APPENDIX A

RECLAMATION

Managing Water in the West

Environmental Assessment

East Highline Reservoir and Intake Channel Project

BUREAU OF RECLAMATION

Interior Region 8 - Lower Colorado Basin
Arizona, California, Nevada
Yuma Area Office
Yuma, Arizona

April 2020

Mission Statements

The U.S. Department of the Interior protects and manages the Nation's natural resources and cultural heritage; provides scientific and other information about those resources; and honors its trust responsibilities or special commitments to American Indians, Alaska Natives, and affiliated Island Communities. The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

Environmental Assessment
East Highline Reservoir and Intake Channel Project

Prepared for:

Bureau of Reclamation
Yuma Area Office
7301 Calle Agua Salada
Yuma, Arizona 85364
Contact: Julian DeSantiago

Prepared by:

Imperial Irrigation District
333 East Barioni Boulevard
Imperial, California 92251
Contact: Justina Gamboa-Arce

Prepared with assistance from:

DUDEK

APRIL 2020

Acronyms and Abbreviations

Acronym or Abbreviation	Description
AAC	All-American Canal
AF	Acre-Feet
APE	Area of Potential Effect
BMPs	Best Management Practices
BLM	Bureau of Land Management
CDFW	California Department of Fish and Wildlife
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
Cfs	Cubic feet per second
CWA	Clean Water Act
CVWD	Coachella Valley Water District
DTSC	Department of Toxic Substances Control
DWR	Department of Water Resources
EA	Environmental Assessment
EHL	East Highline
EIR	Environmental Impact Report
EPA	Environmental Protection Agency
FTHL	Flat-tailed Horned Lizard
FONSI	Finding of No Significant Impact
I-8	Interstate Highway 8
ICAPCD	Imperial County Air Pollution Control District
IID	Imperial Irrigation District
NHPA	National Historic Preservation Act
NEPA	National Environmental Policy Act
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
O&M	Operation and Management
PM_{10}	Coarse particulate matter
QSA	Quantification Settlement Agreement
Reclamation	Bureau of Reclamation
ROW	Right-of-Way
RWQCB	Regional Water Quality Control Board
SCAG	Southern California Association of Governments
SR-98	State Route 98
SPCC	Spill Prevention, Control, and Countermeasures
SHPO	State Historic Preservation Officer
US	United States
USFWS	United States Fish and Wildlife Service
USACE	United States Army Corps of Engineers
YRR	Yuma Ridgway's rail

TABLE OF CONTENTS

APPENDICES

FIGURES

TABLES

Chapter 1. Introduction

1.1 Introduction

The Bureau of Reclamation (Reclamation) has prepared this Environmental Assessment (EA) to evaluate potential impacts associated with the proposed East Highline Reservoir and Intake Channel Project (“Project” or “Proposed Action”). This EA was prepared in accordance with the National Environmental Policy Act (NEPA) of 1969 (42 U.S.C. 4321 et seq.), the Council on Environmental Quality (CEQ) regulations (40 CFR 1500-1508) for implementing NEPA, the Department of the Interior’s NEPA Regulations (43 CFR Part 46), and Reclamation Manual NEPA Policy (ENV P03). Reclamation is the lead Federal agency pursuant to NEPA. Because the Project would modify Reclamation facilities and introduce new facilities within Reclamation’s withdrawn land, a land use license agreement from Reclamation is required in accordance with Reclamation’s Directives and Standards LND 08-01, dated 1/3/2002.

Imperial Irrigation District (IID) intends to undertake the Proposed Action if a land use license (license) is granted by Reclamation. The Proposed Action consists of construction of a new agricultural single cell water reservoir (or split cell design option), and construction of an open intake channel to convey water from the All-American Canal (AAC). The AAC is owned by Reclamation and is operated by IID under contract with Reclamation. Water would be gravitationally conveyed from the AAC to the proposed reservoir via a new open intake channel. Water would then be delivered through automated gates and a discharge structure into the East Highline (EHL) Canal which is owned and operated by the IID and serves the eastern portion of the Imperial Valley. The reservoir would temporarily store and operationally manage up to approximately 3,400 acre-feet (AF) of water.

1.2 Project Location

The Proposed Action is located in the southern region of Imperial County, California, east of Calexico and southeast of Holtville (Figure 1-1, Project Location). The Project is located on five parcels (Assessor’s Parcel Number (APN) 055-250-020, 059-310-005, 055-310-007, 055-310-006, 059-310-006) owned by IID, cumulatively totaling approximately 556 acres (Figure 1-2, Vicinity Map). The Project area is found on the USGS Bonds Corner 7.5-minute topographic quadrangle in Sections 25, 26 and 36 of Township 16 South, Range 16 East, and Section 6 of Township 17 South, Range 17 East. The latitude and longitude coordinates are 32°43'35″N and 115°16'52"W. The Proposed Action is located directly east of the EHL Canal, and directly west of lands managed by the Bureau of Land Management (BLM). The Proposed Action is located adjacent to the AAC, approximately 1.1 miles north of State Highway 98 (SR-98) and approximately 2 miles south of Interstate Highway 8 (I-8). To the east of the Proposed Action site, is open and vacant desert land with desert shrubbery and patches of groundcover managed by the BLM. Agricultural fields surround the Project site to the northwest, west and south, with the EHL Canal directly adjacent to the west. See Figure 1-3 for Proposed Action area and Figure 1-4 for Proposed Action Conceptual Design.

1.3 Project Background

IID was formed in 1911 under a state charter and acquired certain rights of the California Development Company and its Mexican subsidiary. IID is an irrigation district, a limited-purpose public agency, formed under the laws of the State of California. IID holds rights to take water from the Colorado River and deliver it to farmers, tenants, and landowners in Imperial County. IID provides agricultural water to approximately 475,000 acres of some of the most intensively farmed land in the nation. Landowners and tenants within IID's water service area conduct on-farm operations, which include crop irrigation (i.e., applying water to fields) and maintaining on-farm drainage systems. IID does not have authority to approve or disapprove land use, water use, or crop selection by farmers. IID's operational activities are associated with irrigation (i.e., the diversion, measurement, conveyance, and delivery of Colorado River water to customers within the IID water service area through its canal system), drainage (i.e., the collection, removal, measurement, and transport of drainage waters to the Salton Sea), hydroelectric power, and energy services.

In 1942, the AAC, operated by IID, became the sole water source for Imperial Valley residents and area farmlands. Approximately 3.1 million acre-feet of Colorado River water is delivered annually through the AAC to six cities, two special water districts, a private water company, and 475,000 acres of agricultural lands throughout the Imperial Valley (IID 2017). The EHL Canal begins south of the intersection of Bornt Road and SR-98. The EHL Canal deviates from the AAC, thus bringing water north to the surrounding agricultural areas. The AAC is a federal facility under the ownership of Reclamation. IID, in accordance with contractual agreements with Reclamation's Yuma Area Office, has operation and maintenance responsibility for the AAC and appurtenant facilities.

IID has a substantial seepage recovery program from main system laterals within the IID service area that are currently producing approximately 35,000 acre-feet of conserved water annually. IID began seepage recovery along the AAC in 1947, along the EHL Canal in 1967, and has been expanding these projects to meet Quantification Settlement Agreement (QSA)/Transfer Agreements obligations since 2009.

1.4 Project Purpose and Need

Under NEPA, an EA "shall briefly specify the underlying purpose and need to which the agency is responding" with the Proposed Action (40 CFR 1502.13). The purpose of the Proposed Action is to augment IID's current levels of operational flexibility while creating an additional tool to assist in meeting main-system and on-farm conservation program goals. The Project is also consistent with the State of California's water conservation objectives established under Executive Order B-37-16. The Proposed Action is further consistent with the intended use of Reclamation's withdrawn lands for water management use. The specific objectives for IID, and the purpose and need, are further described below:

- The Proposed Action will increase delivery flexibility and provide conservation opportunities within the district to accommodate in-valley water demand. These efforts are consistent with the objectives set forth in IID's 2016 Water Conservation Plan. Mid lateral and off line reservoirs are an integral part of the IID System Conservation Program.
- The Proposed Action will help support IID's 12-Hour Delivery Program via maximized operational storage capacity and flexibility, enabling farmers to match crop water requirements and conserve water. The reservoir will help balance supply-demand mismatches due in part to conveyance travel time, peak demands, unavailable storage, and rain events.
- The Proposed Action will provide consistency with the 2018 California Water Plan goals: Goal 2-Strengthen Resiliency and Operational Flexibility of Existing and Future Infrastructure; Goal 4-Empower California's Under-Represented and Vulnerable Communities; and, Goal 6-Support Real-time Decision-making, Adaptive Management, and Long-term Planning.
- The Proposed Action is in support of the Reclamation Reform Act of 1982 to " . . . encourage . . . consideration and incorporation of prudent and responsible water conservation measures . . .by . . . recipients of irrigation, municipal and industrial water . . ."

Additional specific Project design objectives are as follows:

- Minimize the length of the intake channel from AAC and the outflow channel to EHL Canal.
- Optimal placement to benefit the maximum number of downstream IID water users.
- Utilize a route with the most beneficial hydrologic conditions to accommodate gravity flow (i.e., avoiding/minimizing pumping).

The construction and use of the Proposed Action is primarily for agricultural purposes to have a large operational reservoir that will allow for the management of fluctuating downstream agricultural demands due to increases in requests for shorter 12-hour water deliveries or any reductions from the normal 24-hour water delivery period. The Proposed Action will allow IID to better match water demands by creating a more efficient canal system with the additional water management facility upstream of most of IID’s water service. Improved management of Colorado River water deliveries to agricultural users within IID’s distribution system will further maximize water conservation opportunities.

1.5 Reclamation Authority and Policy

Reclamation’s authority to grant land use authorizations is stated in the Reclamation Manual, Directives and Standards LND 08-01 (dated 1/3/2002). This document provides standard procedures for issuing land use authorization documents such as easements, leases, licenses, and permits, which allow others to use Reclamation lands and interests in its lands, facilities, and water surfaces. According to LND 08-01 item 2.C, “Permits and licenses are similar in nature. Permits are generally considered a form, or subset, of licenses. They do not convey possessory interest, but grant only permission to use real property under specific, limited conditions. Licenses, including permits, are use authorizations that grant personal, revocable permission or authority for a person or entity to utilize a specific parcel of land for a specific purpose or purposes. Licenses, including permits do not convey any ownership interest in the land and are not generally considered appurtenant to a parcel of land, thus are personal in nature. In Reclamation, the term ‘permit’ is generally used to refer to short-term and less intense uses (less than 3 years) and ‘license’ generally is used to refer to longer and more substantial uses.”

IID is requesting a license from Reclamation. The license would grant IID access to the AAC and withdrawn lands to construct the Proposed Action. It would be the responsibility of the IID to adhere to guidance detailed in this EA concerning implementation. It would also be the responsibility of the IID to provide funding, labor and materials to implement and maintain the plan. Therefore, since the Project would result in the addition of permanent infrastructure involving a Reclamation facility that would be a long and substantial use requiring a license, the Project is subject to the provisions in LND 08-01 item 7.A-C regarding licenses

1.6 Purpose of the Environmental Assessment

The Proposed Action consists of construction, operation, and maintenance of a new reservoir and intake structure including connection to the AAC, a federally owned facility. Reclamation’s decision to issue a license to IID is considered a federal undertaking and triggers the requirement under NEPA to conduct an assessment of environmental effects. Reclamation is the lead federal agency for NEPA compliance because Reclamation must authorize the Project’s connection to Reclamation’s AAC in order for IID to implement the project. This EA evaluates the environmental effects of construction, use, and maintenance of the Proposed Action. The environmental process includes a public comment period, during which Reclamation will solicit the public, agencies, and Tribes for comment (please see Chapter 4).

This EA includes an assessment of the effects that could reasonably be expected should Reclamation issue a license to IID granting them access to the AAC to facilitate the construction, use, and maintenance of the proposed EHL Reservoir and Intake Channel. This EA identifies minimization and mitigation measures that will help to minimize potential environmental effects and considers alternatives to the Proposed Action. The scope of this EA is focused on potential environmental effects and serves as an informational document to provide public disclosure of potential effects of the Project, identify ways to minimize those effects, and consider alternatives to the Proposed Action. Fieldwork and resource mapping conducted to evaluate conditions within the Proposed Action area focused on the 556-acre reservoir and intake channel areas, of which 11 acres are federally managed. The land included in the corridor where fieldwork and resource mapping occurred is referred to in this EA as the Study Area. The total acreage of all affected parcels of land is 573 acres.

1.7 Related CEQA Documentation

The Proposed Action also triggers the need for environmental review under the California Environmental Quality Act (CEQA). IID is the agency primarily responsible for the full Project and therefore the lead agency under the CEQA. IID has prepared an Environmental Impact Report (EIR) for the Project (attached as Appendix A) in accordance with Section 21081.6 of the California Resources Code. The EIR and the associated technical studies provide much of the background information relied upon in this EA.

1.8 Determinations to be Made

Although IID is the agency preparing the environmental documentation and responsible for construction, operation, and maintenance of the Proposed Action, Reclamation is the lead Federal agency under NEPA. Because the project would modify Reclamation facilities and introduce new facilities within Reclamation's ROW, a land use authorization license agreement from Reclamation is required in accordance with Reclamation's Directives and Standards LND 08-01, dated January 3, 2002. This EA will serve to inform the Yuma Area Office Manager with the information and analysis necessary to determine whether a Finding of No Significant Impact (FONSI) is appropriate and an EIS is not required. This decision will be based on a determination that all potential effects are either non-significant or can be reduced to non-significant levels through the implementation of mitigation measures. If any potential effects are considered significant and cannot be avoided or reduced to non-significant levels, the preparation and processing of an Environmental Impact Statement is required to implement the Proposed Action.

Permits and Approvals

Permits, and approvals required from other responsible agencies to authorize construction, maintenance, and operation of the Proposed Action include but may not be limited to those detailed in the EIR (Appendix A). Approvals by Reclamation or coordinated through Reclamation are as follows:

- **License Agreement:** Reclamation would issue a license to IID, to allow for construction and operation of an intake channel and associated access facilities to convey water from the AAC to the proposed EHL Reservoir and Intake Channel.
- **Federal Endangered Species Act Consultation:** Prior to issuing an IA, Reclamation shall consult with the U.S. Fish and Wildlife Service (USFWS) to determine whether the Project would adversely affect threatened or endangered plants or wildlife.
- **National Historic Preservation Act Section 106 Consultation:** Prior to issuing an IA, Reclamation shall consult with the State Historic Preservation Officer to determine whether the Proposed Action would adversely affect cultural or historic resources.

Project Site

East Highline Reservoir and Intake Channel

Figure 1-1 Project Location

INTENTIONALLY LEFT BLANK

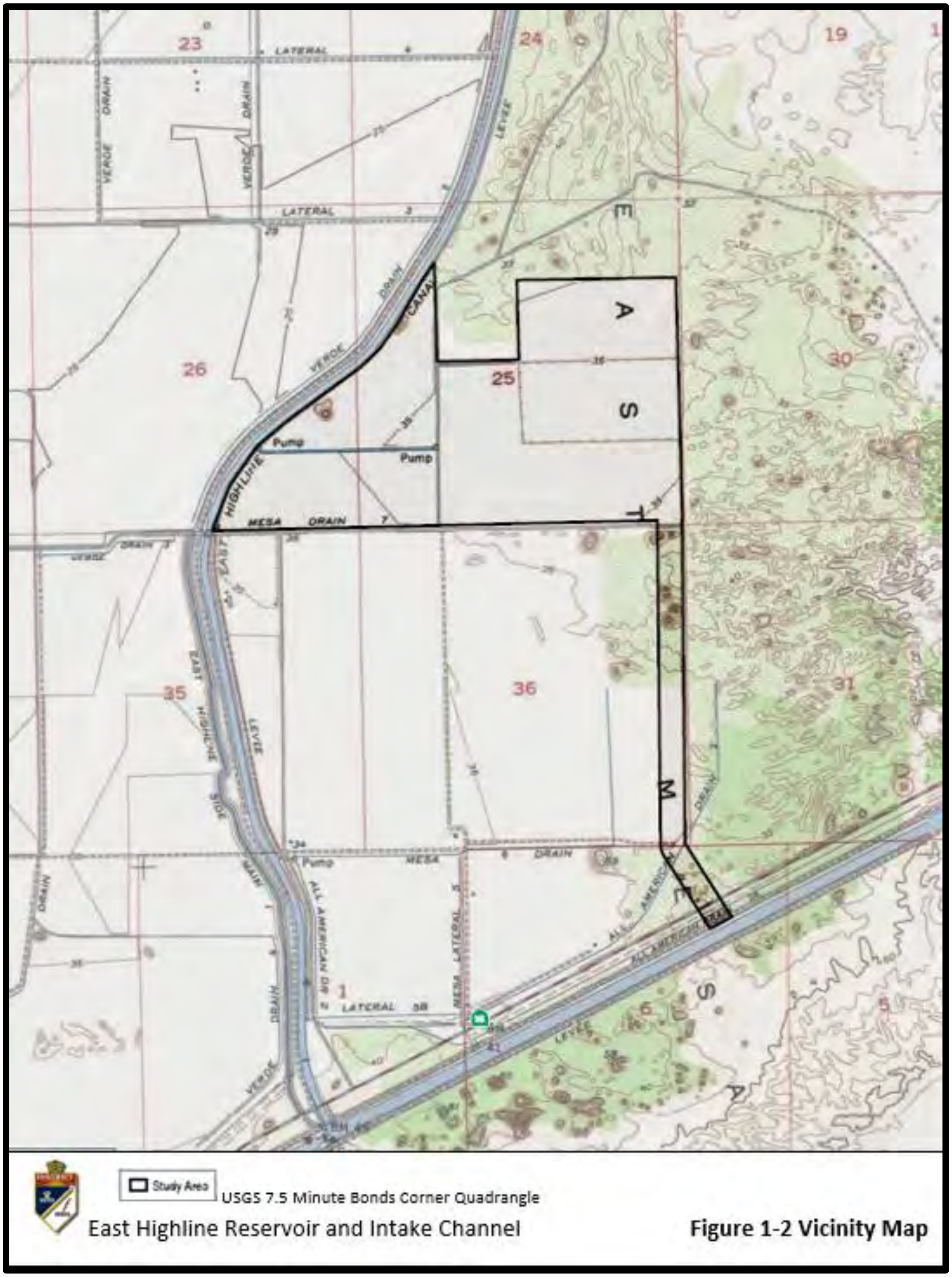
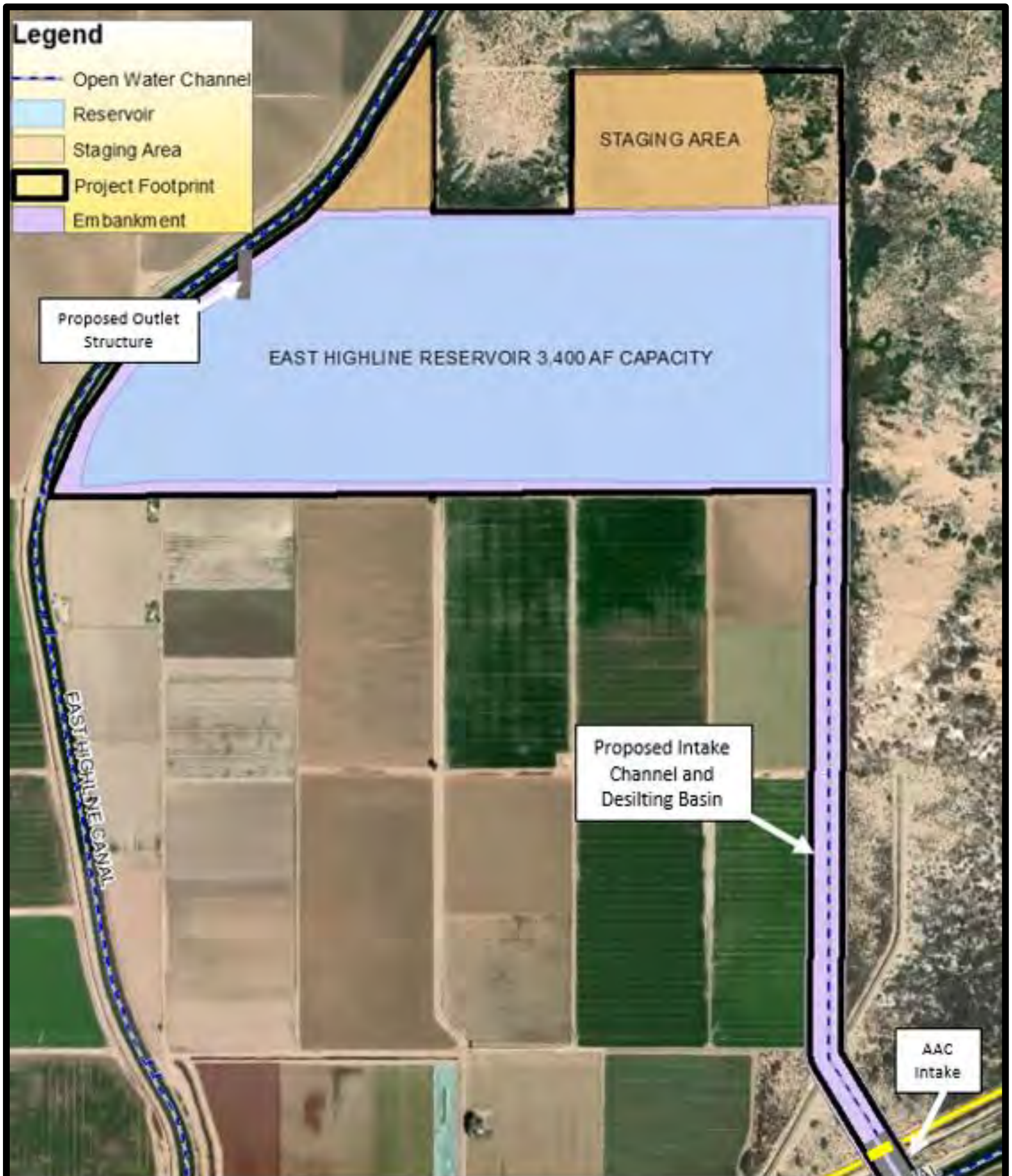


Figure 1-2 Vicinity Map

INTENTIONALLY LEFT BLANK

Figure 1-3 Proposed Action

INTENTIONALLY LEFT BLANK



East Highline Reservoir and Intake Channel **Figure 1-4 Conceptual Design**

INTENTIONALLY LEFT BLANK

Chapter 2. Alternatives

2.1 Introduction

NEPA guidelines require that an EA evaluate the "No Action" alternative in addition to the Proposed Action. This chapter describes the alternatives considered for the Proposed Action, including a No Action alternative, and alternatives that have been eliminated from further analysis due to infeasibility, or economic or environmental restraints.

2.2 No Action Alternative

The No Action alternative provides a basis for comparison of the environmental consequences of the Proposed Action or any other potential action. In this EA, the no action alternative assumes that no activities would occur and the IID system would continue to be operated and maintained in its current condition. Under the No Action alternative, construction of the Proposed Action would not be conducted and the AAC and EHL canals would continue to function in their current state, which would eliminate the potential increase in water conservation and operational flexibility with the demands of downstream water users from new facilities.

2.3 Proposed Action

The Proposed Action consists of constructing an agricultural water storage reservoir and intake channel, covering approximately 370 acres, within a 417-acre Project footprint north of the AAC. The reservoir currently has two optional designs, a single cell, or split cell design (described further on page 19). Both cell design options would equally maximize the operational management of up to approximately 3,400 acre-feet of water without a difference in water storage volume. The reservoir would have concrete lined embankments and a geo-membrane liner on the base floor and have a maximum water storage depth of approximately 11 feet. Water would be gravitationally conveyed from the AAC to the proposed reservoir via an open canal intake channel, within a proposed 300-foot wide ROW (approximately 1.3 miles in length and covering approximately 47 acres). The intake channel would serve a dual purpose as a sedimentation basin. Water temporarily stored in the proposed reservoir would be delivered into the EHL Canal to serve downstream agricultural demands through an automated gate outlet with a gravity flow capacity of approximately 1,500 cubic feet per second (cfs).

Two potential staging areas (approximately 35 acres) are anticipated in the northwest and northeast portions of the Proposed Action site within IID owned land, as indicated in Figure 1-3. The reservoir footprint would be constructed over agricultural land also owned by IID. Approximately 36 acres of the proposed intake channel and right of way would be constructed on agricultural land and an additional 11 acres would cross federal lands withdrawn to Reclamation. The federally owned land is located at the southern end of the proposed intake channel route from the AAC, which is also federally owned.

The proposed intake channel will run from the north side of the AAC within the proposed 300-foot width of new ROW. The ROW would include the channel, embankments on either side, 25-foot wide operation and maintenance roads on either side (top of embankment), and respective setback on either side (70-foot setback on the east side and 30-foot setback on the west side). The actual channel would have a bottom width of approximately 20 feet with a total open channel width of approximately 70 feet (concrete edge to concrete edge) and a depth of 10-15 feet from the top of the embankments. Impacts to the AAC include cutting the AAC bank to allow a direct connection to the open intake channel. The cut bank and intake structure would alter approximately 150 feet of the AAC bank. The embankments on either side of the proposed intake channel would have a height of approximately 10 feet above existing grade and an outer 3-1 slope extending approximately 40 feet in width on either side of the intake channel.

Construction Activities

Construction of the reservoir and intake channel would take a total of approximately 15 months and involve six principal activities that may be phased (but include overlapping and/or concurrent activities) as follows.

Reservoir (Phase 1): The construction of the reservoir is anticipated to occur over the 15-month construction period. Construction of the reservoir will require a crew consisting of an average of 20 workers. The total area that will be excavated and graded is approximately 525 acres, including embankment areas and areas where excess material will be deposited and regraded to the north of the proposed reservoir site. The total volume of excavation is estimated to be about 2.4 million cubic yards. The temporary disposal facility (located within the staging area) is proposed north of and adjacent to the proposed reservoir. However, a material balance is expected at project end resulting from material demand for embankment and rerouted roadway. Any incidental excess would be re-graded to the site areas on the north of the proposed cell area. The quantity of concrete lining for the reservoir would be approximately 28,700 cubic yards for channel, reservoir, outlet and related support structures. A geo-membrane liner would be installed to cover the bottom of the reservoir and continue up under the concrete on the inside embankments. Construction equipment likely to be utilized at various times during the construction of the reservoir is detailed in Table 2-1. Holdridge Road realignment would take place within the proposed action area and at the same time as the reservoir construction activities. Access to the north of Holdridge road will be around the perimeter of the proposed reservoir.

State Route 98 Roadway Detour (Phase 2): The SR-98 Roadway Detour would occur during the first month of construction. The detour plans would be coordinated through, and approved by, the

California Department of Transportation as well as Reclamation for a small portion affecting federal withdrawn lands. The detour would be temporary, while construction of the intake channel intersects with SR-98. Construction equipment likely to be utilized at various times during the construction of the roadway detour is detailed in Table 2-1.

Sedimentation Basin (Phase 3): The construction of the sedimentation basin (located within intake canal's footprint) would be anticipated to occur over a 3-month construction period. Construction of the sedimentation basin would require a crew consisting of an average of 15 workers over the duration of the construction period. The total area that will be graded is approximately 10 acres. The total volume of excavation is estimated to be about 120,000 cubic yards. The disposal facility is located north and adjacent to the reservoir. The quantity of concrete lining for the sedimentation basin would be approximately 3,000 cubic yards. Construction equipment likely to be utilized during the construction of the sedimentation basin is detailed in Table 2-1. This phase would overlap with Phase 4, Intake Canal and Measurement Flume.

Intake Channel and Measurement Flume (Phase 4): The construction of the intake channel and measurement flume would be anticipated to occur over a 3-month construction period. Construction of the channel and measurement flume would require a crew consisting of an average of 20 workers over the duration of the 3-month period. The total area that would be graded is approximately 47 acres. The total volume of canal embankment is estimated to be about 225,000 cubic yards. The material would be hauled primarily from the reservoir excavation for the construction of the channel embankment. The quantity of concrete lining would be approximately 4,000 cubic yards. Construction equipment likely to be utilized during the construction of the intake channel and measurement flume is detailed in Table 2-1.

Canal Tie-Ins (Phase 5): The construction of the AAC inflow Tie-In and EHL Canal outfall Tie-In would occur over an approximate 3-month period and would require a crew consisting of an average of 10 workers over the duration of the construction period, after the SR-98 Roadway Detour, and would overlap partially with the Sedimentation Basin (Phase 3) and the Intake Canal and Measurement Flume (Phase 4) construction. Table 2-1 presents the Construction equipment likely be required at various times during the construction of the tie-ins.

Structures (Phase 6): The construction of the SR-98 crossing, channel inlet structure, reservoir outlet structure, meter vault, and EHL Canal outfall structure would occur over an approximately 6-month period and would require a crew consisting of an average of 12 workers over the duration of the construction period. Construction equipment likely to be utilized during the construction of these structures are detailed in Table 2-1.

Table 2-1
Phasing and Equipment

Phase Number	Phase Name	Months of Construction	List of Equipment*
Phase 1	Reservoir	15	Pickups, Dozer, Large Excavator Backhoe, Dump Truck (40 ton wagons), Flat Bed Truck, Vibratory Compactor, Ready-mix Concrete Trucks, Shotcrete Pump, Concrete Curing Applicator, Water Truck, Caterpillar motor grader, Small Crane or Large Boom Truck, 25 kVA Portable Generator, Dewatering Pump System
Phase 2	SR-98 Detour	1	Pickups, Caterpillar 633 Self-loading scraper, Dump Truck, Vibratory Compactor, Asphalt/Road Base Trucks, Asphalt Pavers, Smooth Drum Roller Compactor, Water Truck, Caterpillar motor grader
Phase 3	Sedimentation Basin	3	Pickups, Dozer, Large Excavator Backhoe, Dump Truck (40 cy wagons), Gradall (Trimming), Ready-mix Concrete Trucks, Shotcrete Pump, Concrete Curing Applicator, Flat Bed Truck, Vibratory Compactor, Water Truck, Caterpillar motor grader, 25 kVA Portable Generator, Dewatering Pump System
Phase 4	Intake Channel and Measurement Flume	3	Pickups, Gradall (Trimming), Ready-mix Concrete Trucks, Shotcrete Pump, Concrete Curing Applicator, Flat Bed Truck, Vibratory Compactor, Caterpillar 633 Self-loading scraper, Small Boom Truck, Water Truck, Caterpillar motor grader, 25 kVA Portable Generator, Dewatering Pump System
Phase 5	Canal Tie-Ins	3	Pickups, Large Excavator Backhoe, Dump Truck, Pile Driving, Vibratory Compactor, Gradall (Trimming), Ready-mix Concrete Trucks, Shotcrete Pump, Concrete Curing Applicator, Small Crane or Large Boom Truck, Water Truck, 15 kVA Portable Generator, Dewatering Pump System
Phase 6	Structures	6	Pickups, Dozer, Large Excavator Backhoe, Dump Truck (40 cy wagons), Gradall (Trimming), Ready-mix Concrete Trucks, Shotcrete Pump, Concrete Curing Applicator, Flat Bed Truck, Vibratory Compactor, Water Truck, Caterpillar motor grader, 25 kVA Portable Generator, Dewatering Pump System

*Not all equipment listed is used in all months of the identified construction phase

Access

The Proposed Action site is accessible from existing County dirt roads, Verde School Road, and Holdridge Road. These County roads are accessible via Bonds Corner Road and SR-98.

Maintenance

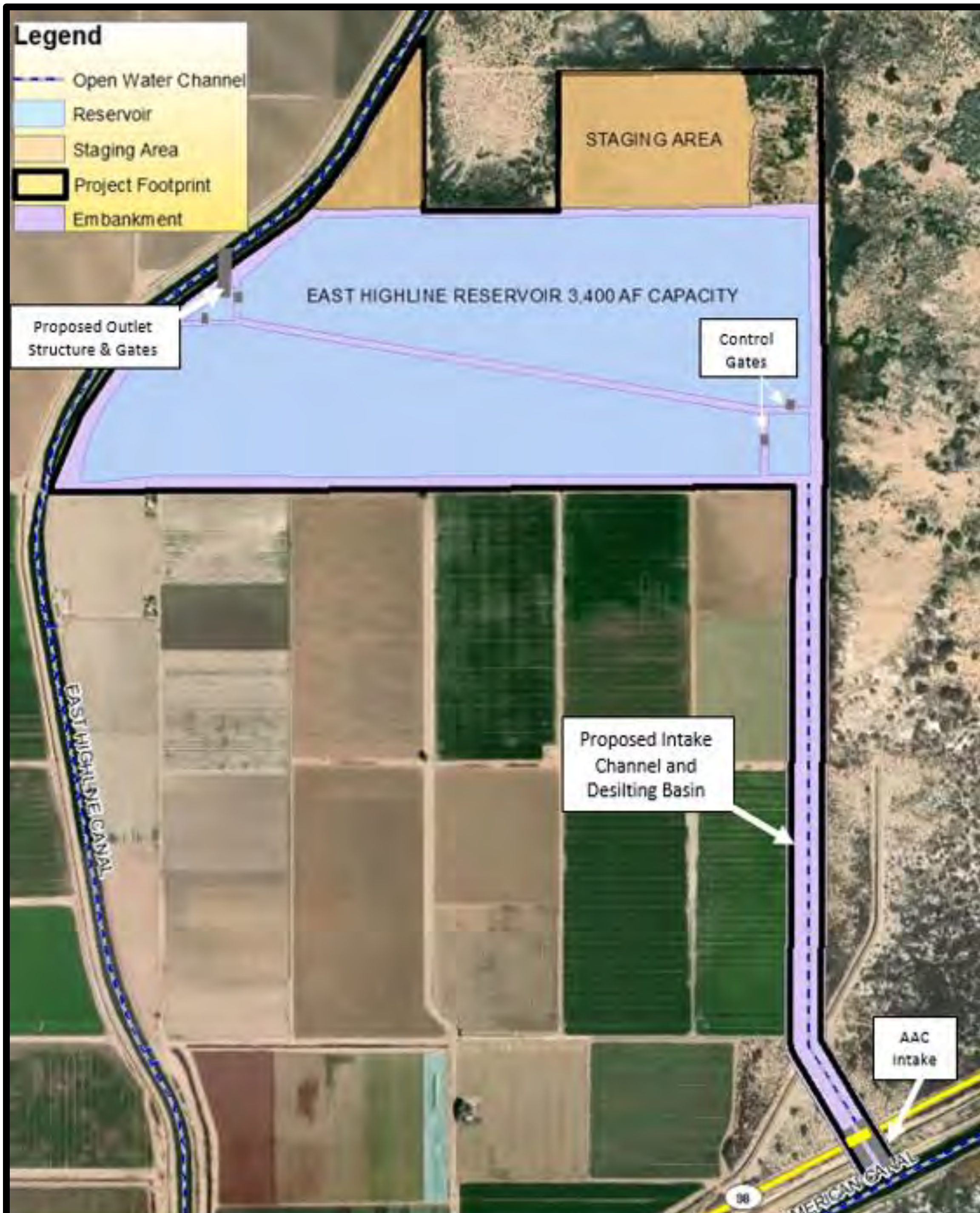
Maintenance would be undertaken by IID in accordance with existing practices for inspections and repair. No on-site operations and maintenance facilities would be provided. Inspections would be made via crew trucks and using the existing road infrastructure and the constructed perimeter road around the reservoir and along the intake channel.

