeholder review. This substantive process allowed for consideration of many different remedy design components and compositions of infrastructure. The Final Remedy Design reflects the extensive design review process undertaken over four years by PG&E and stakeholders, and includes modifications and clarifications by PG&E as a result of the collaborative and iterative design process.

This alternative considers reduction of the Project footprint and associated pipelines, wells and appurtenant facilities to be installed and operated. This alternative would result in less ground disturbance and fewer facilities. However, based on the extensive design review process which identified the exact amount of infrastructure needed to operate the groundwater remedy properly and successfully, it is not guaranteed that this alternative would include enough infrastructure to successfully manage the groundwater plume.

Project Objectives. It is assumed that this alternative would not meet most of the Project objectives, since the type and amount of remedial components included in the Final Remedy Design was based on multiple design iterations and is assumed to include the exact amount of infrastructure required to operate the remedy successfully. For example, it is assumed that any reduction of wells may not guarantee that the contaminated groundwater plume does not permanently expand. Further, the proposed Project evaluated in this SEIR includes a Future Activity Allowance to allow for instances where the infrastructure identified in the Final Remedy Design is not enough to operate the groundwater remedy successfully over time. Because this alternative would not definitively meet all of the project objectives, this alternative was rejected from further consideration in the SEIR.

Feasibility. This alternative would involve reduction of the Project footprint, and associated pipelines, wells and appurtenant facilities to be installed and operated. Accordingly, this alternative would result in less ground disturbance and fewer facilities, which would generally result in fewer impacts than the proposed Project presented in the Final Remedy Design. However, because the alternative would not meet all of the project objectives, and may not result in successful operation of the groundwater remedy, this alternative was rejected from further consideration in the SEIR.

7.6 Alternatives to the Proposed Project

The following sections provide a comparative analysis of four alternatives to the proposed Project: (1) Aboveground Pipeline Infrastructure, (2) Elimination of On-site Soil Storage, (3) Freshwater Supply in California, and (4) No Project Alternative.

The three alternatives were determined to adequately represent the range of feasible alternatives required under CEQA for this Project. These alternatives (Alternatives 1, 2, and 3) were identified as the potentially feasible options that would likely meet most of the Project objectives. Descriptions of each alternative are presented below, along with an evaluation of their environmental impacts. These alternatives would either avoid or lessen significant adverse impacts related to air quality, noise, and/or cultural resources that are expected to occur with the proposed Project. The No Project Alternative is included as required by CEQA Guidelines Section 15126.6(e) even though it would not meet the basic project objectives.

7.6.1 Alternative 1 - Aboveground Pipeline Infrastructure

The proposed Project, as described in Chapter 3, “Project Description” of this SEIR, includes an extensive network of fluid conveyance pipelines to implement the remediation system. The vast majority of piping would be located underground in subsurface trenches. The exception is the segment of pipeline that crosses the Colorado River on the arched bridge.

The Groundwater FEIR and preliminary 30% and 60% BODs situated the majority of pipelines underground. Interested Tribes indicated in their review of the 30% and 60% BOD and in discussions during the response to comment process that their preference was for all piping associated with the remedy to be situated aboveground instead of underground. Interested Tribes explained that further subterranean intrusion into the land resulting from belowground pipelines was objectionable. During the 30% BOD comment resolution, DOI committed to evaluate other options for aboveground piping in the areas adjacent to Old Route 66 and the Station. DOI developed a pipeline matrix detailing the varying alternatives for above/below ground pipelines and evaluation criteria to be considered during the selection process, which was submitted with DOI comments in April 2013 on the 60% BOD (Final Remedy Design, Appendix I; CH2M Hill 2015a). The matrix addressed portions of the remedy infrastructure referred to as Pipeline A and Pipeline B. The purpose of the matrix was to memorialize the multiple criteria considered in evaluating pipeline options and to facilitate the submission of stakeholder input. DOI worked with Interested Tribes and the TRC members on the development of the matrix evaluation criteria and the various pipeline placement alternatives.

On March 7, 2014, DOI received a letter from the FMIT providing a revised position on the preference for portions of Pipeline A. The most significant change was the revised preference for belowground piping for the area adjacent to Maze Loci B, instead of aboveground piping which had previously been requested. The FMIT, however, restated a preference for aboveground placement of the remaining portions of the Pipeline A. A similar letter was received from the Hualapai Tribe on March 10, 2014 with the same position regarding the first segment of the pipeline. However, the Hualapai Tribe identified either above or below ground would be acceptable for the remaining Pipeline A segments. Finally, a letter from the Cocopah Tribe was received on March 13, 2014, noting the acceptance of above or belowground infrastructure for all segments of Pipeline A.

In the evaluation of aboveground versus belowground pipeline alternatives, DOI and DTSC considered all input received from PG&E, Interested Tribes and stakeholders, as well as other significant criteria, such as aesthetic impacts, cultural resources impacts, biological resources impacts, construction-related impacts, long-term maintenance requirements, and safety concerns for construction and operation and maintenance workers. After extensive stakeholder input, evaluation and consideration of all influential factors, the agencies directed PG&E to continue to design the pipeline system, as presented in the proposed Project, belowground, following the alignment in PG&E's 60% BOD proposal.

The Aboveground Pipeline scenario as presented to the Interested Tribes is shown in **Figure 7-1** and is evaluated herein as the Aboveground Pipeline Infrastructure Alternative. As described in the 60% BOD, this alternative provides a scenario in which segments of the pipeline would be placed aboveground on pipe supports for the upland areas:

- Immediately west of the Interim Measure 3 (IM-3) Facility entrance for access to injection well IRL-1;
- Along the existing access road near injection well IRL-4; and
- Along the existing access road to injection well FW-1.

For safe access to these injection wells with no cut into the existing slope, the pipeline/conduits would be required to be installed belowground, similar to the proposed Project. However, otherwise, piping would be installed aboveground. The Final Remedy Design includes approximately 43,200 linear feet of trenches for fluid conveyance piping (about 8.2 miles) with most of the conveyance piping placed belowground in trenches. The Aboveground Pipeline Infrastructure Alternative would include 4,800 linear feet of aboveground fluid conveyance piping and 800 linear feet of underground trenching (less than 1 mile) which is substantially less trenching than the 43,200 linear feet of underground trenching that would be required by the proposed Project. All other wells/boreholes, and Project infrastructure would be located in the same locations as described in the proposed Project.

Electrical power would be taken from the City of Needles power line located east of the IM-3 Facility and then run on poles to each of the injection wells, requiring approximately 360 feet of underground conduit. This is substantially less than the Final Remedy Design, which includes 124,000 linear feet of conduits in 43,200 linear feet of trenches. Communication and control wires would be run along the same poles as the electrical power.

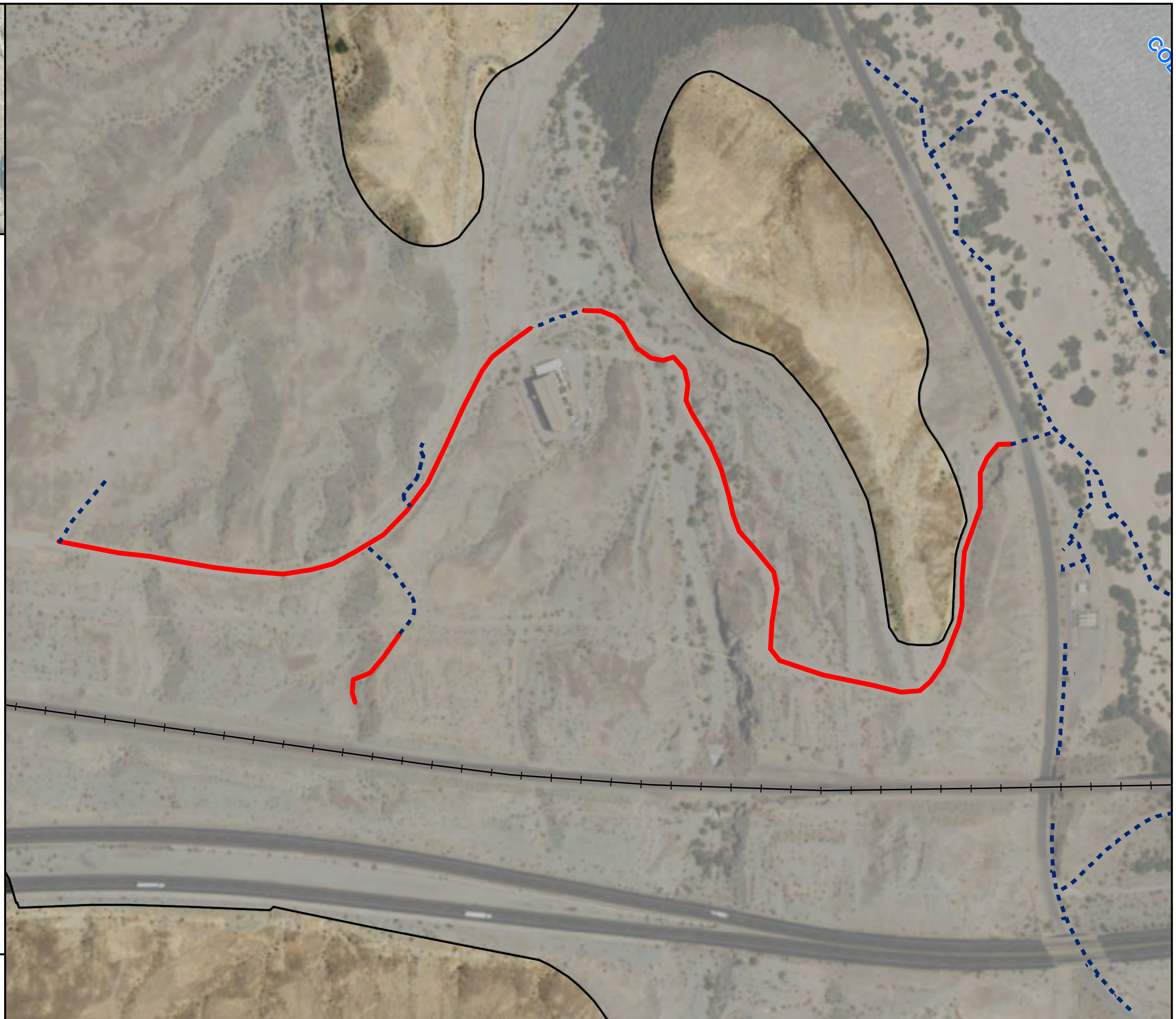
Key design elements applicable to the aboveground piping include the following:

- All aboveground piping would be steel;
- The crossing of Bat Cave Wash would be completed with a bridge structure (herein called the northern aerial crossing);
- Two grade separation structures would span the access roads to the remediation and monitoring wells located west of IM-3 Facility; and
- A retaining wall would be built along the access road to injection well IRL-4.