Split Cell Design Option

The split cell reservoir design option includes the construction of two adjacent reservoirs, or cells, that would add approximately the same linear footage of additional embankment to the single cell design described above (See Figure 2-1). The split cell design would be constructed with the same type of materials, in the same manner as the single cell reservoir previously described. The intake route would remain in the same footprint, and continue to require a single intake gate and structure. The split cell design would continue having a single outfall structure into the EHL Canal.

If the split cell design option is selected, the design would require the addition of a separate fore- and after-bay, as well as a dividing embankment that would split the reservoir diagonally from the southeast corner to the northwest corner of the reservoir. The fore-bay would be constructed just after the intake gates at the southeast corner of the reservoir and would be approximately 400’ x 400’ (3.7 acres in size). There would be two additional sets of automated gates needed in the fore-bay which would be situated in the north and west embankments that would deliver water to each cell with the same capacity of the intake channel of 1500 cfs. The after-bay would be located in the northwest corner of the reservoir where discharge into the EHL Canal is proposed. The after-bay would allow either cell to discharge into the EHL Canal through it. Additional automated gates would be installed in the fore-bay and after-bay.

The split cell design option would require approximately 255,000 additional cubic yards of native material to be handled, all of which would be generated from the Proposed Action site. The size of the embankments would remain the same at 10 feet above existing grade and have an outer slope extending approximately 40 feet in width on both sides, but would require an additional 7,500 linear feet of concrete lined embankment (12,700 CY of additional concrete). The split cell design option is not a preferred design option as it would result in a substantial increase of construction costs, and thus would only be implemented to facilitate long-term maintenance of the facility. The split cell would enable continuous operations. Instead of shutting down reservoir operations of a single cell reservoir while it is being cleaned and/or repaired (when damage occurs), a split cell reservoir may continue and maintain operations in one cell while the second cell is undergoing maintenance.



East Highline Reservoir and Intake Channel **Figure 2-1 Split Cell Design Concept**

INTENTIONALLY LEFT BLANK

2.4 Alternatives Considered and Eliminated from Further Analysis

2.4.1 Alternative Sites Eliminated

IID considered 11 sites, including the proposed site, prior to identifying the preferred site for the Proposed Action. However, 10 of these alternative sites were quickly eliminated as prospective sites due to one or more of the following reasons: the hydraulic conditions of the site are not adequate to be redeveloped as a reservoir and supporting infrastructure, the site is located on BLM property and inside an Area of Critical Environmental Concern (ACEC), or the site was considered financially infeasible. The 10 alternative site locations are listed below (Figure 2-2 Alternative Sites Eliminated). These eliminated alternative sites are all within close proximity to the AAC proposed EHL Project location.

1) North of Anza Road, east of Bowker Road, and southwest of the AAC.
2) North of the AAC, east of Claverie Road, south of Carr Road, and west of SR 7
3) North of the AAC, east of Hawk Road and south of the 98
4) North of the International Border with Mexico, south of the AAC, approximately 1 mile southeast of Bonesteele Road
5) Southeast of Holdridge Road, approximately 0.25 mile north of SR-98
6) Northwest of Holdridge Road, approximately 0.15 mile southeast of the EHL Canal
7) Southwest of Holdridge Road, approximately 0.7 mile southeast of the EHL Canal
8) South of Desert Road, approximately 0.7 mile northeast of Verde School Road
9) North of SR-98, approximately 1.15 east of Holdridge Road
10) South of SR-98, approximately 4 miles northwest of the SR-98 and I-8 intersection

2.4.2 Multiple Smaller Reservoirs Alternative

The Multiple Smaller Reservoirs Alternative would construct up to seven reservoirs on privately owned agricultural parcels along IID's main canal system but at undetermined locations. These reservoirs would be much smaller in size and would be operated by the land owner in which the reservoir is located. The Multiple Smaller Reservoirs Alternative was developed to benefit the local farmers and provide nearby farms with a plentiful, independent water supply. Therefore, this alternative would only partially accomplish the Proposed Action's purpose and need of supporting on-farm efficiency and water conservation measures. However, this alternative would not accomplish the remaining Proposed Action objectives and only provide a few local land owners with increased water delivery flexibility, thus leaving the remaining downstream water users with no additional benefit from an improved system efficiency. Additionally, the construction of up to seven separate reservoirs would likely result in higher greenhouse gas emissions and construction noise levels due to the increase in construction duration, compared to the construction of one reservoir. Overall, this alternative would not avoid any significant environmental effects, or accomplish the Proposed Action objectives. Therefore, this alternative was eliminated from further analysis.

2.4.3 Reduced Size Reservoir Alternative

The Reduced Size Reservoir Alternative (shown in Figure 2-3), would include an approximately 2,700 acre-foot reservoir. The Reduced Size Reservoir would include the same footprint as the Proposed Action with a shallower basin reducing the necessary embankment and the associated construction activities. Due to its smaller water capacity, this alternative would not benefit the greatest number of downstream IID water users, nor would it maximize system-wide water deliveries and water conservation, in comparison to the Proposed Action. The Reduced Size Reservoir alternative would not provide the greatest opportunity to store returned flows that are backed out of main system canals, significantly hindering water conservation efforts. Consequently, the Reduced Size Reservoir would not maximize the goals of the Quantification Settlement Agreement (QSA), which reallocates conserved Colorado River water among IID (including San Diego County Water Authority) Coachella Valley Water District (CVWD), and the Metropolitan Water District of Southern California (MWD). Instead, with implementation of this alternative, less water would be conserved under system efficiency. The shallower basin would reduce the potential to encounter traditional cultural properties, archeological, and paleontological resources, however, monitoring measures would still be required. All other environmental effects would have similar severities as the Proposed Action. In conclusion, the Reduced Size Reservoir Alternative would not accomplish all Proposed Action objectives, yet would result in similar environmental effects. As such, this alternative was eliminated from further analysis.

2.4.4 Alternative Intake Route Alternative

The Alternative Intake Route Alternative (shown in Figure 2-4) would consist of the proposed reservoir with the same footprint; however, the intake route from the AAC would be located further east of where the preferred intake route is proposed. This alternative intake route would connect to the proposed reservoir in the same location as the preferred alternative; however, it would run across BLM land from the southeast. This alternative would have the potential to reduce the amount of agricultural land affected by the proposed intake route, as well as avoid the need to construct beneath the existing AAC Drain No. 2 which bisects the proposed intake route. However, under this alternative, direct and indirect biological impacts would be greater, as the BLM land the intake route would be constructed on is currently undisturbed habitat and located within a BLM ACEC. Additionally, this alternative has similar potential to impact cultural resources (as the Proposed Action), as the two routes are relatively close and contain similar geologic and topographic conditions. As such, this alternative would result in similar environmental effects.

This alternative would also not fulfill the Proposed Action objective to minimize the length of the intake channel from the AAC and the outflow channel to the EHL Canal. Therefore, this alternative has been eliminated from further analysis.

2.5 Comparison of Alternatives

The suitability of the No Action Alternative and Proposed Action (the preferred alternative as described in Sections 2.2 and 2.3) were compared based on potential environmental effects (detailed in Chapter 3) and the four objectives identified for the Project. The objectives are shown in Table 2-2, the No Action Alternative only met one of the Project's objectives, while the Proposed Action meets all eight objectives.

Table 2-2 Alternatives Comparison Summary

Project Objective	Does the No Action Alternative Meet the Objective?	Does the Proposed Action Meet the Objective?
Provide a main canal system improvement project to increase operational flexibility and more closely match water deliveries with downstream water user demands	No	Yes
Conserve water by capturing what would normally be operational discharge	No	Yes
Support on-farm efficiency conservation measures	No	Yes
Increase operational storage to more effectively manage IID's daily water diversions at the Colorado River	No	Yes
Provide the optimal placement for a large operational reservoir that will benefit the greatest number of downstream IID water users, maximize system-wide water deliveries, and provide the greatest opportunity to store returned flows that are backed out of main system canals	No	Yes
Utilize a route with the most beneficial hydrologic conditions that is able to convey intake and discharge waters to and from the proposed reservoir by gravity flow (i.e. avoiding/minimizing pumping)	No	Yes
Minimize the length of the intake channel from AAC and the outflow channel to EHL Canal	No	Yes
Minimize displacement of existing IID and farming infrastructure	Yes	Yes

East Highline Reservoir and Intake Channel **Figure 2-2 Alternative Sites Eliminated**

INTENTIONALLY LEFT BLANK

Figure 2-3 Reduced Size Reservoir

INTENTIONALLY LEFT BLANK

East Highline Reservoir and Intake Channel

Figure 2-4 Alternative Intake Route

INTENTIONALLY LEFT BLANK

Chapter 3. Affected Environment and Environmental Consequences

3.1 Introduction

This section describes the existing environmental resources in the Proposed Action area that may be affected by the Proposed Action and the No Action alternative, if implemented. It also serves as the baseline for the comparisons of alternatives.

3.2 Resources Considered and Eliminated from Further Analysis

Some resources were considered but eliminated from further analysis because they did not occur in the Proposed Action area or because the potential effect to the resource is so minor (negligible) that it was discounted. The resources were either not present or found to not be affected by the Proposed Action because they would be completely mitigated with the implementation of standard stipulations. Resources eliminated from further analysis include Areas of Critical Environmental Concern, Access and Transportation, Agricultural Resources, Conservation Lands, Floodplains, Forestry, Fuels and Fire Management, Livestock Grazing, Public Health and Safety, Recreation/Travel/Wild and Scenic Rivers, Transmission Corridors, Urban Quality and Design of the Built Environment, Wildlife Corridor, Wild Horse and Burros and Wilderness and Wild and Scenic Rivers (See Appendix B, Table B-1).

3.3 Air Quality/Greenhouse Gas Emissions

The following sections describe the existing environmental resources in the Proposed Action area that may be affected by each alternative, if implemented.

3.3.1 Affected Environment

The Clean Air Act (CAA), as amended in 1990, requires the Environmental Protection Agency (EPA) to set National Ambient Air Quality Standards (NAAQS) for wide-spread pollutants harmful to public health and the environment. The EPA has set time-averaged standards for six air pollutants considered to be key indicators of air quality: carbon monoxide, nitrogen dioxide, ozone, sulfur dioxide, lead, and two categories of particulate matter (particulate matter with an aerodynamic diameter of 10 microns or less [PM_{10}] and particulate matter with an aerodynamic diameter of 2.5 microns or less [$PM_{2.5}$]). If an area exceeds the standard, the area is classified as "nonattainment" for that pollutant. If there is not enough data available to determine whether the standard is exceeded in an area, the area is designated as "unclassified" or "unclassifiable." The designation of "unclassifiable/attainment" means that the area meets the standard or is expected to be meet the standard despite a lack of monitoring data. Areas that achieve the standards after a nonattainment designation are re-designated as maintenance areas and must have approved Maintenance Plans to ensure continued attainment of the standards. The Proposed Action is located in an area that is nonattainment for ozone and PM_{10}.

3.3.2 Environmental Consequences

No Action

The No Action Alternative would have no effect to air quality because there would be no increase of criteria air pollutant emissions generated as a result of the Proposed Action.

Proposed Action

An Air Quality and Greenhouse Gas Emissions Assessment Memorandum (Appendix C) was prepared by Dudek in April 2019. A summary of the findings are presented below.

Construction

Construction would result in temporary addition of pollutants to the local airshed. As provided in Table 3-1, the Proposed Action would not exceed any of the applicable federal de minimis thresholds during construction activities (modelled years 2018 or 2019). Therefore, additional conformity analysis is not required; the Proposed Action would conform to the applicable implementation plan for the Project area.

Table 3-1
Estimated Annual Construction Criteria Air Pollutant Emissions

Modelled Year	ROG	NO_x	PM_{10}
	tons per year		
2018*	0.63	5.93	6.45
2019*	0.72	6.96	10.70
Maximum Annual Emissions	**0.72**	**6.96**	**10.70**
De Minimis Threshold	*100*	*100*	*70*
Threshold Exceeded?	No	No	No

Notes: ROG = reactive organic gasses; NO_x = oxides of nitrogen; PM_{10} = fine particulate matter; * Modelled year. Source: Appendix C.

Operation

Operations of the Proposed Action consist of a large operational reservoir, delivering water through an automated gate outlet and structure with a gravity flow capacity of approximately 1,500 cfs for delivery into the EHL Canal. The intake channel would use gravity only (i.e., no pumping would occur). Maintenance would be undertaken by IID in accordance with existing practices for inspections and repair. No on-site operation and maintenance facilities would be provided. Inspections would be made via crew trucks using the existing road infrastructure, the proposed perimeter road around the reservoir and along the inlet channel. Thus, effects to air quality as a result of Proposed Action operation would be negligible.

Split Cell Option

The split cell design option would build two reservoirs, separated by a dividing embankment, within the same disturbance area as the single cell described above. The split cell would manage the same amount of water as the single cell. The additional constructing of embankments would result in an increase in construction activities, resulting in an increase in air quality and greenhouse gas effects. However, the increase, estimated at approximately 10% increase in construction efforts, would not raise emissions to above the de minimis thresholds. Emissions would be approximately 0.79 tons per year for ROG, 7.66 tons per year for NOx, and 11.77 tons per year for PM_{10}. As such conformity analysis would also not be required for the split cell design option.

3.3.3 Minimization and Mitigation Measures

Prior to issuance of a grading or building permit, the project proponent shall submit the dust control plan to the Imperial County Air Pollution Control District (ICAPCD) for review and approval, and shall provide the plan to Imperial County, to demonstrate compliance with ICAPCD Regulation VIII (Fugitive Dust Rules), Rules 800 through 806. The plan shall address construction-related dust as required by ICAPCD.

3.4 Biological Resources

3.4.1 Affected Environment

The Proposed Action site is located within the Sonoran Desert, which is bounded on the west by the Peninsular Ranges and on the east by the Colorado River. The Proposed Action study area consists of primarily flat, fallow agricultural land, disturbed areas (roads), irrigation canals, and small amounts of scrub habitat. Please refer to photos 1 through 4. The study area consists of six vegetation communities: arrow weed (*Pluchea sericea*) thickets, bush seepweed (*Suaeda moquinii*) scrub, cattail (*Typha domingensis*) marshes, creosote bush (*Larrea tridentate*) scrub, mesquite bosque/mesquite (*Prosopis glandulosa*) thicket, and tamarisk thickets; and two land covers (disturbed habitat and open water). Of these vegetation communities, the arrow weed thickets, bush seepweed scrub, and mesquite bosque are considered sensitive biological resources. Special-status plant surveys were not conducted because the site is nearly entirely comprised of agricultural land and disturbed habitat, and the small areas of native habitat suitable for special-status plants will not be affected by the Proposed Action. A total of 20 species of native or naturalized vascular plants, 12 native (60%) and 8 non-native (40%), were recorded within study area (Dudek 2019).

Photo 1- East view of the proposed Reservoir site.
Area previously impacted by past agricultural activity.

Photo 2- West view of the proposed Reservoir site.

Photo 3- Southeasterly view of the intake channel alignment, area near the AAC. Note Highway 98 in background.

Photo 4- Southeasterly view of the intake channel alignment, area near the AAC. A portion of this area was previously impacted.

A total of 22 wildlife species were recorded within the Proposed Action study area. Nineteen (19) bird species were observed which included common raven (*Corvus corax*), black phoebe (*Sayornis nigricans*), mourning dove (*Zenaida macroura*), western meadowlark (*Sturnella neglecta*), and American kestrel (*Falco sparverius*). One mammal species, coyote (*Canis latrans*) and two invertebrate species were observed which included harvester ant (*Pogonomyrmex* sp.) and queen butterfly (*Danaus gilippus*). Five California special-status wildlife species were observed during the 2018 biological surveys: burrowing owl (*Athene cunicularia*), Southern California rufous-crowned sparrow (*Aimophila ruficeps canescens*), northern harrier (*Circus hudsonius*), prairie falcon (*Falco mexicanus*), and loggerhead shrike (*Lanius ludovicianus*). No focused special-status wildlife surveys were conducted in 2018 or 2019 (Dudek 2019).

Federally listed species (threatened, endangered, or candidate species) which may occur in the vicinity of the project area:

The Peirson's milk-vetch (*Astragalus magdalenae var. peirsonii*) was federally listed as a threatened species on October 6, 1998, and critical habitat was designated in 2004 and revised in 2008 (Federal Register Feb. 2008). Critical habitat (approximately 218 acres) is located within the BLM Buttercup Management Area. The milk vetch is found in desert dunes at elevations between 180 and 820 feet. The only known occurrences of the plant in the U.S. are in the Imperial Sand Dunes of Imperial County. The plant is also found on the sand dunes of the Gran Desierto of Sonora Mexico. All activities will occur within disturbed agricultural areas.

Yuma Ridgway's rail *(Rallus obsoletus yumaensis* or YRR [formerly known as Yuma clapper rail (*Rallus longirostris yumanensis]*) is listed as endangered under the federal Endangered Species Act and California Endangered Species Act. The YRR, one of seven North American subspecies of clapper rails, occurs primarily along the lower Colorado River (LCR) in California, Arizona, and Mexico. It is a summer resident from Topock south to Yuma in the U.S. and at the Colorado River Delta in Mexico. There are also populations of this subspecies at the Salton Sea in California (Garrett and Dunn 1981) and along the Gila and Salt Rivers to Picacho Reservoir and Blue Point in central Arizona (Rosenberg et al. 1991). The YRR is associated primarily with freshwater marshes, with the highest densities of this subspecies occurring in mature stands of dense to moderately dense cattails and bulrushes. There is no wetland habitat within the project area. The nearest wetland habitat is located approximately four miles east of the project area, adjacent to the AAC.

3.4.2 Environmental Consequences

No Action

Under the No Action Alternative, no reservoir or intake channel would be constructed. Biological resources would remain as is and there would be no new adverse effects to biological resources.

Proposed Action

The Proposed Project study area is not located within a regional wildlife movement corridor or linkage planning area as identified in *A Linkage Network for the California Deserts* (Penrod et al. 2012). The Proposed Project study area is largely agricultural, but is adjacent to undeveloped BLM land (Lake Cahuilla ACEC) to the east where wildlife can move freely throughout the area with little impediment. The majority of the proposed reservoir and associated infrastructure would be constructed primarily within the open agriculture area, see Figure 3-1 and photos 1 and 2. The project would not result in long-term effects to wildlife movement through the area. No riparian or wetland habitat will be disturbed.

Approximately six acres of creosote and some scattered mesquite will be impacted near the AAC where the inlet channel will connect. This small section of land has been bisected by access roads and has been impacted by construction of drains, off road vehicle use, state highway 98, and transmission lines, see photos 3 and 4 and Figure 3-1 and 3-2.

Once constructed, maintenance of the facilities may also cause short term, localized disturbances from vehicles and other equipment used to remove material behind structures or to repair or maintain structures damaged by storm events. While in operation, it is anticipated that the Proposed Action will result in beneficial impacts to migratory birds. The reservoir could serve as a stopover area during spring and fall for a multitude of waterfowl (i.e., ducks, geese).

Split Cell Option

The split cell design option would build two cells, separated by a dividing embankment, within the same disturbance area as the single cell described. Therefore, biological impacts would be the same. The operational benefits to migratory birds would also apply.

INTENTIONALLY LEFT BLANK

East Highline Reservoir and Intake Channel **Figure 3-1 Biological Resources Index Map**

Note: Maps 1 thru 5 are found in the Dudek 2019 Biological Report.

INTENTIONALLY LEFT BLANK

East Highline Reservoir and Intake Channel

Figure 3-2 Biological Resources Map 6

INTENTIONALLY LEFT BLANK

3.4.3 Minimization and Mitigation Measures

The following avoidance and minimization measures shall be implemented during Proposed Action construction and operation and maintenance activities.

- Project construction limits and activities will be restricted to highly disturbed areas in order to avoid and minimize impacts to native vegetation and wildlife to the extent practical.
- Staging areas and improvements to access roads would be limited to previously disturbed areas and located away from the BLM's ACEC.
- All construction equipment will be cleaned and free of plant parts before moving into construction sites.
- There will be no impacts to waters of the U.S., the United States Army Corps of Engineers (USACE) issued a determination on November 2019 that the Proposed Action would not require a CWA permit from USACE.
- Trash and food materials will be properly contained within vehicles or closed refuse bins while on site, and will be regularly removed from the construction site for proper disposal.
- Worker Environmental Awareness Program training will be provided to construction personnel prior to commencing activities on resource protection measures.
- Additionally, while it is not expected that a federally or state-listed plant would be observed during these surveys, the biologist/botanist shall consult with the applicable agency (i.e., CDFW and/or USFWS) and obtain written concurrence for measures required for federally or state-listed plant species, if observed.
- Night-time activities should be minimized to the extent possible. If night-time activity (e.g., equipment maintenance) is necessary, then the speed limit shall be 10 mph
- Project proponent will comply with State of California permitting requirements (Section 1602 Streambed Alteration Agreement).
- Flat-tailed horned lizard surveys shall be conducted within the Proposed Project study area between April and September, (when surface temperatures are between 95º F and 122º F), prior to start of ground-disturbing activities to determine the status of the Flat-tailed Horned Lizard (FTHL) on-site (FTHL Working Group of Interagency Coordinating Committee 2003). The surveys shall be conducted in accordance to the FTHL Interim Survey Protocol in order to provide an assessment of FTHL presence or absence at a specific site. If the FTHL is found, relocation (if needed) shall be conducted in accordance with the Fencing and Removal Survey Protocols (Appendix 7 of the FTHL Interagency Coordinating Committee 2003). Persons that handle FTHL's will first obtain all necessary permits and authorization from the CDFW.
- No less than 14 days prior to ground-disturbing activities (vegetation clearance and/or grading), a qualified wildlife biologist (i.e., a wildlife biologist with previous burrowing owl survey experience) shall conduct pre-construction take avoidance surveys on and within 200 meters (656 feet) of the construction zone to identify occupied breeding or wintering burrowing owl burrows. The take avoidance burrowing owl surveys shall be conducted in accordance with the Staff Report on Burrowing Owl Mitigation (2012 Staff

Report; CDFW 2012). Copies of the burrowing owl survey results shall be submitted to the CDFW.

- If burrowing owls are detected on site, no ground-disturbing activities shall be permitted within 200 meters (656 feet) of an occupied burrow during the breeding season (February 1 to August 31), unless otherwise authorized by CDFW. During the nonbreeding season (September 1 to January 31), ground-disturbing work can proceed near active burrows as long as the work occurs no closer than 50 meters (165 feet) from the burrow. Depending on the level of disturbance, a smaller buffer may be established in consultation with CDFW.
- If avoidance of active burrows is infeasible during the nonbreeding season, then, before breeding behavior is exhibited and after the burrow is confirmed empty by site surveillance and/or scoping, a qualified biologist shall implement a passive relocation program in accordance with Biological Resources Report (i.e., Example Components for Burrowing Owl Artificial Burrow and Exclusion Plans) of the 2012 CDFW Staff Report on Burrowing Owl Mitigation (CDFW 2012). Passive relocation consists of excluding burrowing owls from occupied burrows and providing suitable artificial burrows nearby for the excluded burrowing owls. A burrowing owl monitoring and mitigation plan will be prepared that outlines how passive relocation would occur and where the replacement burrows would be constructed. It would also outline the monitoring and maintenance requirements for the artificial burrows.

By avoiding direct impacts to wetland, riparian, and riverine habitats, and limiting construction impacts to previously disturbed areas, impacts to federally listed species will be insignificant or discountable.

3.5 Cultural Resources

3.5.1 Affected Environment

The National Historic Preservation Act (NHPA) establishes national policy for protecting significant cultural resources that are defined as “historic properties” under 36 CFR 60.4. NHPA Section 106 (36 CFR 800) requires that Federal agencies consider and evaluate the effect that Federal projects may have on historic properties under their jurisdiction. The AAC is considered a historic property under 36 CFR 60.4.

An examination of existing maps, records, and reports was conducted to determine if the project area contains previously recorded cultural resources. Dudek conducted a records search in January and February 2017 at the South Coastal Information Center (SCIC) at San Diego State University. The search encompassed the Area of Potential Effect (APE) for the undertaking and a one -mile buffer around the APE. The purpose of the records search is to identify any previously recorded resources that may be located in or adjacent to the APE and to identify previous studies in the vicinity of the proposed action. In addition to a review of previously prepared site records and reports, the records search also reviewed the National Register of Historic Places (NRHP), the California Register of Historical Resources (CRHR), the California Historic Property Data File, and the lists of California State Historical Landmarks, California Points of Historical Interest, and Archaeological Determinations of Eligibility. A search of the Native American Heritage Commission (NAHC) Sacred Lands File was also conducted.

A field survey of the APE was conducted in July 2017. Utilizing intensive pedestrian survey, the entire APE was inventoried. Six previously identified cultural resources are within the APE while pedestrian survey identified 12 new cultural resources. Three of the 18 cultural resources within the APE are prehistoric, while 15 are historic. The historic-period resources include the AAC, EHL Canal, and the All-American Drain 2A. The terrain and vegetation varied little throughout the APE. The majority of the reservoir portion of the Project APE consisted of plowed agricultural fields with no vegetation. The intake channel crosses earthworks including the All-American Drains 2 and 2A and SR-98. There is a small segment of undeveloped desert land located between the All-American Drain 2 and SR-98.

3.5.2 Environmental Consequences

No Action

Under the No Action Alternative, no reservoir would be constructed. No ground-breaking or excavation activities would occur. As such, no effect would occur related to cultural resources.

Proposed Action

Archival review identified six previously recorded cultural resources within the proposed Project APE while pedestrian survey identified 12 new cultural resources. These 18 cultural resources include 3 archaeological sites and 15 built environment resources. Native American and California State Historic Preservation Officer (SHPO) consultations are ongoing.

The cultural resources survey identified one unevaluated archaeological site within the APE that would be impacted by the Proposed Action activities: P-13-017218, identified during the survey of the proposed Project APE on January 4, 2018. This site underwent archaeological testing and all collected materials were transported to Dudek’s archaeological laboratory. Cataloging and laboratory analysis of the excavated materials was conducted to aid in the evaluation of the site’s eligibility for listing on the NRHP. Native American and SHPO consultations are ongoing.

Split Cell Option

The split cell design option would build two cells, separated by a dividing embankment, within the same disturbance area as the single cell design option. Therefore, impacts to archaeological, historical, and tribal cultural resources would be the same.

3.5.3 Minimization and Mitigation Measures

In accordance with 36 CFR Part 800.5 Reclamation has applied the criteria of adverse effect to historic properties to determine if the Proposed Action would directly or indirectly affect any of the characteristics of historic properties that make them eligible for inclusion in the NRHP. Impacts on cultural resources are considered significant if a resource is physically damaged, altered, or isolated from the context considered significant. To avoid potential impacts to cultural resources:

- Construction activities will be designed to avoid and minimize impacts to cultural resources by limiting project activities to previously disturbed areas.
- Consultation with the California SHPO and Native American Tribes under Section 106 of the NHPA will be conducted prior to implementing the Proposed Action.
- Monitoring by Native American Tribes will be conducted during all ground disturbing activities.
- Prior to start of construction, project proponent will have an on-call archaeologist that meets the Secretary of the Interior’s Professional Qualifications Standards to assist with monitoring.

If during the course of any activities associated with the implementation of the Proposed Action any sites, buildings, structures, or objects not addressed in this assessment are discovered, activities will cease in the vicinity of the resource. Reclamation’s Environmental Group Manager and project archaeologist will be notified immediately and appropriate coordination with Tribes will be conducted. Reclamation shall ensure that the stipulations of 36 CFR Part 800.11 are satisfied before activities in the vicinity of the previously unidentified property resume.

3.6 Hazards and Hazardous Materials or Solid Waste

3.6.1 Affected Environment

The Proposed Action site is not included on a list of hazardous materials sites based on the California’s Department of Toxic Substances Control’s (DTSC) data management system, EnviroStor (DTSC 2016). The site has historically and is currently being used for agricultural cultivation, since at least 1996. Besides the historical use of pesticides on the site, no other hazardous materials were observed within the Project site. DTSC’s Envirostor website identified no hazardous sites and facilities within a seven-mile radius of the site. The closest school to the

Proposed Action site is Emmett S. Finley Middle School, located approximately 7.5 miles to the northwest, and the nearest residence located 150 feet south of the Proposed Action location.

3.6.2 Environmental Consequences

No Action

The No Action Alternative would have no effects related to hazards and hazardous materials or solid waste. The site would continue to be used as agricultural and undeveloped federal land and the potential of hazardous materials would remain the same as the existing conditions.

Proposed Action

During construction, there is the potential for short-term use of hazardous materials and fuels including gasoline, oil, solvents, and various other liquids and materials required for the operation of construction equipment. All contractors are required to comply with applicable laws and regulations regarding hazardous materials and hazardous waste management and disposal. Direct effects from accidental spills of small amounts of hazardous materials from construction equipment could potentially occur. However, the Proposed Action would comply with federal, state, and local health and safety requirements that are intended to minimize hazardous materials risk to the public, such as California's Occupational Safety and Health Administration (Cal/OSHA) requirements, the Hazardous Waste Control Act, California's Accidental Release Prevention Program (CalARP), and the California Health and Safety Code. Additionally, standard best management practices regarding hazardous materials handling protocols would be prepared and implemented to ensure the safe storage, handling, transport, use, and disposal of all hazardous materials during the construction phase of the Proposed Action. Due to past uses for agriculture, there is also the potential to expose previously used pesticides and herbicides. Therefore, with implementation of minimization and mitigation of hazards, proper use and disposal of these materials would not pose a significant risk to the public and the environment, and impacts resulting from discovery of previously unknown hazards would remain less than significant.

Construction of the Proposed Action would occur in an area favorable to the growth of Valley Fever, a fungus (*Coccidioides immitis*) that grows in soils in areas of low rainfall, high summer temperatures, and moderate winter temperatures. Project construction would disturb the soil and cause the fungal spores to become airborne, potentially putting construction personnel and wildlife at risk of contracting Valley Fever. However, Imperial County is not considered to have a high incidence of Valley Fever (BLM 2011). While the potential exposure of workers to Valley Fever spores could occur during construction, implementation of a Dust Control Plan and the provisions of ICAPCD Regulation VIII identified to reduce PM_{10} in Section 3.3, would be effective in reducing airborne dust. No impacts associated with exposure to Valley Fever are anticipated during operation and maintenance activities.

Operations would not include the treatment of the water contained in the proposed reservoir. Day to day operations would be unmanned. These activities would not include the routine transport, use, or disposal of hazardous materials. Occasional maintenance activities like for inspections and repair would be made via crew trucks using existing roads infrastructure. Maintenance activities would be in compliance with all current local, state, and federal regulations listed above in the construction discussion. Impacts related to operations of the Proposed Action would be less than significant.

Split Cell Option

The split cell design option would build two cells, separated by a dividing embankment, within the same disturbance area as the single cell. The additional excavating and constructing of embankments would result in an increase in construction activities, however the split cell design option would be required to comply with the same restrictions and regulations as the single cell. Therefore, impacts related to hazards and hazardous materials or solid waste would be the same.

3.6.3 Minimization and Mitigation Measures

Mitigation actions designed to limit the potential impact of hazardous materials or solid waste would be implemented according to State and Federal regulations.

Soil Sampling and Disposal

Due to past uses for agriculture, prior to grading activities, soil shall be sampled and analyzed for metals and residual pesticides. Sampling shall be conducted in accordance with California DTSC guidance documents. The soil testing will confirm the presence or absence of on-site contamination associated with past uses on the Proposed Action site. Any soils qualifying as hazardous waste shall delineated, removed, and properly disposed of off-site. Any soil that exceeds the California Human Health Screening Levels shall be either remediated on site to levels protective of human health or removed and properly disposed of off-site. Should contaminants be identified, IID will retain a qualified Hazardous Materials Specialist for the Project to ensure appropriate remediation is conducted and completed on all affected areas.

Hazardous Materials Contingency Plan

A hazardous materials contingency plan shall be followed during demolition, excavation, and construction activities for the Proposed Action. The hazardous materials contingency plan shall include, at a minimum, the following:

- Identification of known areas with hazardous waste and hazardous materials of concern
- Procedures for temporary cessation of construction activity and evaluation of the level of environmental concern
- Procedures for restricting access to the contaminated area except for properly trained personnel
- Procedures for notification and reporting, including internal management and local agencies (e.g., Imperial County Fire Department, Imperial County Public Health Department), as needed
- Health and safety measures for removal and excavation of contaminated soil
- Procedures for characterizing and managing excavated soils
- Procedures for certification of completion of remediation

Site workers shall be familiar with the hazardous materials contingency plan and should be fully trained on how to identify suspected contaminated soil.

Spill Prevention Control and Countermeasures Plan

During construction, if aggregate aboveground oil/fuel storage capacity is greater than 1,320 gallons (or completely buried 42,000 gallons) and there is a reasonable expectation of an oil discharge into or upon navigable waters of the U.S. or adjoining shorelines, a spill prevention, control, and countermeasures (SPCC) plan pursuant to 40 CFR 112 (or, for small quantities, a spill prevention and response plan) shall be prepared and implemented during construction and, if applicable, during site operations. The SPCC plan (or spill prevention and response plan) shall identify best management practices for spill and release prevention and provide procedures for cleaning up and disposing of any spills or releases.

3.7 Noise

3.7.1 Affected Environment

Noise that currently exists in the area generally comes from vehicle travel along SR-98, and current ongoing AAC operations. The Proposed Action site is located on agricultural land with the nearest residence located 150 feet south of the Proposed Action boundary. The Proposed Action is also adjacent to open desert areas managed by the federal government, which is not populated.

3.7.2 Environmental Consequences

No Action

In the No Action Alternative, current noise levels from the existing agricultural land would continue at the present levels. External noise from EHL Canal and AAC operations would remain at current levels.

Proposed Action

During construction, the Proposed Action would have the potential to increase noise in the area due to construction equipment and workers in the area. The magnitude of the increases would depend on the type of construction activity, the noise level generated by various pieces of construction equipment, site geometry (i.e., shielding from intervening terrain or other structures), and the distance between the noise source and the nearest receiver. The maximum noise levels at 150 feet for typical equipment would be up to 74 dBA for the type of equipment normally used for this type of project (Appendix D, Field Noise Measurement Data). However, because equipment will be used throughout the site and at different intervals during the construction day, and due to the typical operating cycles for construction equipment, the hourly average noise levels would vary and would likely be lower than the maximum noise levels allowed. Noise from construction could result in annoyance at times to nearby noise-sensitive land uses—specifically, residences. However, the duration at any one location would be relatively brief, and Proposed Action construction would comply with County construction noise ordinance standards (i.e., construction activities would take place only between the hours of 8 a.m. and 6 p.m.). Restricting construction activities to the daytime period will avoid disruption of evening relaxation and overnight sleep periods. Construction of the Proposed Action would not result in adverse noise effects.