As it was described in the response to comment process on the 60% BOD, the Aboveground Pipeline Infrastructure Alternative would have increased maintenance requirements than the proposed Project, given the extreme heat conditions of the Project Area. Thermal design considerations would require additional area to allow for expansion/contraction loops as well as potentially large support structures (e.g., pipe racks, conduits or cable tray, shade assemblies). There would also be increased worker safety and risk during construction and operation of the Aboveground Pipeline Infrastructure Alternative. For example, given the Project Area's topography and steep slopes, there is limited work space available. Attempting to conduct work on steep slopes would increase safety risks to on-site personnel, including during operation and maintenance activities, and while lifting or working in vaults, or working near existing natural gas pipelines. The alternative could also include the use of bollards to protect the vault at the bottom of steep slopes. This would potentially result in a safety hazard for motorists while traveling on National Trails Highway. Long-term maintenance of the aboveground pipeline structures would require sand blasting and painting every 10 years. Placement of the aboveground pipeline would increase construction activity by 20 days, which is a negligible increase in the overall construction schedule in comparison to the proposed Project. The Aboveground Pipeline Alternative would result in 1,869 cubic yards of soil disturbance, which is substantially less than the proposed Project disturbance of 45,200 cubic yards. **Table 7-2** compares the infrastructure differences between the Final Remedy Design and the Aboveground Pipeline Infrastructure Alternative.

TABLE 7-2
COMPARISON OF INFRASTRUCTURE ASSOCIATED WITH THE ABOVEGROUND PIPELINE INFRASTRUCTURE ALTERNATIVE

Infrastructure Component	Final Remedy Design	Aboveground Pipeline Alternative
Fluid Conveyance Piping and Trenches	• 127,500 linear feet of piping in 43,200 linear feet of trenches	• 4,800 linear feet of piping (3,970 linear feet aboveground/ 830 linear feet of trenches).
Total Volume of Soil Disturbance	• 45,200 cubic yards	• Displaced soil volume: 1,869 cubic yards • Ground disturbance: 209 linear feet
Electrical/Communications Conduits and Trenches	• 124,000 linear feet of conduits in 43,200 linear feet of trenches • 10 power poles	• 26 power poles for electrical and communications cable • 3 radio towers for transmitting control and signals to Remedy SCADA



LEGEND

- Groundwater SEIR Project Area
- Alternate Aboveground Pipeline
- Underground Pipe/Conduit

0 250 500
Feet
N

Final Groundwater Remediation Project SEIR

Map Creation Date: 12/15/2016 Sources: ESRI Aerial, PG&E 2015

Alternate Aboveground Pipeline Segments

Figure 7-1

ESA North State Resources

Path: G:\Projects\15.135.000 Topock Remediation CEQA\Figure MXDs\Groundwater SIER Figures\Figure7-1_Alternate Aboveground Pipeline.mxd Date Saved: 12/15/2016 9:43:30 AM

7.6.1.1 Ability to Meet Most of the Project Objectives

As noted above, the project objectives are to ensure the Final Groundwater Remedy Project achieves cleanup levels and/or performance goals and compliance with RAO's within a reasonable time frame; minimize ground disturbance to protect biological, historical, cultural resources and aesthetic impacts to the extent feasible; and to ensure efficiency and compliance with health and safety standards in consideration of public safety. These primary Project objectives would not be attained with implementation of the Aboveground Pipeline Infrastructure Alternative. The construction and long-term operation and maintenance of the Aboveground Pipeline Alternative would result in greater worker and public safety issues associated with an increased risk of injury or even death associated with worker/visitor falls due to the Project Area's topography and steep slopes. Further, the Aboveground Pipeline Alternative would require increased maintenance requirements, such as sand blasting and painting every 10 years. Therefore, the increased worker and public safety issues would not meet the Project's objectives.

7.6.1.2 Comparison of Environmental Impacts

Aesthetics

The Aboveground Pipeline Alternative would introduce permanent views of steel aboveground pipelines, as well as utility poles, retaining walls, and grade separation structures that would be located within the same general viewshed as the proposed Project, including Needles Rock, Topock Maze Loci A, B & C, Chemehuevi Mountains, Colorado River, Bureau of Land Management (BLM) Area of Critical Environmental Concern (ACEC) and the Havasu National Wildlife Refuge (HNWR). Baseline views also include manmade features including Interstate 40 (I-40), Burlington Northern Santa Fe (BNSF) Railroad, the pipeline bridge, Topock Marina, Moabi Regional Park, the Station and the IM-3 Facility. Views of the 4,800 linear feet of aboveground pipelines and associated infrastructure would be visible from these key viewsheds, resulting in greater visual intrusion to the natural landscape than the proposed Project. Similar to the proposed Project, the alternative would include surface treatment (i.e., muted earth-tone color pallet) of aboveground structures; however, visual intrusions under the Aboveground Pipeline Alternative would be substantially higher than that of the proposed Project, and would substantially degrade the existing visual character and quality of the site and its surroundings, resulting in greater significant aesthetic impacts than the Project.

Air Quality

The Aboveground Pipeline Alternative would use similar types of equipment as the proposed Project at all phases including: water trucks, backhoes, concrete pumps, cranes, bulldozers, drill rigs and associated equipment, excavators, forklifts, loaders, man lifts, crushing equipment, compactors, and scrapers. Because this alternative would result in less soil excavation (1,869 cubic yards vs 45,200 cubic yards), haul trips for soil import/export construction activities would be less than the proposed Project. Therefore, the daily and annual air pollutant emissions associated with the proposed Project would be less than the proposed Project. Air quality impacts for the proposed Project were determined to be less than significant with mitigation, and under this alternative, emissions would be reduced from those of the proposed Project during construction. Due to increased operation and maintenance requirements of the aboveground pipeline system, there would likely be increased vehicle trips to and from the Project Area resulting in increased emissions (though still anticipated to be below thresholds). Overall, this alternative would not serve the purpose of avoiding or substantially lessening a significant adverse environmental effect of the Project in regard to air quality.

Biological Resources

Placement of aboveground pipelines in this alternative would occur primarily in previously disturbed roads and open creosote bush scrub community. As shown in the table above, the alternative would result in 1,869 cubic yards of soil excavation and 830 linear feet of trenching, resulting in an overall reduction of 43,335 cubic yards of soil disturbance in comparison to the proposed Project. This reduction in soil excavation would likely minimize habitat loss and potentially reduce impacts to upland habitat, riparian vegetation at the Bat Cave Wash crossing, and impacts to nesting birds. The Project Area contains suitable bat maternity roosting areas for a number of common and special-status bat species, particularly within Bat Cave Wash and the East Ravine, and the proposed Project may result in impacts to active bat maternity roosts. While the decrease in soil excavation activity associated with the installation of aboveground structures may reduce impacts to the bat maternity roosts, potentially significant impacts to bat species may still occur given that construction of the aboveground structures would still result in increased noise and human activity around maternity roost sites.

The proposed Project was determined to not have a significant impact on wildlife movement corridors or linkages. However, the Aboveground Pipeline Infrastructure Alternative would potentially increase impacts on wildlife movement corridors and linkages due to the introduction of the aboveground infrastructure, including the pipeline and associated retaining walls and structures. While the ultimate height of the aboveground pipelines off the ground would likely vary based on underlying topography and land cover, it is assumed that there would be no significant impediment of movement for smaller wildlife and avian species, and that the greatest impact would be to large wildlife such as the bighorn sheep. Particular impacts to desert tortoise could be increased depending on the overall clearance of the pipelines. Overall, impacts to wildlife movement corridors or linkages would therefore be greater under this alternative.

Cultural Resources

Proposed Project activities involving ground disturbance and the installation of belowground infrastructure would directly and adversely affect the soil and landforms identified by some Interested Tribes as contributing elements of the Topock TCP. Because the land itself is essential to the significance of the Topock TCP, the disturbance of soil is considered a profound disruption in the belief system of some Interested Tribes and would affect the Topock TCP long after the Project is completed. Likewise, disturbances in areas of Tribal importance for their association with clay materials are also considered a significant intrusion of the Tribal values in Arizona. The use of aboveground pipeline infrastructure would potentially reduce cultural resource impacts to the Topock TCP by reducing overall ground disturbing activities (42,370 fewer linear feet of subsurface trenches would be needed).

Potential impacts to unknown historical and unique archaeological resources from the Aboveground Pipeline Infrastructure Alternative would be greatly lessened relative to the proposed Project because soil and ground disturbance would be reduced. However, because there still remains a potential to impact unknown historical or unique archaeological resources from installation, maintenance and replacement of aboveground infrastructure, and because of the overall impacts to landscapes within the Topock TCP, the difference in soil disturbance would not change the conclusion that the impacts of the Aboveground Pipeline Alternative to unknown historical and unique archaeological resources would be significant and unavoidable.

Potential impacts to paleontological resources from the Aboveground Pipeline Alternative would be greatly lessened relative to the Project because the soil and ground disturbance would be substantially reduced. However, because there is still a potential to impact as yet unknown paleontological resources, this difference would not alter the conclusion that the impacts of the Aboveground Pipeline Alternative to paleontological resources would be significant and unavoidable.

Potential impacts to human remains from the Aboveground Pipeline Alternative would be greatly lessened relative to the Project because the soil and ground disturbance would be substantially reduced. However, because there still is a potential to impact as yet unknown human remains, this difference would not change the conclusion that the impacts of the Aboveground Pipeline Alternative to human remains would be significant and unavoidable.

Hazards and Hazardous Materials

The Aboveground Pipeline Infrastructure Alternative has the potential to increase public health and safety impacts during both construction, and operation and maintenance of the Project. There would be greater worker safety and risk hazards during construction and operation of the Aboveground Pipeline Alternative than the proposed Project. Because of the Project Area's topography and steep slopes, there is limited work space to install aboveground infrastructure which increases worker safety risk associated with accidental falls and injury. During operation and maintenance activities, there would be an increased risk of incidents while working on steep slopes, or working near a high pressure natural gas pipeline. The placement of the aboveground piping would therefore result in greater significant hazards to the public or the environment through transport and potential release of hazardous materials than the proposed Project. Since the proposed Project's impacts related to hazards and hazardous materials were determined to be less than significant with mitigation, this alternative would not serve the purpose of avoiding or substantially lessening a significant adverse environmental effect of the Project.

Hydrology and Water Quality

During construction, the Aboveground Pipeline Infrastructure Alternative would substantially reduce the amount of soil excavation and storage of soils, thereby minimizing potential runoff impacts associated with the stockpiling of soil material. However, the alternative would introduce new aboveground infrastructure that would potentially increase impervious surface that could affect the natural drainage patterns. Operation and maintenance activities, which include sandblasting activities, would potentially increase water quality impacts. Since the proposed Project's impacts related to hydrology and water quality were determined to be less than significant with mitigation, this alternative would not serve the purpose of avoiding or substantially lessening a significant adverse environmental effect of the Project.

Noise

Long-term operational noise impacts are expected to be greater than the proposed Project since the Aboveground Pipeline Infrastructure Alternative would require additional and more frequent operation and maintenance requirements, and potentially more periodic replacement. Pipeline construction associated with the proposed Project would likely be slightly reduced from the proposed Project at nearby sensitive receptors (Topock Maze, Moabi Regional Park, and Pirate Cove) as the trenching and excavation equipment use would be reduced from the proposed Project. Construction-related noise in Arizona to the sensitive receptors located along the south side of I-40 in Arizona and the sensitive receptors along the Topock 66 Spa and Resort would be expected to be similar. There still remains a potential to impact sensitive receptors during the aboveground pipeline construction and operation, the difference in soil disturbance would not change the conclusion that the noise impacts of the Aboveground Pipeline Alternative would be significant and unavoidable.

Utilities, Service Systems, and Energy

The Aboveground Pipeline infrastructure Alternative would require far less soil disturbance than the proposed Project. As a result, impacts related to off-site soil disposal (and associated traffic and air quality emissions) would be significantly reduced under this alternative. Similar to the proposed Project, the Aboveground Pipeline Infrastructure Alternative would obtain power from the City of Needles, the Mohave Electric Cooperative, as well as various on-site sources of electricity, including the use of on-site generators and solar panels. The alternative would also include the use of radio as a transmission method for control and communication, which was identified at the 60% BOD as being less reliable than a cable or wired connection. The alternative would require the installation of 23 power poles, which is an additional increase of ten power poles required for the proposed Project. Therefore, this alternative would result in slightly greater utility and energy impacts than the proposed Project. Proposed Project impacts relative to utilities and energy were determined to be less than significant with mitigation, so this alternative would not serve the purpose of avoiding or substantially lessening a significant adverse environmental effect of the proposed Project.

Water Supplies

The use of water for construction and the decommissioning of the IM-3 Facility under the proposed Project is estimated to be approximately 152 to 192 acre feet annually (afa). During construction, the Aboveground Pipeline Infrastructure Alternative would potentially decrease the consumption of construction water for dust control since less soil excavation and soil storage would be required. However, the long-term maintenance activities associated with the Aboveground Pipeline Infrastructure Alternative would require sandblasting every ten years, which would potentially increase the consumption of water for the alternative. Consumptive water use during operation of the proposed Project would consist of about 2.8 acre-feet per year (0.91 mg per year) of water to the TCS Evaporation Ponds, off-site disposal, and miscellaneous water use. This amount was determined to be within PG&E’s 422 acre-feet per year of allotted capacity. Since this alternative is not expected to result in a substantial increase in water use and because the sources of water already exists and the entitlement volume has not changed since certification of the Groundwater FEIR, impacts related to water use would not be significant, similar to the proposed Project. Since the proposed Project would not result in significant impacts to water supplies and would not require mitigation, this alternative would not serve the purpose of avoiding or substantially lessening a significant adverse environmental effect of the proposed Project.

7.6.2 Alternative 2 - Elimination of On-site Soil Storage

A major component of the proposed Project, which was a result of Tribal input during the iterative design review process, was the retention of all disturbed on-site soils (i.e., through trenching, grading, well cuttings, road improvements, etc.) for reuse within the Project Area. The Final Remedy Design was modified to include use of on-site soil storage areas near Moabi Regional Park that were not anticipated when the Groundwater FEIR was certified. The soil would be processed and stored at the Soil Processing Area/Clean Soil Storage Area north of National Trails Highway, southwest of Moabi Regional Park. The Elimination of On-site Soil Storage Alternative would involve eliminating soil storage entirely at the Soil Processing Area/Clean Storage Area, and exporting all, or a significant majority of, excavated materials off-site. The intent of this alternative is to minimize construction-related impacts to sensitive receptors at the nearby Moabi Regional Park, and to potentially reduce overall construction-related efforts.

While this alternative would eliminate soil storage, a location near the Project Area would still be required for temporary soil staging for import soil, reusable site soil, and soil to be disposed of off-site. For purposes of this alternative, the existing U.S. Bureau of Reclamation (BOR) quarry area, which is located between the Station and TCS Evaporation Ponds, could be used (see **Figure 7-2**. The BOR quarry area would require site preparation, including access road improvements and grading to provide a workable surface to unload, temporarily stage, and load soil. The existing approximately 1,400-foot long access road that provides access to the BOR quarry from the TCS Evaporation Pond access road would require additional upgrades to allow on-road vehicles to access the quarry. Road upgrade work would likely be similar to the access road upgrade planned west of the Station, near Bat Cave Wash. The BOR quarry area would be graded to provide an even workable surface. Quarry area hydrology would be evaluated to determine whether site drainage features would need to be installed to maintain adequate drainage in a manner compliant with Project requirements. Assuming a 25-foot wide and 1,400-foot long access road to the soil quarry, access road improvements would result in approximately 35,000 square feet of new road improvements. Assuming a worst-case scenario, it is expected that approximately one acre would provide a sufficient area to allow soil management.

Under the Elimination of On-site Soil Storage Alternative, all soil excavated during construction that would require processing (screening, sorting, or similar) prior to reuse on-site (as pipeline trench backfill or access road embankment material) would be disposed of off-site. This is most applicable to soils excavated in the upland (interior) parts of the Project Area, as the soils vary in their composition and makeup (and potential for contamination). It is likely that sandy soil excavated from the floodplain area (along the National Trails Highway [NTH] in situ reactive zone [IRZ] or Riverbank extraction wells) could be reused on-site, since the soil is of a consistent suitable material that is easily used to backfill excavated areas without processing. The soil estimated to be excavated from the floodplain, and therefore likely reused on-site not requiring export, is 11,000 cubic yards. However, no other excavated soil is expected to be reusable and would require all non-floodplain soil to be disposed of off-site. This alternative would increase both the volume of soil to be exported off-site for disposal, as well as soil needed to be imported to the site for pipeline backfill, access road embankment material or other needs. The proposed Project assumes the total amount of soil disturbance would be 45,200 cubic yards. Excluding the soil excavated from the floodplain (which would be reused on-site), the total amount of soil that would be exported under this alternative would be approximately 34,200 cubic yards.

This alternative would assume that non-contaminated soil exported for disposal could be used for daily cover at a municipal landfill, although geotechnical characteristics of exported soil (particularly the presence of large aggregate) may preclude it from being useful as daily cover. In addition, landfills commonly have a limited capacity for the quantity of daily cover soil required, and a landfill may stop accepting soil for daily cover based on short-term site capacity or lack of need, in which case soil would need to be stockpiled on-site for delivery to the landfill at a frequency and quantity acceptable to the landfill. As a result, this alternative assumes temporary on-site staging of export soil would be required. The nearest landfill to the Project Area is the Mohave Valley Landfill, which is a 54-mile round trip from the Project Area. Current capacity at the landfill is approximately 3,032,445 cubic yards (Mohave Valley Landfill 2016), which would accommodate the 45,500 cubic yards exported under the Elimination of On-site Soil Storage Alternative (although not all excavated soil can be accepted by local landfills).

Without the ability to process and screen excavated floodplain soil for use as road embankment (11,000 cubic yards), soil would need to be imported. As a result, the Project soil import estimate would increase from approximately 12,400 cubic yards assumed for the proposed Project to approximately 14,900 cubic yards for the Elimination of On-site Soil Storage Alternative. Assuming a 21-ton export truck load, the daily cover off haul would require approximately 153 additional export truck trips between the site and landfill over the course of the Project. The Project currently assumes that 3,200 tons of access road embankment soil would be required.