Maintenance would be undertaken by IID in accordance with existing practices for inspections and repair. No on-site operations and maintenance facilities would be provided. Inspections would be made via crew trucks and using the existing road infrastructure and the constructed perimeter road around the reservoir. Thus, once operational, the Proposed Action would not generate noise levels in excess of established standards. Furthermore, the Proposed Action would not have any operational staff which would be traveling to and from the Proposed Action site. As such, the Proposed Action would not result in substantial adverse operational noise effects.

Split Cell Option

The split cell design option would build two cells, separated by a dividing embankment, within the same disturbance area as the Proposed Action. The two cells would manage the same amount of water as the single cell, achieved by making the two cells slightly deeper. The additional excavating and constructing of embankments would result in an increase in construction activities, resulting in an increase in construction noise effects. However, construction noise would not be noticeably different (louder) than the single cell nor result in an increase of 3 dBA or more. Operation of the split cell design option would generate the same noise as the single cell.

3.7.3 Minimization and Mitigation Measures

No mitigation measures are required for noise.

3.8 Indian Trust Assets

3.8.1 Affected Environment

Indian Trust Assets (ITAs) are legal interests in property held in trust by the US for Indian tribes or individuals, or property in which the US is charged by law to protect for Indian tribes or individuals. In accordance with the Indian Trusts Fund Management Reform Act of 1994, as amended, all the Department of the Interior agencies, including Reclamation, are responsible for protecting ITAs from adverse impacts resulting from their programs and activities. In cooperation with tribes, Federal agencies must inventory and evaluate assets, and mitigate or compensate for adverse impacts to the asset. While most ITAs are located on reservation lands, they may also be located off-reservation. Examples of ITAs include, but are not limited to, land, minerals, rights to hunt, fish, and gather, and water rights.

Water from the LCR has been a major source of supply for the Coachella Valley since 1949 with the completion of the Coachella Canal. This water is used for agricultural and non-urban purposes, as well as groundwater recharge. The Colorado River is managed and operated in accordance with the Law of the River, the collection of interstate compacts, federal and state legislation, various agreements and contracts, an international treaty, a U.S. Supreme Court decree, and federal administrative actions that govern the rights to use of Colorado River water within the seven Colorado River Basin states.

The water authority for the project area is IID. The AAC is a canal that brings water from the LCR into the Imperial and Coachella Valleys. Historically, CVWD received approximately 330,000 acre-feet per year (AFY) of Priority 3A LCR water delivered via the Coachella Canal. The service area for LCR water delivery under CVWD's contract with Reclamation is defined as Improvement District No. 1 (ID-1) which encompasses most of the East Valley and a portion of the West Valley north of Interstate 10. Under the 1931 California Seven Party Agreement, CVWD has water rights to Colorado River water as part of the first 3.85 million AFY allocated to California. CVWD is in the third priority position along with Imperial Irrigation District (IID).

3.8.2 Environmental Consequences

Reclamation departmental policy requires the agency to address potential impacts to ITAs even if impacts are found to be non-significant. The Proposed Action site is located approximately 45 miles to the east of the Fort Yuma Indian Reservation.

Trust Lands

The Proposed Action is not located on ITA lands. The nearest tribal land, Fort Yuma Indian Reservation, is located approximately 45 miles away from the Proposed Action site. There are no tribal residences and/or facilities within the Proposed Action area.

Water Rights

The nearest tribal land, Fort Yuma Indian Reservation, is served by Bard Water District as part of Bard's water rights contract with Reclamation.

Hunting, Fishing, and Gathering Rights

LCR water is currently delivered to the project vicinity via the AAC, and is primarily used for non-potable uses such as agricultural. As such, hunting, fishing and gathering generally does not occur in this section of the AAC.

No Action

Under the No Action Alternative, construction of the reservoir would not take place. Therefore, no change to Federal actions will occur that could result in an adverse effect to ITAs.

Proposed Action

Trust Lands

The Proposed Action would not interfere with any Trust Lands. The Proposed Action is not located on Trust Lands and would not prevent the use or management of any tribal or Trust Lands.

Water Rights

The Proposed Action would not result in a change to any tribal water right, or to the diversion or delivery of tribal water entitlements.

Hunting, Fishing, and Gathering Rights

The Proposed Action would not interfere with any hunting, fishing or gathering rights which could be exercised by any tribe.

Split Cell Option

The split cell design option would build two cells, separated by a dividing embankment, within the same disturbance area as the single cell. Therefore, impacts to ITAs would be the same.

3.8.3 Minimization and Mitigation Measures

No mitigation measures are proposed.

3.9 Hydrology and Water Quality

3.9.1 Affected Environment

The Proposed Action is located in a desert climate with no present or seasonal streams or rivers on or near the Proposed Action site. Imperial County only receives approximately 3 inches of rainfall annually (U.S. Climate Data 2018). As such, any surface runoff on the Proposed Action site would drain to shallow depths and evaporate.

According to the Imperial County's Water Element, Groundwater within the Imperial Valley is stored in the Pleistocene sediments of the Valley floor, the mesas on the west, and the East Mesa and sand hills on the east. However, the fine-grained lake sediments in the principal portion of the Imperial Valley inhibit groundwater movement, and tile-drain systems are required to dewater the sediments to a depth below the root zone of crops and to prevent the accumulation of saline water on the surface. Few wells have been drilled in these lake sediments because the yield is poor and the water is generally highly saline. The few wells in the Imperial County (East and West Mesa) are for domestic use only (County of Imperial 1993a). Groundwater in the Imperial Valley is of poor quality and is generally unsuitable for domestic or irrigation purposes (IID 2019).

The Proposed Action site is not located within a 100-year flood hazard area, nor is the site located in the Imperial Dam inundation area, Laguna Dam inundation area, or Senator Wash Dam inundation area, because all of these areas are more than 45 miles away from the Proposed Action site (County of Imperial 1993b; DWR 2016). The Proposed Action site is approximately 108 miles inland from the Pacific Ocean, 35 miles from the Salton Sea and would not be subject to inundation by tsunami.

3.9.2 Environmental Consequences

The Proposed Action would redirect a portion of Colorado River water supplies through the proposed intake channel and temporarily store it in the proposed reservoir. However, the existing AAC infrastructure is man-made and would not be considered a natural drainage of the area. The proposed reservoir and intake route would be lined, therefore water flowing through the intake channel and reservoir would not seep into the underlying soils. Any precipitation to occur on the site would be managed onsite. As such, the Proposed Action would not create or contribute runoff water which may result in flooding, erosion, or inundation on or off site.

Operations of the proposed reservoir and intake channel would be unmanned, and would not require direct drawing of groundwater from the underlying aquifer. Therefore, the Proposed Action would not interfere with groundwater resources or local groundwater recharge.

Impervious surfaces over which runoff may occur would be minimal, consisting of access roads and accessory facilities. The Proposed Action is required to comply with the National Pollutant Discharge Elimination System (NPDES) SWRCB Construction General Permit Order No. 2009-0009-DWQ for storm water discharges and general construction activities, including preparation of a Storm Water Pollution Prevention Plan (SWPPP) that specifies BMPs that would be implemented during construction to minimize impacts to water quality. Any amount of water used for construction would be surface water delivered through IID's conveyance system. The Proposed Action would convey and manage surface water only. A SPCC Plan shall be prepared during construction, if applicable, for the unlikely event of spills from construction activities.

Although existing water flows would be altered, they would be altered using a proposed channel that would not result in substantial erosion or siltation on or off site. No wells or direct connections to the underlying aquifers are proposed for Proposed Action construction or operations, and any dust control actions would utilize water imported via water trucks. The connection to the AAC would be achieved the same as the existing EHL Canal connection to the AAC. The Proposed Action will allow IID to access the same amount of water as it is entitled to and would not affect the availability of water long-term in the AAC or the quality of water in the AAC during construction. The proposed reservoir will maximize the management of fluctuating downstream water demands from agricultural water users. Therefore, hydrology and water quality would not be adversely affected or altered as a result of the Proposed Action.

Split Cell Option

The split cell design option would build two cells, separated by a dividing embankment, within the same disturbance area and consistent with the same regulations as the single cell. Therefore, impacts to hydrology and water quality would be the same.

3.9.3 Minimization and Mitigation Measures

No mitigation measures are required for the Proposed Action. However, appropriate Best Management Practices (BMPs) shall be implemented during construction in order to protect water resources in the Proposed Action Area. No refueling equipment should be permitted within the Canal area, and staging areas will be located outside the Canal areas. Should an accident or spills occur, project proponent will implement a Spill Prevention, Control, and Countermeasures Plan (SPCCP) to contain and/or remove contamination to groundwater.

3.10 Land Use

3.10.1 Affected Environment

The Proposed Action site is largely located on land under the jurisdiction of Imperial County (as the land use authority) as well as within IID's and Reclamation's ROW and/or jurisdiction. The County of Imperial's General Plan, adopted in 1993 and revised and adopted in 2015, designate the land use for the Proposed Action location as Agriculture. Imperial County's Zoning Map has designated the Proposed Action location as A-2 (General Agricultural Zone) and A-3 (Heavy Agricultural). The A-2 zone permitted uses include agricultural accessory structure(s), buildings, and uses. A-3 zone permitted uses include agricultural accessory structures, miscellaneous uses including water storage or groundwater recharge facilities, and water systems (County of Imperial 1998). The proposed reservoir would be an agricultural accessory structure to IID's current irrigation and distribution system which spans over 1,667 miles of canals, contains similar accessory reservoir structures throughout which are designed to enable increased operational flexibility. IID delivers 97 percent of its water to agricultural operations.

3.10.2 Environmental Consequences

The Proposed Action would not conflict with the A-2 and A-3 zoning, established in the Imperial County Zoning Ordinance, considering the Proposed Action would include similar uses to those allowed, such as aquaculture fish farms, flood control facilities, water storage, water systems, and sewage treatment facilities. Specifically the Proposed Action includes water storage and water systems to manage the water for agricultural use. The Proposed Action is in support of the Reclamation Reform Act of 1982 to " . . . encourage . . . consideration and incorporation of prudent and responsible water conservation measures . . .by . . . recipients of irrigation, municipal and industrial water . . ." Furthermore, the Proposed Action would not conflict with the goals and policies of BLM's Desert Renewable Energy Conservation Plan. No substantial adverse effects would occur related to land use.

Split Cell Option

The split cell design option would build two cells, separated by a dividing embankment, within the same disturbance area as the single cell. Therefore, impacts to land use would be the same.

3.10.3 Minimization and Mitigation Measures

No mitigation measures are required for land use.

3.11 Geology and Soils

3.11.1 Affected Environment

The Alquist-Priolo Earthquake Fault Zoning Act identifies no active faults within the Bonds Corner Quadrangle within Imperial County. Consequently, the risk of surface rupture is low. The site has previously been developed and disturbed, and there are no known cases of landslide, lateral spreading, subsidence, liquefaction, or collapse occurring on site. According to United States Department of Agriculture's (USDA) Web Soil Survey, the Proposed Action site is located on predominantly Rositas fine sand; other soils include Rositas sand, Meloland and Holtville loams, Meloland very fine sandy loam, and Holtville silty clay. These soils are predominantly considered moderately well drained.

3.11.2 Environmental Consequences

Because the Proposed Action is anticipated to result in a disturbance of more than one acre of land, compliance with the NPDES General Construction Permit would be necessary, as well as preparation of a water management plan that would minimize or eliminate the potential soil erosion that could result from construction. Construction activities for the Proposed Action, would not be at risk of causing landslides or seismic hazards.

Prior to construction, a geotechnical report would be prepared to assess the Proposed Action's susceptibility to landslides, lateral spreading, subsidence, liquefaction, or collapse. Geotechnical recommendations would be implemented as a part of the Proposed Action design and construction plans to protect the Proposed Action from landslides, lateral spreading, subsidence, liquefaction, and collapse. Therefore, by preparing a geotechnical report and complying with the Uniform Building Code and other applicable geologic regulations, no substantial adverse effects would occur related to geology and soils.

No groundbreaking activities would result during operations of the Proposed Action. Operations of the Proposed Action would include an un-manned operational reservoir and intake channel. The project site is not in an area with mapped active earthquake faults. Therefore, no impact would occur to geology and soils during operation.

Split Cell Option

The split cell design option would build two cells, separated by a dividing embankment, within the same disturbance area as the single cell. While excavation depths would be slightly deeper, the geologic location and geotechnical recommendations would be the same. Therefore, impacts related to geology and soils would be the same.

3.11.3 Minimization and Mitigation Measures

No mitigation measures are required for geology and soils.

3.12 Visual Resources

3.12.1 Affected Environment

The surrounding areas of the Proposed Action consist of generally flat agricultural land, in a rural, sparsely populated area of Imperial County. The Proposed Action site is bound to the west by the EHL Canal, further west are agricultural fields. East of the site is open, desert landscape owned by BLM, characterized by desert shrubbery and patches of ground cover. To the north and south, the Proposed Action site is bound by scattered agricultural fields and open desert landscape, and a few scattered single-family dwellings to the south. The Proposed Action site has no visual resources such as trees, rock outcroppings, or historic buildings. The Proposed Action site is not within a designated scenic vista, and there are no officially designated state scenic highways that exist within the Proposed Action vicinity. The nearest residential structure is located approximately 150 feet south of the proposed reservoir.

The County of Imperial General Plan Conservation and Open Space Element identifies the visual quality of the BLM land adjacent to the Proposed Action to be “Moderate” or “High Value” (County of Imperial 2016). As discussed in the Imperial County General Plan, many of the natural scenic resources are located on land under BLM jurisdiction. The Proposed Action will not impede or hinder access to the BLM lands located to the east.

3.12.2 Environmental Consequences

The proposed reservoir and intake channel Project is not anticipated to damage or compromise any outstanding aesthetic features. With the EHL Canal directly to the west, and the AAC directly south of the Proposed Action site, the proposed reservoir and intake channel would not be unordinary in the Proposed Action vicinity. Because of the flat and rural character of the area, which includes existing water infrastructure features, the Proposed Action would not obstruct scenic vistas or degrade the existing visual quality or visual character of the site and surroundings. In addition, the Proposed Action site would not damage or degrade any scenic resources designated by the local jurisdiction.

With the nearest residential structure located 150 feet south of the proposed reservoir, the views from this residence would experience minor changes in views north of Verde School Road. Beyond the current intake berm visible for the existing irrigation ditch would be the proposed 10 foot berm at least 150 feet from the residence. The proposed embankments of the reservoir and intake channel would shield any glare from the Proposed Action. Operational and construction lighting would be used for safety and security purposes. All lighting would be directed downward or at a narrow beam angle, in order to focus all light only on the desired area. Although the Proposed Action may create a new source of glare from the large body of water, it would not affect day or nighttime views, because of the absence of elevated vantage points. As such, impacts would be less than significant.

Split Cell Option

The split cell design option would build two cells, separated by a dividing embankment, within the same disturbance area as the single cell. While the berm heights would be slightly taller than those of the single cell, the increase would not be noticeable even at the closest residence (approximately 150 feet away). Therefore, impacts to visual resources would be the same.

3.12.3 Minimization and Mitigation Measures

No mitigation measures are required for visual resources.

3.13 Environmental Justice and Socioeconomic Considerations

3.13.1 Affected Environment

The Office of Environmental Health Hazard Assessment's CalEnviroScreen[1] tool identified the census tract in which the Proposed Action is located to have a CalEnviroScreen 3.0 Percentile of 70-75%, meaning the Proposed Action's census tract is ranked within the 68th percentile throughout the state in pollution burden. The Proposed Action area ranks above 75% for hazardous cleanup sites, hazardous waste, impaired water bodies, solid waste sites, asthma cases, and poverty (OHHA 2018). According to Southern California Association of Government's (SCAG) Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) Environmental Justice Appendix (SCAG 2016), the Proposed Action area is designated as a Disadvantaged Community, based on the requirements set forth in Senate Bill 535 Disadvantaged Communities with Environmental Justice Areas.

[1] CalEnviroScreen is a screening tool that evaluates the burden of pollution from multiple sources in communities while accounting for potential vulnerability to the adverse effects of pollution. CalEnviroScreen ranks census tracts in California based on potential exposures to pollutants, adverse environmental conditions, socioeconomic factors and prevalence of certain health conditions. Data used in the CalEnviroScreen model come from national and state sources.

The 2018 California Water Plan incorporates socio economic objectives within the State's water conservation efficiency and reliability goals: Goal 2-Strengthen Resiliency and Operational Flexibility of Existing and Future Infrastructure; Goal 4-Empower California's Under-Represented and Vulnerable Communities; and, Goal 6-Support Real-time Decision-making, Adaptive Management, and Long-term Planning. The Proposed Action is consistent with these established goals and in furthering the Plan's objectives.

3.13.2 Environmental Consequences

Implementation of the Proposed Action would not disproportionately affect the minority and impoverished population in the area. Based on the analysis for air quality, noise, water resources, hazardous materials, and visual resources in this EA, changes resulting from implementing the Proposed Action would not result in proportionately high and adverse effects to the environment or to the health of low-income and minority populations. As stated in Section 1.3, Project Purpose and Need, the Proposed Action would assist the state in achieving water efficiency, reliability and conservation goals. The Proposed Action would not disproportionately affect a group of people or socio-economic class.

Split Cell Option

The split cell design option would build two cells, separated by a dividing embankment, within the same disturbance area as the single cell. While the split cell design option would require increased earth movement and associated construction activities it would not increase the maximum daily construction intensity or significantly increase the total emissions such that the environment or health of low-income or minority populations would be impacted. Therefore, impacts to environmental justice and socioeconomics would be the same.

3.13.3 Minimization and Mitigation Measures

No mitigation measures are required under environmental justice and socioeconomic considerations.

3.14 Cumulative Effects of the Proposed Action

NEPA requires federal agencies to consider the cumulative effects of proposals under their review. Cumulative effects are defined in the CEQ regulations 40 CFR §1508.7 as "…the impact on the environment that results from the incremental impacts of the action when added to other past, present, and reasonably foreseeable actions regardless of what agency…or person undertakes such other actions." The CEQ states that the "cumulative effects analysis should be conducted on the scale of human communities, landscapes, watersheds, or airsheds" using the concept of "project impact zone" or more simply put, the area that might be affected by the Proposed Action. Several current and planned projects, either located within or in the vicinity of the planning area, that may have the potential to generate a cumulative effect when analyzed in conjunction with the Proposed Action are noted as follows:

- AAC Seepage Recovery Project (an IID project)
- Imperial Solar Energy West
- Iris Cluster Solar Farm Project
- California Energy Commission Alternative Energy Update Project
- Campo Verde Solar Project

The following analysis of the effects from these Projects concluded that effects to resources would not be substantial. Resource types perceived to have only temporary effects (effects that end following construction of the respective project or within a few seasons following construction). The Campo Verde Solar Project, located 7 miles southwest of El Centro, and the AAC Surface Waters Seepage Recovery Project are two projects that have been identified that have the potential to overlap in construction periods. Considering the Campo Verde Solar Project is approximately 21 miles away from the Proposed Action, the Proposed Action, in combination with this project is not anticipated to result in any significant cumulative effects.

3.14.1 Effect by Resource

Air Quality

Should the Proposed Action and the AAC Seepage Waters Recovery Project be constructed at the same time, the greenhouse gas emissions emitted from the two projects would both be temporary and insignificant. Additionally, the peak of emissions would not likely overlap. As such the Proposed Action in combination with the AAC Surface Waters Seepage Recovery Project, would not produce significant cumulative effects to air quality and climate conditions.

Biological Resources

The Proposed Action has the potential for adverse biological effects due to habitat loss for sensitive and common wildlife species. However, with incorporation of avoidance, minimization, and mitigation measures, the Proposed Action Alternative, in conjunction with the other actions, is not anticipated to have substantial adverse cumulative effects to biological resources.

In general terms, in instances where a potential impact could occur, CDFW and USFWS have promulgated a regulatory scheme that limits impacts on these species. The effects of the projects would be rendered less than significant through mitigation requiring compliance with all applicable regulations that protect plant, fish, and animal species, as well as waters of the U.S. and state. Other cumulative projects would also be required to avoid impacts on special-status species and/or mitigate to the satisfaction of the CDFW and USFWS for the potential loss of habitat.

Therefore, the Proposed Action, in conjunction with other projects listed above, would not result in substantial adverse cumulative effects on fish and wildlife.

As discussed in section 3.4, the Proposed Action would permanently impact approximately 0.08 acre of wetlands. Long-term direct impacts to loss of vegetation communities would be mitigated with restoration and enhancement within nearby disturbed areas. Permanent impacts to jurisdictional waters/wetlands would be minimized as they require a site-specific wetlands mitigation plan. The cumulative projects listed above, such as the AAC Seepage Recovery Project may have temporary and permanent impacts to wetlands and riparian area, however that project would also require mitigation at the required ratios and would be subject to federal, state, and local regulations.

No cumulative effects are anticipated to wetlands and riparian areas from the Proposed Action because the potential effects identified would be mitigated at regulated ratios subject to agency permitting and all other cumulative projects effects would be subject to similar mitigation requirements. The Proposed Action, in conjunction with other proposed or ongoing projects described above, would not result in cumulatively substantial adverse effects to wetlands and riparian areas.

Archaeological/Cultural/Tribal Cultural Resources

During the implementation phase of the Proposed Action, there is potential for unforeseen cultural resources to be discovered or damaged. Reclamation has established “stop work” procedures that shall be implemented should an unanticipated discovery situation arise. Federal and/or State laws developed to preserve and manage cultural resources would apply to activities undertaken at the Proposed Action area. Therefore, the Proposed Action, in conjunction with other projects listed above, would not result in substantial adverse cumulative effects on cultural resources.

Hazardous Materials or Solid Waste

No cumulative effects are anticipated to hazards/hazardous materials/human health and solid waste because the Proposed Action would not cause direct or indirect effects to this environmental category. During construction, there is the potential for short-term use of hazardous materials and fuels including diesel fuel, gasoline, and other oils and lubricants. These hazardous materials would be transported and disposed of in compliance with all current local, state, and federal regulations. Other projects described in this section may have hazards/hazardous materials related effects due to construction activities. However, with compliance to existing regulations through minimization measures, these risks would be cumulatively less than significant as these effects are localized and temporary.

Noise

The Proposed Action Alternative would have the potential to increase noise in the area due to construction equipment and workers in the area. Construction noise from the Proposed Action and concurrent projects are expected to remain well below noise levels established in the County General Plan. Noise levels dissipate over distance, therefore, considering the nearest concurrent project is located over 3.5 miles away, adverse cumulative noise effects are not anticipated.

Indian Trust Assets

There are no ITAs or other resources of tribal concern in the project area, and adverse impacts on ITAs or other tribal resources from implementation of the Proposed Action would not occur. Therefore, the Proposed Action, in combination with other proposed or on-going projects, would not cause adverse cumulative effects on ITAs.

Hydrology and Water Quality

The Proposed Action would have beneficial effects related to ensuring water supply to the Imperial County population. The Proposed Action would manage water for delivery to agricultural uses and more efficiently use the same water volume as currently used from the AAC. As such the subsequent end drainage of water to the Salton Sea would not be adversely affected by the Proposed Action. The AAC Surface Waters Seepage Recovery Project would potentially increase the water volume available from the AAC be reducing loss. No other cumulative projects would result in cumulative changes to the water volume in the system and thus final drainage amounts into the Salton Sea. The Proposed Action, in conjunction with other proposed or ongoing projects described above, would not result in cumulatively adverse effects to water resources.

The AAC Surface Waters Seepage Recovery Project, along with other projects over 1 acre in size (which includes most of the projects in the cumulative scenario), would be required to obtain coverage under the NPDES Construction General Permit, which requires project proponents to identify and implement stormwater BMPs that effectively control erosion and sedimentation and other construction-related pollutants. IID’s stormwater standards manual also requires smaller projects (less than 1 acre) to implement a minimum set of water quality BMPs.

The various NPDES permits required are aimed at maintaining the beneficial uses of the water bodies in the RWQCB Basin Plan and meeting water quality objectives associated with specific pollutants of concern. Because adverse water quality and major hydrologic alterations are linked to the large-scale, cumulative effects of development projects, as well as industrial and/or agricultural land uses, the provisions within the various NPDES permits, by their nature, seek to address cumulative conditions.

In terms of water supply, the Proposed Action would increase water efficiency and reliability of agricultural water for the Imperial Valley. Additionally, any cumulative project within the County's jurisdiction that meets the definition of a "project" under Senate Bill 610 and/or Senate Bill 221 would be required to prepare a Water Supply Assessment, which requires detailed information regarding water availability to be provided to local decision makers prior to approval of specified large development projects as well as updates to community plans, new specific plans, or certain plan amendments. Therefore, the Proposed Action when combined with cumulative projects, would not result in a cumulative impact regarding water supply.

Land Use

Applicable regional land use plans identified cumulatively significant and unavoidable land use impacts related to incremental adverse physical changes to the environment. While such effects have been attributed to renewable energy projects including the listed cumulative solar projects, the Proposed Action would not involve a use or physical change inconsistent with the rural and farming uses of the area. The Proposed Action would not conflict with the A-2 and A-3 zoning, established in the Imperial County Zoning Ordinance, considering the Proposed Action would include similar uses to those allowed. As such the Proposed Action would not contribute to in a cumulatively considerable contribution to cumulative impacts related to the compatibility of the Proposed Action with applicable land use plans.

Geology and Soils

Potential cumulative impacts on geology and soils would result from projects that combine to create geologic hazards, including unstable geologic conditions, or substantially contribute to erosion. The majority of impacts from geologic hazards, such as rupture of a fault line, liquefaction, landslides, expansive soils, and unstable soils, are site-specific and must be mitigated on a project-by-project basis. The Proposed Action and all future projects in the region would be required to adhere to proper building engineering design per most recent Uniform Building Code or in order to ensure the safety of building occupants and avoid a cumulative geologic hazard. Additionally, projects would incorporate individual mitigation for site-specific geologic hazards present on each individual cumulative project site. Therefore, cumulative impacts related to site-specific geologic hazards would not occur.

Visual Resources

As discussed in Section 3.14, Visual Resources, the Proposed Action would not result in a substantial change to natural topography, the blockage of public views, or degrade the existing visual character or quality of the site and its surroundings. The Proposed Action would not damage or degrade any scenic resources designated by the local jurisdiction. Other cumulative projects are subject to design review prior to discretionary approvals or permit issuance, which reduces the opportunity for significant cumulative visual effects and visual character impacts. However, impacts may result from renewable energy projects. The Proposed Action would not contribute considerably to cumulative visual effects.

Environmental Justice and Socioeconomics

As discussed in Section 3.15, Environmental Justice and Socioeconomics, the location of Proposed Action is designated as a Disadvantaged Community. However, the Proposed Action would not result in proportionately high and adverse effects to the environment or to the health of low-income and minority populations. As such, no disproportionate environmental effects would result from the Proposed Action and contribution to environmental justice or socioeconomic effects would not be cumulatively considerable.

Chapter 4. Consultation, Coordination, and List of Preparers

4.1 Agencies Consulted

4.1.1 Scoping

Reclamation sent a letter to the entities listed below to solicit scoping comments, interest, and issues of concern on December 3rd, 2019. The Fort Yuma Quechan Indian Tribe's Cultural Committee (Committee) responded with an email requesting a meeting regarding the scoping request December 13th. Reclamation met with the Committee by conference call and discussed the project on January 10th, 2020. The Committee requested a field trip at the proposed project location to further discuss the proposed project, which took place on February 28th, 2020. Reclamation continues to consult with the Committee regarding the proposed project. The California Department of Transportation, District 11 responded with a letter including list of suggested items to address in the draft EA. No other scoping comments or letters were received. A copy of the scoping letter sent by Reclamation soliciting comments is available upon request.

- USFWS, Palm Springs office
- BLM, El Centro Field Office
- CDFW
- California Department of Transportation, District 11
- IID
- California Regional Water Quality Control Board
- Fort Yuma Quechan Indian Tribe
- Imperial County Planning and Development Services Department
- USACE, Carlsbad office

4.1.2 Draft Environmental Assessment

An electronic copy of this EA has been posted for public viewing on Reclamation's Yuma Area Office web site at http://www.usbr.gov/lc/yuma/. Paper copies of the Notice of Availability memorandum and EA were distributed to the following entities:

- USFWS, Palm Springs office
- BLM, El Centro Field Office
- CDFW
- California Department of Transportation, District 11

- IID
- California Regional Water Quality Control Board
- Fort Yuma Quechan Indian Tribe
- Imperial County Planning and Development Services Department
- USACE, Carlsbad office

Consultations with the California State Historic Preservation Officer and tribal representatives are ongoing under Section 106 of the NHPA (36 Part 800) for undertakings involving Federal facilities.

4.1.3 Final Environmental Assessment

Reclamation will consider and incorporate relevant comments from the Draft EA and publish a Final EA and FONSI if a determination is made that an EIS is not required and a FONSI is appropriate. Reclamation will make the final documents available on the Yuma Area Office's Environmental Documents web site.

4.2 List of Preparers

IID

Vince Brooke, Principal Engineer
Justina Gamboa-Arce, Water Resources Planner

Reclamation

Julian DeSantiago, Environmental Planning & Compliance Group Manager
Nicholas Heatwole, Environmental Protection Specialist
Erik Bray, Environmental Protection Specialist
Andrea Kayser, Archaeologist

Dudek

Matt Valerio, Project Manager
Ian McIntire, Air Quality Technical Specialist
Callie Ford, Biologist
Shannon Baer, Analyst
Matthew DeCarlo, Cultural Resources Specialist
Sarah Siren, Paleontologist

Chapter 5. References

CAL FIRE (California Department of Forestry and Fire Protection. 2007. Fire and Resource Assessment Program. http://frap.fire.ca.gov/webdata/maps/imperial/fhszl06_1_map.13.pdf.

CDFG (California Department of Fish and Game). 2009. Protocols for Surveying and Evaluating Effects to Special Status Native Populations and Natural Communities.

CDFG. 2012. Staff Report on Burrowing Owl Mitigation. Appendix E Draft Example Components for Burrowing Owl Artificial Burrow and Exclusion Plans. https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=83843.

CNPS (California Native Plant Society). 2001. *CNPS Botanical Survey Guidelines*.

County of Imperial. 1977. "Geology and Minerals of Imperial County." County Report 7. https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=8417.

County of Imperial. 1993. *Seismic and Public Safety Element.* http://www.icpds.com/CMS/Media/Seismic-and-Public-Safety-Element.pdf

County of Imperial. 1998. Imperial County Land Use Code. https://library.municode.com/ca/imperial_county/codes/code_of_ordinances?nodeId=TIT9LAUSCO_DIV5ZOARES_CH8GEAGRGEAGRUZO_90508.00PUAP.

County of Imperial. 2015a. Imperial County Land Use Element. October 2015. http://www.icpds.com/CMS/Media/Land-Use-Element-(2015).pdf

County of Imperial. 2016. "Conservation and Open Space Element." Imperial County General Plan. http://www.icpds.com/CMS/Media/Conservation-&-Open-Space-Element-2016.pdf

Cypher, E.A. 2002. U.S. Fish and Wildlife Service General Rare Plant Survey Guidelines.

DOC (Department of Conservation). 2014. California Farmland Mapping and Monitoring Program Map. http://maps.conservation.ca.gov/ciff/ciff.html.

Dudek. 2019. Biological Resources Report for the East Highline Reservoir Project Imperial County, California.

DTSC (Department of Toxic Substances Control). 2016. "Envirostor." Database. Accessed February 13, 2017.

DWR (Department of Water Resources). 2016. Best Available Maps: FEMA 100-year Flood Area. Accessed October 2017. http://gis.bam.water.ca.gov/bam/.

Flat-tailed Horned Lizard Interagency Coordinating Committee. 2003. "Appendix 7, Fencing and Removal Survey Protocols." May 2003. https://www.fws.gov/southwest/es/arizona/Documents/SpeciesDocs/FTHL/RMS%20-%20Final%202003.pdf.

Garrett, K., and J. Dunn. 1981. *Birds of southern California: Status and distribution.* Los Angeles, CA: The Artisan Press.

ICAPCD (Imperial County Air Pollution Control District). 2007. *CEQA Air Quality Handbook.*

IID (Imperial Irrigation District). 2007. 2007 Water Conservation Plan. Imperial Irrigation District Resources Planning & Management Section. October 2008. Accessed October 2017. http://www.iid.com/home/showdocument?id=4598.

IID (Imperial Irrigation District). 2017. HCP NCCP Process. http://www.iid.com/water/library/qsa-water-transfer/environmental-assessments-permits/hcp-nccp-process.

Imperial IRWMP. Integrated Regional Water Management Plan. 2011. http://imperialirwmp.org/2012%20Updates/1-20100824%20WF%20GoalsObjectives_rev_16June2011.pdf

NPS (National Park Service). 2015. Interactive Map of NPS Wild and Scenic Rivers. https://www.nps.gov/orgs/1912/plan-your-visit.htm.

OHHA (Office of Environmental Health Hazard Assessment). 2018. CalEnviroScreen 3.0. https://oehha.ca.gov/calenviroscreen/report/calenviroscreen-30.

Rosenberg, K. V., R. D. Ohmart, W. C. Hunter, and B. W. Anderson. 1991. *The birds of the lower Colorado River.* Tucson, AZ: University of Arizona Press.

SCAG (Southern California Association of Governments). 2016 RTP SCS. http://scagrtpscs.net/Documents/2016/final/f2016RTPSCS_EnvironmentalJustice.pdf.

APPENDICES TO THE

ENVIRONMENTAL ASSESSMENT

APPENDIX A

DRAFT ENVIRONMENTAL IMPACT REPORT

(Please refer to Draft EIR)

APPENDIX B

RESOURCES CONSIDERED BUT ELIMINATED FROM FURTHER DISCUSSION

APPENDIX C
AIR QUALITY AND GREENHOUSE GAS EMISSIONS
MEMO

(Please refer to Draft EIR Appendix B-Air Quality and Greenhouse Gas Emissions)

APPENDIX D

FIELD NOISE MEASUREMENT DATA

(Please refer to Draft EIR Appendix E-Noise Model Run)

APPENDIX B

605 THIRD STREET
ENCINITAS, CALIFORNIA 92024
T 760.942.5147 F 760.632.0164

MEMORANDUM

To:	Jessica Lovecchio, Sr. Environmental Project manager
From:	Ian McIntire, Dudek
Subject:	East Highline Reservoir Project Air Quality and Greenhouse Gas Emissions Assessment
Date:	April 16, 2019
Attachment A:	Air Quality and Greenhouse Gas Emissions Calculations

Dudek is pleased to submit this air quality and greenhouse gas (GHG) emissions assessment to assist Imperial Irrigation District (IID) with initial environmental planning requirements for the proposed East Highline (EHL) Reservoir Project (proposed project) located in Imperial County (County), California.

This memorandum estimates criteria air pollutant and GHG emissions from construction of the proposed project and evaluates potential air quality and GHG emissions impacts resulting from project construction.

The contents and organization of this memorandum are as follows: project description; general analysis and methodology; threshold of significance and an impact analysis for the air quality assessment and GHG emissions assessment; conclusions; and references cited.