The use of the BOR quarry location for temporary management of site soil would increase soil transit time to work areas within the Project Area compared to the soil management procedures of the proposed Project using the Soil Processing Area/Clean Soil Storage Area near Moabi Regional Park. Given the location of the BOR, which is further away from the majority of Project components within Project Area than the proposed Soil Processing Area/Clean Soil Storage area, an overall increase in the construction schedule would occur. In addition, well drilling could be affected if drill cuttings cannot be removed from the (generally constricted) drilling site at a sufficient rate. This could be partially mitigated by increasing the number and capacity of soil delivery vehicles, but the constricted pipeline and well drilling work areas would likely not allow more than one soil truck to be active at a work site/temporary staging area.

LEGEND

- Groundwater SEIR Project Area
- BOR Quarry: Alternative 2 Soil Storage Site

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Feet
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Final Groundwater Remediation Project SEIR
Map Creation Date: 12/15/2016 Sources: ESRI Aerial, PG&E 2015

Elimination of On-site Soil Storage Alternative

Figure 7-2

ESA

North State Resources

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As described above, additional soil delivery (import and export) trucks would be required. Internal Project Area truck trips from the BOR quarry to work locations could be expected to double in comparison to the proposed Project. Soil screening and processing equipment and activities would not be required, as soil would no longer be processed for reuse on-site. Soil excavation and loading equipment requirements would be the same as the proposed Project.

The Final Remedy Design assumes that power for the Soil Processing Area would be routed from the existing overhead service line to the area via a new overhead distribution line. It is anticipated that the new overhead distribution will consist of 2 to 3 electrical poles in the area between the existing distribution line and the Soil Processing Area. The electrical load for the Moabi Regional Park facilities (which is inclusive of the Soil Processing Area) was estimated to be 1.3 million kilowatt hours (kWh) annually during remedy construction and 0.85 million kWh during remedy operation. The Elimination of On-site Soil Storage Alternative could potentially decrease electricity use given the reduced area of the quarry location relative to the Soil Processing Area/Clean Soil Storage Area, assuming that site lighting is the primary consumption of electrical power at these areas. Electrical power to the BOR quarry would be provided by diesel generators.

The use of the BOR quarry as a temporary soil staging area would likely increase consumption of construction water for dust control along unpaved roads, whereas the Soil Processing Area/Clean Soil Storage Area proposed for the Project is accessed primarily via paved roads. The approximately 1,400-foot access road extension to the quarry area would require continuous dust control. Over the course of the Final Remedy construction phase the additional extent of dust control could be expected to increase water consumption by approximately 10 percent. The quarry location site itself is expected to require a similar degree of construction water for dust control as the Soil Processing Area/Clean Soil Storage Area for maintaining stockpiled soils.

7.6.2.3 Ability to Meet Most of the Project Objectives

As noted above, the project objectives are to ensure the Final Groundwater Remedy achieves cleanup levels and/or performance goals and compliance with RAO’s within a reasonable time frame; minimize ground disturbance to protect biological, historical, cultural resources and aesthetic impacts to the extent feasible; to ensure efficiency and compliance with health and safety standards in consideration of public safety. The primary project objectives could potentially be attained with the Elimination of On-site Soil Storage Alternative; however, given the additional construction time, this alternative would increase the amount of time needed to achieve the timely management of cleanup goals.

7.6.2.4 Comparison of Environmental Impacts

Aesthetics

The Elimination of On-site Soil Storage Alternative would eliminate views of a soil processing and storage area near Moabi Regional Park, including views of the soil staging area, a truck waiting area, and an approximately 12-foot high shade structure and elevated water tank. The proposed BOR quarry is located between the Station and the TCS Evaporation Ponds and in proximity to the Topock Maze, which represents a view from a location of tribal sensitivity. The access road improvements would be even closer to the Topock Maze, approximately 920 feet.

However, the BOD quarry is situated in a ravine and may not be completely visible from the resource. Nevertheless, the constant stream of trucks during construction and operation of the BOD quarry as a soil storage location could result in additional aesthetic impacts from the Topock Maze . As stated in Section 4.1, “Aesthetics,” visual impacts associated with the Project’s Soil Processing Area/Clean Soil Storage Area would be minor and the activities would not obstruct distant views of Mohave Valley and surrounding peaks. However, aesthetic effects associated with the Soil Processing Area/Clean Soil Storage Area were determined to be less than significant with mitigation, so this alternative would not serve the purpose of avoiding or substantially lessening a significant adverse environmental effect of the Project.

Air Quality

The Elimination of On-site Soil Storage Alternative would result in an overall increase in approximately 153 additional export truck trips between the site and landfill over the course of the Project construction phases, as well as additional off road trips internal to the Project Area in order to access the BOR area. The overall increase in truck trips would result in additional annual air pollutant emissions; however, they would be spread over the course of construction activities and therefore would result in negligible daily emissions. This alternative would not serve the purpose of avoiding or substantially lessening a significant adverse environmental effect of the Project.

Biological Resources

The Elimination of On-site Soil Storage Alternative would result in less ground disturbance at the current Soil Processing/ Clean Soil Storage Area. However, the use of the BOR quarry may occur within or adjacent to sensitive habitat, potentially resulting in both direct and indirect impacts to biological resources. For the proposed Project, construction activities would occur throughout the Project Area within and adjacent to habitat for several special-status species, including special-status bird species, desert tortoise, ring-tailed cat, Nelson’s bighorn sheep, special-status bats, and special-status plants. The Project would impede the use of active bat maternity roosts. However, Soil Processing Area/Clean Soil Storage Area impacts for the Project were determined to be less than significant with mitigation, so this alternative would not serve the purpose of avoiding or substantially lessening a significant adverse environmental effect of the Project.

Cultural Resources

The BOR quarry activities proposed under this alternative would occur in proximity to the Topock Maze. Therefore, potential impacts to unknown historical and unique archaeological resources from the Elimination of On-site Soil Storage Alternative would be similar to the Project. Because there remains a potential to impact unknown historical or unique archaeological resources, this incremental difference would not change the conclusion that the impacts of the Elimination of On-site Soil Storage Alternative to unknown historical and unique archaeological resources which would be significant and unavoidable.

The off-site disposal of soils is considered a highly sensitive Tribal issue since on-site soil and landforms are identified by some Interested Tribes as contributing elements of the Topock TCP. Because the land itself is essential to the significance of the Topock TCP, the disturbance of soil is considered a profound disruption in the belief system of some Interested Tribes and would affect the Topock TCP long after the Project is completed. The Elimination of On-site Soil Storage Alternative would therefore, result in greater cultural resource impacts than the proposed Project.

Hazards and Hazardous Materials

The Elimination of On-site Soil Storage Alternative would result in the relocation of the Soil Processing Area/Clean Storage Area to the BOR quarry location. The proposed BOR quarry area would be smaller in size (1.0 acre vs 2.8 acres) and the level of soil processing activity would be reduced. The BOR quarry would be used to temporarily store excavated soil pending sampling to determine the appropriate management of that soil. The alternative would use the same preventative measures included in the Soils Management Plan and best management practices (BMPs) as the Project to minimize the potential hazards of the routine use, storage, disposal, or accidental spills to less than significant levels. Since the Project's impacts related to hazards and hazardous materials were determined to be less than significant with mitigation, this alternative would not serve the purpose of avoiding or substantially lessening a significant adverse environmental effect of the Project.

Hydrology and Water Quality

Since the Elimination of On-site Soil Storage Alternative requires the relocation of the temporary storage area to the BOR quarry location, the potential for runoff impacts associated with the stockpiles would be similar to the proposed Project. As the BOR quarry is located in a ravine, the quarry area hydrology would have to be evaluated to determine whether site drainage features would need to be installed to maintain adequate drainage in a manner compliant with Project requirements. This alternative would use the same preventative measures detailed in the Project's Operations and Maintenance Manual, the Soil Management Plan, and BMP Plan for construction to reduce impacts to hydrology and water quality to a level less than significant. Since the Project's impacts related to hydrology and water quality were determined to be less than significant with mitigation, this alternative would not serve the purpose of avoiding or substantially lessening a significant adverse environmental effect of the Project.

Noise

The Elimination of On-site Soil Storage Alternative would remove some, but not all, activities from the Moabi Regional Park area which contains sensitive residential receptors. The equipment used to construct the Construction Headquarters would remain the same despite elimination of the Soil Processing Area/Clean Soil Storage Area. Construction of the Soil Processing Area/Clean Soil Storage Area would involve less noise generation than the Construction Headquarters since no buildings are being constructed, therefore while elimination of this facility near Moabi Regional Park would not completely eliminate noise impacts to the area, it would be reduced. Furthermore, the elimination of the Soil Processing Area/Clean Soil Storage Area from Moabi Regional Park would eliminate a constant stream of truck trips depositing clean soil during construction. While this alternative would work to reduce operational noise resulting from soil truck trips, the majority of noise-producing truck trips associated with the Construction Headquarters/Long-Term Remedy Support Area would remain during operation. Given that the

Construction Headquarters/ Long-Term Remedy Support Area would still remain near Moabi Regional Park, removal of the Soil Processing Area/Clean Soil Storage Area would have a slight reduction in noise to the nearby residential sensitive receptors. The Project's impacts related to noise and vibration were determined to be significant and unavoidable even with the implementation of mitigation measures, and while noise levels would be slightly reduced by eliminating the Soil Processing Area/Clean Soil Storage Area, it would not avoid the significant and unavoidable impact identified for the proposed Project. As a result, this alternative would not serve the purpose of avoiding or substantially lessening a significant adverse environmental effect of the Project.

Utilities, Service Systems, and Energy

The alternative could potentially decrease electricity use given the reduced area of the quarry location relative to the Soil Processing Area/Clean Soil Storage Area. The Soil Processing Area/Clean Soil Storage Area is 2.68 acres whereas the BOR quarry site is estimated to be 1 acre. This reduction in surface area would require less electricity to illuminate than was required at the Soil Processing Area/Clean Soil Storage Area. Diesel generators would provide electrical power; therefore the electrical power that would be supplied by the City of Needles for the current Soil Processing Area/Clean Soil Storage Area would not be required. The alternative would result in greater impacts to existing landfills since it would increase the amount of soil exported for use as daily cover at a municipal landfill, which is estimated to be approximately 45,500 cubic yards of soil. This may result in a new impact since landfills have a limited capacity for the quantity of daily cover soil required. All other utility and energy impacts would be similar to the proposed Project. Project impacts relative to utilities and energy were determined to be less than significant; however, this alternative has the potential to result in a greater impact to existing landfills than the proposed Project.

Water Supplies

This alternative would increase water consumption by 10 percent since the use of the BOR quarry as a temporary soil staging area would increase consumption of construction water for dust control. Despite the increase in water supply required by this alternative, impacts to water supplies would be similar to that required by the proposed Project. Since the Project would not result in significant impacts to water supplies, this alternative would not serve the purpose of avoiding or substantially lessening a significant adverse environmental effect of the Project.

7.6.3 Alternative 3 - Freshwater Supply in California Alternative

A primary component of the proposed Project is the use of freshwater injection to control and confine the plume migration to the west (away from the Colorado River), assist with flushing the chromium plume through the NTH IRZ, and to constrain westward spread of carbon-amended water and in-situ byproducts from the Inner Recirculation Loop. The proposed Project includes the use of well(s) in and near the HNWR (namely Well HNWR-1A, Well HNWR-1, Topock 2/3 wells, or Site B) in Arizona as the freshwater source to inject freshwater upgradient of the contaminant plume and drive the contaminated groundwater through the treatment zone (see Chapter 3, "Project Description," subsection 3.6.1.7; Figure 3-4).

This freshwater source is relatively close to the treatment zones and would provide a sufficient volume of freshwater needed to meet remedy goals. As shown on Figure 3-3e, these wells are located off the Topock-Oatman Highway in Arizona. Freshwater from these sources would require the construction of subsurface pipelines to deliver the freshwater from Arizona to California (over the Colorado River) and through pipelines to injection wells. The length of ground disturbance required to install the pipeline from existing wells in Arizona to the IRZ well cluster would be up to 2.13 miles. This takes into consideration the 0.35 miles of pipeline to be installed on the bridge crossing the Colorado River which will not require ground disturbance. As indicated in Section 3.6.1.7 of the Project Description, the freshwater from Arizona may have arsenic at concentrations that exceed water quality objectives for the Colorado River groundwater basin in California and may require pretreatment prior to injection in California (through the construction and use of a contingent freshwater treatment system). The State Water Resources Control Board (SWRCB) has required conditions for allowing the injection of water with naturally occurring arsenic above the maximum contaminant levels (MCLs), including additional groundwater monitoring requirements in California (see Section 3.6.1.7 of the Project Description for more information). DTSC has also directed PG&E to include an arsenic pre-treatment contingency as part of the Final Remedy Design. The use of water from wells in Arizona was investigated in the adopted Addendum to the Groundwater FEIR in 2013, and the results of that investigation concluded that there is water of sufficient quantity (between 450 and 900 gpm [gallons per minute]) and quality to be used in the remedial system. The proposed Project assumes a freshwater injection rate of 450 gpm from these wells.

The Freshwater Supply in California Alternative would involve installation of freshwater supply well(s) in California as opposed to Arizona. Preliminary analysis indicates that freshwater obtained in California would not require treatment for arsenic; however pre-treatment for other constituents such as total dissolved solids (TDS), iron and manganese would likely still be required. Under this alternative, freshwater would be obtained from a primary well with future backup well options, similar to the freshwater wells in Arizona associated with the proposed Project. This alternative would limit the amount of infrastructure in Arizona to monitoring wells X and Y. All freshwater supply wells and supporting infrastructure would be located in California. The installation of freshwater supply wells on the California side of the Colorado River would require locating the wells far enough from the contaminated groundwater plume so that the drawdown created by freshwater pumping would not adversely affect the operation of the remedy by drawing the plume away from the IRZ line. To maintain adequate distance from the plume, the freshwater wells installed under the Freshwater Supply in California Alternative would be located approximately 2.9 miles north of the IRZ well cluster (see **Figure 7-3**). As shown in **Table 7-3**, which presents a comparison of pipeline lengths and total ground disturbance between the proposed Project and the alternative, the length of freshwater pipelines in California to be installed would result in more ground disturbance than the proposed Project pipeline in Arizona. The data from existing wells in this area suggest the aquifer near Moabi Regional Park is much less productive than that on the Arizona side of the river. Due to the less productive aquifer conditions, the volume of water obtained for use in the remedy would be greatly reduced, which would lengthen the amount of time it would take to clean up groundwater contamination. Based on conceptual modeling conducted for the Freshwater Supply in California Alternative, freshwater injection rate would be reduced from the 450 gpm for the proposed

Project to 60 gpm. As a result, this would extend the active potion of the remedy timeframe from 30 years to 90 years.

TABLE 7-3
PIPELINE LENGTHS AND GROUND DISTURBANCE COMPARISON

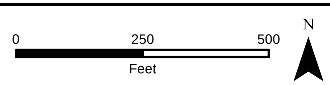
Pipeline Segment	Pipeline Distance (miles)	Pipeline Bridge Length (not included in ground disturbance total)	Total Ground Disturbance (miles)
Proposed Project - Arizona			
Freshwater pipe from Well HNWR-1A and Well HNWR-1 to IRZ wells	1.78	(0.35)	1.43
Freshwater pipe from Site B to IRZ wells	2.48	(0.35)	2.13
Freshwater Supply in California Alternative			
From location north of Project Area to IRZ wells	2.9	N/A	2.9

Despite the reduction in available pumping volume, preliminary modeling results indicate that the plume would not expand as a result of implementing the Freshwater Supply in California Alternative. This alternative would not change the number/location of remediation wells that are identified as part of the proposed Project. There is the potential to reduce the extraction/injection rates at several of the remedial wells, because there is a lower volumetric flux of groundwater through the aquifer, but the well locations would still be adequate. Hydraulic capture analyses indicate that the riverbank extraction well rates could be reduced as the capture zone has the potential to expand further eastward under the Colorado River and the capture zone would potentially negatively impact the shallow reducing rind as there is less flux coming from the west. A reduction in riverbank extraction rates would therefore directly result in a decrease in IRL injection at IRL-1 and IRL-2. The simulated NTH IRZ injection/extraction wells at nominal rates still indicate an adequate distribution of carbon to treat the contaminated Cr(VI) plume and no simulated plume breakthrough along the line was observed. TCS loop wells (TCS injection and Transwestern Bench extraction) would still be appropriately located and rates could potentially be reduced to achieve similar hydraulic influence under this lower simulated flow regime. Modeling indicates that TCS loop wells from East Ravine extraction could be maintained at current rates as there is minimal hydraulic response in bedrock associated with a reduction in freshwater injection in the aquifer.

LEGEND

- Groundwater SEIR Project Area
- Alternative 3: California Freshwater Supply Locations

Notes: California Fresh Water Supply Locations are located approximately 1.75 miles north of Moabi Regional Park



Final Groundwater Remediation Project SEIR

Map Creation Date: 12/15/2016 Sources: ESRI Aerial, PG&E 2015

Conceptual Locations of freshwater Supply in California

Figure **7-3**

ESA North State Resources

Path: G:\Projects\15.135.000 Topock Remediation CEQA\Figure MXDs\Groundwater SIER Figures\Figure7-3 Freshwater Supply in California Alternative.mxd Date Saved: 12/15/2016 10:08:10 AM

Early indications and information about the groundwater table in California indicate that water obtained from a well or wells near Moabi Regional Park in California are unlikely to have arsenic elevated above the MCL; however further exploration and testing would be required. It is also likely that the TDS of the water from a high capacity well would be greater than 3,000 mg/L, making it undesirable, without some level of pretreatment, for injection into the less saline, upper portions of the aquifer in the Project Area. Early investigations also indicate that the water may contain iron and manganese at concentrations that would require conditioning prior to injection (*Final Implementation Plan for Evaluation of Alternative Freshwater Sources in Topock Remediation Project Area* [CH2M 2012b]). As such, similar to the proposed Project, additional pre-treatment prior to injection would be required, although not at the extent of the arsenic treatment for the proposed Project.

7.6.3.1 Ability to Meet Most of the Project Objectives

As noted above, the project objectives are to ensure the Final Groundwater Remedy achieves cleanup levels and/or performance goals and compliance with RAO's within a reasonable time frame; minimize ground disturbance to protect biological, historical, cultural resources and aesthetic impacts to the extent feasible; to ensure efficiency and compliance with health and safety standards in consideration of public safety. The primary project objectives could potentially be attained with the Freshwater Supply in California Alternative, however, the timeframe for cleanup under this alternative would increase from 30 years for the proposed Project to 90 years for the alternative. Given the extended timeframe for cleanup, this alternative would not achieve the Project's objective to achieve the timely management of cleanup goals.