1 Project Description

The proposed project consists of a main canal off-line reservoir storage project and related infrastructure. The reservoir would be a single 2,500 to 3,400 acre-foot (AF) capacity reservoir on a parcel of farm ground located approximately 1.25 miles north of the All-American Canal (AAC) and on the east side of the EHL Canal at Verde School Road, in Imperial County, California. A proposed intake structure off the north side of the AAC would direct Colorado River flows along a proposed intake canal to the reservoir at up to approximately 1,500 cubic feet per second (cfs). The construction and use of this large operational reservoir is a planned strategy to manage reduced downstream demands due to increase in grower requests for 12-hour deliveries or any reduction to a 24-hour order. Stored water would be delivered through an automated gate outlet and structure with a gravity flow capacity of approximately 1,500 cfs for delivery into the EHL Canal.

Construction of the reservoir would occur over an approximately 15-month construction period and involve the following components: construction of the reservoir; canal and measurement flume; sedimentation basin; construction of the Highway 98 crossing, canal inlet structure, reservoir outlet structure, meter vault, and EHL Canal outfall structure; construction of the AAC and EHL Canal tie-ins; and construction of the Highway 98 detour roadway.

2 General Analysis and Methodology

The project is located within the Imperial County portion of the Salton Sea Air Basin (SSAB). The SSAB includes all of Imperial County and the central portion of Riverside County (Coachella Valley). The Imperial County portion is under the jurisdiction of the Imperial County Air Pollution Control District (ICAPCD). Project-generated criteria air pollutant and GHG emissions are estimated using the most recent version of the California Emissions Estimator Model (CalEEMod Version 2016.3.1). Emission calculations were based on assumptions provided by IID and/or CalEEMod default values.

Criteria air pollutants are defined as pollutants for which the federal and state governments have established ambient air quality standards, or criteria, for outdoor concentrations to protect public health. Criteria air pollutants that are evaluated include volatile organic compounds (VOCs; also referred to as reactive organic gases (ROGs)), oxides of nitrogen (NO_x), carbon monoxide (CO), sulfur oxides (SO_x), particulate matter with an aerodynamic diameter less than or equal to 10 microns in size (PM_{10}), and particulate matter with an aerodynamic diameter less than or equal to 2.5 microns in size ($PM_{2.5}$). VOCs and NO_x are important because they are precursors to ozone (O_3). Criteria air pollutant emissions associated with construction of the proposed project were estimated for the following emission sources: operation of off-road construction equipment, on-road hauling and vendor (material delivery) trucks, and worker vehicles.

GHGs are gases that absorb infrared radiation in the atmosphere. The greenhouse effect is a natural process that contributes to regulating the Earth's temperature. Global climate change concerns are focused on whether human activities are leading to an enhancement of the greenhouse effect. Principal GHGs include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), O_3, and water vapor. If the atmospheric concentrations of GHGs rise, the average temperature of the lower atmosphere will gradually increase. Globally, climate change has the potential to impact numerous environmental resources though uncertain impacts related to future air temperatures and precipitation patterns. Although climate change is driven by global atmospheric conditions, climate change impacts are felt locally. Climate change is already affecting California: average temperatures have increased, leading to more extreme hot days and fewer cold nights; shifts in the water cycle have been observed, with less winter precipitation falling as snow, and both snowmelt and rainwater running off earlier in the year; sea levels have risen; and wildland fires are becoming more frequent and intense due to dry seasons that start earlier and end later (CAT 2010).

The effect each GHG has on climate change is measured as a combination of the mass of its emissions and the potential of a gas or aerosol to trap heat in the atmosphere, known as its global warming potential (GWP), which varies among GHGs. Total GHG emissions are expressed as a function of how much warming would be caused by the same mass of CO_2. Thus, GHG emissions are typically measured in terms of pounds or tons of CO_2 equivalent (CO_2e). The CO_2E for a gas is derived by multiplying the mass of the gas by the associated GWP, such that metric tons (MT) of CO_2e = (MT of a GHG) × (GWP of the GHG). CalEEMod assumes that the GWP for CH_4 is 25, which means that emissions of 1 MT of CH_4 are equivalent to emissions of 25 MT of CO_2, and the GWP for N_2O is 298, based on the Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report.

GHG emissions associated with construction of the proposed project were estimated for the following emission sources: operation of off-road construction equipment, on-road hauling and vendor trucks, and worker vehicles. The detailed project construction assumptions are included in Attachment A for the proposed project.

2.1 Construction Assumptions

Criteria air pollutants and GHG emissions associated with construction of the proposed project were estimated for the following emission sources: operation of off-road construction equipment, on-road vendor and haul trucks, and worker vehicles.

CalEEMod was used to estimate project-generated construction emissions. For purposes of estimating project emissions, and based on information provided by the applicant and CalEEMod default values. Construction is expected to begin October 2019, and would last approximately 15 months, ending in late 2020. Because CalEEMod uses real dates (e.g., January 1, 2018) to calculate construction emissions, assumptions were made as to key dates for each phase. However, the analysis presented herein assumes a construction start date of October 2018, which was the original earliest date at which construction would initiate per the project's preliminary construction schedule. Assuming an earlier start date for construction represents the worst-case scenario for criteria air pollutant and GHG emissions because equipment and vehicle emission factors for later years would be slightly less due to more stringent standards for in-use off-road equipment and heavy-duty trucks, as well as fleet turnover replacing older equipment and vehicles in later years. Thus, by assuming an earlier construction date of October 2019, this technical memorandum's estimated emissions would likely overstate the actual emission levels. In summary, construction phasing would consist of the following (duration of phases is approximate):

- Reservoir – 15 months (October 2019– December 2020)
- Highway 98 Detour Roadway – 1 month (October 2019)
- Sedimentation Basin – 3 months (October 2019 – December 2019)
- Canal and Measurement Flume – 3 months (October 2019 – December 2019)
- Canal Tie-Ins – 3 months (November 2019 – January 2020)
- Structures (Highway 98 Crossing Meter Vault, and EHL Canal Outfall Structure), Canal Inlet Structure, Reservoir Outlet Structure – 3 months (February 2020 – April 2020)

The construction equipment mix used for estimating the construction emissions of the proposed project in addition to worker and vendor truck assumptions are based on information provided by the applicant and are included in Attachment A of this memorandum.

3 Air Quality Assessment

3.1 Thresholds of Significance

The State of California has developed guidelines to address the significance of air quality impacts based on Appendix G of the CEQA Guidelines (14 CCR 15000 et seq.). In addition, Appendix G of the CEQA Guidelines indicates that where available, the significance criteria established by the applicable air district may be relied upon to determine whether the proposed project would have a significant impact on air quality. This analysis focuses on addressing the potential for the project to violate any air quality standard or contribute substantially to an existing or projected air quality violation, which is determined by comparing estimated project-generated construction emissions to numeric thresholds established by the ICAPCD.

The ICAPCD has established significance thresholds in the 2007 ICAPCD CEQA Air Quality Handbook for the preparation of air quality impact assessments. The screening criteria within this handbook can be used to determine whether a project's total emissions would result in a significant impact as defined by CEQA. Should emissions be found to exceed these thresholds, additional modeling is required to demonstrate that the project's total air quality impacts are below the state and federal ambient air quality standards. Table 1 below shows the screening thresholds for construction and daily operations.

Table 1. ICAPCD Air Quality Significance Thresholds

Pollutant	Construction Criteria Pollutants Mass Daily Thresholds (pounds per day)
ROG	75
NO_x	100
CO	550
PM_{10}	150

Source: ICAPCD 2007.
Notes: CO = carbon monoxide; ICAPCD = Imperial County Air Pollution Control District, NO_x = oxides of nitrogen; PM_{10} = coarse particulate matter; ROG = reactive organic gases

Pursuant to the ICAPCD CEQA Air Quality Handbook, regardless of the size of the project, standard mitigation measures for construction equipment and fugitive PM_{10} must be implemented at all construction sites. The implementation of discretionary mitigation measures, as listed in Section 7.1 of the handbook, apply to those construction sites that are 5 acres or more for non-residential developments.

3.2 Imperial County Attainment Classification and De Minimis Thresholds

Pursuant to the 1990 federal Clean Air Act amendments, the Environmental Protection Agency classifies air basins (or portions thereof) as "attainment" or "nonattainment" for each criteria air pollutant, based on whether the National Ambient Air Quality Standards (NAAQS) have been achieved. Generally, if the recorded concentrations of a pollutant are lower than the standard, the area is classified as "attainment" for that pollutant. If an area exceeds the standard, the area is classified as "nonattainment" for that pollutant. If there is not enough data available to determine whether the standard is exceeded in an area, the area is designated as "unclassified" or "unclassifiable." The designation of "unclassifiable/attainment" means that the area meets the standard or is expected to be meet the standard despite a lack of monitoring data. Areas that achieve the standards after a nonattainment designation are re-designated as maintenance areas and must have approved Maintenance Plans to ensure continued attainment of the standards. Table 2 shows that the proposed project is located in an area that is nonattainment for ozone and PM_{10}.

Table 2. Imperial County Attainment Classification

Pollutant	Federal Attainment Status	De Minimis Thresholds (tpy)
Ozone (O_3) – 1 hour	Attainment[a]	N/A
O_3 (8-hour – 1997) (8-hour – 2015)	Attainment (maintenance) **Nonattainment (marginal)**	100 [b] (VOC or NO_x)
Nitrogen Dioxide (NO_2)	Unclassifiable/attainment	N/A
Carbon Monoxide (CO)	Unclassifiable/attainment	N/A
Sulfur Dioxide (SO_2)	Unclassifiable/attainment	N/A
Coarse Particulate Matter (PM_{10})	**Nonattainment (serious)**	70
Fine Particulate Matter ($PM_{2.5}$)	Unclassifiable/attainment	N/A
Lead (Pb)	Unclassifiable/attainment	N/A
Hydrogen Sulfide	No federal standard	N/A
Sulfates	No federal standard	N/A
Visibility-Reducing Particles	No federal standard	N/A
Vinyl Chloride	No federal standard	N/A

Sources: EPA 2018 (federal attainment status); EPA 2017 (de minimis thresholds).
Notes:
Attainment = meets the standards; Attainment/Maintenance = achieve the standards after a nonattainment designation; N/A = not applicable; Nonattainment = does not meet the standards; tpy = tons per year; Unclassified or Unclassifiable = insufficient data to classify; Unclassifiable/Attainment = meets the standard or is expected to be meet the standard despite a lack of monitoring data.
[a] The federal 1-hour standard of 0.12 ppm was in effect from 1979 through June 15, 2005. The revoked standard is referenced here because it was employed for such a long period and because this benchmark is addressed in SIPs.
[b] The applicable de minimis threshold applies equally to each ozone precursor (VOC and NO_x)

3.3 Impact Analysis

Construction Emissions

Construction of the project would result in the temporary addition of pollutants to the local airshed caused by on-site sources (i.e., off-road construction equipment, soil disturbance, and off-site sources (i.e., on-road haul trucks, vendor trucks, and worker vehicle trips). Construction emissions can vary substantially from day to day, depending on the level of activity, the specific type of operation, and for dust, the prevailing weather conditions. Therefore, such emission levels can only be approximately estimated with a corresponding uncertainty in precise ambient air quality impacts. Table 2 presents the estimated maximum daily construction emissions generated during construction of the proposed project. Details of the emission calculations are provided in Attachment A.

Notably, as discussed previously, the estimated commencement date for project construction is now going to occur at a later date compared to the construction schedule assumed at the time of modeling. However, for the purposes of construction modeling, the models do not need to use the exact commencement and completion dates to accurately represent the project construction emissions. This is because state and local regulations, restrictions, and increased market penetration of cleaner construction equipment are anticipated to continue to reduce emissions in the future. In other words, because California's construction related emission sources are regulated and will foreseeably continue to be more strictly regulated in the future, project emissions are reasonably expected to continue to decline. Thus, by utilizing an earlier start date of October 2018, estimated emissions likely overstate actual emission levels. Therefore, the analysis and modeling included herein continue to provide an accurate and conservative assessment of the project's construction-related air pollutant emissions.

Table 3 presents the estimated maximum daily construction emissions generated during construction of the proposed project.

Table 3. Estimated Maximum Daily Construction Criteria Air Pollutant Emissions

Project Component	ROG	NOx	CO	PM10
	pounds per day			
Year 2018				
Reservoir	3.54	36.22	16.35	55.07
Highway 98 Detour	4.06	46.97	28.46	66.68
Canal Tie-Ins	2.68	21.92	20.12	49.00
Sedimentation Basin	11.72	115.34	70.03	76.29
Canal and Measurement Flumes	8.97	87.84	63.31	78.68
Year 2019				
Reservoir	4.83	44.07	34.77	102.58
Canal Tie-Ins	3.05	25.29	22.01	54.24
Structures	10.71	102.75	67.93	75.93
Maximum Daily	**11.72**	**115.34**	**70.03**	**102.58**
ICAPCD Threshold	*75*	*100*	*550*	*150*
Threshold Exceeded?	No	**Yes**	No	No

Notes: CO = carbon monoxide; ICAPCD = Imperial County Air Pollution Control District; NO_x = oxides of nitrogen; PM_{10} = coarse particulate matter; ROG = reactive organic gasses.
The values shown are the maximum summer or winter daily emissions results from CalEEMod.
These estimates reflect control of fugitive dust required by ICAPCD including watering of active sites at least three times per day and limiting vehicle speeds to 15 miles per hour on unpaved roads.
See Attachment A for complete results.

Table 3 presents a worst-case scenario for construction activities. Construction of the structures and sedimentation are estimated to generate the greatest daily NO_x emissions. Construction activities could result in some overlap with other project components, because the reservoir construction would occur over a 15-month period and construction of the Highway 98 detour, canal tie-ins, structures, sedimentation basin, and canal and measurement flume would range from a construction period of up to 3 months within the same 15-month duration as the reservoir. Because the IID is limited in construction equipment and staffing, it is assumed that equipment and staff would move accordingly so that the maximum emissions which a project component could produce as shown in Table 2, would not overlap with another construction component. Therefore, the total daily maximum emissions presented in Table 2 would present a worst-case scenario. As shown in Table 2, the proposed project would likely exceed the NO_x ICAPCD significance thresholds and therefore would have a potentially significant impact and thus mitigation is required.

While construction-generated emissions would be temporary and would not represent a long-term source of criteria air pollutant emissions with construction of the reservoir and other project components would occur over a 15-month period, the ICAPCD's CEQA Air Quality Handbook recommends that projects comply with Regulation VIII - Fugitive Dust Control Measures, to reduce the amount of fugitive dust generated during construction. The proposed project would be required as conditions of approval to implement the following measures that are required of all projects:

Discretionary Mitigation Measures for Fugitive PM_{10} Control

1. Water exposed soil with adequate frequency for continued moist soil.
2. Replace ground cover in disturbed areas as quickly as possible.
3. Vehicle speed for all construction vehicles shall not exceed 15 miles per hour on any unpaved surface at the construction site.

Standard Mitigation Measures for Construction Combustion Equipment

1. Use of alternative fueled or catalyst equipped diesel construction equipment, including all off-road and portable diesel powered equipment.
2. Minimize idling time either by shutting equipment off when not in use or reducing the time of idling to 5 minutes as a maximum.
3. Limit, to the extent feasible, the hours of operation of heavy duty equipment and/or the amount of equipment in use.
4. Replace fossil fueled equipment with electrically driven equivalents (provided they are not run via a portable generator set).

Clean Air Act

Regarding if the proposed project would conflict with the applicable de minimis thresholds, estimated project construction emissions (in tons per year) are shown in Table 4. As previously discussed, construction of the proposed project would result in the temporary addition of pollutants to the local airshed caused by on-site sources (i.e., off-road construction equipment, soil disturbance, and off-site sources (i.e., on-road haul trucks, vendor trucks, and worker vehicle trips). Construction emissions can vary substantially from day to day, depending on the level of activity, the specific type of operation, and for dust, the prevailing weather conditions. Therefore, such emission levels can only be approximately estimated with a corresponding uncertainty in precise ambient air quality impacts. Refer to Attachment A of this document for the complete air quality modeling assumptions and outputs.

Table 4. Estimated Annual Construction Criteria Air Pollutant Emissions

Year	ROG	NOx	PM10
	tons per year		
2018	0.63	5.93	6.45
2019	0.72	6.96	10.70
Maximum Annual Emissions	**0.72**	**6.96**	**10.70**
De Minimis Threshold	*100*	*100*	*70*
Threshold Exceeded?	No	No	No

Notes: NO_x = oxides of nitrogen; PM_{10} = fine particulate matter; $PM_{2.5}$ = fine particulate matter; ROG = reactive organic gasses.
See Attachment A for detailed results.

As provided in Table 4, the proposed project would not exceed any of the applicable federal de minimis thresholds during construction activities in 2018 or 2019. Therefore, additional conformity analysis is not required; the proposed project would conform to the applicable implementation plan for the project area.

4 Greenhouse Gas Emissions Assessment

4.1 Thresholds of Significance

The California Natural Resources Agency (CNRA) adopted amendments to the CEQA Guidelines on December 30, 2009, which became effective on March 18, 2010. With respect to GHG emissions, the amended CEQA Guidelines state in Section 15064.4(a) that lead agencies should “make a good faith effort, to the extent possible on scientific and factual data, to describe, calculate or estimate” GHG emissions. The CEQA Guidelines note that an agency may identify emissions by either selecting a “model or methodology” to quantify the emissions or by relying on “qualitative analysis or other performance based standards” (14 CCR 15064.4(a)). Section 15064.4(b) states that the lead agency should consider the following when assessing the significance of impacts from GHG emissions on the environment:

- The extent a project may increase or reduce GHG emissions as compared to the existing environmental setting.
- Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project.
- The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions (14 CCR 15064.4(b)).

In addition, Section 15064.7(c) of the CEQA Guidelines specifies that “[w]hen adopting thresholds of significance, a lead agency may consider thresholds of significance previously adopted or recommended by other public agencies, or recommended by experts, provided the decision of the lead agency to adopt such thresholds is supported by substantial evidence.” Similarly, the revisions to Appendix G, Environmental Checklist Form, which is often used as a basis for lead agencies’ selection of significance thresholds, do not prescribe specific thresholds.

Rather, the CEQA Guidelines establish the following CEQA threshold related to GHGs which has been established to discuss the significance of project impacts (14 CCR 15000 et seq.):

1. Would the project generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment?
2. Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emission of greenhouse gases?

Accordingly, the CEQA Guidelines do not prescribe specific methodologies for performing an assessment, establish specific thresholds of significance, or mandate specific mitigation measures. Rather, the CEQA Guidelines emphasize the lead agency's discretion to determine the appropriate methodologies and thresholds of significance that are consistent with the manner in which other impact areas are handled in CEQA (CNRA 2009).

The ICAPCD has not adopted GHG thresholds for projects. While GHG emissions were quantified for construction activities for informational purposes, to determine the proposed project's significance, a discussion has been included pertaining to how the proposed project would not conflict with applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions.

4.2 Impact Analysis

Construction Emissions

Construction of the project would result in GHG emissions, which are primarily associated with use of off-road construction equipment, on-road vendor and haul trucks, and worker vehicles. As stated above, the ICAPCD does not have adopted GHG thresholds however; total construction emissions of the proposed project were calculated.

CalEEMod was used to calculate the annual GHG emissions based on the construction scenario described in Attachment A. Construction of the proposed project is anticipated to commence in October 2019, lasting a total of approximately fifteen months. However, the analysis presented herein assumes a construction start date of October 2018, which was the original earliest date at which construction would initiate per the project's preliminary construction schedule. On-site sources of GHG emissions include off-road equipment and off-site sources include on-road vehicles (haul trucks, vendor trucks, and worker vehicles). Table 5 presents construction GHG emissions for the proposed project from on-site and off-site emission sources.

Table 5. Estimated Annual Construction GHG Emissions

Project Component	CO_2	CH_4	N_2O	CO_2e
	metric tons per year			
Year 2018				
Reservoir	99.78	0.03	0.00	100.50
Highway 98 Detour	46.79	0.01	0.00	47.14
Canal Tie-Ins	50.92	0.01	0.00	51.17
Sedimentation Basin	300.46	0.06	0.00	301.91
Canal and Measurement Flumes	220.69	0.03	0.00	221.53
Year 2019				
Reservoir	506.24	0.11	0.00	509.02
Canal Tie-Ins	38.65	0.00	0.00	38.75
Structures	282.13	0.05	0.00	283.43
Total	**1,545.66**	**0.30**	**0.00**	**1,553.45**

Notes: CO_2 = carbon dioxide; CH_4 = methane; N_2O = nitrous oxide; CO_2e = carbon dioxide equivalent.
See Attachment A for complete results.

As shown in Table 5, the estimated total GHG emissions during construction of would be approximately 1,553 MT CO_2e over the entire construction period. As with project-generated construction air quality pollutant emissions, GHG emissions generated during construction of the proposed project would be short-term in nature, lasting only for the duration of the construction period, and would not represent a long-term source of GHG emissions. To evaluate whether the proposed project would generate GHG emissions that are cumulatively considerable, a discussion is provided below discussing if the proposed project would conflict with the state's GHG reduction goals.

Consistency with CARB's Scoping Plan

The Climate Change Scoping Plan, approved by California Air Resources Board (CARB) in 2008 and updated in 2014 and 2017, provides a framework for actions to reduce California's GHG emissions and requires CARB and other state agencies to adopt regulations and other initiatives to reduce GHGs. As such, the Scoping Plan is not directly applicable to specific projects. Moreover, the Final Statement of Reasons for the amendments to the CEQA Guidelines reiterates the statement in the Initial Statement of Reasons that "[t]he Scoping Plan may not be appropriate for use in determining the significance of individual projects because it is conceptual at this stage and relies on the future development of regulations to implement the strategies identified in the Scoping Plan" (CNRA 2009). Under the Scoping Plan, however, there are several state regulatory measures aimed at the identification and reduction of GHG emissions. CARB and other state agencies have adopted many of the measures identified in the Scoping Plan. Most of these measures focus on area source emissions (e.g., energy usage, high-GWP GHGs in consumer products) and changes to the vehicle fleet (hybrid, electric, and more fuel-efficient vehicles) and associated fuels (e.g., Low Carbon Fuel Standard), among others. While state regulatory measures would ultimately reduce GHG emissions associated with the proposed project through their effect on these sources, no statewide plan, policy, or regulation would be specifically applicable to reductions in GHG emissions from the proposed project.

Consistency with SCAG 2016–2040 RTP/SCS

At the regional level, SCAG has adopted the 2016–2040 Regional Transportation Plan (RTP)/Sustainable Communities Strategy (SCS) for the purpose of reducing GHG emissions attributable to passenger vehicles in Imperial County and surrounding areas. The RTP/SCS quantified an 8% reduction in emissions per capita by 2020, an 18% reduction by 2035, and a 21% reduction by 2040 (SCAG 2016). Although the RTP/SCS does not regulate land use or supersede the exercise of land use authority by SCAG's member jurisdictions (i.e., the County), the RTP/SCS is a relevant regional reference document for purposes of evaluating the connection of land use and transportation patterns and the corresponding GHG emissions. The RTP/SCS is not directly applicable to the proposed program because the underlying purpose of the RTP/SCS is to provide direction and guidance on future regional growth (i.e., the location of new residential and non-residential land uses) and transportation patterns throughout the region, as stipulated under SB 375. The proposed project involves construction of a main canal off-line reservoir storage project and related infrastructure, which entails short-term use of construction equipment and worker vehicle trips. As such, the proposed project would not conflict with the goals and policies of the RTP/SCS.

Consistency with EO S-3-05 and SB 32

Executive Order (EO) S-3-05. This executive order establishes the following goals: GHG emissions should be reduced to 2000 levels by 2010, to 1990 levels by 2020, and to 80% below 1990 levels by 2050.

Senate Bill (SB) 32. This bill establishes a statewide GHG emissions reduction target whereby CARB, in adopting rules and regulations to achieve the maximum technologically feasible and cost-effective GHG emissions reductions, shall ensure that statewide GHG emissions are reduced to at least 40% below 1990 levels by December 31, 2030.

CARB has expressed optimism with regard to both the 2030 and 2050 goals. It states in the Scoping Plan First Update that "California is on track to meet the near-term 2020 GHG emissions limit and is well positioned to maintain and continue reductions beyond 2020 as required by AB 32" (CARB 2014). With regard to the 2050 target for reducing GHG emissions to 80% below 1990 levels, the Scoping Plan First Update (CARB 2014) states the following:

> This level of reduction is achievable in California. In fact, if California realizes the expected benefits of existing policy goals (such as 12,000 megawatts of renewable distributed generation by 2020, net zero energy homes after 2020, existing building retrofits under AB 758, and others) it could reduce emissions by 2030 to levels squarely in line with those needed in the developed world and to stay on track to reduce emissions to 80% below 1990 levels by 2050. Additional measures, including locally driven measures and those necessary to meet federal air quality standards in 2032, could lead to even greater emission reductions.

In other words, CARB believes that the state is on a trajectory to meet the 2030 and 2050 GHG reduction targets set forth in AB 32, SB 32, and EO S-3-05. This is confirmed in the Second Update, which states, "[t]his Plan draws from the experiences in developing and implementing previous plans to present a path to reaching California's 2030 GHG reduction target. The Plan is a package of economically viable and technologically feasible actions to not just keep California on track to achieve its 2030 target, but stay on track for a low- to zero-carbon economy by involving every part of the state" (CARB 2017). The Second Update also states that although "the Scoping Plan charts the path to achieving the 2030 GHG emissions reduction target, we also need momentum to propel us to the 2050 statewide GHG target (80% below 1990 levels). In developing this Scoping Plan, we considered what policies are needed to meet our mid-term and long-term goals" (CARB 2017).

The proposed project would not interfere with implementation of any of the previously described GHG reduction goals for 2030 or 2050 because, as evidenced previously, the proposed project's GHG emissions would cease after construction activities have been completed. Therefore, the proposed project would not conflict with the state's trajectory toward future GHG reductions, and the proposed project's impacts on GHG emissions in the 2030 and 2050 horizon years would be less than significant.

Based on the preceding considerations, the proposed project would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions. Therefore, the proposed project would result in a less than significant impact.

5 Conclusions

Emissions generated during construction of the proposed project would exceed the ICAPCD's significance thresholds for NO_x resulting in a significant impact. The proposed project would also not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions.

6 References

CAPCOA (California Air Pollution Control Officers Association). 2008. *CEQA and Climate Change Evaluating and Addressing Greenhouse Gas Emissions from Projects Subject to the California Environmental Quality Act.* http://www.capcoa.org/wp-content/uploads/2012/03/CAPCOA-White-Paper.pdf.

CARB (California Air Resources Board). 2014. *First Update to the Climate Change Scoping Plan: Building on the Framework.* May 2014. Accessed October 2016. http://www.arb.ca.gov/cc/scopingplan/document/updatedscopingplan2013.htm.

CARB. 2017. *The 2017 Climate Change Scoping Plan Update: The Proposed Strategy for Achieving California's 2030 Greenhouse Gas Target*. Accessed January 2017. https://www.arb.ca.gov/cc/scopingplan/2030sp_pp_final.pdf.

CAT. 2010. *Climate Action Team Biennial Report*. Sacramento, California. April 2010. Accessed December 2016. http://www.energy.ca.gov/2010publications/CAT-1000-2010-004/CAT-1000-2010-004.PDF.

CNRA (California Natural Resources Agency). 2009. *2009 California Climate Adaptation Strategy: A Report to the Governor of the State of California in Response to Executive Order S-13-2008.* Accessed December 2016. http://resources.ca.gov/docs/climate/Statewide_Adaptation_Strategy.pdf.

EPA (Environmental Protection Agency). 2018. "EPA Region 9 Air Quality Maps and Geographic Information." Last updated September 28, 2018. Accessed August 2016. http://www.epa.gov/region9/air/maps/.

EPA. 2017. General Conformity De Minimis Tables. Website: https://www.epa.gov/general-conformity/de-minimis-tables. Accessed January 10, 2018.

ICAPCD (Imperial County Air Pollution Control District). 2007. CEQA Air Quality Handbook.

IPCC (Intergovernmental Panel on Climate Change). 1995. *IPCC Second Assessment Synthesis of Scientific-Technical Information Relevant to Interpreting Article 2 of the U.N. Framework Convention on Climate Change*.

IPCC. 2007. *IPCC Fourth Assessment Synthesis of Scientific-Technical Information Relevant to Interpreting Article 2 of the U.N. Framework Convention on Climate Change*.

IPCC. 2014. *Climate Change 2014 Synthesis Report: A Report of the Intergovernmental Panel on Climate Change.* Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Accessed December 2016. http://www.ipcc.ch/report/ar5/syr/.

SCAG (Southern California Association of Governments). 2016. *Final 2016–2040 Regional Transportation Plan/Sustainable Communities Strategy.* Adopted April 2016. Accessed October 26, 2016. http://scagrtpscs.net/Documents/2016/final/f2016RTPSCS.pdf.

Attachment A

Air Quality and Greenhouse Gas Emissions Calculations

CalEEMod Version: CalEEMod.2016.3.2

Date: 6/6/2018 9:17 AM

IID EHR-Reservoir

Imperial County APCD Air District, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	1.00	User Defined Unit	525.00	22,870,000.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	3.4	**Precipitation Freq (Days)**	12
Climate Zone	15			**Operational Year**	2020
Utility Company	Imperial Irrigation District				
CO2 Intensity (lb/MWhr)	1270.9	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - East Highline Reservoir Project. Imperial County.

Land Use - Construction of a 525-acre reservoir.

Construction Phase - Construction would begin October 2018 and would be completed by December 2019.

Off-road Equipment - 15-month equipment

Off-road Equipment - 15-month equipment

Off-road Equipment - 3-month equipment

Off-road Equipment - 12-month equipment

Trips and VMT - 20 workers over entire duration

On-road Fugitive Dust - Hauling is all offroad.

Grading - Excavation, balanced onsite.

Construction Off-road Equipment Mitigation - Comply with ICAPCD fugitive dust control measures: water twice daily and limit vehicle speeds to 15 mph on unpaved roads.