7.6.3.2 Comparison of Environmental Impacts

Aesthetics

The Freshwater Supply in California Alternative would introduce views of construction activities for supporting infrastructure, including equipment such as backhoes, concrete trucks and soil compactors, from the IRZ wells to a location approximately 2.9 miles north along the Colorado River. The viewshed area north of the Project Area is similar in nature and context to the Project Area, with exposure to similar foreground, middle ground, and background viewing distances. The alternative would introduce temporary construction views of pipeline installation along the Colorado River, as well as permanent views of a water supply well(s) with security fencing, though based on the current conceptual location, it is unlikely that the structures would be visible to sensitive receptors, including from the Colorado River. The area north of the Project Area is not as elevated as some upland portions within the Project Area. The area is part of the overall Colorado River valley that has a unique visual character that is of particular importance to Native American Tribes, as well as to recreational, pedestrian and vehicular viewers. Assuming the freshwater well infrastructure at the California site would incorporate façade colors which are consistent with that of the surrounding topography and vegetation, as specified in the Final Remedy Design and as defined in mitigation measures AES-1 and AES-2, the resulting impact on the surrounding quality and character of the landscape would be less than significant. Therefore, visual impacts associated with construction of the freshwater well infrastructure at the California site are expected to be similar to the Project. As stated in Section 4.1, "Aesthetics," visual impacts associated with the Project would be less than significant, so this alternative would not serve the purpose of avoiding or substantially lessening a significant adverse environmental effect of the Project.

Air Quality

The freshwater well proposed in California would require approximately 2.9 miles of freshwater pipeline to connect the freshwater source with the IRZ wells in the floodplain. Total ground disturbance resulting from Project freshwater wells in Arizona would be up to 2.13 miles if Site B were used, and 1.43 miles if wells near HNWR-1A were used. Although the types of construction equipment used under this alternative use would be similar to the Project, the increased distance of installation of freshwater pipeline in California would increase the duration of construction activity which would increase overall emissions. The air pollutant emissions during construction, operation and maintenance, and decommissioning activities would be greater than the proposed Project. This alternative would not serve the purpose of avoiding or substantially lessening a significant adverse environmental effect of the Project.

Biological Resources

The Freshwater Supply in California Alternative would result in greater ground disturbing impacts associated with freshwater pipeline installation in California since the pipeline would cover a greater length then the proposed Project. In addition, pipeline installation in California north of the Project Area would occur in densely vegetated habitat, whereas the proposed Project's Arizona alignment would be primarily installed within the Topock-Oatman highway ROW. In addition, the use of the Freshwater Supply location in California is located in an unnamed wash near the Colorado River and is within proximity to a BLM-designated Area of Critical Concern (Beale Slough). Similar to the proposed Project, this alternative site may occur within or adjacent to sensitive habitat, potentially resulting in both direct and indirect impacts to biological resources. Both the proposed Project and the Freshwater Supply in California Alternative would involve construction activities that would occur within and adjacent to habitat for several special-status species, including special-status bird species, desert tortoise, ring-tailed cat, Nelson's bighorn sheep, special-status bats, and special-status plants. However, the overall ground disturbance would be greater under the Freshwater Supply in California Alternative than the proposed Project, which would result in more severe impacts to biological resources. This alternative would not serve the purpose of avoiding or substantially lessening a significant adverse environmental effect of the Project.

Cultural Resources

Potential impacts to unknown historical and unique archaeological resources from the Freshwater Supply in California Alternative are expected to be similar to the Project. Because there remains a potential to impact unknown historical or unique archaeological resources, the Freshwater Supply in California Alternative would not change the conclusion that the impacts would be significant and unavoidable. While the freshwater infrastructure in Arizona and associated impacts would be avoided by this alternative, this alternative would not influence the installation of MW-X and MY-Y. Any freshwater well site and associated infrastructure connections would require cultural survey and appropriate management as described throughout the Cultural Resources mitigation measures that are identified in this SEIR. Potential impacts to paleontological resources from the

Freshwater Supply in California Alternative would be similar to the Project given its location and proximity to the Project Area, though additional surveys and documentation would be required. Potential impacts to human remains would also be similar to the Project because there still would be a potential to impact as yet unknown human remains at the alternate freshwater well location. CEQA impacts and determinations of their significance for known and unknown historical and unique archaeological resources, paleontological resources, and human remains would therefore be the same as described for the proposed Project. The Freshwater Supply in California Alternative would not serve the purpose of avoiding or substantially lessening a significant adverse environmental effect of the Project.

Hazards and Hazardous Materials

The Freshwater Supply in California Alternative would result in similar pipeline infrastructure construction impacts given its proximity to the existing pipeline route along National Trials Highway; however the construction impacts would be prolonged due to the greater length of the California freshwater well. The construction, operation and maintenance, and decommissioning of the Project under the Freshwater Supply in California Alternative could still result in the potential release of hazardous materials during use or delivery of hazardous materials as a result of component failure (e.g., valve, flange, or pipe), tank failure, or human error (e.g., tank overfilling). Potential impacts related to hazards and hazardous materials would be similar to the Project. Since the Project's impacts related to hazards and hazardous materials were determined to be less than significant with mitigation, this alternative would not serve the purpose of avoiding or substantially lessening a significant adverse environmental effect of the Project.

Hydrology and Water Quality

Freshwater obtained from a primary well with future backup well options in California under this alternative would likely not have arsenic elevated above the MCL. Therefore, the Freshwater Supply in California Alternative would avoid potential water quality impacts related to freshwater that may contain arsenic above water quality objectives set by the State of California, or Cr(VI) above the 32µg/L water quality objective. However, given that TDS would likely be greater than 3,000 mg/L, additional pre-treatment would be required prior to injection. Early investigations also indicate that the water at the alternative California site may contain iron and manganese at concentrations that would require conditioning prior to injection. This would require additional pre-treatment prior to injection, similar to the proposed Project. The primary drawback of this alternative is related to the aquifer near Moabi Regional Park, which was determined to not be capable of delivering a sufficient quantity of water for the remedial action without adversely affecting the quality and quantity of water available from the existing non-Project related supply wells that are used by Moabi Regional Park.

Similar to the proposed Project, this alternative would also result in the use of carbon substrate to be injected into the aquifer, the potential generation of byproducts above water quality objectives, the discharge of remedy-produced water to the TCS Evaporation Ponds, and runoff associated with the soils stockpiling. Therefore, similar to the proposed Project, this alternative could result in the exceedance of water quality standards, violation of waste discharge requirements, and/or substantial degradation of water quality.

Similar to the proposed Project, the potential presence of manganese under the Freshwater Supply in California Alternative would require treatment in a purpose-built treatment system if the concentrations of manganese exceed the basin water quality objective of 0.05 mg/L. Similar to the proposed Project, this alternative would require the construction and operation of the manganese treatment system as a contingency. However, given the reduced levels of arsenic in California freshwater compared to Arizona, impacts to water quality associated with this alternative would be slightly reduced compared to the proposed Project. Since the Project's impacts related to hydrology and water quality were determined to be less than significant with mitigation, this alternative would not serve the purpose of avoiding or substantially lessening a significant adverse environmental effect of the Project.

Noise

The Freshwater Supply in California Alternative would relocate freshwater infrastructure to the California side of the Colorado River, approximately 2.9 miles north of the IRZ wells. Extending north from Moabi Regional Park, the pipeline for the Freshwater Supply in California Alternative would be primarily installed through unpopulated and densely vegetated land not in close proximity to any sensitive noise receptors; however a portion of the pipeline would most likely be installed near Moabi Regional Park, which is a sensitive residential and recreational receptor. The proposed Project's planned freshwater supply wells in Arizona would be installed in the Topock-Oatman Highway in close proximity (180 feet) to Topock Marina recreational and residential sensitive receptors. Under this alternative, the only Project components to be located in Arizona would be MW-X and MW-Y, which would significantly reduce noise-generating activities near the Topock Marina. The location of a freshwater pipeline in California to connect the freshwater wells to the Project Area would likely be located near Moabi Regional Park. Unlike the Project freshwater pipeline in Arizona which is relegated to the Topock-Oatman Highway due to the adjacent HNWR, there are several possible routes for a freshwater pipeline in California that could lessen impacts to sensitive receptors in Moabi Regional Park. A possible route could be located on the western border of the park near the Soil Processing Area. Regardless of where the pipeline would be located, it would not likely be closer to residential and recreational receptors than the Project freshwater pipeline in Arizona, which is 180 feet from sensitive receptors. As a result, the alternative would constitute a decrease in construction and maintenance-related noise that affects sensitive receptors near the Topock Marina. Since the Project's impacts related to noise and vibration were determined to be significant and unavoidable even with the implementation of mitigation measures, this alternative would serve the purpose of avoiding or substantially lessening a significant adverse environmental effect of the Project.

Utilities, Service Systems, and Energy

Similar to the proposed Project, the Freshwater Supply in California Alternative would obtain power from the City of Needles, as well as various on-site sources of electricity, including the use of on-site generators and solar panels. Overall, this alternative would result in similar utility and energy impacts as the proposed Project. Project impacts relative to utilities and energy were determined to be less than significant with mitigation, so this alternative would not serve the purpose of avoiding or substantially lessening a significant adverse environmental effect of the Project.

Water Supplies

Conceptual modelling conducted for the Freshwater Supply in California Alternative indicates that pumping at the proposed maximum 900 gpm rate would not be achieved due to the less productive aquifer conditions. The pumping rate for the Freshwater Supply in California Alternative would be substantially decreased to 60 gpm. At this rate, the Freshwater Supply in California Alternative would not produce adequate groundwater supplies to achieve adequate levels of freshwater to flush the remedy system. Since the Project's impacts related to water supply were determined to be less than significant with mitigation, this alternative would not serve the purpose of avoiding or substantially lessening a significant adverse environmental effect of the Project.

7.6.4 Alternative 4 – No Project

The No Project Alternative represents what would reasonably be expected to occur in the foreseeable future if the Project is not approved. Pursuant to Section 15126.6(e)(2) of the CEQA Guidelines, the No Project Alternative shall:

> …discuss the existing conditions at the time the notice of preparation is published, or if no notice of preparation is published, at the time the environmental analysis is commenced, as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services.

The existing condition at the time the notice of preparation (NOP) for the proposed Project was published in June 2015 included ongoing operation of the Station and related PG&E facilities in the Project Area as discussed below. Reasonably foreseeable future activities are associated with the ongoing operation of the Station as well as soil sampling and analysis at the Project Area, which is being implemented independently of the proposed Project. These projects form the baseline for the No Project Alternative analysis presented in this section, which characterizes the activities occurring in the Project Area if the Project analyzed in this SEIR were not to occur.

On August 24, 2015, DTSC approved the Topock Soil Investigation Project based on the Topock Compressor Station Soil Investigation Project FEIR. The primary purpose of the Soil Investigation Project is to gather sufficient soil samples to be able to reliably characterize the nature and extent of soil and sediment contamination within the Project Area. The soil investigation project includes soil sampling and analysis as described in the Soil Work Plan (CH2M Hill 2013), and the potential need for bench scale tests, pilot studies, and geotechnical evaluations to support a future Soil Corrective Measures Study/Feasibility Study (Soil CMS/FS) and plant or other biota sampling activities to support an ecological risk assessment within, and in the vicinity of, the PG&E Station. The Soil Work Plan sampling began in October 2015 and continued through April 2016; additional activities described above associated with investigation have not yet been completed, but are anticipated to occur from late 2016 through 2018, if needed. Implementation of the soil investigation project will provide DTSC with sufficient data for the completion of the RFI/RI process that is consistent with state and federal guidance for site investigations and would support evaluation of possible soil cleanup action(s) if determined necessary.

At the time the NOP for this SEIR was published in June 2015, PG&E also installed and tested wells at the East Ravine and Station locations. These activities were conducted to support the groundwater remedy design. In addition, PG&E has been operating and maintaining the IM-3 extraction and treatment system at the Project Site since July 2005.

For the No Project Alternative, the Final Remedy Design identified under the proposed Project would not be implemented. The fundamental objective of the proposed Project as presented in the Groundwater FEIR certified in January 2011, is to clean up the groundwater contamination related to the historical release of chemicals at the Station, including into Bat Cave Wash and the East Ravine near the Station, in a manner that would be consistent with all applicable regulatory requirements and to do so within a reasonable period of time when compared between viable alternatives. Groundwater contamination would continue to exist at the Project Area and would continue to pose a risk to human health and the environment if the No Project Alternative were implemented. Under the No Project Alternative, the operation of the IM-3 Facility would continue to occur. If the Final Remedy Design was not implemented, PG&E must still protect the beneficial water resource of the Colorado River from the potential impacts of the Cr(VI) plume contamination. Thus, the interim measure to continue extraction of contaminated groundwater, treatment, and reinjection of the treated water would continue to be required by DTSC under Section IV.A of the 1996 Correction Action Consent Agreement, which was entered into pursuant to California Health and Safety Code, Section 25187, until such treatment is properly mitigated. Therefore, it would not be feasible to abandon the IM-3 Facility under the No Project Alternative.

7.6.4.1 Ability to Meet Most of the Project Objectives

The No Project Alternative would not meet any of the Project objectives. This alternative would not provide adequate protection of human health or the environment, and does not meet defined RAOs. No active remediation would occur, and no institutional controls would exist to prohibit groundwater use for potable water supply. The existing contaminated groundwater plume would be left on surrounding landowner property without ongoing oversight. This alternative would result in potentially significant environmental impacts related to potential ingestion of groundwater known to be contaminated with Cr(VI), and long-term presence of contaminated groundwater. In addition, improper handling of existing infrastructure that has been used to monitor and remediate the contamination through the lack of a formal decommissioning process could result in significant environmental impacts. Therefore, the No Project Alternative would not meet the primary and fundamental project objective.

7.6.5 Comparison of Environmental Impacts

Aesthetics

The introduction of new facilities within potentially scenic corridors associated with the proposed Project would not occur under this alternative. The No Project Alternative would not impact scenic vistas or the visual character of the Project Area. However, the visual effects of the proposed Project were determined to be less than significant with mitigation. Under the No

Project Alternative, the Project Area would not be affected by Final Remedy Design activities that may alter the religious and cultural experience of Native American Tribes on-site. Thus, the No Project Alternative would result in fewer aesthetic impacts compared to the proposed Project.

Air Quality

The No Project Alternative would not increase air quality impacts from existing conditions. The proposed Project would result in significant air quality impacts, which would be reduced to less than significant levels with mitigation measures. The No Project Alternative would result in fewer air quality impacts when compared to the proposed Project. Thus, the No Project Alternative would result in fewer air quality impacts compared to the proposed Project.

Biological Resources

The No Project Alternative would not alter the existing site condition. Final Remedy construction, operation and maintenance, and decommissioning activities would not be conducted, including construction of new buildings, roads, pipelines, and wells. Therefore, the No Project Alternative would result in fewer biological resource impacts than the proposed Project.

However, if the No Project Alternative were implemented, potentially harmful contaminated groundwater that remains on the Project Area would remain unmitigated, which could pose a threat to the protection of health, safety, and the environment including a risk to aquatic resources, plant and animal species that depend on uncontaminated desert habitat for survival. Thus, the No Project Alternative would result in greater biological resource impacts compared to the proposed Project.

Cultural Resources

The No Project Alternative would not involve activities that could impact significant archaeological, historic, or paleontological resources, or human remains. The proposed Project would result in significant and unavoidable adverse change to historical resources, including the Topock TCP. The No Project Alternative would not alter existing conditions and would therefore not cause impacts to cultural resources. Because the No Project Alternative would cause no adverse change to archaeological, historical resources, human remains, or paleontological resources, it would not cause or contribute to any cumulative effect on cultural resources. Therefore, the No Project Alternative would avoid the significant adverse effects to historical and cultural resources that would occur under the Project.

Hazards and Hazardous Materials

The No Project Alternative would not involve the excavation and ground disturbance of the Project Area. There would be no disruption of soil and no related potential for disruption or exposure of hazardous materials. If the No Project Alternative were implemented, however, potentially harmful contaminated groundwater that remains on the Project Area would remain unmitigated, which could pose a threat to the protection of health, safety, and the environment as the contaminant may spread as a result of weather conditions or other human-related disturbances which could occur in the Project Site. Thus, the No Project Alternative would result in greater hazards and hazardous materials impacts compared to the proposed Project.

Hydrology and Water Quality

The No Project Alternative would not involve the excavation and related ground-disturbing activities on the Project Site. There would be no disruption of soil or water use and therefore no resulting impacts to hydrology or water quality. If the No Project Alternative were implemented, however, contaminated groundwater would remain which would increase the risk to water quality in particular as a result of weather conditions or other human-related disturbances, which could occur in the Project Area. Thus, the No Project Alternative would result in greater hydrology and water quality impacts compared to the proposed Project.

Noise

The No Project Alternative would not involve activities that would generate noise. The proposed Project would result in significant and unavoidable impacts to ambient noise levels even after implementation of mitigation. As a result, the No Project Alternative would not alter the existing condition and would have fewer noise impacts than the proposed Project, but noise in the Project Area would not completely be avoided. For example, the existing noise environment associated with the IM-3 Facility would remain under the No Project Alternative. However, the No Project Alternative would result in fewer noise impacts compared to the proposed Project.

Utilities, Service Systems, and Energy

The No Project Alternative would continue to use existing utilities, services and electricity currently provided at the Project Area. Project impacts relative to utilities and energy would not occur with the No Project Alternative. However, these impacts were determined to be less than significant with mitigation, so the No Project Alternative would not serve the purpose of avoiding or substantially lessening a significant adverse environmental effect of the Project.

Water Supplies

The No Project Alternative would not involve water consumption activities or the depletion of groundwater resources and therefore no resulting impacts to water supply would occur. However, these impacts were determined to be less than significant with mitigation, so the No Project Alternative would not serve the purpose of avoiding or substantially lessening a significant adverse environmental effect of the Project.

7.7 Environmentally Superior Alternative

CEQA requires that an EIR identify the environmentally superior alternative of a project other than the No Project Alternative (CEQA Guidelines Section 15126.6(e)(2). As discussed in Section 7.6.1, the Aboveground Pipeline Infrastructure Alternative would result in minor reductions in environmental effects when compared to the proposed Project. The Aboveground Pipeline Infrastructure Alternative is therefore considered the Environmentally Superior Alternative. While the Aboveground Pipeline Infrastructure Alternative would potentially reduce air quality, biological and cultural resource impacts, it would not avoid them. In comparison, under the On-site Soil Storage Alternative, potential noise impacts would be slightly reduced relative to the proposed Project because the activities would be relocated away from sensitive receptors. However, the Elimination of On-site Soil Storage Alternative would result in greater impacts to existing landfills due to the substantial increase in soil export quantities, and would result in greater impacts to the Topock TCP and Tribal resources because native soil would be removed from the site.

It is important to note that the Aboveground Pipeline Alternative would not achieve the fundamental Project objectives. The Project objectives are to ensure the Final Groundwater Remedy achieves cleanup levels and/or performance goals and compliance with RAO's within a reasonable time frame; minimize ground disturbance to protect biological, historical, cultural resources and aesthetic impacts to the extent feasible; to ensure efficiency and compliance with health and safety standards in consideration of public safety. The construction and long-term operation and maintenance of the Aboveground Pipeline Alternative would result in greater worker and public safety issues associated with an increased risk of injury or even death associated with worker/visitor falls due to the Project Area's topography and steep slopes. Further, the Aboveground Pipeline Alternative would require increased maintenance requirements, such as sand blasting and painting every 10 years. Since the construction and long-term maintenance and operation of the Aboveground Pipeline Alternative would result in greater risks to worker and public safety issues as well as greater aesthetic impacts, this alternative would not meet the objectives of the Project.