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadMoistureContent	0	0.5
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	930.00	327.00
tblConstructionPhase	NumDays	660.00	66.00
tblConstructionPhase	NumDays	360.00	261.00
tblLandUse	LandUseSquareFeet	0.00	22,870,000.00
tblLandUse	LotAcreage	0.00	525.00
tblOffRoadEquipment	HorsePower	16.00	300.00
tblOffRoadEquipment	LoadFactor	0.38	0.31
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	10.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	PhaseName		Site Preparation
tblOffRoadEquipment	PhaseName		Site Preparation
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Paving
tblOffRoadEquipment	PhaseName		Paving
tblOffRoadEquipment	PhaseName		Paving

tblOffRoadEquipment	PhaseName		Paving
tblOffRoadEquipment	UsageHours	8.00	4.00
tblOnRoadDust	HaulingPercentPave	50.00	80.00
tblOnRoadDust	HaulingPercentPave	50.00	80.00
tblOnRoadDust	HaulingPercentPave	50.00	80.00
tblOnRoadDust	VendorPercentPave	50.00	80.00
tblOnRoadDust	VendorPercentPave	50.00	80.00
tblOnRoadDust	VendorPercentPave	50.00	80.00
tblOnRoadDust	WorkerPercentPave	50.00	80.00
tblOnRoadDust	WorkerPercentPave	50.00	80.00
tblOnRoadDust	WorkerPercentPave	50.00	80.00
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	24.00
tblTripsAndVMT	WorkerTripNumber	35.00	0.00
tblTripsAndVMT	WorkerTripNumber	5.00	24.00
tblTripsAndVMT	WorkerTripNumber	18.00	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2018	0.1155	1.1953	0.5276	1.1000e-003	2.9696	0.0558	3.0254	0.4765	0.0513	0.5278	0.0000	99.7780	99.7780	0.0290	0.0000	100.5025
2019	0.4837	4.7771	2.6472	5.7000e-003	13.9083	0.2272	14.1355	1.9219	0.2136	2.1354	0.0000	506.2441	506.2441	0.1110	0.0000	509.0200
Maximum	**0.4837**	**4.7771**	**2.6472**	**5.7000e-003**	**13.9083**	**0.2272**	**14.1355**	**1.9219**	**0.2136**	**2.1354**	**0.0000**	**506.2441**	**506.2441**	**0.1110**	**0.0000**	**509.0200**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2018	0.1155	1.1953	0.5276	1.1000e-003	1.7224	0.0558	1.7781	0.2425	0.0513	0.2938	0.0000	99.7779	99.7779	0.0290	0.0000	100.5024
2019	0.4837	4.7771	2.6472	5.7000e-003	8.2563	0.2272	8.4835	1.0343	0.2136	1.2479	0.0000	506.2436	506.2436	0.1110	0.0000	509.0195
Maximum	**0.4837**	**4.7771**	**2.6472**	**5.7000e-003**	**8.2563**	**0.2272**	**8.4835**	**1.0343**	**0.2136**	**1.2479**	**0.0000**	**506.2436**	**506.2436**	**0.1110**	**0.0000**	**509.0195**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**40.88**	**0.00**	**40.20**	**46.76**	**0.00**	**42.11**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	10/1/2018	9/30/2019	5	261	
2	Grading	Grading	10/1/2018	12/31/2019	5	327	
3	Paving	Paving	10/1/2019	12/31/2019	5	66	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 81.75

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Dumpers/Tenders	10	8.00	300	0.31
Site Preparation	Plate Compactors	1	8.00	8	0.43
Site Preparation	Rubber Tired Dozers	2	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Grading	Graders	1	4.00	187	0.41
Grading	Off-Highway Trucks	1	4.00	402	0.38
Paving	Cement and Mortar Mixers	1	8.00	9	0.56
Paving	Cranes	1	8.00	231	0.29
Paving	Pumps	4	8.00	84	0.74
Paving	Pumps	1	24.00	84	0.74

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	14	0.00	0.00	0.00	10.20	11.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	2	24.00	2.00	0.00	10.20	11.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	7	0.00	24.00	0.00	10.20	11.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Site Preparation - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.3975	0.0000	0.3975	0.2185	0.0000	0.2185	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0871	0.9240	0.3729	6.8000e-004		0.0468	0.0468		0.0431	0.0431	0.0000	61.8980	61.8980	0.0191	0.0000	62.3744
Total	**0.0871**	**0.9240**	**0.3729**	**6.8000e-004**	**0.3975**	**0.0468**	**0.4442**	**0.2185**	**0.0431**	**0.2615**	**0.0000**	**61.8980**	**61.8980**	**0.0191**	**0.0000**	**62.3744**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1550	0.0000	0.1550	0.0852	0.0000	0.0852	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0871	0.9240	0.3729	6.8000e-004		0.0468	0.0468		0.0431	0.0431	0.0000	61.8979	61.8979	0.0191	0.0000	62.3743
Total	**0.0871**	**0.9240**	**0.3729**	**6.8000e-004**	**0.1550**	**0.0468**	**0.2018**	**0.0852**	**0.0431**	**0.1283**	**0.0000**	**61.8979**	**61.8979**	**0.0191**	**0.0000**	**62.3743**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.2 Site Preparation - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.1743	0.0000	1.1743	0.6455	0.0000	0.6455	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.2479	2.6069	1.0804	2.0100e-003		0.1310	0.1310		0.1206	0.1206	0.0000	179.8091	179.8091	0.0562	0.0000	181.2152
Total	**0.2479**	**2.6069**	**1.0804**	**2.0100e-003**	**1.1743**	**0.1310**	**1.3053**	**0.6455**	**0.1206**	**0.7661**	**0.0000**	**179.8091**	**179.8091**	**0.0562**	**0.0000**	**181.2152**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.4580	0.0000	0.4580	0.2517	0.0000	0.2517	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.2479	2.6069	1.0804	2.0100e-003		0.1310	0.1310		0.1206	0.1206	0.0000	179.8089	179.8089	0.0562	0.0000	181.2149
Total	**0.2479**	**2.6069**	**1.0804**	**2.0100e-003**	**0.4580**	**0.1310**	**0.5890**	**0.2517**	**0.1206**	**0.3723**	**0.0000**	**179.8089**	**179.8089**	**0.0562**	**0.0000**	**181.2149**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.3 Grading - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0434	0.0000	0.0434	4.6800e-003	0.0000	4.6800e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0213	0.2550	0.1009	3.3000e-004		8.8400e-003	8.8400e-003		8.1300e-003	8.1300e-003	0.0000	29.9304	29.9304	9.3200e-003	0.0000	30.1633
Total	**0.0213**	**0.2550**	**0.1009**	**3.3000e-004**	**0.0434**	**8.8400e-003**	**0.0522**	**4.6800e-003**	**8.1300e-003**	**0.0128**	**0.0000**	**29.9304**	**29.9304**	**9.3200e-003**	**0.0000**	**30.1633**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	4.5000e-004	0.0106	3.1900e-003	3.0000e-005	0.2242	1.0000e-004	0.2243	0.0225	1.0000e-004	0.0226	0.0000	2.5343	2.5343	1.3000e-004	0.0000	2.5375
Worker	6.6400e-003	5.6900e-003	0.0506	6.0000e-005	2.3046	4.0000e-005	2.3047	0.2308	4.0000e-005	0.2309	0.0000	5.4153	5.4153	4.8000e-004	0.0000	5.4273
Total	**7.0900e-003**	**0.0163**	**0.0537**	**9.0000e-005**	**2.5288**	**1.4000e-004**	**2.5290**	**0.2533**	**1.4000e-004**	**0.2535**	**0.0000**	**7.9496**	**7.9496**	**6.1000e-004**	**0.0000**	**7.9648**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0169	0.0000	0.0169	1.8300e-003	0.0000	1.8300e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0213	0.2550	0.1009	3.3000e-004		8.8400e-003	8.8400e-003		8.1300e-003	8.1300e-003	0.0000	29.9304	29.9304	9.3200e-003	0.0000	30.1633
Total	**0.0213**	**0.2550**	**0.1009**	**3.3000e-004**	**0.0169**	**8.8400e-003**	**0.0258**	**1.8300e-003**	**8.1300e-003**	**9.9600e-003**	**0.0000**	**29.9304**	**29.9304**	**9.3200e-003**	**0.0000**	**30.1633**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	4.5000e-004	0.0106	3.1900e-003	3.0000e-005	0.1375	1.0000e-004	0.1376	0.0138	1.0000e-004	0.0139	0.0000	2.5343	2.5343	1.3000e-004	0.0000	2.5375
Worker	6.6400e-003	5.6900e-003	0.0506	6.0000e-005	1.4130	4.0000e-005	1.4130	0.1417	4.0000e-005	0.1417	0.0000	5.4153	5.4153	4.8000e-004	0.0000	5.4273
Total	**7.0900e-003**	**0.0163**	**0.0537**	**9.0000e-005**	**1.5505**	**1.4000e-004**	**1.5506**	**0.1555**	**1.4000e-004**	**0.1556**	**0.0000**	**7.9496**	**7.9496**	**6.1000e-004**	**0.0000**	**7.9648**

3.3 Grading - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0434	0.0000	0.0434	4.6800e-003	0.0000	4.6800e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0781	0.8984	0.3807	1.3000e-003		0.0308	0.0308		0.0284	0.0284	0.0000	116.3371	116.3371	0.0368	0.0000	117.2573
Total	**0.0781**	**0.8984**	**0.3807**	**1.3000e-003**	**0.0434**	**0.0308**	**0.0742**	**4.6800e-003**	**0.0284**	**0.0331**	**0.0000**	**116.3371**	**116.3371**	**0.0368**	**0.0000**	**117.2573**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.5800e-003	0.0385	0.0110	1.1000e-004	0.8866	3.4000e-004	0.8869	0.0890	3.3000e-004	0.0893	0.0000	9.9560	9.9560	4.9000e-004	0.0000	9.9681
Worker	0.0242	0.0204	0.1823	2.3000e-004	9.1138	1.6000e-004	9.1139	0.9128	1.5000e-004	0.9130	0.0000	20.7552	20.7552	1.7300e-003	0.0000	20.7985
Total	**0.0258**	**0.0589**	**0.1933**	**3.4000e-004**	**10.0004**	**5.0000e-004**	**10.0009**	**1.0018**	**4.8000e-004**	**1.0023**	**0.0000**	**30.7111**	**30.7111**	**2.2200e-003**	**0.0000**	**30.7666**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0169	0.0000	0.0169	1.8300e-003	0.0000	1.8300e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0781	0.8984	0.3807	1.3000e-003		0.0308	0.0308		0.0284	0.0284	0.0000	116.3369	116.3369	0.0368	0.0000	117.2571
Total	**0.0781**	**0.8984**	**0.3807**	**1.3000e-003**	**0.0169**	**0.0308**	**0.0478**	**1.8300e-003**	**0.0284**	**0.0302**	**0.0000**	**116.3369**	**116.3369**	**0.0368**	**0.0000**	**117.2571**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.5800e-003	0.0385	0.0110	1.1000e-004	0.5438	3.4000e-004	0.5441	0.0547	3.3000e-004	0.0550	0.0000	9.9560	9.9560	4.9000e-004	0.0000	9.9681
Worker	0.0242	0.0204	0.1823	2.3000e-004	5.5876	1.6000e-004	5.5878	0.5602	1.5000e-004	0.5604	0.0000	20.7552	20.7552	1.7300e-003	0.0000	20.7985
Total	**0.0258**	**0.0589**	**0.1933**	**3.4000e-004**	**6.1314**	**5.0000e-004**	**6.1319**	**0.6149**	**4.8000e-004**	**0.6154**	**0.0000**	**30.7111**	**30.7111**	**2.2200e-003**	**0.0000**	**30.7666**

3.4 Paving - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1272	1.0960	0.9593	1.7300e-003		0.0638	0.0638		0.0632	0.0632	0.0000	149.1756	149.1756	0.0143	0.0000	149.5331
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.1272**	**1.0960**	**0.9593**	**1.7300e-003**		**0.0638**	**0.0638**		**0.0632**	**0.0632**	**0.0000**	**149.1756**	**149.1756**	**0.0143**	**0.0000**	**149.5331**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	4.7800e-003	0.1169	0.0334	3.2000e-004	2.6903	1.0400e-003	2.6914	0.2699	1.0000e-003	0.2709	0.0000	30.2112	30.2112	1.4700e-003	0.0000	30.2480
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**4.7800e-003**	**0.1169**	**0.0334**	**3.2000e-004**	**2.6903**	**1.0400e-003**	**2.6914**	**0.2699**	**1.0000e-003**	**0.2709**	**0.0000**	**30.2112**	**30.2112**	**1.4700e-003**	**0.0000**	**30.2480**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1272	1.0960	0.9593	1.7300e-003		0.0638	0.0638		0.0632	0.0632	0.0000	149.1754	149.1754	0.0143	0.0000	149.5329
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.1272**	**1.0960**	**0.9593**	**1.7300e-003**		**0.0638**	**0.0638**		**0.0632**	**0.0632**	**0.0000**	**149.1754**	**149.1754**	**0.0143**	**0.0000**	**149.5329**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	4.7800e-003	0.1169	0.0334	3.2000e-004	1.6500	1.0400e-003	1.6511	0.1659	1.0000e-003	0.1669	0.0000	30.2112	30.2112	1.4700e-003	0.0000	30.2480
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**4.7800e-003**	**0.1169**	**0.0334**	**3.2000e-004**	**1.6500**	**1.0400e-003**	**1.6511**	**0.1659**	**1.0000e-003**	**0.1669**	**0.0000**	**30.2112**	**30.2112**	**1.4700e-003**	**0.0000**	**30.2480**

CalEEMod Version: CalEEMod.2016.3.2

Date: 6/6/2018 9:19 AM

IID EHR-Reservoir

Imperial County APCD Air District, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	1.00	User Defined Unit	525.00	22,870,000.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	3.4	**Precipitation Freq (Days)**	12
Climate Zone	15			**Operational Year**	2020
Utility Company	Imperial Irrigation District				
CO2 Intensity (lb/MWhr)	1270.9	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - East Highline Reservoir Project. Imperial County.

Land Use - Construction of a 525-acre reservoir.

Construction Phase - Construction would begin October 2018 and would be completed by December 2019.

Off-road Equipment - 15-month equipment

Off-road Equipment - 15-month equipment

Off-road Equipment - 3-month equipment

Off-road Equipment - 12-month equipment

Trips and VMT - 20 workers over entire duration

On-road Fugitive Dust - Hauling is all offroad.

Grading - Excavation, balanced onsite.

Construction Off-road Equipment Mitigation - Comply with ICAPCD fugitive dust control measures: water twice daily and limit vehicle speeds to 15 mph on unpaved roads.

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadMoistureContent	0	0.5
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	930.00	327.00
tblConstructionPhase	NumDays	660.00	66.00
tblConstructionPhase	NumDays	360.00	261.00
tblLandUse	LandUseSquareFeet	0.00	22,870,000.00
tblLandUse	LotAcreage	0.00	525.00
tblOffRoadEquipment	HorsePower	16.00	300.00
tblOffRoadEquipment	LoadFactor	0.38	0.31
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	10.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	PhaseName		Site Preparation
tblOffRoadEquipment	PhaseName		Site Preparation
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Paving
tblOffRoadEquipment	PhaseName		Paving
tblOffRoadEquipment	PhaseName		Paving

tblOffRoadEquipment	PhaseName		Paving
tblOffRoadEquipment	UsageHours	8.00	4.00
tblOnRoadDust	HaulingPercentPave	50.00	80.00
tblOnRoadDust	HaulingPercentPave	50.00	80.00
tblOnRoadDust	HaulingPercentPave	50.00	80.00
tblOnRoadDust	VendorPercentPave	50.00	80.00
tblOnRoadDust	VendorPercentPave	50.00	80.00
tblOnRoadDust	VendorPercentPave	50.00	80.00
tblOnRoadDust	WorkerPercentPave	50.00	80.00
tblOnRoadDust	WorkerPercentPave	50.00	80.00
tblOnRoadDust	WorkerPercentPave	50.00	80.00
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	24.00
tblTripsAndVMT	WorkerTripNumber	35.00	0.00
tblTripsAndVMT	WorkerTripNumber	5.00	24.00
tblTripsAndVMT	WorkerTripNumber	18.00	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	3.5357	36.2001	16.3500	0.0335	91.5406	1.6894	93.2300	14.5852	1.5551	16.1403	0.0000	3,353.0436	3,353.0436	0.9705	0.0000	3,377.3053
2019	4.8293	43.9350	34.7726	0.0750	163.7858	2.2059	165.9918	16.4200	2.1651	18.5851	0.0000	7,266.0714	7,266.0714	0.9677	0.0000	7,287.4872
Maximum	**4.8293**	**43.9350**	**34.7726**	**0.0750**	**163.7858**	**2.2059**	**165.9918**	**16.4200**	**2.1651**	**18.5851**	**0.0000**	**7,266.0714**	**7,266.0714**	**0.9705**	**0.0000**	**7,287.4872**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	3.5357	36.2001	16.3500	0.0335	53.3769	1.6894	55.0663	7.4637	1.5551	9.0188	0.0000	3,353.0436	3,353.0436	0.9705	0.0000	3,377.3053
2019	4.8293	43.9350	34.7726	0.0750	100.3738	2.2059	102.5797	10.0775	2.1651	12.2426	0.0000	7,266.0714	7,266.0714	0.9677	0.0000	7,287.4872
Maximum	**4.8293**	**43.9350**	**34.7726**	**0.0750**	**100.3738**	**2.2059**	**102.5797**	**10.0775**	**2.1651**	**12.2426**	**0.0000**	**7,266.0714**	**7,266.0714**	**0.9705**	**0.0000**	**7,287.4872**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**39.78**	**0.00**	**39.18**	**43.42**	**0.00**	**38.77**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	10/1/2018	9/30/2019	5	261	
2	Grading	Grading	10/1/2018	12/31/2019	5	327	
3	Paving	Paving	10/1/2019	12/31/2019	5	66	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 81.75

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Dumpers/Tenders	10	8.00	300	0.31
Site Preparation	Plate Compactors	1	8.00	8	0.43
Site Preparation	Rubber Tired Dozers	2	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Grading	Graders	1	4.00	187	0.41
Grading	Off-Highway Trucks	1	4.00	402	0.38
Paving	Cement and Mortar Mixers	1	8.00	9	0.56
Paving	Cranes	1	8.00	231	0.29
Paving	Pumps	4	8.00	84	0.74
Paving	Pumps	1	24.00	84	0.74

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	14	0.00	0.00	0.00	10.20	11.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	2	24.00	2.00	0.00	10.20	11.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	7	0.00	24.00	0.00	10.20	11.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Site Preparation - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					12.0442	0.0000	12.0442	6.6205	0.0000	6.6205			0.0000			0.0000
Off-Road	2.6384	28.0009	11.3002	0.0207		1.4172	1.4172		1.3046	1.3046		2,067.6021	2,067.6021	0.6365		2,083.5151
Total	**2.6384**	**28.0009**	**11.3002**	**0.0207**	**12.0442**	**1.4172**	**13.4614**	**6.6205**	**1.3046**	**7.9251**		**2,067.6021**	**2,067.6021**	**0.6365**		**2,083.5151**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					4.6972	0.0000	4.6972	2.5820	0.0000	2.5820			0.0000			0.0000
Off-Road	2.6384	28.0009	11.3002	0.0207		1.4172	1.4172		1.3046	1.3046	0.0000	2,067.602 1	2,067.6021	0.6365		2,083.515 1
Total	**2.6384**	**28.0009**	**11.3002**	**0.0207**	**4.6972**	**1.4172**	**6.1144**	**2.5820**	**1.3046**	**3.8866**	**0.0000**	**2,067.602 1**	**2,067.6021**	**0.6365**		**2,083.515 1**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.2 Site Preparation - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					12.0442	0.0000	12.0442	6.6205	0.0000	6.6205			0.0000			0.0000
Off-Road	2.5421	26.7375	11.0813	0.0206		1.3433	1.3433		1.2366	1.2366		2,032.8782	2,032.8782	0.6359		2,048.7745
Total	**2.5421**	**26.7375**	**11.0813**	**0.0206**	**12.0442**	**1.3433**	**13.3874**	**6.6205**	**1.2366**	**7.8570**		**2,032.8782**	**2,032.8782**	**0.6359**		**2,048.7745**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					4.6972	0.0000	4.6972	2.5820	0.0000	2.5820			0.0000			0.0000
Off-Road	2.5421	26.7375	11.0813	0.0206		1.3433	1.3433		1.2366	1.2366	0.0000	2,032.8782	2,032.8782	0.6359		2,048.7745
Total	**2.5421**	**26.7375**	**11.0813**	**0.0206**	**4.6972**	**1.3433**	**6.0405**	**2.5820**	**1.2366**	**3.8186**	**0.0000**	**2,032.8782**	**2,032.8782**	**0.6359**		**2,048.7745**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.3 Grading - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.2651	0.0000	0.2651	0.0286	0.0000	0.0286			0.0000			0.0000
Off-Road	0.6465	7.7263	3.0582	9.9400e-003		0.2678	0.2678		0.2464	0.2464		999.7757	999.7757	0.3112		1,007.5568
Total	**0.6465**	**7.7263**	**3.0582**	**9.9400e-003**	**0.2651**	**0.2678**	**0.5329**	**0.0286**	**0.2464**	**0.2750**		**999.7757**	**999.7757**	**0.3112**		**1,007.5568**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0137	0.3067	0.0937	8.2000e-004	7.0241	3.0800e-003	7.0272	0.7046	2.9400e-003	0.7076		85.6830	85.6830	4.1300e-003		85.7862
Worker	0.2371	0.1662	1.8979	2.0300e-003	72.2072	1.2900e-003	72.2085	7.2315	1.1900e-003	7.2327		199.9828	199.9828	0.0186		200.4472
Total	**0.2508**	**0.4729**	**1.9917**	**2.8500e-003**	**79.2313**	**4.3700e-003**	**79.2357**	**7.9361**	**4.1300e-003**	**7.9402**		**285.6658**	**285.6658**	**0.0227**		**286.2335**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.1034	0.0000	0.1034	0.0112	0.0000	0.0112			0.0000			0.0000
Off-Road	0.6465	7.7263	3.0582	9.9400e-003		0.2678	0.2678		0.2464	0.2464	0.0000	999.7757	999.7757	0.3112		1,007.5568
Total	**0.6465**	**7.7263**	**3.0582**	**9.9400e-003**	**0.1034**	**0.2678**	**0.3712**	**0.0112**	**0.2464**	**0.2575**	**0.0000**	**999.7757**	**999.7757**	**0.3112**		**1,007.5568**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0137	0.3067	0.0937	8.2000e-004	4.3078	3.0800e-003	4.3109	0.4330	2.9400e-003	0.4359		85.6830	85.6830	4.1300e-003		85.7862
Worker	0.2371	0.1662	1.8979	2.0300e-003	44.2684	1.2900e-003	44.2697	4.4376	1.1900e-003	4.4388		199.9828	199.9828	0.0186		200.4472
Total	**0.2508**	**0.4729**	**1.9917**	**2.8500e-003**	**48.5763**	**4.3700e-003**	**48.5806**	**4.8706**	**4.1300e-003**	**4.8747**		**285.6658**	**285.6658**	**0.0227**		**286.2335**

3.3 Grading - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.2651	0.0000	0.2651	0.0286	0.0000	0.0286			0.0000			0.0000
Off-Road	0.5983	6.8846	2.9174	9.9300e-003		0.2363	0.2363		0.2174	0.2174		982.6793	982.6793	0.3109		990.4521
Total	**0.5983**	**6.8846**	**2.9174**	**9.9300e-003**	**0.2651**	**0.2363**	**0.5014**	**0.0286**	**0.2174**	**0.2460**		**982.6793**	**982.6793**	**0.3109**		**990.4521**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0121	0.2837	0.0810	8.1000e-004	7.0241	2.6200e-003	7.0267	0.7046	2.5000e-003	0.7071		85.1208	85.1208	3.9300e-003		85.2191
Worker	0.2186	0.1507	1.7326	1.9600e-003	72.2072	1.2500e-003	72.2085	7.2315	1.1500e-003	7.2326		193.8526	193.8526	0.0170		194.2782
Total	**0.2307**	**0.4344**	**1.8136**	**2.7700e-003**	**79.2313**	**3.8700e-003**	**79.2352**	**7.9361**	**3.6500e-003**	**7.9397**		**278.9734**	**278.9734**	**0.0210**		**279.4973**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.1034	0.0000	0.1034	0.0112	0.0000	0.0112			0.0000			0.0000
Off-Road	0.5983	6.8846	2.9174	9.9300e-003		0.2363	0.2363		0.2174	0.2174	0.0000	982.6793	982.6793	0.3109		990.4521
Total	**0.5983**	**6.8846**	**2.9174**	**9.9300e-003**	**0.1034**	**0.2363**	**0.3397**	**0.0112**	**0.2174**	**0.2286**	**0.0000**	**982.6793**	**982.6793**	**0.3109**		**990.4521**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0121	0.2837	0.0810	8.1000e-004	4.3078	2.6200e-003	4.3105	0.4330	2.5000e-003	0.4355		85.1208	85.1208	3.9300e-003		85.2191
Worker	0.2186	0.1507	1.7326	1.9600e-003	44.2684	1.2500e-003	44.2697	4.4376	1.1500e-003	4.4387		193.8526	193.8526	0.0170		194.2782
Total	**0.2307**	**0.4344**	**1.8136**	**2.7700e-003**	**48.5763**	**3.8700e-003**	**48.5801**	**4.8706**	**3.6500e-003**	**4.8742**		**278.9734**	**278.9734**	**0.0210**		**279.4973**

3.4 Paving - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.8550	33.2119	29.0697	0.0525		1.9343	1.9343		1.9140	1.9140		4,982.968 9	4,982.9689	0.4776		4,994.908 6
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**3.8550**	**33.2119**	**29.0697**	**0.0525**		**1.9343**	**1.9343**		**1.9140**	**1.9140**		**4,982.968 9**	**4,982.9689**	**0.4776**		**4,994.908 6**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1453	3.4041	0.9719	9.7700e-003	84.2894	0.0314	84.3208	8.4553	0.0301	8.4854		1,021.449 9	1,021.4499	0.0472		1,022.629 2
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.1453**	**3.4041**	**0.9719**	**9.7700e-003**	**84.2894**	**0.0314**	**84.3208**	**8.4553**	**0.0301**	**8.4854**		**1,021.449 9**	**1,021.4499**	**0.0472**		**1,022.629 2**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.8550	33.2119	29.0697	0.0525		1.9343	1.9343		1.9140	1.9140	0.0000	4,982.9689	4,982.9689	0.4776		4,994.9086
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**3.8550**	**33.2119**	**29.0697**	**0.0525**		**1.9343**	**1.9343**		**1.9140**	**1.9140**	**0.0000**	**4,982.9689**	**4,982.9689**	**0.4776**		**4,994.9086**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1453	3.4041	0.9719	9.7700e-003	51.6941	0.0314	51.7255	5.1958	0.0301	5.2258		1,021.4499	1,021.4499	0.0472		1,022.6292
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.1453**	**3.4041**	**0.9719**	**9.7700e-003**	**51.6941**	**0.0314**	**51.7255**	**5.1958**	**0.0301**	**5.2258**		**1,021.4499**	**1,021.4499**	**0.0472**		**1,022.6292**

CalEEMod Version: CalEEMod.2016.3.2

Date: 6/6/2018 9:20 AM

IID EHR-Reservoir
Imperial County APCD Air District, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	1.00	User Defined Unit	525.00	22,870,000.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	3.4	**Precipitation Freq (Days)**	12
Climate Zone	15			**Operational Year**	2020
Utility Company	Imperial Irrigation District				
CO2 Intensity (lb/MWhr)	1270.9	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - East Highline Reservoir Project. Imperial County.

Land Use - Construction of a 525-acre reservoir.

Construction Phase - Construction would begin October 2018 and would be completed by December 2019.

Off-road Equipment - 15-month equipment

Off-road Equipment - 15-month equipment

Off-road Equipment - 3-month equipment

Off-road Equipment - 12-month equipment

Trips and VMT - 20 workers over entire duration

On-road Fugitive Dust - Hauling is all offroad.

Grading - Excavation, balanced onsite.

Construction Off-road Equipment Mitigation - Comply with ICAPCD fugitive dust control measures: water twice daily and limit vehicle speeds to 15 mph on unpaved roads.

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadMoistureContent	0	0.5
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	930.00	327.00
tblConstructionPhase	NumDays	660.00	66.00
tblConstructionPhase	NumDays	360.00	261.00
tblLandUse	LandUseSquareFeet	0.00	22,870,000.00
tblLandUse	LotAcreage	0.00	525.00
tblOffRoadEquipment	HorsePower	16.00	300.00
tblOffRoadEquipment	LoadFactor	0.38	0.31
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	10.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	PhaseName		Site Preparation
tblOffRoadEquipment	PhaseName		Site Preparation
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Paving
tblOffRoadEquipment	PhaseName		Paving
tblOffRoadEquipment	PhaseName		Paving

tblOffRoadEquipment	PhaseName		Paving
tblOffRoadEquipment	UsageHours	8.00	4.00
tblOnRoadDust	HaulingPercentPave	50.00	80.00
tblOnRoadDust	HaulingPercentPave	50.00	80.00
tblOnRoadDust	HaulingPercentPave	50.00	80.00
tblOnRoadDust	VendorPercentPave	50.00	80.00
tblOnRoadDust	VendorPercentPave	50.00	80.00
tblOnRoadDust	VendorPercentPave	50.00	80.00
tblOnRoadDust	WorkerPercentPave	50.00	80.00
tblOnRoadDust	WorkerPercentPave	50.00	80.00
tblOnRoadDust	WorkerPercentPave	50.00	80.00
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	24.00
tblTripsAndVMT	WorkerTripNumber	35.00	0.00
tblTripsAndVMT	WorkerTripNumber	5.00	24.00
tblTripsAndVMT	WorkerTripNumber	18.00	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	3.4961	36.2212	15.8517	0.0331	91.5406	1.6894	93.2300	14.5852	1.5551	16.1403	0.0000	3,318.1672	3,318.1672	0.9670	0.0000	3,342.3421
2019	4.7970	44.0731	34.4227	0.0744	163.7858	2.2063	165.9921	16.4200	2.1654	18.5854	0.0000	7,202.8794	7,202.8794	0.9646	0.0000	7,224.3386
Maximum	**4.7970**	**44.0731**	**34.4227**	**0.0744**	**163.7858**	**2.2063**	**165.9921**	**16.4200**	**2.1654**	**18.5854**	**0.0000**	**7,202.8794**	**7,202.8794**	**0.9670**	**0.0000**	**7,224.3386**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	3.4961	36.2212	15.8517	0.0331	53.3769	1.6894	55.0663	7.4637	1.5551	9.0188	0.0000	3,318.1672	3,318.1672	0.9670	0.0000	3,342.3421
2019	4.7970	44.0731	34.4227	0.0744	100.3738	2.2063	102.5801	10.0775	2.1654	12.2429	0.0000	7,202.8794	7,202.8794	0.9646	0.0000	7,224.3386
Maximum	**4.7970**	**44.0731**	**34.4227**	**0.0744**	**100.3738**	**2.2063**	**102.5801**	**10.0775**	**2.1654**	**12.2429**	**0.0000**	**7,202.8794**	**7,202.8794**	**0.9670**	**0.0000**	**7,224.3386**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**39.78**	**0.00**	**39.18**	**43.42**	**0.00**	**38.77**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	10/1/2018	9/30/2019	5	261	
2	Grading	Grading	10/1/2018	12/31/2019	5	327	
3	Paving	Paving	10/1/2019	12/31/2019	5	66	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 81.75

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Dumpers/Tenders	10	8.00	300	0.31
Site Preparation	Plate Compactors	1	8.00	8	0.43
Site Preparation	Rubber Tired Dozers	2	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Grading	Graders	1	4.00	187	0.41
Grading	Off-Highway Trucks	1	4.00	402	0.38
Paving	Cement and Mortar Mixers	1	8.00	9	0.56
Paving	Cranes	1	8.00	231	0.29
Paving	Pumps	4	8.00	84	0.74
Paving	Pumps	1	24.00	84	0.74

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	14	0.00	0.00	0.00	10.20	11.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	2	24.00	2.00	0.00	10.20	11.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	7	0.00	24.00	0.00	10.20	11.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Site Preparation - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					12.0442	0.0000	12.0442	6.6205	0.0000	6.6205			0.0000			0.0000
Off-Road	2.6384	28.0009	11.3002	0.0207		1.4172	1.4172		1.3046	1.3046		2,067.602 1	2,067.6021	0.6365		2,083.515 1
Total	**2.6384**	**28.0009**	**11.3002**	**0.0207**	**12.0442**	**1.4172**	**13.4614**	**6.6205**	**1.3046**	**7.9251**		**2,067.602 1**	**2,067.6021**	**0.6365**		**2,083.515 1**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					4.6972	0.0000	4.6972	2.5820	0.0000	2.5820			0.0000			0.0000
Off-Road	2.6384	28.0009	11.3002	0.0207		1.4172	1.4172		1.3046	1.3046	0.0000	2,067.6021	2,067.6021	0.6365		2,083.5151
Total	**2.6384**	**28.0009**	**11.3002**	**0.0207**	**4.6972**	**1.4172**	**6.1144**	**2.5820**	**1.3046**	**3.8866**	**0.0000**	**2,067.6021**	**2,067.6021**	**0.6365**		**2,083.5151**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.2 Site Preparation - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					12.0442	0.0000	12.0442	6.6205	0.0000	6.6205			0.0000			0.0000
Off-Road	2.5421	26.7375	11.0813	0.0206		1.3433	1.3433		1.2366	1.2366		2,032.8782	2,032.8782	0.6359		2,048.7745
Total	**2.5421**	**26.7375**	**11.0813**	**0.0206**	**12.0442**	**1.3433**	**13.3874**	**6.6205**	**1.2366**	**7.8570**		**2,032.8782**	**2,032.8782**	**0.6359**		**2,048.7745**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					4.6972	0.0000	4.6972	2.5820	0.0000	2.5820			0.0000			0.0000
Off-Road	2.5421	26.7375	11.0813	0.0206		1.3433	1.3433		1.2366	1.2366	0.0000	2,032.8782	2,032.8782	0.6359		2,048.7745
Total	**2.5421**	**26.7375**	**11.0813**	**0.0206**	**4.6972**	**1.3433**	**6.0405**	**2.5820**	**1.2366**	**3.8186**	**0.0000**	**2,032.8782**	**2,032.8782**	**0.6359**		**2,048.7745**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.3 Grading - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.2651	0.0000	0.2651	0.0286	0.0000	0.0286			0.0000			0.0000
Off-Road	0.6465	7.7263	3.0582	9.9400e-003		0.2678	0.2678		0.2464	0.2464		999.7757	999.7757	0.3112		1,007.5568
Total	**0.6465**	**7.7263**	**3.0582**	**9.9400e-003**	**0.2651**	**0.2678**	**0.5329**	**0.0286**	**0.2464**	**0.2750**		**999.7757**	**999.7757**	**0.3112**		**1,007.5568**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0140	0.3186	0.1025	8.0000e-004	7.0241	3.1000e-003	7.0272	0.7046	2.9700e-003	0.7076		83.2339	83.2339	4.5400e-003		83.3473
Worker	0.1972	0.1754	1.3908	1.7000e-003	72.2072	1.2900e-003	72.2085	7.2315	1.1900e-003	7.2327		167.5555	167.5555	0.0147		167.9229
Total	**0.2112**	**0.4940**	**1.4933**	**2.5000e-003**	**79.2313**	**4.3900e-003**	**79.2357**	**7.9361**	**4.1600e-003**	**7.9402**		**250.7894**	**250.7894**	**0.0192**		**251.2702**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.1034	0.0000	0.1034	0.0112	0.0000	0.0112			0.0000			0.0000
Off-Road	0.6465	7.7263	3.0582	9.9400e-003		0.2678	0.2678		0.2464	0.2464	0.0000	999.7757	999.7757	0.3112		1,007.5568
Total	**0.6465**	**7.7263**	**3.0582**	**9.9400e-003**	**0.1034**	**0.2678**	**0.3712**	**0.0112**	**0.2464**	**0.2575**	**0.0000**	**999.7757**	**999.7757**	**0.3112**		**1,007.5568**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0140	0.3186	0.1025	8.0000e-004	4.3078	3.1000e-003	4.3110	0.4330	2.9700e-003	0.4360		83.2339	83.2339	4.5400e-003		83.3473
Worker	0.1972	0.1754	1.3908	1.7000e-003	44.2684	1.2900e-003	44.2697	4.4376	1.1900e-003	4.4388		167.5555	167.5555	0.0147		167.9229
Total	**0.2112**	**0.4940**	**1.4933**	**2.5000e-003**	**48.5763**	**4.3900e-003**	**48.5807**	**4.8706**	**4.1600e-003**	**4.8747**		**250.7894**	**250.7894**	**0.0192**		**251.2702**

3.3 Grading - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.2651	0.0000	0.2651	0.0286	0.0000	0.0286			0.0000			0.0000
Off-Road	0.5983	6.8846	2.9174	9.9300e-003		0.2363	0.2363		0.2174	0.2174		982.6793	982.6793	0.3109		990.4521
Total	**0.5983**	**6.8846**	**2.9174**	**9.9300e-003**	**0.2651**	**0.2363**	**0.5014**	**0.0286**	**0.2174**	**0.2460**		**982.6793**	**982.6793**	**0.3109**		**990.4521**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0124	0.2937	0.0899	7.9000e-004	7.0241	2.6400e-003	7.0268	0.7046	2.5300e-003	0.7071		82.6813	82.6813	4.3400e-003		82.7898
Worker	0.1820	0.1587	1.2665	1.6400e-003	72.2072	1.2500e-003	72.2085	7.2315	1.1500e-003	7.2326		162.3747	162.3747	0.0135		162.7109
Total	**0.1945**	**0.4524**	**1.3564**	**2.4300e-003**	**79.2313**	**3.8900e-003**	**79.2352**	**7.9361**	**3.6800e-003**	**7.9398**		**245.0560**	**245.0560**	**0.0178**		**245.5007**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.1034	0.0000	0.1034	0.0112	0.0000	0.0112			0.0000			0.0000
Off-Road	0.5983	6.8846	2.9174	9.9300e-003		0.2363	0.2363		0.2174	0.2174	0.0000	982.6793	982.6793	0.3109		990.4521
Total	**0.5983**	**6.8846**	**2.9174**	**9.9300e-003**	**0.1034**	**0.2363**	**0.3397**	**0.0112**	**0.2174**	**0.2286**	**0.0000**	**982.6793**	**982.6793**	**0.3109**		**990.4521**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0124	0.2937	0.0899	7.9000e-004	4.3078	2.6400e-003	4.3105	0.4330	2.5300e-003	0.4355		82.6813	82.6813	4.3400e-003		82.7898
Worker	0.1820	0.1587	1.2665	1.6400e-003	44.2684	1.2500e-003	44.2697	4.4376	1.1500e-003	4.4387		162.3747	162.3747	0.0135		162.7109
Total	**0.1945**	**0.4524**	**1.3564**	**2.4300e-003**	**48.5763**	**3.8900e-003**	**48.5802**	**4.8706**	**3.6800e-003**	**4.8742**		**245.0560**	**245.0560**	**0.0178**		**245.5007**

3.4 Paving - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.8550	33.2119	29.0697	0.0525		1.9343	1.9343		1.9140	1.9140		4,982.968 9	4,982.9689	0.4776		4,994.908 6
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**3.8550**	**33.2119**	**29.0697**	**0.0525**		**1.9343**	**1.9343**		**1.9140**	**1.9140**		**4,982.968 9**	**4,982.9689**	**0.4776**		**4,994.908 6**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1492	3.5242	1.0791	9.5000e-003	84.2894	0.0317	84.3211	8.4553	0.0304	8.4857		992.1752	992.1752	0.0521		993.4772
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.1492**	**3.5242**	**1.0791**	**9.5000e-003**	**84.2894**	**0.0317**	**84.3211**	**8.4553**	**0.0304**	**8.4857**		**992.1752**	**992.1752**	**0.0521**		**993.4772**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.8550	33.2119	29.0697	0.0525		1.9343	1.9343		1.9140	1.9140	0.0000	4,982.9689	4,982.9689	0.4776		4,994.9086
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**3.8550**	**33.2119**	**29.0697**	**0.0525**		**1.9343**	**1.9343**		**1.9140**	**1.9140**	**0.0000**	**4,982.9689**	**4,982.9689**	**0.4776**		**4,994.9086**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1492	3.5242	1.0791	9.5000e-003	51.6941	0.0317	51.7258	5.1958	0.0304	5.2261		992.1752	992.1752	0.0521		993.4772
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.1492**	**3.5242**	**1.0791**	**9.5000e-003**	**51.6941**	**0.0317**	**51.7258**	**5.1958**	**0.0304**	**5.2261**		**992.1752**	**992.1752**	**0.0521**		**993.4772**

CalEEMod Version: CalEEMod.2016.3.2

Date: 6/6/2018 9:31 AM

IID EHR-Hwy 98 Detour
Imperial County APCD Air District, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	10.00	Acre	10.00	435,600.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.4	**Precipitation Freq (Days)**	12
Climate Zone	15			**Operational Year**	2020
Utility Company	Imperial Irrigation District				
CO2 Intensity (lb/MWhr)	1270.9	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - East Highline Reservoir Project. Imperial County.