CHAPTER 8
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CHAPTER 10
Glossary

Acre-Foot: An acre-foot is defined as the volume of water that would cover 1 acre to a depth of 1 foot. It is equivalent to about 325,851 gallons.

Aquifer: A water-bearing layer of rock or sediment that is capable of yielding useable amounts of water.

Area of Concern (AOC): Areas in and around a project site that either have shown high levels of contamination or may have been contaminated from past operations, making them focus areas of the site investigation.

Berms: A curb, ledge, wall, or mound made of various materials, used to prevent the spread of contaminants.

Best Management Practice (BMP): Acceptable practices that prevent the release of toxic and/or hazardous chemicals, and may include operational changes, materials substitution, materials and water conservation, and other measures.

Bureau of Land Management (BLM): An agency within the Department of the Interior that administers and manages the subsurface mineral estate underlying federal, state, and private lands.

California Department of Toxic Substances Control (DTSC): A department within the California Environmental Protection Agency in charge of regulating hazardous waste from generation to final disposal and overseeing the investigation and cleanup of hazardous waste sites.

California Environmental Quality Act (CEQA): Enacted in 1970 to provide long-term environmental protection, this law requires that governmental decision makers and public agencies study the environmental effects of proposed activities and that significant adverse effects be avoided or reduced where feasible.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): A law enacted by the U.S. Congress on December 11, 1980, as amended on October 17, 1986, to provide broad federal authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health or the environment.

Chemicals of Potential Concern (COPC): Chemical elements or compounds (e.g., chromium) that may or may not be present at a project area.

Chromium: The additive of concentrations from all forms of chromium, mainly comprising hexavalent and trivalent forms. The California drinking water standard for total chromium is 50 micrograms per liter (or parts per billion), while the Federal standard is 100 micrograms per liter.

Compressor Station**:** A compressor station is a facility which helps the transportation process of natural gas from one location to another

Corrective Action Process: A process designed to evaluate the nature and extent of a release of a hazardous substance and implement appropriate measures to protect public health and the environment.

Corrective Measure Study/Feasibility Study (CMS/FS): A study conducted by the facility owner/operator to identify and evaluate alternative cleanup options to address contamination at a project site.

Cumulative Impacts: Total effect on a natural resource, ecosystem, or human community due to past, present, and future activities or actions of federal, non-federal, public, and private entities.

Data Quality Objectives*:* Systematic planning approach used to prepare plans for environmental data collection activities.

Decommissioning: The planned shut-down or removal of a building, equipment, plant, etc. from operation or usage.

Department of the Interior (DOI): The United States department charged with conservation and development of natural resources. The U.S. Department of the Interior uses sound science to manage and sustain America's lands, water, wildlife, and energy resources, honors our nation's responsibilities to tribal nations, and advocates for America's island communities.

Environmental Impact Report (EIR): A report designed to examine the potential environmental impacts of proposed activities as required by the California Environmental Quality Act.

Extraction Wells: Wells that are used primarily to remove contaminated groundwater from the ground. Water level measurements and water samples can also be collected from extraction wells.

Final Remedy: The final cleanup action proposed for dealing with contaminants at a site.

Groundwater: Water beneath the earth's surface that flows through soil and rock openings.

Groundwater Plume: A body of contaminated groundwater. The movement of a groundwater plume can be influenced by such factors as local groundwater flow patterns, the character of the aquifer in which the groundwater is contained, and the density of contaminants.

Growth Inducement: The effects of a proposed project could have on economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment.

Hexavalent Chromium: One of several chemical forms of the element chromium. Chromium is a metal naturally found in rocks, soil and the tissue of plants and animals. Hexavalent chromium is used in industrial products and processes and is a known carcinogen when inhaled (i.e., through breathing) and ingested in unsafe concentrations.

Independent Utility**:** A project is considered to have independent utility if it would be constructed absent the construction of other projects in the project area.

In Situ Treatment: Technology that treats contaminants in place within the soil or in groundwater. It typically involves injection of a material such as air, gases, chemical or biological reagents, or solid material (e.g., molasses or lactose) to chemically alter the contaminant or to encourage bacteria in the soil to aid in the treatment.

Interim Measures: Cleanup actions taken to protect public health and the environment while long-term solutions are being developed.

Interested Tribes: The five Native American Tribes that actively participate in the Topock project are the Chemehuevi Indian Tribe, Cocopah Indian Tribe, Colorado River Indian Tribes, Fort Mojave Indian Tribe, and the Hualapai Indian Tribe.

Lead Agency: A public agency with the principal responsibility for ordering and overseeing site investigation and cleanup.

Mitigation Measures: Actions designed to minimize significant impacts from project-related activities.

Mitigation Monitoring & Reporting Program (MMRP): A MRMP is a document or a matrix identifying mitigation actions to be taken and the outcomes of mitigation measure implementation when significant environmental impacts have been identified.

Molybdenum: A metallic element widely distributed in the Earth's crust and is used in industrial products and processes.

Monitoring Wells: Specially constructed wells used exclusively for testing groundwater.

Nitrate: Nitrates and nitrites are nitrogen-oxygen chemical compounds that combine with various organic and inorganic compounds. Once taken into the body, nitrates are converted into nitrites.

Notice of Determination (NOD): A formal notice filed with the California State Clearinghouse after the final EIR has been certified and a project approved.

Notice of Preparation (NOP): A CEQA document to be sent by the lead agency to notify the public, responsible agencies, trustee agencies, and involved federal agencies that the EIR is being prepared.

Parts per Billion (ppb): A unit of measure used to describe levels or concentrations of contamination. (a measure of concentration equaling 0.0000001%). Most drinking water standards are expressed in ppb concentrations.

Percolation: The downward flow or filtering of water or other liquids through subsurface rock or soil layers, usually continuing to groundwater.

Plume: A body of contaminated groundwater. The movement of a plume in groundwater can be influenced by such factors as local groundwater flow patterns, the character of the aquifer in which the groundwater is contained, and the density of contaminants.

Precipitate: A substance separated from a solution or suspension by chemical or physical change usually as an insoluble amorphous or crystalline solid.

Regional Water Quality Control Board (RWQCB): A California agency that maintains water quality standards for a specific geographic jurisdiction and enforces state water quality laws.

Remediation: Cleanup or other methods used to remove or contain a toxic spill or hazardous materials from a site.

Resource Conservation and Recovery Act (RCRA): A federal law that establishes a regulatory system to track and provide safe procedures for management of hazardous wastes from the time of generation to final disposal.

Resource Conservation Recovery Act (RCRA) Facility Investigation/Remedial Investigation (RFI/RI): An investigation that occurs in the corrective action process following a Facility Assessment under RCRA and/or a Site Inspection under Comprehensive Environmental Response, Compensation, and Liability Act. It is an in-depth study designed to gather data needed to determine the nature and extent of contamination at a site.

Reverse Osmosis: A treatment process used in water and wastewater systems by adding pressure to force water through a semi-permeable membrane. Reverse osmosis removes most drinking water contaminants, including salts.

Risk Assessment: Qualitative and quantitative evaluation of the risk posed to human health and/or the environment by the actual or potential presence and/or use of specific pollutants.

Scoping: A process to gain input from agencies and the public regarding the content of an EIR.

Scoping Meeting: Meeting to gain input from the public, the local community, government agencies, and tribal government agencies regarding selection of the final remedy.

Sediments: The soil, sand, and minerals at the bottom of surface waters, such as streams, lakes, and rivers. The term may also refer to solids that settle out of any liquid.

Selenium: A nonmetallic element abundant in the Earth's crust that is used in industrial products and processes.

Solid Waste Management Unit (SWMU): Any discernable unit at which solid wastes have been placed at any time, irrespective of whether the unit was intended for the management of solid or hazardous waste. Such units include any area at a facility at which solid wastes have been routinely and systematically released (Title 40 of the Code of Federal Regulations, Section 265.501).

Standard Operating Procedures (SOP): A set of step-by-step instructions compiled by an organization to help workers carry out routine operations.

Statement of Basis: A document that describes the basis for DTSC's proposed remedy and cleanup standards.

Subsequent Environmental Impact Report (EIR): A report prepared when substantial changes are proposed which require major revisions to a certified EIR, per CEQA Guidelines Section 21166.

Subsurface Containment Barrier: Barriers used to contain or control the flow of contaminated groundwater or subsurface liquids. They are constructed by digging a trench around a contaminated area and filling the trench with a material that tends not to allow water to pass through it.

Surface Water: All water naturally open to the atmosphere such as rivers, lakes, reservoirs, ponds, streams, impoundments, seas, and estuaries.

Total Chromium: The additive of concentrations from all forms of chromium, mainly comprising hexavalent and trivalent forms. The California drinking water standard for total chromium is

50 micrograms per liter (or parts per billion), while the federal standard is 100 micrograms per liter.

Trivalent Chromium: A form of chromium and a metal naturally found in rocks, soil, and the tissue of plants and animals. Trivalent chromium is considered an essential nutrient and is relatively harmless. It does not dissolve in groundwater and tends to bind to soil; thus it does not travel readily in the environment.

Work Plan: A document that presents key elements of the approach for a proposed action. These may include health and safety, waste management, data collection, construction activities and methods, the schedule, approvals, a reporting plan and reporting schedule.

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