Land Use - Completion of Highway 98 detour

Construction Phase - Construction would occur October 2018

Off-road Equipment - 15-month equipment

Off-road Equipment - 1-month equipment

Off-road Equipment - 1-week equipment

Trips and VMT - 20 workers over entire duration

On-road Fugitive Dust - Hauling is all offroad.

Grading - Excavation, balanced onsite.

Construction Off-road Equipment Mitigation - Comply with ICAPCD fugitive dust control measures: water three times daily and limit vehicle speeds to 15 mph on unpaved roads.

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadMoistureContent	0	0.5
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	20.00	22.00
tblConstructionPhase	NumDays	20.00	5.00
tblOffRoadEquipment	HorsePower	402.00	250.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	UsageHours	8.00	4.00
tblOnRoadDust	HaulingPercentPave	50.00	80.00
tblOnRoadDust	HaulingPercentPave	50.00	80.00
tblOnRoadDust	VendorPercentPave	50.00	80.00
tblOnRoadDust	VendorPercentPave	50.00	80.00
tblOnRoadDust	WorkerPercentPave	50.00	80.00
tblOnRoadDust	WorkerPercentPave	50.00	80.00
tblTripsAndVMT	VendorTripNumber	0.00	20.00
tblTripsAndVMT	WorkerTripNumber	13.00	24.00
tblTripsAndVMT	WorkerTripNumber	5.00	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2018	0.0384	0.4414	0.2619	5.1000e-004	0.7031	0.0172	0.7203	0.0707	0.0159	0.0865	0.0000	46.7925	46.7925	0.0138	0.0000	47.1380
Maximum	**0.0384**	**0.4414**	**0.2619**	**5.1000e-004**	**0.7031**	**0.0172**	**0.7203**	**0.0707**	**0.0159**	**0.0865**	**0.0000**	**46.7925**	**46.7925**	**0.0138**	**0.0000**	**47.1380**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2018	0.0384	0.4414	0.2619	5.1000e-004	0.4252	0.0172	0.4425	0.0427	0.0159	0.0586	0.0000	46.7924	46.7924	0.0138	0.0000	47.1380
Maximum	**0.0384**	**0.4414**	**0.2619**	**5.1000e-004**	**0.4252**	**0.0172**	**0.4425**	**0.0427**	**0.0159**	**0.0586**	**0.0000**	**46.7924**	**46.7924**	**0.0138**	**0.0000**	**47.1380**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**39.52**	**0.00**	**38.57**	**39.52**	**0.00**	**32.27**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Grading	Grading	10/1/2018	10/30/2018	5	22	
2	Paving	Paving	10/25/2018	10/31/2018	5	5	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 49.5

Acres of Paving: 10

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Grading	Graders	1	4.00	187	0.41
Grading	Off-Highway Trucks	1	8.00	250	0.38
Grading	Plate Compactors	1	8.00	8	0.43
Grading	Scrapers	2	8.00	367	0.48
Paving	Pavers	1	8.00	130	0.42
Paving	Rollers	1	8.00	80	0.38

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Grading	5	24.00	0.00	0.00	7.30	8.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	2	0.00	20.00	0.00	7.30	8.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Grading - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0263	0.0000	0.0263	2.8300e-003	0.0000	2.8300e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0348	0.4178	0.2346	4.6000e-004		0.0163	0.0163		0.0150	0.0150	0.0000	42.2720	42.2720	0.0131	0.0000	42.5992
Total	**0.0348**	**0.4178**	**0.2346**	**4.6000e-004**	**0.0263**	**0.0163**	**0.0425**	**2.8300e-003**	**0.0150**	**0.0178**	**0.0000**	**42.2720**	**42.2720**	**0.0131**	**0.0000**	**42.5992**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.7900e-003	1.4200e-003	0.0130	1.0000e-005	0.5498	1.0000e-005	0.5498	0.0551	1.0000e-005	0.0551	0.0000	1.3079	1.3079	1.2000e-004	0.0000	1.3109
Total	**1.7900e-003**	**1.4200e-003**	**0.0130**	**1.0000e-005**	**0.5498**	**1.0000e-005**	**0.5498**	**0.0551**	**1.0000e-005**	**0.0551**	**0.0000**	**1.3079**	**1.3079**	**1.2000e-004**	**0.0000**	**1.3109**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0102	0.0000	0.0102	1.1100e-003	0.0000	1.1100e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0348	0.4178	0.2346	4.6000e-004		0.0163	0.0163		0.0150	0.0150	0.0000	42.2720	42.2720	0.0131	0.0000	42.5992
Total	**0.0348**	**0.4178**	**0.2346**	**4.6000e-004**	**0.0102**	**0.0163**	**0.0265**	**1.1100e-003**	**0.0150**	**0.0161**	**0.0000**	**42.2720**	**42.2720**	**0.0131**	**0.0000**	**42.5992**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.7900e-003	1.4200e-003	0.0130	1.0000e-005	0.3371	1.0000e-005	0.3371	0.0338	1.0000e-005	0.0338	0.0000	1.3079	1.3079	1.2000e-004	0.0000	1.3109
Total	**1.7900e-003**	**1.4200e-003**	**0.0130**	**1.0000e-005**	**0.3371**	**1.0000e-005**	**0.3371**	**0.0338**	**1.0000e-005**	**0.0338**	**0.0000**	**1.3079**	**1.3079**	**1.2000e-004**	**0.0000**	**1.3109**

3.3 Paving - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	1.4600e-003	0.0153	0.0122	2.0000e-005		8.7000e-004	8.7000e-004		8.0000e-004	8.0000e-004	0.0000	1.6716	1.6716	5.2000e-004	0.0000	1.6846
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.4600e-003**	**0.0153**	**0.0122**	**2.0000e-005**		**8.7000e-004**	**8.7000e-004**		**8.0000e-004**	**8.0000e-004**	**0.0000**	**1.6716**	**1.6716**	**5.2000e-004**	**0.0000**	**1.6846**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.9000e-004	6.9500e-003	2.1200e-003	2.0000e-005	0.1270	6.0000e-005	0.1271	0.0127	6.0000e-005	0.0128	0.0000	1.5410	1.5410	9.0000e-005	0.0000	1.5433
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**2.9000e-004**	**6.9500e-003**	**2.1200e-003**	**2.0000e-005**	**0.1270**	**6.0000e-005**	**0.1271**	**0.0127**	**6.0000e-005**	**0.0128**	**0.0000**	**1.5410**	**1.5410**	**9.0000e-005**	**0.0000**	**1.5433**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	1.4600e-003	0.0153	0.0122	2.0000e-005		8.7000e-004	8.7000e-004		8.0000e-004	8.0000e-004	0.0000	1.6716	1.6716	5.2000e-004	0.0000	1.6846
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.4600e-003**	**0.0153**	**0.0122**	**2.0000e-005**		**8.7000e-004**	**8.7000e-004**		**8.0000e-004**	**8.0000e-004**	**0.0000**	**1.6716**	**1.6716**	**5.2000e-004**	**0.0000**	**1.6846**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.9000e-004	6.9500e-003	2.1200e-003	2.0000e-005	0.0779	6.0000e-005	0.0780	7.8300e-003	6.0000e-005	7.8900e-003	0.0000	1.5410	1.5410	9.0000e-005	0.0000	1.5433
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**2.9000e-004**	**6.9500e-003**	**2.1200e-003**	**2.0000e-005**	**0.0779**	**6.0000e-005**	**0.0780**	**7.8300e-003**	**6.0000e-005**	**7.8900e-003**	**0.0000**	**1.5410**	**1.5410**	**9.0000e-005**	**0.0000**	**1.5433**

CalEEMod Version: CalEEMod.2016.3.2

Date: 6/6/2018 9:32 AM

IID EHR-Hwy 98 Detour

Imperial County APCD Air District, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	10.00	Acre	10.00	435,600.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.4	**Precipitation Freq (Days)**	12
Climate Zone	15			**Operational Year**	2020
Utility Company	Imperial Irrigation District				
CO_2 Intensity (lb/MWhr)	1270.9	**CH_4 Intensity (lb/MWhr)**	0.029	**N_2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - East Highline Reservoir Project. Imperial County.

Land Use - Completion of Highway 98 detour

Construction Phase - Construction would occur October 2018

Off-road Equipment - 15-month equipment

Off-road Equipment - 1-month equipment

Off-road Equipment - 1-week equipment

Trips and VMT - 20 workers over entire duration

On-road Fugitive Dust - Hauling is all offroad.

Grading - Excavation, balanced onsite.

Construction Off-road Equipment Mitigation - Comply with ICAPCD fugitive dust control measures: water three times daily and limit vehicle speeds to 15 mph on unpaved roads.

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadMoistureContent	0	0.5
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	20.00	22.00
tblConstructionPhase	NumDays	20.00	5.00
tblOffRoadEquipment	HorsePower	402.00	250.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	UsageHours	8.00	4.00
tblOnRoadDust	HaulingPercentPave	50.00	80.00
tblOnRoadDust	HaulingPercentPave	50.00	80.00
tblOnRoadDust	VendorPercentPave	50.00	80.00
tblOnRoadDust	VendorPercentPave	50.00	80.00
tblOnRoadDust	WorkerPercentPave	50.00	80.00
tblOnRoadDust	WorkerPercentPave	50.00	80.00
tblTripsAndVMT	VendorTripNumber	0.00	20.00
tblTripsAndVMT	WorkerTripNumber	13.00	24.00
tblTripsAndVMT	WorkerTripNumber	5.00	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	4.0604	46.8923	28.4566	0.0576	106.5974	1.8531	108.4504	10.7030	1.7065	12.4094	0.0000	5,807.6528	5,807.6528	1.5945	0.0000	5,847.5149
Maximum	**4.0604**	**46.8923**	**28.4566**	**0.0576**	**106.5974**	**1.8531**	**108.4504**	**10.7030**	**1.7065**	**12.4094**	**0.0000**	**5,807.6528**	**5,807.6528**	**1.5945**	**0.0000**	**5,847.5149**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	4.0604	46.8923	28.4566	0.0576	64.8314	1.8531	66.6845	6.5147	1.7065	8.2212	0.0000	5,807.6528	5,807.6528	1.5945	0.0000	5,847.5149
Maximum	**4.0604**	**46.8923**	**28.4566**	**0.0576**	**64.8314**	**1.8531**	**66.6845**	**6.5147**	**1.7065**	**8.2212**	**0.0000**	**5,807.6528**	**5,807.6528**	**1.5945**	**0.0000**	**5,847.5149**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**39.18**	**0.00**	**38.51**	**39.13**	**0.00**	**33.75**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Grading	Grading	10/1/2018	10/30/2018	5	22	
2	Paving	Paving	10/25/2018	10/31/2018	5	5	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 49.5

Acres of Paving: 10

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Grading	Graders	1	4.00	187	0.41
Grading	Off-Highway Trucks	1	8.00	250	0.38
Grading	Plate Compactors	1	8.00	8	0.43
Grading	Scrapers	2	8.00	367	0.48
Paving	Pavers	1	8.00	130	0.42
Paving	Rollers	1	8.00	80	0.38

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Grading	5	24.00	0.00	0.00	7.30	8.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	2	0.00	20.00	0.00	7.30	8.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Grading - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.3861	0.0000	2.3861	0.2577	0.0000	0.2577			0.0000			0.0000
Off-Road	3.1646	37.9799	21.3271	0.0422		1.4809	1.4809		1.3632	1.3632		4,236.0842	4,236.0842	1.3116		4,268.8741
Total	**3.1646**	**37.9799**	**21.3271**	**0.0422**	**2.3861**	**1.4809**	**3.8670**	**0.2577**	**1.3632**	**1.6209**		**4,236.0842**	**4,236.0842**	**1.3116**		**4,268.8741**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1952	0.1251	1.4517	1.4700e-003	51.6778	9.8000e-004	51.6788	5.1755	9.0000e-004	5.1764		144.7803	144.7803	0.0138		145.1258
Total	**0.1952**	**0.1251**	**1.4517**	**1.4700e-003**	**51.6778**	**9.8000e-004**	**51.6788**	**5.1755**	**9.0000e-004**	**5.1764**		**144.7803**	**144.7803**	**0.0138**		**145.1258**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.9306	0.0000	0.9306	0.1005	0.0000	0.1005			0.0000			0.0000
Off-Road	3.1646	37.9799	21.3271	0.0422		1.4809	1.4809		1.3632	1.3632	0.0000	4,236.0842	4,236.0842	1.3116		4,268.8741
Total	**3.1646**	**37.9799**	**21.3271**	**0.0422**	**0.9306**	**1.4809**	**2.4115**	**0.1005**	**1.3632**	**1.4637**	**0.0000**	**4,236.0842**	**4,236.0842**	**1.3116**		**4,268.8741**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1952	0.1251	1.4517	1.4700e-003	31.6824	9.8000e-004	31.6834	3.1759	9.0000e-004	3.1768		144.7803	144.7803	0.0138		145.1258
Total	**0.1952**	**0.1251**	**1.4517**	**1.4700e-003**	**31.6824**	**9.8000e-004**	**31.6834**	**3.1759**	**9.0000e-004**	**3.1768**		**144.7803**	**144.7803**	**0.0138**		**145.1258**

3.3 Paving - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.5841	6.1019	4.8621	7.3200e-003		0.3479	0.3479		0.3201	0.3201		737.0392	737.0392	0.2295		742.7755
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.5841**	**6.1019**	**4.8621**	**7.3200e-003**		**0.3479**	**0.3479**		**0.3201**	**0.3201**		**737.0392**	**737.0392**	**0.2295**		**742.7755**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1164	2.6854	0.8157	6.6000e-003	52.5334	0.0233	52.5567	5.2698	0.0223	5.2921		689.7491	689.7491	0.0396		690.7395
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.1164**	**2.6854**	**0.8157**	**6.6000e-003**	**52.5334**	**0.0233**	**52.5567**	**5.2698**	**0.0223**	**5.2921**		**689.7491**	**689.7491**	**0.0396**		**690.7395**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.5841	6.1019	4.8621	7.3200e-003		0.3479	0.3479		0.3201	0.3201	0.0000	737.0392	737.0392	0.2295		742.7755
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.5841**	**6.1019**	**4.8621**	**7.3200e-003**		**0.3479**	**0.3479**		**0.3201**	**0.3201**	**0.0000**	**737.0392**	**737.0392**	**0.2295**		**742.7755**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1164	2.6854	0.8157	6.6000e-003	32.2185	0.0233	32.2418	3.2383	0.0223	3.2606		689.7491	689.7491	0.0396		690.7395
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.1164**	**2.6854**	**0.8157**	**6.6000e-003**	**32.2185**	**0.0233**	**32.2418**	**3.2383**	**0.0223**	**3.2606**		**689.7491**	**689.7491**	**0.0396**		**690.7395**

CalEEMod Version: CalEEMod.2016.3.2

Date: 6/6/2018 9:33 AM

IID EHR-Hwy 98 Detour
Imperial County APCD Air District, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	10.00	Acre	10.00	435,600.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.4	**Precipitation Freq (Days)**	12
Climate Zone	15			**Operational Year**	2020
Utility Company	Imperial Irrigation District				
CO2 Intensity (lb/MWhr)	1270.9	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - East Highline Reservoir Project. Imperial County.

Land Use - Completion of Highway 98 detour

Construction Phase - Construction would occur October 2018

Off-road Equipment - 15-month equipment

Off-road Equipment - 1-month equipment

Off-road Equipment - 1-week equipment

Trips and VMT - 20 workers over entire duration

On-road Fugitive Dust - Hauling is all offroad.

Grading - Excavation, balanced onsite.

Construction Off-road Equipment Mitigation - Comply with ICAPCD fugitive dust control measures: water three times daily and limit vehicle speeds to 15 mph on unpaved roads.

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadMoistureContent	0	0.5
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	20.00	22.00
tblConstructionPhase	NumDays	20.00	5.00
tblOffRoadEquipment	HorsePower	402.00	250.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	UsageHours	8.00	4.00
tblOnRoadDust	HaulingPercentPave	50.00	80.00
tblOnRoadDust	HaulingPercentPave	50.00	80.00
tblOnRoadDust	VendorPercentPave	50.00	80.00
tblOnRoadDust	VendorPercentPave	50.00	80.00
tblOnRoadDust	WorkerPercentPave	50.00	80.00
tblOnRoadDust	WorkerPercentPave	50.00	80.00
tblTripsAndVMT	VendorTripNumber	0.00	20.00
tblTripsAndVMT	WorkerTripNumber	13.00	24.00
tblTripsAndVMT	WorkerTripNumber	5.00	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	4.0248	46.9740	28.1958	0.0572	106.5974	1.8534	108.4507	10.7030	1.7067	12.4097	0.0000	5,759.8645	5,759.8645	1.5960	0.0000	5,799.7632
Maximum	**4.0248**	**46.9740**	**28.1958**	**0.0572**	**106.5974**	**1.8534**	**108.4507**	**10.7030**	**1.7067**	**12.4097**	**0.0000**	**5,759.8645**	**5,759.8645**	**1.5960**	**0.0000**	**5,799.7632**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	4.0248	46.9740	28.1958	0.0572	64.8314	1.8534	66.6848	6.5147	1.7067	8.2215	0.0000	5,759.8645	5,759.8645	1.5960	0.0000	5,799.7632
Maximum	**4.0248**	**46.9740**	**28.1958**	**0.0572**	**64.8314**	**1.8534**	**66.6848**	**6.5147**	**1.7067**	**8.2215**	**0.0000**	**5,759.8645**	**5,759.8645**	**1.5960**	**0.0000**	**5,799.7632**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**39.18**	**0.00**	**38.51**	**39.13**	**0.00**	**33.75**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Grading	Grading	10/1/2018	10/30/2018	5	22	
2	Paving	Paving	10/25/2018	10/31/2018	5	5	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 49.5

Acres of Paving: 10

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Grading	Graders	1	4.00	187	0.41
Grading	Off-Highway Trucks	1	8.00	250	0.38
Grading	Plate Compactors	1	8.00	8	0.43
Grading	Scrapers	2	8.00	367	0.48
Paving	Pavers	1	8.00	130	0.42
Paving	Rollers	1	8.00	80	0.38

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Grading	5	24.00	0.00	0.00	7.30	8.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	2	0.00	20.00	0.00	7.30	8.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Grading - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.3861	0.0000	2.3861	0.2577	0.0000	0.2577			0.0000			0.0000
Off-Road	3.1646	37.9799	21.3271	0.0422		1.4809	1.4809		1.3632	1.3632		4,236.0842	4,236.0842	1.3116		4,268.8741
Total	**3.1646**	**37.9799**	**21.3271**	**0.0422**	**2.3861**	**1.4809**	**3.8670**	**0.2577**	**1.3632**	**1.6209**		**4,236.0842**	**4,236.0842**	**1.3116**		**4,268.8741**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1564	0.1316	1.0995	1.2300e-003	51.6778	9.8000e-004	51.6788	5.1755	9.0000e-004	5.1764		121.4830	121.4830	0.0112		121.7618
Total	**0.1564**	**0.1316**	**1.0995**	**1.2300e-003**	**51.6778**	**9.8000e-004**	**51.6788**	**5.1755**	**9.0000e-004**	**5.1764**		**121.4830**	**121.4830**	**0.0112**		**121.7618**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.9306	0.0000	0.9306	0.1005	0.0000	0.1005			0.0000			0.0000
Off-Road	3.1646	37.9799	21.3271	0.0422		1.4809	1.4809		1.3632	1.3632	0.0000	4,236.0842	4,236.0842	1.3116		4,268.8741
Total	**3.1646**	**37.9799**	**21.3271**	**0.0422**	**0.9306**	**1.4809**	**2.4115**	**0.1005**	**1.3632**	**1.4637**	**0.0000**	**4,236.0842**	**4,236.0842**	**1.3116**		**4,268.8741**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1564	0.1316	1.0995	1.2300e-003	31.6824	9.8000e-004	31.6834	3.1759	9.0000e-004	3.1768		121.4830	121.4830	0.0112		121.7618
Total	**0.1564**	**0.1316**	**1.0995**	**1.2300e-003**	**31.6824**	**9.8000e-004**	**31.6834**	**3.1759**	**9.0000e-004**	**3.1768**		**121.4830**	**121.4830**	**0.0112**		**121.7618**

3.3 Paving - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.5841	6.1019	4.8621	7.3200e-003		0.3479	0.3479		0.3201	0.3201		737.0392	737.0392	0.2295		742.7755
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.5841**	**6.1019**	**4.8621**	**7.3200e-003**		**0.3479**	**0.3479**		**0.3201**	**0.3201**		**737.0392**	**737.0392**	**0.2295**		**742.7755**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1197	2.7606	0.9071	6.3700e-003	52.5334	0.0236	52.5570	5.2698	0.0226	5.2924		665.2580	665.2580	0.0438		666.3518
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.1197**	**2.7606**	**0.9071**	**6.3700e-003**	**52.5334**	**0.0236**	**52.5570**	**5.2698**	**0.0226**	**5.2924**		**665.2580**	**665.2580**	**0.0438**		**666.3518**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.5841	6.1019	4.8621	7.3200e-003		0.3479	0.3479		0.3201	0.3201	0.0000	737.0392	737.0392	0.2295		742.7755
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.5841**	**6.1019**	**4.8621**	**7.3200e-003**		**0.3479**	**0.3479**		**0.3201**	**0.3201**	**0.0000**	**737.0392**	**737.0392**	**0.2295**		**742.7755**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1197	2.7606	0.9071	6.3700e-003	32.2185	0.0236	32.2420	3.2383	0.0226	3.2609		665.2580	665.2580	0.0438		666.3518
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.1197**	**2.7606**	**0.9071**	**6.3700e-003**	**32.2185**	**0.0236**	**32.2420**	**3.2383**	**0.0226**	**3.2609**		**665.2580**	**665.2580**	**0.0438**		**666.3518**

CalEEMod Version: CalEEMod.2016.3.2

Date: 6/6/2018 9:38 AM

IID EHR-Sedimentation Basin
Imperial County APCD Air District, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	10.00	Acre	10.00	435,600.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.4	**Precipitation Freq (Days)**	12
Climate Zone	15			**Operational Year**	2020
Utility Company	Imperial Irrigation District				
CO_2 Intensity (lb/MWhr)	1270.9	**CH_4 Intensity (lb/MWhr)**	0.029	**N_2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - East Highline Reservoir Project. Imperial County.

Land Use - Sedimentaiton Basin

Construction Phase - Construction would occur from October 2018 through December 2018

Off-road Equipment - 15-month equipment

Off-road Equipment - 3-month equipment

Off-road Equipment - May equipment

Off-road Equipment - June equipment

Trips and VMT - 20 workers over entire duration

On-road Fugitive Dust - Hauling is all offroad.

Grading - Excavation, balanced onsite.

Construction Off-road Equipment Mitigation - Comply with ICAPCD fugitive dust control measures: water three times daily and limit vehicle speeds to 15 mph on unpaved roads.

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadMoistureContent	0	0.5
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	230.00	66.00
tblConstructionPhase	NumDays	20.00	23.00
tblConstructionPhase	NumDays	20.00	21.00
tblOffRoadEquipment	HorsePower	402.00	300.00
tblOffRoadEquipment	HorsePower	84.00	10.00
tblOffRoadEquipment	HorsePower	84.00	110.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	10.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Building Construction
tblOffRoadEquipment	PhaseName		Building Construction
tblOffRoadEquipment	PhaseName		Building Construction
tblOffRoadEquipment	PhaseName		Building Construction
tblOffRoadEquipment	PhaseName		Paving
tblOffRoadEquipment	PhaseName		Paving

tblOffRoadEquipment	UsageHours	8.00	24.00
tblOnRoadDust	HaulingPercentPave	50.00	80.00
tblOnRoadDust	HaulingPercentPave	50.00	80.00
tblOnRoadDust	HaulingPercentPave	50.00	80.00
tblOnRoadDust	VendorPercentPave	50.00	80.00
tblOnRoadDust	VendorPercentPave	50.00	80.00
tblOnRoadDust	VendorPercentPave	50.00	80.00
tblOnRoadDust	WorkerPercentPave	50.00	80.00
tblOnRoadDust	WorkerPercentPave	50.00	80.00
tblOnRoadDust	WorkerPercentPave	50.00	80.00
tblTripsAndVMT	VendorTripNumber	71.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	24.00
tblTripsAndVMT	WorkerTripNumber	33.00	0.00
tblTripsAndVMT	WorkerTripNumber	183.00	24.00
tblTripsAndVMT	WorkerTripNumber	8.00	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2018	0.2412	2.2311	1.5320	3.4100e-003	2.5265	0.1095	2.6360	0.2843	0.1058	0.3901	0.0000	300.4592	300.4592	0.0582	0.0000	301.9145
Maximum	**0.2412**	**2.2311**	**1.5320**	**3.4100e-003**	**2.5265**	**0.1095**	**2.6360**	**0.2843**	**0.1058**	**0.3901**	**0.0000**	**300.4592**	**300.4592**	**0.0582**	**0.0000**	**301.9145**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2018	0.2412	2.2311	1.5320	3.4100e-003	1.5337	0.1095	1.6432	0.1661	0.1058	0.2718	0.0000	300.4589	300.4589	0.0582	0.0000	301.9141
Maximum	**0.2412**	**2.2311**	**1.5320**	**3.4100e-003**	**1.5337**	**0.1095**	**1.6432**	**0.1661**	**0.1058**	**0.2718**	**0.0000**	**300.4589**	**300.4589**	**0.0582**	**0.0000**	**301.9141**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**39.29**	**0.00**	**37.66**	**41.60**	**0.00**	**30.32**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Grading	Grading	10/1/2018	10/31/2018	5	23	
2	Building Construction	Building Construction	10/1/2018	12/31/2018	5	66	
3	Paving	Paving	11/1/2018	11/29/2018	5	21	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 10

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Grading	Excavators	1	8.00	158	0.38
Grading	Off-Highway Trucks	10	8.00	300	0.38
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Building Construction	Generator Sets	2	24.00	84	0.74
Building Construction	Graders	1	4.00	187	0.41
Building Construction	Off-Highway Trucks	1	4.00	402	0.38
Building Construction	Plate Compactors	1	8.00	8	0.43
Building Construction	Pumps	1	24.00	10	0.74
Paving	Cement and Mortar Mixers	1	8.00	9	0.56
Paving	Pumps	2	8.00	110	0.74

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Grading	13	0.00	0.00	0.00	7.30	8.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	6	24.00	2.00	0.00	7.30	8.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	3	0.00	24.00	0.00	7.30	8.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Grading - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0693	0.0000	0.0693	0.0381	0.0000	0.0381	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0862	0.9247	0.4755	1.3300e-003		0.0370	0.0370		0.0340	0.0340	0.0000	121.1754	121.1754	0.0377	0.0000	122.1185
Total	**0.0862**	**0.9247**	**0.4755**	**1.3300e-003**	**0.0693**	**0.0370**	**0.1062**	**0.0381**	**0.0340**	**0.0721**	**0.0000**	**121.1754**	**121.1754**	**0.0377**	**0.0000**	**122.1185**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0270	0.0000	0.0270	0.0149	0.0000	0.0149	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0862	0.9247	0.4755	1.3300e-003		0.0370	0.0370		0.0340	0.0340	0.0000	121.1752	121.1752	0.0377	0.0000	122.1183
Total	**0.0862**	**0.9247**	**0.4755**	**1.3300e-003**	**0.0270**	**0.0370**	**0.0640**	**0.0149**	**0.0340**	**0.0489**	**0.0000**	**121.1752**	**121.1752**	**0.0377**	**0.0000**	**122.1183**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.3 Building Construction - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1326	1.1392	0.8961	1.7500e-003		0.0644	0.0644		0.0636	0.0636	0.0000	149.5351	149.5351	0.0183	0.0000	149.9927
Total	**0.1326**	**1.1392**	**0.8961**	**1.7500e-003**		**0.0644**	**0.0644**		**0.0636**	**0.0636**	**0.0000**	**149.5351**	**149.5351**	**0.0183**	**0.0000**	**149.9927**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.8000e-004	9.1700e-003	2.7900e-003	2.0000e-005	0.1677	8.0000e-005	0.1678	0.0168	7.0000e-005	0.0169	0.0000	2.0341	2.0341	1.2000e-004	0.0000	2.0372
Worker	5.3600e-003	4.2700e-003	0.0391	4.0000e-005	1.6494	3.0000e-005	1.6494	0.1652	3.0000e-005	0.1652	0.0000	3.9236	3.9236	3.6000e-004	0.0000	3.9326
Total	**5.7400e-003**	**0.0134**	**0.0419**	**6.0000e-005**	**1.8171**	**1.1000e-004**	**1.8172**	**0.1820**	**1.0000e-004**	**0.1821**	**0.0000**	**5.9578**	**5.9578**	**4.8000e-004**	**0.0000**	**5.9698**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1326	1.1392	0.8961	1.7500e-003		0.0644	0.0644		0.0636	0.0636	0.0000	149.5349	149.5349	0.0183	0.0000	149.9926
Total	**0.1326**	**1.1392**	**0.8961**	**1.7500e-003**		**0.0644**	**0.0644**		**0.0636**	**0.0636**	**0.0000**	**149.5349**	**149.5349**	**0.0183**	**0.0000**	**149.9926**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.8000e-004	9.1700e-003	2.7900e-003	2.0000e-005	0.1028	8.0000e-005	0.1029	0.0103	7.0000e-005	0.0104	0.0000	2.0341	2.0341	1.2000e-004	0.0000	2.0372
Worker	5.3600e-003	4.2700e-003	0.0391	4.0000e-005	1.0112	3.0000e-005	1.0113	0.1014	3.0000e-005	0.1014	0.0000	3.9236	3.9236	3.6000e-004	0.0000	3.9326
Total	**5.7400e-003**	**0.0134**	**0.0419**	**6.0000e-005**	**1.1141**	**1.1000e-004**	**1.1142**	**0.1117**	**1.0000e-004**	**0.1118**	**0.0000**	**5.9578**	**5.9578**	**4.8000e-004**	**0.0000**	**5.9698**

3.4 Paving - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0152	0.1187	0.1079	1.9000e-004		7.7500e-003	7.7500e-003		7.7500e-003	7.7500e-003	0.0000	16.0244	16.0244	1.2300e-003	0.0000	16.0551
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0152**	**0.1187**	**0.1079**	**1.9000e-004**		**7.7500e-003**	**7.7500e-003**		**7.7500e-003**	**7.7500e-003**	**0.0000**	**16.0244**	**16.0244**	**1.2300e-003**	**0.0000**	**16.0551**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.4600e-003	0.0350	0.0107	8.0000e-005	0.6402	3.0000e-004	0.6405	0.0642	2.8000e-004	0.0645	0.0000	7.7666	7.7666	4.7000e-004	0.0000	7.7784
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.4600e-003**	**0.0350**	**0.0107**	**8.0000e-005**	**0.6402**	**3.0000e-004**	**0.6405**	**0.0642**	**2.8000e-004**	**0.0645**	**0.0000**	**7.7666**	**7.7666**	**4.7000e-004**	**0.0000**	**7.7784**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0152	0.1187	0.1079	1.9000e-004		7.7500e-003	7.7500e-003		7.7500e-003	7.7500e-003	0.0000	16.0244	16.0244	1.2300e-003	0.0000	16.0550
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0152**	**0.1187**	**0.1079**	**1.9000e-004**		**7.7500e-003**	**7.7500e-003**		**7.7500e-003**	**7.7500e-003**	**0.0000**	**16.0244**	**16.0244**	**1.2300e-003**	**0.0000**	**16.0550**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.4600e-003	0.0350	0.0107	8.0000e-005	0.3927	3.0000e-004	0.3930	0.0395	2.8000e-004	0.0398	0.0000	7.7666	7.7666	4.7000e-004	0.0000	7.7784
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.4600e-003**	**0.0350**	**0.0107**	**8.0000e-005**	**0.3927**	**3.0000e-004**	**0.3930**	**0.0395**	**2.8000e-004**	**0.0398**	**0.0000**	**7.7666**	**7.7666**	**4.7000e-004**	**0.0000**	**7.7784**

CalEEMod Version: CalEEMod.2016.3.2

Date: 6/6/2018 9:39 AM

IID EHR-Sedimentation Basin

Imperial County APCD Air District, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	10.00	Acre	10.00	435,600.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.4	**Precipitation Freq (Days)**	12
Climate Zone	15			**Operational Year**	2020
Utility Company	Imperial Irrigation District				
CO2 Intensity (lb/MWhr)	1270.9	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - East Highline Reservoir Project. Imperial County.

Land Use - Sedimentaiton Basin

Construction Phase - Construction would occur from October 2018 through December 2018

Off-road Equipment - 15-month equipment

Off-road Equipment - 3-month equipment

Off-road Equipment - May equipment

Off-road Equipment - June equipment

Trips and VMT - 20 workers over entire duration

On-road Fugitive Dust - Hauling is all offroad.

Grading - Excavation, balanced onsite.

Construction Off-road Equipment Mitigation - Comply with ICAPCD fugitive dust control measures: water three times daily and limit vehicle speeds to 15 mph on unpaved roads.

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadMoistureContent	0	0.5
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	230.00	66.00
tblConstructionPhase	NumDays	20.00	23.00
tblConstructionPhase	NumDays	20.00	21.00
tblOffRoadEquipment	HorsePower	402.00	300.00
tblOffRoadEquipment	HorsePower	84.00	10.00
tblOffRoadEquipment	HorsePower	84.00	110.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	10.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Building Construction
tblOffRoadEquipment	PhaseName		Building Construction
tblOffRoadEquipment	PhaseName		Building Construction
tblOffRoadEquipment	PhaseName		Building Construction
tblOffRoadEquipment	PhaseName		Paving

tblOffRoadEquipment	PhaseName		Paving
tblOffRoadEquipment	UsageHours	8.00	24.00
tblOnRoadDust	HaulingPercentPave	50.00	80.00
tblOnRoadDust	HaulingPercentPave	50.00	80.00
tblOnRoadDust	HaulingPercentPave	50.00	80.00
tblOnRoadDust	VendorPercentPave	50.00	80.00
tblOnRoadDust	VendorPercentPave	50.00	80.00
tblOnRoadDust	VendorPercentPave	50.00	80.00
tblOnRoadDust	WorkerPercentPave	50.00	80.00
tblOnRoadDust	WorkerPercentPave	50.00	80.00
tblOnRoadDust	WorkerPercentPave	50.00	80.00
tblTripsAndVMT	VendorTripNumber	71.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	24.00
tblTripsAndVMT	WorkerTripNumber	33.00	0.00
tblTripsAndVMT	WorkerTripNumber	183.00	24.00
tblTripsAndVMT	WorkerTripNumber	8.00	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	11.7182	115.3285	70.0314	0.1706	119.9712	5.1678	122.6905	12.0263	4.8891	14.7227	0.0000	16,823.7727	16,823.7727	4.2452	0.0000	16,929.9035
Maximum	**11.7182**	**115.3285**	**70.0314**	**0.1706**	**119.9712**	**5.1678**	**122.6905**	**12.0263**	**4.8891**	**14.7227**	**0.0000**	**16,823.7727**	**16,823.7727**	**4.2452**	**0.0000**	**16,929.9035**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	11.7182	115.3285	70.0314	0.1706	73.5664	5.1678	76.2856	7.3858	4.8891	10.0822	0.0000	16,823.7726	16,823.7726	4.2452	0.0000	16,929.9035
Maximum	**11.7182**	**115.3285**	**70.0314**	**0.1706**	**73.5664**	**5.1678**	**76.2856**	**7.3858**	**4.8891**	**10.0822**	**0.0000**	**16,823.7726**	**16,823.7726**	**4.2452**	**0.0000**	**16,929.9035**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**38.68**	**0.00**	**37.82**	**38.59**	**0.00**	**31.52**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Grading	Grading	10/1/2018	10/31/2018	5	23	
2	Building Construction	Building Construction	10/1/2018	12/31/2018	5	66	
3	Paving	Paving	11/1/2018	11/29/2018	5	21	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 10

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Grading	Excavators	1	8.00	158	0.38
Grading	Off-Highway Trucks	10	8.00	300	0.38
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Building Construction	Generator Sets	2	24.00	84	0.74
Building Construction	Graders	1	4.00	187	0.41
Building Construction	Off-Highway Trucks	1	4.00	402	0.38
Building Construction	Plate Compactors	1	8.00	8	0.43
Building Construction	Pumps	1	24.00	10	0.74
Paving	Cement and Mortar Mixers	1	8.00	9	0.56
Paving	Pumps	2	8.00	110	0.74

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Grading	13	0.00	0.00	0.00	7.30	8.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	6	24.00	2.00	0.00	7.30	8.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	3	0.00	24.00	0.00	7.30	8.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Grading - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.0221	0.0000	6.0221	3.3102	0.0000	3.3102			0.0000			0.0000
Off-Road	7.4924	80.4125	41.3445	0.1154		3.2146	3.2146		2.9575	2.9575		11,615.0425	11,615.0425	3.6159		11,705.4406
Total	**7.4924**	**80.4125**	**41.3445**	**0.1154**	**6.0221**	**3.2146**	**9.2367**	**3.3102**	**2.9575**	**6.2677**		**11,615.0425**	**11,615.0425**	**3.6159**		**11,705.4406**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.3486	0.0000	2.3486	1.2910	0.0000	1.2910			0.0000			0.0000
Off-Road	7.4924	80.4125	41.3445	0.1154		3.2146	3.2146		2.9575	2.9575	0.0000	11,615.0425	11,615.0425	3.6159		11,705.4405
Total	**7.4924**	**80.4125**	**41.3445**	**0.1154**	**2.3486**	**3.2146**	**5.5632**	**1.2910**	**2.9575**	**4.2484**	**0.0000**	**11,615.0425**	**11,615.0425**	**3.6159**		**11,705.4405**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.3 Building Construction - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.0189	34.5223	27.1536	0.0530		1.9499	1.9499		1.9285	1.9285		4,994.9749	4,994.9749	0.6115		5,010.2633
Total	**4.0189**	**34.5223**	**27.1536**	**0.0530**		**1.9499**	**1.9499**		**1.9285**	**1.9285**		**4,994.9749**	**4,994.9749**	**0.6115**		**5,010.2633**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0116	0.2685	0.0816	6.6000e-004	5.2533	2.3300e-003	5.2557	0.5270	2.2300e-003	0.5292		68.9749	68.9749	3.9600e-003		69.0740
Worker	0.1952	0.1251	1.4517	1.4700e-003	51.6778	9.8000e-004	51.6788	5.1755	9.0000e-004	5.1764		144.7803	144.7803	0.0138		145.1258
Total	**0.2069**	**0.3936**	**1.5333**	**2.1300e-003**	**56.9311**	**3.3100e-003**	**56.9344**	**5.7025**	**3.1300e-003**	**5.7056**		**213.7552**	**213.7552**	**0.0178**		**214.1997**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.0189	34.5223	27.1536	0.0530		1.9499	1.9499		1.9285	1.9285	0.0000	4,994.9749	4,994.9749	0.6115		5,010.2632
Total	**4.0189**	**34.5223**	**27.1536**	**0.0530**		**1.9499**	**1.9499**		**1.9285**	**1.9285**	**0.0000**	**4,994.9749**	**4,994.9749**	**0.6115**		**5,010.2632**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0116	0.2685	0.0816	6.6000e-004	3.2219	2.3300e-003	3.2242	0.3238	2.2300e-003	0.3261		68.9749	68.9749	3.9600e-003		69.0740
Worker	0.1952	0.1251	1.4517	1.4700e-003	31.6824	9.8000e-004	31.6834	3.1759	9.0000e-004	3.1768		144.7803	144.7803	0.0138		145.1258
Total	**0.2069**	**0.3936**	**1.5333**	**2.1300e-003**	**34.9042**	**3.3100e-003**	**34.9075**	**3.4998**	**3.1300e-003**	**3.5029**		**213.7552**	**213.7552**	**0.0178**		**214.1997**

3.4 Paving - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4513	11.3021	10.2746	0.0179		0.7381	0.7381		0.7381	0.7381		1,682.2735	1,682.2735	0.1287		1,685.4913
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.4513**	**11.3021**	**10.2746**	**0.0179**		**0.7381**	**0.7381**		**0.7381**	**0.7381**		**1,682.2735**	**1,682.2735**	**0.1287**		**1,685.4913**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1397	3.2225	0.9788	7.9200e-003	63.0401	0.0280	63.0681	6.3238	0.0267	6.3505		827.6989	827.6989	0.0475		828.8874
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.1397**	**3.2225**	**0.9788**	**7.9200e-003**	**63.0401**	**0.0280**	**63.0681**	**6.3238**	**0.0267**	**6.3505**		**827.6989**	**827.6989**	**0.0475**		**828.8874**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4513	11.3021	10.2746	0.0179		0.7381	0.7381		0.7381	0.7381	0.0000	1,682.2735	1,682.2735	0.1287		1,685.4913
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.4513**	**11.3021**	**10.2746**	**0.0179**		**0.7381**	**0.7381**		**0.7381**	**0.7381**	**0.0000**	**1,682.2735**	**1,682.2735**	**0.1287**		**1,685.4913**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1397	3.2225	0.9788	7.9200e-003	38.6621	0.0280	38.6901	3.8860	0.0267	3.9127		827.6989	827.6989	0.0475		828.8874
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.1397**	**3.2225**	**0.9788**	**7.9200e-003**	**38.6621**	**0.0280**	**38.6901**	**3.8860**	**0.0267**	**3.9127**		**827.6989**	**827.6989**	**0.0475**		**828.8874**

CalEEMod Version: CalEEMod.2016.3.2

Date: 6/6/2018 9:40 AM

IID EHR-Sedimentation Basin

Imperial County APCD Air District, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	10.00	Acre	10.00	435,600.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.4	**Precipitation Freq (Days)**	12
Climate Zone	15			**Operational Year**	2020
Utility Company	Imperial Irrigation District				
CO2 Intensity (lb/MWhr)	1270.9	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - East Highline Reservoir Project. Imperial County.

Land Use - Sedimentaiton Basin

Construction Phase - Construction would occur from October 2018 through December 2018

Off-road Equipment - 15-month equipment

Off-road Equipment - 3-month equipment

Off-road Equipment - May equipment

Off-road Equipment - June equipment

Trips and VMT - 20 workers over entire duration

On-road Fugitive Dust - Hauling is all offroad.

Grading - Excavation, balanced onsite.

Construction Off-road Equipment Mitigation - Comply with ICAPCD fugitive dust control measures: water three times daily and limit vehicle speeds to 15 mph on unpaved roads.

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadMoistureContent	0	0.5
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	230.00	66.00
tblConstructionPhase	NumDays	20.00	23.00
tblConstructionPhase	NumDays	20.00	21.00
tblOffRoadEquipment	HorsePower	402.00	300.00
tblOffRoadEquipment	HorsePower	84.00	10.00
tblOffRoadEquipment	HorsePower	84.00	110.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	10.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Building Construction
tblOffRoadEquipment	PhaseName		Building Construction
tblOffRoadEquipment	PhaseName		Building Construction
tblOffRoadEquipment	PhaseName		Building Construction
tblOffRoadEquipment	PhaseName		Paving

tblOffRoadEquipment	PhaseName		Paving
tblOffRoadEquipment	UsageHours	8.00	24.00
tblOnRoadDust	HaulingPercentPave	50.00	80.00
tblOnRoadDust	HaulingPercentPave	50.00	80.00
tblOnRoadDust	HaulingPercentPave	50.00	80.00
tblOnRoadDust	VendorPercentPave	50.00	80.00
tblOnRoadDust	VendorPercentPave	50.00	80.00
tblOnRoadDust	VendorPercentPave	50.00	80.00
tblOnRoadDust	WorkerPercentPave	50.00	80.00
tblOnRoadDust	WorkerPercentPave	50.00	80.00
tblOnRoadDust	WorkerPercentPave	50.00	80.00
tblTripsAndVMT	VendorTripNumber	71.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	24.00
tblTripsAndVMT	WorkerTripNumber	33.00	0.00
tblTripsAndVMT	WorkerTripNumber	183.00	24.00
tblTripsAndVMT	WorkerTripNumber	8.00	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	11.6797	115.3425	69.6883	0.1703	119.9712	5.1679	122.6908	12.0263	4.8891	14.7230	0.0000	16,798.0263	16,798.0263	4.2430	0.0000	16,904.1008
Maximum	**11.6797**	**115.3425**	**69.6883**	**0.1703**	**119.9712**	**5.1679**	**122.6908**	**12.0263**	**4.8891**	**14.7230**	**0.0000**	**16,798.0263**	**16,798.0263**	**4.2430**	**0.0000**	**16,904.1008**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	11.6797	115.3425	69.6883	0.1703	73.5664	5.1679	76.2860	7.3858	4.8891	10.0825	0.0000	16,798.0263	16,798.0263	4.2430	0.0000	16,904.1008
Maximum	**11.6797**	**115.3425**	**69.6883**	**0.1703**	**73.5664**	**5.1679**	**76.2860**	**7.3858**	**4.8891**	**10.0825**	**0.0000**	**16,798.0263**	**16,798.0263**	**4.2430**	**0.0000**	**16,904.1008**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**38.68**	**0.00**	**37.82**	**38.59**	**0.00**	**31.52**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Grading	Grading	10/1/2018	10/31/2018	5	23	
2	Building Construction	Building Construction	10/1/2018	12/31/2018	5	66	
3	Paving	Paving	11/1/2018	11/29/2018	5	21	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 10

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Grading	Excavators	1	8.00	158	0.38
Grading	Off-Highway Trucks	10	8.00	300	0.38
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Building Construction	Generator Sets	2	24.00	84	0.74
Building Construction	Graders	1	4.00	187	0.41
Building Construction	Off-Highway Trucks	1	4.00	402	0.38
Building Construction	Plate Compactors	1	8.00	8	0.43
Building Construction	Pumps	1	24.00	10	0.74
Paving	Cement and Mortar Mixers	1	8.00	9	0.56
Paving	Pumps	2	8.00	110	0.74

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Grading	13	0.00	0.00	0.00	7.30	8.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	6	24.00	2.00	0.00	7.30	8.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	3	0.00	24.00	0.00	7.30	8.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Grading - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category					lb/day								lb/day			
Fugitive Dust					6.0221	0.0000	6.0221	3.3102	0.0000	3.3102			0.0000			0.0000
Off-Road	7.4924	80.4125	41.3445	0.1154		3.2146	3.2146		2.9575	2.9575		11,615.0425	11,615.0425	3.6159		11,705.4406
Total	**7.4924**	**80.4125**	**41.3445**	**0.1154**	**6.0221**	**3.2146**	**9.2367**	**3.3102**	**2.9575**	**6.2677**		**11,615.0425**	**11,615.0425**	**3.6159**		**11,705.4406**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category					lb/day								lb/day			
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.3486	0.0000	2.3486	1.2910	0.0000	1.2910			0.0000			0.0000
Off-Road	7.4924	80.4125	41.3445	0.1154		3.2146	3.2146		2.9575	2.9575	0.0000	11,615.0425	11,615.0425	3.6159		11,705.4405
Total	**7.4924**	**80.4125**	**41.3445**	**0.1154**	**2.3486**	**3.2146**	**5.5632**	**1.2910**	**2.9575**	**4.2484**	**0.0000**	**11,615.0425**	**11,615.0425**	**3.6159**		**11,705.4405**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.3 Building Construction - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.0189	34.5223	27.1536	0.0530		1.9499	1.9499		1.9285	1.9285		4,994.974 9	4,994.9749	0.6115		5,010.263 3
Total	**4.0189**	**34.5223**	**27.1536**	**0.0530**		**1.9499**	**1.9499**		**1.9285**	**1.9285**		**4,994.974 9**	**4,994.9749**	**0.6115**		**5,010.263 3**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0120	0.2761	0.0907	6.4000e-004	5.2533	2.3600e-003	5.2557	0.5270	2.2600e-003	0.5292		66.5258	66.5258	4.3700e-003		66.6352
Worker	0.1564	0.1316	1.0995	1.2300e-003	51.6778	9.8000e-004	51.6788	5.1755	9.0000e-004	5.1764		121.4830	121.4830	0.0112		121.7618
Total	**0.1683**	**0.4077**	**1.1902**	**1.8700e-003**	**56.9311**	**3.3400e-003**	**56.9345**	**5.7025**	**3.1600e-003**	**5.7056**		**188.0088**	**188.0088**	**0.0155**		**188.3970**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.0189	34.5223	27.1536	0.0530		1.9499	1.9499		1.9285	1.9285	0.0000	4,994.9749	4,994.9749	0.6115		5,010.2632
Total	**4.0189**	**34.5223**	**27.1536**	**0.0530**		**1.9499**	**1.9499**		**1.9285**	**1.9285**	**0.0000**	**4,994.9749**	**4,994.9749**	**0.6115**		**5,010.2632**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0120	0.2761	0.0907	6.4000e-004	3.2219	2.3600e-003	3.2242	0.3238	2.2600e-003	0.3261		66.5258	66.5258	4.3700e-003		66.6352
Worker	0.1564	0.1316	1.0995	1.2300e-003	31.6824	9.8000e-004	31.6834	3.1759	9.0000e-004	3.1768		121.4830	121.4830	0.0112		121.7618
Total	**0.1683**	**0.4077**	**1.1902**	**1.8700e-003**	**34.9042**	**3.3400e-003**	**34.9076**	**3.4998**	**3.1600e-003**	**3.5029**		**188.0088**	**188.0088**	**0.0155**		**188.3970**

3.4 Paving - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4513	11.3021	10.2746	0.0179		0.7381	0.7381		0.7381	0.7381		1,682.2735	1,682.2735	0.1287		1,685.4913
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.4513**	**11.3021**	**10.2746**	**0.0179**		**0.7381**	**0.7381**		**0.7381**	**0.7381**		**1,682.2735**	**1,682.2735**	**0.1287**		**1,685.4913**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1436	3.3127	1.0885	7.6400e-003	63.0401	0.0283	63.0684	6.3238	0.0271	6.3509		798.3096	798.3096	0.0525		799.6221
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.1436**	**3.3127**	**1.0885**	**7.6400e-003**	**63.0401**	**0.0283**	**63.0684**	**6.3238**	**0.0271**	**6.3509**		**798.3096**	**798.3096**	**0.0525**		**799.6221**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4513	11.3021	10.2746	0.0179		0.7381	0.7381		0.7381	0.7381	0.0000	1,682.2735	1,682.2735	0.1287		1,685.4913
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.4513**	**11.3021**	**10.2746**	**0.0179**		**0.7381**	**0.7381**		**0.7381**	**0.7381**	**0.0000**	**1,682.2735**	**1,682.2735**	**0.1287**		**1,685.4913**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1436	3.3127	1.0885	7.6400e-003	38.6621	0.0283	38.6904	3.8860	0.0271	3.9131		798.3096	798.3096	0.0525		799.6221
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.1436**	**3.3127**	**1.0885**	**7.6400e-003**	**38.6621**	**0.0283**	**38.6904**	**3.8860**	**0.0271**	**3.9131**		**798.3096**	**798.3096**	**0.0525**		**799.6221**

CalEEMod Version: CalEEMod.2016.3.2

Date: 6/6/2018 9:44 AM

IID EHR-Canal and Measurement Flume

Imperial County APCD Air District, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	40.00	Acre	40.00	1,742,400.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.4	**Precipitation Freq (Days)**	12
Climate Zone	15			**Operational Year**	2020
Utility Company	Imperial Irrigation District				
CO2 Intensity (lb/MWhr)	1270.9	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - East Highline Reservoir Project. Imperial County.

Land Use - Construction of canal and measurement flume

Construction Phase - Construction would occur May 2018 through July 2018.

Off-road Equipment - 15-month equipment

Off-road Equipment - 3-month equipment

Off-road Equipment - May equipment

Off-road Equipment - June equipment

Trips and VMT - 20 workers over entire duration

On-road Fugitive Dust - Hauling is all offroad.

Grading - Excavation, balanced onsite.

Construction Off-road Equipment Mitigation - Comply with ICAPCD fugitive dust control measures: water twice daily and limit vehicle speeds to 15 mph on unpaved roads.

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadMoistureContent	0	0.5
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	740.00	66.00
tblConstructionPhase	NumDays	75.00	22.00
tblConstructionPhase	NumDays	55.00	21.00
tblOffRoadEquipment	HorsePower	84.00	10.00
tblOffRoadEquipment	HorsePower	84.00	110.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	UsageHours	8.00	24.00
tblOnRoadDust	HaulingPercentPave	50.00	80.00
tblOnRoadDust	HaulingPercentPave	50.00	80.00
tblOnRoadDust	HaulingPercentPave	50.00	80.00
tblOnRoadDust	VendorPercentPave	50.00	80.00
tblOnRoadDust	VendorPercentPave	50.00	80.00
tblOnRoadDust	VendorPercentPave	50.00	80.00
tblOnRoadDust	WorkerPercentPave	50.00	80.00
tblOnRoadDust	WorkerPercentPave	50.00	80.00
tblOnRoadDust	WorkerPercentPave	50.00	80.00
tblTripsAndVMT	VendorTripNumber	286.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	24.00
tblTripsAndVMT	WorkerTripNumber	10.00	0.00
tblTripsAndVMT	WorkerTripNumber	732.00	24.00
tblTripsAndVMT	WorkerTripNumber	8.00	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2018	0.1898	1.7277	1.3136	2.5400e-003	2.4806	0.0897	2.5703	0.2488	0.0876	0.3364	0.0000	220.6946	220.6946	0.0334	0.0000	221.5291
Maximum	**0.1898**	**1.7277**	**1.3136**	**2.5400e-003**	**2.4806**	**0.0897**	**2.5703**	**0.2488**	**0.0876**	**0.3364**	**0.0000**	**220.6946**	**220.6946**	**0.0334**	**0.0000**	**221.5291**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2018	0.1898	1.7277	1.3136	2.5400e-003	1.5158	0.0897	1.6055	0.1522	0.0876	0.2398	0.0000	220.6944	220.6944	0.0334	0.0000	221.5288
Maximum	**0.1898**	**1.7277**	**1.3136**	**2.5400e-003**	**1.5158**	**0.0897**	**1.6055**	**0.1522**	**0.0876**	**0.2398**	**0.0000**	**220.6944**	**220.6944**	**0.0334**	**0.0000**	**221.5288**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**38.89**	**0.00**	**37.54**	**38.83**	**0.00**	**28.71**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Grading	Grading	10/1/2018	10/30/2018	5	22	
2	Building Construction	Building Construction	10/1/2018	12/31/2018	5	66	
3	Paving	Paving	10/1/2018	10/29/2018	5	21	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 44

Acres of Paving: 40

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Grading	Cranes	1	8.00	231	0.29
Grading	Excavators	1	8.00	158	0.38
Grading	Scrapers	2	8.00	367	0.48
Building Construction	Generator Sets	2	24.00	84	0.74
Building Construction	Graders	1	4.00	187	0.41
Building Construction	Off-Highway Trucks	1	4.00	402	0.38
Building Construction	Plate Compactors	1	8.00	8	0.43
Building Construction	Pumps	1	24.00	10	0.74
Paving	Cement and Mortar Mixers	1	8.00	9	0.56
Paving	Pumps	2	8.00	110	0.74

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Grading	4	0.00	0.00	0.00	7.30	8.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	6	24.00	2.00	0.00	7.30	8.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	3	0.00	24.00	0.00	7.30	8.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Grading - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0233	0.0000	0.0233	2.5200e-003	0.0000	2.5200e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0347	0.4213	0.2571	4.5000e-004		0.0172	0.0172		0.0158	0.0158	0.0000	41.4108	41.4108	0.0129	0.0000	41.7331
Total	**0.0347**	**0.4213**	**0.2571**	**4.5000e-004**	**0.0233**	**0.0172**	**0.0405**	**2.5200e-003**	**0.0158**	**0.0184**	**0.0000**	**41.4108**	**41.4108**	**0.0129**	**0.0000**	**41.7331**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					9.1000e-003	0.0000	9.1000e-003	9.8000e-004	0.0000	9.8000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0347	0.4213	0.2571	4.5000e-004		0.0172	0.0172		0.0158	0.0158	0.0000	41.4108	41.4108	0.0129	0.0000	41.7330
Total	**0.0347**	**0.4213**	**0.2571**	**4.5000e-004**	**9.1000e-003**	**0.0172**	**0.0263**	**9.8000e-004**	**0.0158**	**0.0168**	**0.0000**	**41.4108**	**41.4108**	**0.0129**	**0.0000**	**41.7330**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.3 Building Construction - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1326	1.1392	0.8961	1.7500e-003		0.0644	0.0644		0.0636	0.0636	0.0000	149.5351	149.5351	0.0183	0.0000	149.9927
Total	**0.1326**	**1.1392**	**0.8961**	**1.7500e-003**		**0.0644**	**0.0644**		**0.0636**	**0.0636**	**0.0000**	**149.5351**	**149.5351**	**0.0183**	**0.0000**	**149.9927**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.8000e-004	9.1700e-003	2.7900e-003	2.0000e-005	0.1677	8.0000e-005	0.1678	0.0168	7.0000e-005	0.0169	0.0000	2.0341	2.0341	1.2000e-004	0.0000	2.0372
Worker	5.3600e-003	4.2700e-003	0.0391	4.0000e-005	1.6494	3.0000e-005	1.6494	0.1652	3.0000e-005	0.1652	0.0000	3.9236	3.9236	3.6000e-004	0.0000	3.9326
Total	**5.7400e-003**	**0.0134**	**0.0419**	**6.0000e-005**	**1.8171**	**1.1000e-004**	**1.8172**	**0.1820**	**1.0000e-004**	**0.1821**	**0.0000**	**5.9578**	**5.9578**	**4.8000e-004**	**0.0000**	**5.9698**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1326	1.1392	0.8961	1.7500e-003		0.0644	0.0644		0.0636	0.0636	0.0000	149.5349	149.5349	0.0183	0.0000	149.9926
Total	**0.1326**	**1.1392**	**0.8961**	**1.7500e-003**		**0.0644**	**0.0644**		**0.0636**	**0.0636**	**0.0000**	**149.5349**	**149.5349**	**0.0183**	**0.0000**	**149.9926**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.8000e-004	9.1700e-003	2.7900e-003	2.0000e-005	0.1028	8.0000e-005	0.1029	0.0103	7.0000e-005	0.0104	0.0000	2.0341	2.0341	1.2000e-004	0.0000	2.0372
Worker	5.3600e-003	4.2700e-003	0.0391	4.0000e-005	1.0112	3.0000e-005	1.0113	0.1014	3.0000e-005	0.1014	0.0000	3.9236	3.9236	3.6000e-004	0.0000	3.9326
Total	**5.7400e-003**	**0.0134**	**0.0419**	**6.0000e-005**	**1.1141**	**1.1000e-004**	**1.1142**	**0.1117**	**1.0000e-004**	**0.1118**	**0.0000**	**5.9578**	**5.9578**	**4.8000e-004**	**0.0000**	**5.9698**

3.4 Paving - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0152	0.1187	0.1079	1.9000e-004		7.7500e-003	7.7500e-003		7.7500e-003	7.7500e-003	0.0000	16.0244	16.0244	1.2300e-003	0.0000	16.0551
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0152**	**0.1187**	**0.1079**	**1.9000e-004**		**7.7500e-003**	**7.7500e-003**		**7.7500e-003**	**7.7500e-003**	**0.0000**	**16.0244**	**16.0244**	**1.2300e-003**	**0.0000**	**16.0551**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.4600e-003	0.0350	0.0107	8.0000e-005	0.6402	3.0000e-004	0.6405	0.0642	2.8000e-004	0.0645	0.0000	7.7666	7.7666	4.7000e-004	0.0000	7.7784
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.4600e-003**	**0.0350**	**0.0107**	**8.0000e-005**	**0.6402**	**3.0000e-004**	**0.6405**	**0.0642**	**2.8000e-004**	**0.0645**	**0.0000**	**7.7666**	**7.7666**	**4.7000e-004**	**0.0000**	**7.7784**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0152	0.1187	0.1079	1.9000e-004		7.7500e-003	7.7500e-003		7.7500e-003	7.7500e-003	0.0000	16.0244	16.0244	1.2300e-003	0.0000	16.0550
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0152**	**0.1187**	**0.1079**	**1.9000e-004**		**7.7500e-003**	**7.7500e-003**		**7.7500e-003**	**7.7500e-003**	**0.0000**	**16.0244**	**16.0244**	**1.2300e-003**	**0.0000**	**16.0550**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.4600e-003	0.0350	0.0107	8.0000e-005	0.3927	3.0000e-004	0.3930	0.0395	2.8000e-004	0.0398	0.0000	7.7666	7.7666	4.7000e-004	0.0000	7.7784
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.4600e-003**	**0.0350**	**0.0107**	**8.0000e-005**	**0.3927**	**3.0000e-004**	**0.3930**	**0.0395**	**2.8000e-004**	**0.0398**	**0.0000**	**7.7666**	**7.7666**	**4.7000e-004**	**0.0000**	**7.7784**

CalEEMod Version: CalEEMod.2016.3.2

Date: 6/6/2018 9:46 AM

IID EHR-Canal and Measurement Flume
Imperial County APCD Air District, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	40.00	Acre	40.00	1,742,400.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.4	**Precipitation Freq (Days)**	12
Climate Zone	15			**Operational Year**	2020
Utility Company	Imperial Irrigation District				
CO_2 Intensity (lb/MWhr)	1270.9	**CH_4 Intensity (lb/MWhr)**	0.029	**N_2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - East Highline Reservoir Project. Imperial County.

Land Use - Construction of canal and measurement flume

Construction Phase - Construction would occur May 2018 through July 2018.

Off-road Equipment - 15-month equipment

Off-road Equipment - 3-month equipment

Off-road Equipment - May equipment

Off-road Equipment - June equipment

Trips and VMT - 20 workers over entire duration

On-road Fugitive Dust - Hauling is all offroad.

Grading - Excavation, balanced onsite.

Construction Off-road Equipment Mitigation - Comply with ICAPCD fugitive dust control measures: water twice daily and limit vehicle speeds to 15 mph on unpaved roads.

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadMoistureContent	0	0.5
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	740.00	66.00
tblConstructionPhase	NumDays	75.00	22.00
tblConstructionPhase	NumDays	55.00	21.00
tblOffRoadEquipment	HorsePower	84.00	10.00
tblOffRoadEquipment	HorsePower	84.00	110.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	UsageHours	8.00	24.00
tblOnRoadDust	HaulingPercentPave	50.00	80.00
tblOnRoadDust	HaulingPercentPave	50.00	80.00
tblOnRoadDust	HaulingPercentPave	50.00	80.00
tblOnRoadDust	VendorPercentPave	50.00	80.00
tblOnRoadDust	VendorPercentPave	50.00	80.00
tblOnRoadDust	VendorPercentPave	50.00	80.00
tblOnRoadDust	WorkerPercentPave	50.00	80.00
tblOnRoadDust	WorkerPercentPave	50.00	80.00
tblOnRoadDust	WorkerPercentPave	50.00	80.00
tblTripsAndVMT	VendorTripNumber	286.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	24.00
tblTripsAndVMT	WorkerTripNumber	10.00	0.00
tblTripsAndVMT	WorkerTripNumber	732.00	24.00
tblTripsAndVMT	WorkerTripNumber	8.00	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	8.9706	87.7403	63.3113	0.1222	122.0922	4.2832	126.3754	12.2553	4.1352	16.3905	0.0000	11,868.4833	11,868.4833	2.0974	0.0000	11,920.9195
Maximum	**8.9706**	**87.7403**	**63.3113**	**0.1222**	**122.0922**	**4.2832**	**126.3754**	**12.2553**	**4.1352**	**16.3905**	**0.0000**	**11,868.4833**	**11,868.4833**	**2.0974**	**0.0000**	**11,920.9195**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	8.9706	87.7403	63.3113	0.1222	74.3936	4.2832	78.6767	7.4751	4.1352	11.6103	0.0000	11,868.4833	11,868.4833	2.0974	0.0000	11,920.9194
Maximum	**8.9706**	**87.7403**	**63.3113**	**0.1222**	**74.3936**	**4.2832**	**78.6767**	**7.4751**	**4.1352**	**11.6103**	**0.0000**	**11,868.4833**	**11,868.4833**	**2.0974**	**0.0000**	**11,920.9194**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**39.07**	**0.00**	**37.74**	**39.01**	**0.00**	**29.16**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Grading	Grading	10/1/2018	10/30/2018	5	22	
2	Building Construction	Building Construction	10/1/2018	12/31/2018	5	66	
3	Paving	Paving	10/1/2018	10/29/2018	5	21	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 44

Acres of Paving: 40

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Grading	Cranes	1	8.00	231	0.29
Grading	Excavators	1	8.00	158	0.38
Grading	Scrapers	2	8.00	367	0.48
Building Construction	Generator Sets	2	24.00	84	0.74
Building Construction	Graders	1	4.00	187	0.41
Building Construction	Off-Highway Trucks	1	4.00	402	0.38
Building Construction	Plate Compactors	1	8.00	8	0.43
Building Construction	Pumps	1	24.00	10	0.74
Paving	Cement and Mortar Mixers	1	8.00	9	0.56
Paving	Pumps	2	8.00	110	0.74

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Grading	4	0.00	0.00	0.00	7.30	8.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	6	24.00	2.00	0.00	7.30	8.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	3	0.00	24.00	0.00	7.30	8.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Grading - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.1210	0.0000	2.1210	0.2290	0.0000	0.2290			0.0000			0.0000
Off-Road	3.1537	38.2998	23.3710	0.0412		1.5639	1.5639		1.4388	1.4388		4,149.7807	4,149.7807	1.2919		4,182.0778
Total	**3.1537**	**38.2998**	**23.3710**	**0.0412**	**2.1210**	**1.5639**	**3.6849**	**0.2290**	**1.4388**	**1.6678**		**4,149.7807**	**4,149.7807**	**1.2919**		**4,182.0778**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.8272	0.0000	0.8272	0.0893	0.0000	0.0893			0.0000			0.0000
Off-Road	3.1537	38.2998	23.3710	0.0412		1.5639	1.5639		1.4388	1.4388	0.0000	4,149.780 7	4,149.7807	1.2919		4,182.077 8
Total	**3.1537**	**38.2998**	**23.3710**	**0.0412**	**0.8272**	**1.5639**	**2.3911**	**0.0893**	**1.4388**	**1.5281**	**0.0000**	**4,149.780 7**	**4,149.7807**	**1.2919**		**4,182.077 8**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.3 Building Construction - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.0189	34.5223	27.1536	0.0530		1.9499	1.9499		1.9285	1.9285		4,994.9749	4,994.9749	0.6115		5,010.2633
Total	**4.0189**	**34.5223**	**27.1536**	**0.0530**		**1.9499**	**1.9499**		**1.9285**	**1.9285**		**4,994.9749**	**4,994.9749**	**0.6115**		**5,010.2633**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0116	0.2685	0.0816	6.6000e-004	5.2533	2.3300e-003	5.2557	0.5270	2.2300e-003	0.5292		68.9749	68.9749	3.9600e-003		69.0740
Worker	0.1952	0.1251	1.4517	1.4700e-003	51.6778	9.8000e-004	51.6788	5.1755	9.0000e-004	5.1764		144.7803	144.7803	0.0138		145.1258
Total	**0.2069**	**0.3936**	**1.5333**	**2.1300e-003**	**56.9311**	**3.3100e-003**	**56.9344**	**5.7025**	**3.1300e-003**	**5.7056**		**213.7552**	**213.7552**	**0.0178**		**214.1997**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.0189	34.5223	27.1536	0.0530		1.9499	1.9499		1.9285	1.9285	0.0000	4,994.9749	4,994.9749	0.6115		5,010.2632
Total	**4.0189**	**34.5223**	**27.1536**	**0.0530**		**1.9499**	**1.9499**		**1.9285**	**1.9285**	**0.0000**	**4,994.9749**	**4,994.9749**	**0.6115**		**5,010.2632**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0116	0.2685	0.0816	6.6000e-004	3.2219	2.3300e-003	3.2242	0.3238	2.2300e-003	0.3261		68.9749	68.9749	3.9600e-003		69.0740
Worker	0.1952	0.1251	1.4517	1.4700e-003	31.6824	9.8000e-004	31.6834	3.1759	9.0000e-004	3.1768		144.7803	144.7803	0.0138		145.1258
Total	**0.2069**	**0.3936**	**1.5333**	**2.1300e-003**	**34.9042**	**3.3100e-003**	**34.9075**	**3.4998**	**3.1300e-003**	**3.5029**		**213.7552**	**213.7552**	**0.0178**		**214.1997**

3.4 Paving - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4513	11.3021	10.2746	0.0179		0.7381	0.7381		0.7381	0.7381		1,682.2735	1,682.2735	0.1287		1,685.4913
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.4513**	**11.3021**	**10.2746**	**0.0179**		**0.7381**	**0.7381**		**0.7381**	**0.7381**		**1,682.2735**	**1,682.2735**	**0.1287**		**1,685.4913**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1397	3.2225	0.9788	7.9200e-003	63.0401	0.0280	63.0681	6.3238	0.0267	6.3505		827.6989	827.6989	0.0475		828.8874
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.1397**	**3.2225**	**0.9788**	**7.9200e-003**	**63.0401**	**0.0280**	**63.0681**	**6.3238**	**0.0267**	**6.3505**		**827.6989**	**827.6989**	**0.0475**		**828.8874**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4513	11.3021	10.2746	0.0179		0.7381	0.7381		0.7381	0.7381	0.0000	1,682.2735	1,682.2735	0.1287		1,685.4913
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.4513**	**11.3021**	**10.2746**	**0.0179**		**0.7381**	**0.7381**		**0.7381**	**0.7381**	**0.0000**	**1,682.2735**	**1,682.2735**	**0.1287**		**1,685.4913**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1397	3.2225	0.9788	7.9200e-003	38.6621	0.0280	38.6901	3.8860	0.0267	3.9127		827.6989	827.6989	0.0475		828.8874
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.1397**	**3.2225**	**0.9788**	**7.9200e-003**	**38.6621**	**0.0280**	**38.6901**	**3.8860**	**0.0267**	**3.9127**		**827.6989**	**827.6989**	**0.0475**		**828.8874**

CalEEMod Version: CalEEMod.2016.3.2

Date: 6/6/2018 9:45 AM

IID EHR-Canal and Measurement Flume

Imperial County APCD Air District, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	40.00	Acre	40.00	1,742,400.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.4	**Precipitation Freq (Days)**	12
Climate Zone	15			**Operational Year**	2020
Utility Company	Imperial Irrigation District				
CO2 Intensity (lb/MWhr)	1270.9	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - East Highline Reservoir Project. Imperial County.

Land Use - Construction of canal and measurement flume

Construction Phase - Construction would occur May 2018 through July 2018.

Off-road Equipment - 15-month equipment

Off-road Equipment - 3-month equipment

Off-road Equipment - May equipment

Off-road Equipment - June equipment

Trips and VMT - 20 workers over entire duration

On-road Fugitive Dust - Hauling is all offroad.

Grading - Excavation, balanced onsite.

Construction Off-road Equipment Mitigation - Comply with ICAPCD fugitive dust control measures: water twice daily and limit vehicle speeds to 15 mph on unpaved roads.

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadMoistureContent	0	0.5
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	740.00	66.00
tblConstructionPhase	NumDays	75.00	22.00
tblConstructionPhase	NumDays	55.00	21.00
tblOffRoadEquipment	HorsePower	84.00	10.00
tblOffRoadEquipment	HorsePower	84.00	110.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	UsageHours	8.00	24.00
tblOnRoadDust	HaulingPercentPave	50.00	80.00
tblOnRoadDust	HaulingPercentPave	50.00	80.00
tblOnRoadDust	HaulingPercentPave	50.00	80.00
tblOnRoadDust	VendorPercentPave	50.00	80.00
tblOnRoadDust	VendorPercentPave	50.00	80.00
tblOnRoadDust	VendorPercentPave	50.00	80.00
tblOnRoadDust	WorkerPercentPave	50.00	80.00
tblOnRoadDust	WorkerPercentPave	50.00	80.00
tblOnRoadDust	WorkerPercentPave	50.00	80.00
tblTripsAndVMT	VendorTripNumber	286.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	24.00
tblTripsAndVMT	WorkerTripNumber	10.00	0.00
tblTripsAndVMT	WorkerTripNumber	732.00	24.00
tblTripsAndVMT	WorkerTripNumber	8.00	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	8.9360	87.8446	63.0780	0.1217	122.0922	4.2835	126.3758	12.2553	4.1356	16.3909	0.0000	11,813.3476	11,813.3476	2.1001	0.0000	11,865.8515
Maximum	**8.9360**	**87.8446**	**63.0780**	**0.1217**	**122.0922**	**4.2835**	**126.3758**	**12.2553**	**4.1356**	**16.3909**	**0.0000**	**11,813.3476**	**11,813.3476**	**2.1001**	**0.0000**	**11,865.8515**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	8.9360	87.8446	63.0780	0.1217	74.3936	4.2835	78.6771	7.4751	4.1356	11.6107	0.0000	11,813.3476	11,813.3476	2.1001	0.0000	11,865.8515
Maximum	**8.9360**	**87.8446**	**63.0780**	**0.1217**	**74.3936**	**4.2835**	**78.6771**	**7.4751**	**4.1356**	**11.6107**	**0.0000**	**11,813.3476**	**11,813.3476**	**2.1001**	**0.0000**	**11,865.8515**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**39.07**	**0.00**	**37.74**	**39.01**	**0.00**	**29.16**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Grading	Grading	10/1/2018	10/30/2018	5	22	
2	Building Construction	Building Construction	10/1/2018	12/31/2018	5	66	
3	Paving	Paving	10/1/2018	10/29/2018	5	21	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 44

Acres of Paving: 40

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Grading	Cranes	1	8.00	231	0.29
Grading	Excavators	1	8.00	158	0.38
Grading	Scrapers	2	8.00	367	0.48
Building Construction	Generator Sets	2	24.00	84	0.74
Building Construction	Graders	1	4.00	187	0.41
Building Construction	Off-Highway Trucks	1	4.00	402	0.38
Building Construction	Plate Compactors	1	8.00	8	0.43
Building Construction	Pumps	1	24.00	10	0.74
Paving	Cement and Mortar Mixers	1	8.00	9	0.56
Paving	Pumps	2	8.00	110	0.74

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Grading	4	0.00	0.00	0.00	7.30	8.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	6	24.00	2.00	0.00	7.30	8.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	3	0.00	24.00	0.00	7.30	8.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Grading - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.1210	0.0000	2.1210	0.2290	0.0000	0.2290			0.0000			0.0000
Off-Road	3.1537	38.2998	23.3710	0.0412		1.5639	1.5639		1.4388	1.4388		4,149.7807	4,149.7807	1.2919		4,182.0778
Total	**3.1537**	**38.2998**	**23.3710**	**0.0412**	**2.1210**	**1.5639**	**3.6849**	**0.2290**	**1.4388**	**1.6678**		**4,149.7807**	**4,149.7807**	**1.2919**		**4,182.0778**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.8272	0.0000	0.8272	0.0893	0.0000	0.0893			0.0000			0.0000
Off-Road	3.1537	38.2998	23.3710	0.0412		1.5639	1.5639		1.4388	1.4388	0.0000	4,149.7807	4,149.7807	1.2919		4,182.0778
Total	**3.1537**	**38.2998**	**23.3710**	**0.0412**	**0.8272**	**1.5639**	**2.3911**	**0.0893**	**1.4388**	**1.5281**	**0.0000**	**4,149.7807**	**4,149.7807**	**1.2919**		**4,182.0778**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.3 Building Construction - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.0189	34.5223	27.1536	0.0530		1.9499	1.9499		1.9285	1.9285		4,994.9749	4,994.9749	0.6115		5,010.2633
Total	**4.0189**	**34.5223**	**27.1536**	**0.0530**		**1.9499**	**1.9499**		**1.9285**	**1.9285**		**4,994.9749**	**4,994.9749**	**0.6115**		**5,010.2633**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0120	0.2761	0.0907	6.4000e-004	5.2533	2.3600e-003	5.2557	0.5270	2.2600e-003	0.5292		66.5258	66.5258	4.3700e-003		66.6352
Worker	0.1564	0.1316	1.0995	1.2300e-003	51.6778	9.8000e-004	51.6788	5.1755	9.0000e-004	5.1764		121.4830	121.4830	0.0112		121.7618
Total	**0.1683**	**0.4077**	**1.1902**	**1.8700e-003**	**56.9311**	**3.3400e-003**	**56.9345**	**5.7025**	**3.1600e-003**	**5.7056**		**188.0088**	**188.0088**	**0.0155**		**188.3970**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.0189	34.5223	27.1536	0.0530		1.9499	1.9499		1.9285	1.9285	0.0000	4,994.9749	4,994.9749	0.6115		5,010.2632
Total	**4.0189**	**34.5223**	**27.1536**	**0.0530**		**1.9499**	**1.9499**		**1.9285**	**1.9285**	**0.0000**	**4,994.9749**	**4,994.9749**	**0.6115**		**5,010.2632**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0120	0.2761	0.0907	6.4000e-004	3.2219	2.3600e-003	3.2242	0.3238	2.2600e-003	0.3261		66.5258	66.5258	4.3700e-003		66.6352
Worker	0.1564	0.1316	1.0995	1.2300e-003	31.6824	9.8000e-004	31.6834	3.1759	9.0000e-004	3.1768		121.4830	121.4830	0.0112		121.7618
Total	**0.1683**	**0.4077**	**1.1902**	**1.8700e-003**	**34.9042**	**3.3400e-003**	**34.9076**	**3.4998**	**3.1600e-003**	**3.5029**		**188.0088**	**188.0088**	**0.0155**		**188.3970**

3.4 Paving - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4513	11.3021	10.2746	0.0179		0.7381	0.7381		0.7381	0.7381		1,682.2735	1,682.2735	0.1287		1,685.4913
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.4513**	**11.3021**	**10.2746**	**0.0179**		**0.7381**	**0.7381**		**0.7381**	**0.7381**		**1,682.2735**	**1,682.2735**	**0.1287**		**1,685.4913**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1436	3.3127	1.0885	7.6400e-003	63.0401	0.0283	63.0684	6.3238	0.0271	6.3509		798.3096	798.3096	0.0525		799.6221
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.1436**	**3.3127**	**1.0885**	**7.6400e-003**	**63.0401**	**0.0283**	**63.0684**	**6.3238**	**0.0271**	**6.3509**		**798.3096**	**798.3096**	**0.0525**		**799.6221**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4513	11.3021	10.2746	0.0179		0.7381	0.7381		0.7381	0.7381	0.0000	1,682.2735	1,682.2735	0.1287		1,685.4913
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.4513**	**11.3021**	**10.2746**	**0.0179**		**0.7381**	**0.7381**		**0.7381**	**0.7381**	**0.0000**	**1,682.2735**	**1,682.2735**	**0.1287**		**1,685.4913**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1436	3.3127	1.0885	7.6400e-003	38.6621	0.0283	38.6904	3.8860	0.0271	3.9131		798.3096	798.3096	0.0525		799.6221
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.1436**	**3.3127**	**1.0885**	**7.6400e-003**	**38.6621**	**0.0283**	**38.6904**	**3.8860**	**0.0271**	**3.9131**		**798.3096**	**798.3096**	**0.0525**		**799.6221**

CalEEMod Version: CalEEMod.2016.3.2

Date: 6/6/2018 9:50 AM

IID EHR-Canal Tie-Ins
Imperial County APCD Air District, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	10.00	Acre	10.00	435,600.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	3.4	**Precipitation Freq (Days)**	12
Climate Zone	15			**Operational Year**	2020
Utility Company	Imperial Irrigation District				
CO2 Intensity (lb/MWhr)	1270.9	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - East Highline Reservoir Project. Imperial County.

Land Use - Construction of canal tie-ins structures

Construction Phase - Construction would occur from November 2018 through January 2019.

Off-road Equipment - July equipment

Off-road Equipment - August equipment

Off-road Equipment - June equipment

Trips and VMT - 20 workers over entire duration

On-road Fugitive Dust - Hauling is all offroad.

Grading - Excavation, balanced onsite.

Construction Off-road Equipment Mitigation - Comply with ICAPCD fugitive dust control measures: water three times daily and limit vehicle speeds to 15 mph on unpaved roads.

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadMoistureContent	0	0.5
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	20.00	22.00
tblConstructionPhase	NumDays	20.00	22.00
tblConstructionPhase	NumDays	10.00	21.00
tblOffRoadEquipment	HorsePower	402.00	250.00
tblOffRoadEquipment	HorsePower	84.00	10.00
tblOffRoadEquipment	HorsePower	84.00	110.00
tblOffRoadEquipment	HorsePower	84.00	10.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	PhaseName		Site Preparation
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Paving
tblOffRoadEquipment	PhaseName		Paving
tblOffRoadEquipment	PhaseName		Paving
tblOffRoadEquipment	PhaseName		Paving
tblOffRoadEquipment	PhaseName		Paving
tblOnRoadDust	HaulingPercentPave	50.00	80.00
tblOnRoadDust	HaulingPercentPave	50.00	80.00
tblOnRoadDust	HaulingPercentPave	50.00	80.00
tblOnRoadDust	VendorPercentPave	50.00	80.00
tblOnRoadDust	VendorPercentPave	50.00	80.00
tblOnRoadDust	VendorPercentPave	50.00	80.00
tblOnRoadDust	WorkerPercentPave	50.00	80.00
tblOnRoadDust	WorkerPercentPave	50.00	80.00
tblOnRoadDust	WorkerPercentPave	50.00	80.00
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	4.00
tblTripsAndVMT	WorkerTripNumber	5.00	24.00
tblTripsAndVMT	WorkerTripNumber	13.00	24.00
tblTripsAndVMT	WorkerTripNumber	13.00	24.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2018	0.0402	0.3346	0.2861	5.8000e-004	1.5728	0.0173	1.5902	0.1576	0.0167	0.1743	0.0000	50.9216	50.9216	9.9000e-003	0.0000	51.1691
2019	0.0332	0.2783	0.2385	4.5000e-004	0.9177	0.0150	0.9326	0.0919	0.0147	0.1067	0.0000	38.6461	38.6461	4.0700e-003	0.0000	38.7479
Maximum	**0.0402**	**0.3346**	**0.2861**	**5.8000e-004**	**1.5728**	**0.0173**	**1.5902**	**0.1576**	**0.0167**	**0.1743**	**0.0000**	**50.9216**	**50.9216**	**9.9000e-003**	**0.0000**	**51.1691**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2018	0.0402	0.3346	0.2861	5.8000e-004	0.9643	0.0173	0.9816	0.0967	0.0167	0.1134	0.0000	50.9215	50.9215	9.9000e-003	0.0000	51.1691
2019	0.0332	0.2783	0.2385	4.5000e-004	0.5627	0.0150	0.5776	0.0564	0.0147	0.0712	0.0000	38.6461	38.6461	4.0700e-003	0.0000	38.7478
Maximum	**0.0402**	**0.3346**	**0.2861**	**5.8000e-004**	**0.9643**	**0.0173**	**0.9816**	**0.0967**	**0.0167**	**0.1134**	**0.0000**	**50.9215**	**50.9215**	**9.9000e-003**	**0.0000**	**51.1691**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**38.69**	**0.00**	**38.19**	**38.62**	**0.00**	**34.30**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	11/1/2018	11/29/2018	5	21	
2	Grading	Grading	11/30/2018	12/31/2018	5	22	
3	Paving	Paving	1/1/2019	1/30/2019	5	22	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 10

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Off-Highway Trucks	1	8.00	250	0.38
Site Preparation	Rubber Tired Dozers	0	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Grading	Bore/Drill Rigs	1	8.00	221	0.50
Grading	Excavators	1	8.00	158	0.38
Grading	Generator Sets	1	24.00	84	0.74
Grading	Graders	0	8.00	187	0.41
Grading	Plate Compactors	1	8.00	8	0.43
Grading	Pumps	1	24.00	10	0.74
Grading	Rubber Tired Dozers	0	8.00	247	0.40
Grading	Scrapers	0	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Paving	Cement and Mortar Mixers	1	8.00	9	0.56
Paving	Cranes	1	8.00	231	0.29

Paving	Generator Sets	1	24.00	84	0.74
Paving	Pavers	0	8.00	130	0.42
Paving	Paving Equipment	0	8.00	132	0.36
Paving	Pumps	1	8.00	110	0.74
Paving	Pumps	1	24.00	10	0.74
Paving	Rollers	0	8.00	80	0.38

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	2	24.00	2.00	0.00	10.20	11.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	5	24.00	0.00	0.00	10.20	11.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	5	24.00	4.00	0.00	10.20	11.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Site Preparation - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	8.7900e-003	0.0883	0.0517	1.2000e-004		4.4400e-003	4.4400e-003		4.0900e-003	4.0900e-003	0.0000	10.7620	10.7620	3.3500e-003	0.0000	10.8458
Total	**8.7900e-003**	**0.0883**	**0.0517**	**1.2000e-004**	**0.0000**	**4.4400e-003**	**4.4400e-003**	**0.0000**	**4.0900e-003**	**4.0900e-003**	**0.0000**	**10.7620**	**10.7620**	**3.3500e-003**	**0.0000**	**10.8458**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.4000e-004	3.3600e-003	1.0100e-003	1.0000e-005	0.0713	3.0000e-005	0.0714	7.1600e-003	3.0000e-005	7.1900e-003	0.0000	0.8064	0.8064	4.0000e-005	0.0000	0.8074
Worker	2.1100e-003	1.8100e-003	0.0161	2.0000e-005	0.7333	1.0000e-005	0.7333	0.0735	1.0000e-005	0.0735	0.0000	1.7231	1.7231	1.5000e-004	0.0000	1.7269
Total	**2.2500e-003**	**5.1700e-003**	**0.0171**	**3.0000e-005**	**0.8046**	**4.0000e-005**	**0.8047**	**0.0806**	**4.0000e-005**	**0.0807**	**0.0000**	**2.5294**	**2.5294**	**1.9000e-004**	**0.0000**	**2.5343**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	8.7900e-003	0.0883	0.0517	1.2000e-004		4.4400e-003	4.4400e-003		4.0900e-003	4.0900e-003	0.0000	10.7620	10.7620	3.3500e-003	0.0000	10.8457
Total	**8.7900e-003**	**0.0883**	**0.0517**	**1.2000e-004**	**0.0000**	**4.4400e-003**	**4.4400e-003**	**0.0000**	**4.0900e-003**	**4.0900e-003**	**0.0000**	**10.7620**	**10.7620**	**3.3500e-003**	**0.0000**	**10.8457**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.4000e-004	3.3600e-003	1.0100e-003	1.0000e-005	0.0438	3.0000e-005	0.0438	4.4000e-003	3.0000e-005	4.4300e-003	0.0000	0.8064	0.8064	4.0000e-005	0.0000	0.8074
Worker	2.1100e-003	1.8100e-003	0.0161	2.0000e-005	0.4496	1.0000e-005	0.4496	0.0451	1.0000e-005	0.0451	0.0000	1.7231	1.7231	1.5000e-004	0.0000	1.7269
Total	**2.2500e-003**	**5.1700e-003**	**0.0171**	**3.0000e-005**	**0.4933**	**4.0000e-005**	**0.4934**	**0.0495**	**4.0000e-005**	**0.0495**	**0.0000**	**2.5294**	**2.5294**	**1.9000e-004**	**0.0000**	**2.5343**

3.3 Grading - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0269	0.2392	0.2004	4.2000e-004		0.0128	0.0128		0.0126	0.0126	0.0000	35.8251	35.8251	6.2000e-003	0.0000	35.9800
Total	**0.0269**	**0.2392**	**0.2004**	**4.2000e-004**	**0.0000**	**0.0128**	**0.0128**	**0.0000**	**0.0126**	**0.0126**	**0.0000**	**35.8251**	**35.8251**	**6.2000e-003**	**0.0000**	**35.9800**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.2100e-003	1.9000e-003	0.0169	2.0000e-005	0.7682	1.0000e-005	0.7682	0.0769	1.0000e-005	0.0770	0.0000	1.8051	1.8051	1.6000e-004	0.0000	1.8091
Total	**2.2100e-003**	**1.9000e-003**	**0.0169**	**2.0000e-005**	**0.7682**	**1.0000e-005**	**0.7682**	**0.0769**	**1.0000e-005**	**0.0770**	**0.0000**	**1.8051**	**1.8051**	**1.6000e-004**	**0.0000**	**1.8091**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0269	0.2392	0.2004	4.2000e-004		0.0128	0.0128		0.0126	0.0126	0.0000	35.8250	35.8250	6.2000e-003	0.0000	35.9800
Total	**0.0269**	**0.2392**	**0.2004**	**4.2000e-004**	**0.0000**	**0.0128**	**0.0128**	**0.0000**	**0.0126**	**0.0126**	**0.0000**	**35.8250**	**35.8250**	**6.2000e-003**	**0.0000**	**35.9800**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.2100e-003	1.9000e-003	0.0169	2.0000e-005	0.4710	1.0000e-005	0.4710	0.0472	1.0000e-005	0.0472	0.0000	1.8051	1.8051	1.6000e-004	0.0000	1.8091
Total	**2.2100e-003**	**1.9000e-003**	**0.0169**	**2.0000e-005**	**0.4710**	**1.0000e-005**	**0.4710**	**0.0472**	**1.0000e-005**	**0.0472**	**0.0000**	**1.8051**	**1.8051**	**1.6000e-004**	**0.0000**	**1.8091**

3.4 Paving - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0308	0.2700	0.2213	4.2000e-004		0.0149	0.0149		0.0147	0.0147	0.0000	35.2182	35.2182	3.8400e-003	0.0000	35.3143
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0308**	**0.2700**	**0.2213**	**4.2000e-004**		**0.0149**	**0.0149**		**0.0147**	**0.0147**	**0.0000**	**35.2182**	**35.2182**	**3.8400e-003**	**0.0000**	**35.3143**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.7000e-004	6.4900e-003	1.8600e-003	2.0000e-005	0.1495	6.0000e-005	0.1495	0.0150	6.0000e-005	0.0151	0.0000	1.6784	1.6784	8.0000e-005	0.0000	1.6804
Worker	2.0400e-003	1.7200e-003	0.0154	2.0000e-005	0.7682	1.0000e-005	0.7682	0.0769	1.0000e-005	0.0770	0.0000	1.7495	1.7495	1.5000e-004	0.0000	1.7531
Total	**2.3100e-003**	**8.2100e-003**	**0.0172**	**4.0000e-005**	**0.9177**	**7.0000e-005**	**0.9177**	**0.0919**	**7.0000e-005**	**0.0920**	**0.0000**	**3.4279**	**3.4279**	**2.3000e-004**	**0.0000**	**3.4336**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0308	0.2700	0.2213	4.2000e-004		0.0149	0.0149		0.0147	0.0147	0.0000	35.2182	35.2182	3.8400e-003	0.0000	35.3143
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0308**	**0.2700**	**0.2213**	**4.2000e-004**		**0.0149**	**0.0149**		**0.0147**	**0.0147**	**0.0000**	**35.2182**	**35.2182**	**3.8400e-003**	**0.0000**	**35.3143**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.7000e-004	6.4900e-003	1.8600e-003	2.0000e-005	0.0917	6.0000e-005	0.0917	9.2200e-003	6.0000e-005	9.2700e-003	0.0000	1.6784	1.6784	8.0000e-005	0.0000	1.6804
Worker	2.0400e-003	1.7200e-003	0.0154	2.0000e-005	0.4710	1.0000e-005	0.4710	0.0472	1.0000e-005	0.0472	0.0000	1.7495	1.7495	1.5000e-004	0.0000	1.7531
Total	**2.3100e-003**	**8.2100e-003**	**0.0172**	**4.0000e-005**	**0.5627**	**7.0000e-005**	**0.5627**	**0.0564**	**7.0000e-005**	**0.0565**	**0.0000**	**3.4279**	**3.4279**	**2.3000e-004**	**0.0000**	**3.4336**

CalEEMod Version: CalEEMod.2016.3.2

Date: 6/6/2018 9:51 AM

IID EHR-Canal Tie-Ins
Imperial County APCD Air District, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	10.00	Acre	10.00	435,600.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	3.4	**Precipitation Freq (Days)**	12
Climate Zone	15			**Operational Year**	2020
Utility Company	Imperial Irrigation District				
CO2 Intensity (lb/MWhr)	1270.9	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - East Highline Reservoir Project. Imperial County.

Land Use - Construction of canal tie-ins structures

Construction Phase - Construction would occur from November 2018 through January 2019.

Off-road Equipment - July equipment

Off-road Equipment - August equipment

Off-road Equipment - June equipment

Trips and VMT - 20 workers over entire duration

On-road Fugitive Dust - Hauling is all offroad.

Grading - Excavation, balanced onsite.

Construction Off-road Equipment Mitigation - Comply with ICAPCD fugitive dust control measures: water three times daily and limit vehicle speeds to 15 mph on unpaved roads.

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadMoistureContent	0	0.5
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	20.00	22.00
tblConstructionPhase	NumDays	20.00	22.00
tblConstructionPhase	NumDays	10.00	21.00
tblOffRoadEquipment	HorsePower	402.00	250.00
tblOffRoadEquipment	HorsePower	84.00	10.00
tblOffRoadEquipment	HorsePower	84.00	110.00
tblOffRoadEquipment	HorsePower	84.00	10.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	PhaseName		Site Preparation
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Paving
tblOffRoadEquipment	PhaseName		Paving
tblOffRoadEquipment	PhaseName		Paving
tblOffRoadEquipment	PhaseName		Paving
tblOffRoadEquipment	PhaseName		Paving
tblOnRoadDust	HaulingPercentPave	50.00	80.00
tblOnRoadDust	HaulingPercentPave	50.00	80.00
tblOnRoadDust	HaulingPercentPave	50.00	80.00
tblOnRoadDust	VendorPercentPave	50.00	80.00
tblOnRoadDust	VendorPercentPave	50.00	80.00
tblOnRoadDust	VendorPercentPave	50.00	80.00
tblOnRoadDust	WorkerPercentPave	50.00	80.00
tblOnRoadDust	WorkerPercentPave	50.00	80.00
tblOnRoadDust	WorkerPercentPave	50.00	80.00
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	4.00
tblTripsAndVMT	WorkerTripNumber	5.00	24.00
tblTripsAndVMT	WorkerTripNumber	13.00	24.00
tblTripsAndVMT	WorkerTripNumber	13.00	24.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	2.6837	21.9142	20.1192	0.0399	79.2313	1.1661	79.6587	7.9361	1.1445	8.3759	0.0000	3,790.0168	3,790.0168	0.6398	0.0000	3,806.0109
2019	3.0464	25.2669	22.0115	0.0416	86.2555	1.3589	87.6144	8.6407	1.3382	9.9789	0.0000	3,893.3161	3,893.3161	0.4101	0.0000	3,903.5673
Maximum	**3.0464**	**25.2669**	**22.0115**	**0.0416**	**86.2555**	**1.3589**	**87.6144**	**8.6407**	**1.3382**	**9.9789**	**0.0000**	**3,893.3161**	**3,893.3161**	**0.6398**	**0.0000**	**3,903.5673**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	2.6837	21.9142	20.1192	0.0399	48.5763	1.1661	49.0036	4.8706	1.1445	5.5821	0.0000	3,790.0168	3,790.0168	0.6398	0.0000	3,806.0109
2019	3.0464	25.2669	22.0115	0.0416	52.8841	1.3589	54.2431	5.3035	1.3382	6.6418	0.0000	3,893.3161	3,893.3161	0.4101	0.0000	3,903.5673
Maximum	**3.0464**	**25.2669**	**22.0115**	**0.0416**	**52.8841**	**1.3589**	**54.2431**	**5.3035**	**1.3382**	**6.6418**	**0.0000**	**3,893.3161**	**3,893.3161**	**0.6398**	**0.0000**	**3,903.5673**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**38.69**	**0.00**	**38.28**	**38.62**	**0.00**	**33.40**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	11/1/2018	11/29/2018	5	21	
2	Grading	Grading	11/30/2018	12/31/2018	5	22	
3	Paving	Paving	1/1/2019	1/30/2019	5	22	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 10

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Off-Highway Trucks	1	8.00	250	0.38
Site Preparation	Rubber Tired Dozers	0	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Grading	Bore/Drill Rigs	1	8.00	221	0.50
Grading	Excavators	1	8.00	158	0.38
Grading	Generator Sets	1	24.00	84	0.74
Grading	Graders	0	8.00	187	0.41
Grading	Plate Compactors	1	8.00	8	0.43
Grading	Pumps	1	24.00	10	0.74
Grading	Rubber Tired Dozers	0	8.00	247	0.40
Grading	Scrapers	0	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Paving	Cement and Mortar Mixers	1	8.00	9	0.56
Paving	Cranes	1	8.00	231	0.29

Paving	Generator Sets	1	24.00	84	0.74
Paving	Pavers	0	8.00	130	0.42
Paving	Paving Equipment	0	8.00	132	0.36
Paving	Pumps	1	8.00	110	0.74
Paving	Pumps	1	24.00	10	0.74
Paving	Rollers	0	8.00	80	0.38

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	2	24.00	2.00	0.00	10.20	11.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	5	24.00	0.00	0.00	10.20	11.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	5	24.00	4.00	0.00	10.20	11.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Site Preparation - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.8369	8.4114	4.9225	0.0112		0.4230	0.4230		0.3892	0.3892		1,129.8153	1,129.8153	0.3517		1,138.6085
Total	**0.8369**	**8.4114**	**4.9225**	**0.0112**	**0.0000**	**0.4230**	**0.4230**	**0.0000**	**0.3892**	**0.3892**		**1,129.8153**	**1,129.8153**	**0.3517**		**1,138.6085**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0137	0.3067	0.0937	8.2000e-004	7.0241	3.0800e-003	7.0272	0.7046	2.9400e-003	0.7076		85.6830	85.6830	4.1300e-003		85.7862
Worker	0.2371	0.1662	1.8979	2.0300e-003	72.2072	1.2900e-003	72.2085	7.2315	1.1900e-003	7.2327		199.9828	199.9828	0.0186		200.4472
Total	**0.2508**	**0.4729**	**1.9917**	**2.8500e-003**	**79.2313**	**4.3700e-003**	**79.2357**	**7.9361**	**4.1300e-003**	**7.9402**		**285.6658**	**285.6658**	**0.0227**		**286.2335**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.8369	8.4114	4.9225	0.0112		0.4230	0.4230		0.3892	0.3892	0.0000	1,129.8153	1,129.8153	0.3517		1,138.6085
Total	**0.8369**	**8.4114**	**4.9225**	**0.0112**	**0.0000**	**0.4230**	**0.4230**	**0.0000**	**0.3892**	**0.3892**	**0.0000**	**1,129.8153**	**1,129.8153**	**0.3517**		**1,138.6085**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0137	0.3067	0.0937	8.2000e-004	4.3078	3.0800e-003	4.3109	0.4330	2.9400e-003	0.4359		85.6830	85.6830	4.1300e-003		85.7862
Worker	0.2371	0.1662	1.8979	2.0300e-003	44.2684	1.2900e-003	44.2697	4.4376	1.1900e-003	4.4388		199.9828	199.9828	0.0186		200.4472
Total	**0.2508**	**0.4729**	**1.9917**	**2.8500e-003**	**48.5763**	**4.3700e-003**	**48.5806**	**4.8706**	**4.1300e-003**	**4.8747**		**285.6658**	**285.6658**	**0.0227**		**286.2335**

3.3 Grading - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	2.4466	21.7479	18.2212	0.0379		1.1648	1.1648		1.1433	1.1433		3,590.0340	3,590.0340	0.6212		3,605.5636
Total	**2.4466**	**21.7479**	**18.2212**	**0.0379**	**0.0000**	**1.1648**	**1.1648**	**0.0000**	**1.1433**	**1.1433**		**3,590.0340**	**3,590.0340**	**0.6212**		**3,605.5636**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2371	0.1662	1.8979	2.0300e-003	72.2072	1.2900e-003	72.2085	7.2315	1.1900e-003	7.2327		199.9828	199.9828	0.0186		200.4472
Total	**0.2371**	**0.1662**	**1.8979**	**2.0300e-003**	**72.2072**	**1.2900e-003**	**72.2085**	**7.2315**	**1.1900e-003**	**7.2327**		**199.9828**	**199.9828**	**0.0186**		**200.4472**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	2.4466	21.7479	18.2212	0.0379		1.1648	1.1648		1.1433	1.1433	0.0000	3,590.0340	3,590.0340	0.6212		3,605.5636
Total	**2.4466**	**21.7479**	**18.2212**	**0.0379**	**0.0000**	**1.1648**	**1.1648**	**0.0000**	**1.1433**	**1.1433**	**0.0000**	**3,590.0340**	**3,590.0340**	**0.6212**		**3,605.5636**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2371	0.1662	1.8979	2.0300e-003	44.2684	1.2900e-003	44.2697	4.4376	1.1900e-003	4.4388		199.9828	199.9828	0.0186		200.4472
Total	**0.2371**	**0.1662**	**1.8979**	**2.0300e-003**	**44.2684**	**1.2900e-003**	**44.2697**	**4.4376**	**1.1900e-003**	**4.4388**		**199.9828**	**199.9828**	**0.0186**		**200.4472**

3.4 Paving - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.8036	24.5488	20.1169	0.0380		1.3525	1.3525		1.3321	1.3321		3,529.2220	3,529.2220	0.3852		3,538.8509
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.8036**	**24.5488**	**20.1169**	**0.0380**		**1.3525**	**1.3525**		**1.3321**	**1.3321**		**3,529.2220**	**3,529.2220**	**0.3852**		**3,538.8509**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0242	0.5674	0.1620	1.6300e-003	14.0482	5.2400e-003	14.0535	1.4092	5.0100e-003	1.4142		170.2416	170.2416	7.8600e-003		170.4382
Worker	0.2186	0.1507	1.7326	1.9600e-003	72.2072	1.2500e-003	72.2085	7.2315	1.1500e-003	7.2326		193.8526	193.8526	0.0170		194.2782
Total	**0.2428**	**0.7181**	**1.8946**	**3.5900e-003**	**86.2555**	**6.4900e-003**	**86.2619**	**8.6407**	**6.1600e-003**	**8.6468**		**364.0942**	**364.0942**	**0.0249**		**364.7164**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.8036	24.5488	20.1169	0.0380		1.3525	1.3525		1.3321	1.3321	0.0000	3,529.2219	3,529.2219	0.3852		3,538.8509
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.8036**	**24.5488**	**20.1169**	**0.0380**		**1.3525**	**1.3525**		**1.3321**	**1.3321**	**0.0000**	**3,529.2219**	**3,529.2219**	**0.3852**		**3,538.8509**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0242	0.5674	0.1620	1.6300e-003	8.6157	5.2400e-003	8.6209	0.8660	5.0100e-003	0.8710		170.2416	170.2416	7.8600e-003		170.4382
Worker	0.2186	0.1507	1.7326	1.9600e-003	44.2684	1.2500e-003	44.2697	4.4376	1.1500e-003	4.4387		193.8526	193.8526	0.0170		194.2782
Total	**0.2428**	**0.7181**	**1.8946**	**3.5900e-003**	**52.8841**	**6.4900e-003**	**52.8906**	**5.3035**	**6.1600e-003**	**5.3097**		**364.0942**	**364.0942**	**0.0249**		**364.7164**

CalEEMod Version: CalEEMod.2016.3.2

Date: 6/6/2018 9:52 AM

IID EHR-Canal Tie-Ins

Imperial County APCD Air District, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	10.00	Acre	10.00	435,600.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	3.4	**Precipitation Freq (Days)**	12
Climate Zone	15			**Operational Year**	2020
Utility Company	Imperial Irrigation District				
CO2 Intensity (lb/MWhr)	1270.9	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - East Highline Reservoir Project. Imperial County.

Land Use - Construction of canal tie-ins structures

Construction Phase - Construction would occur from November 2018 through January 2019.

Off-road Equipment - July equipment

Off-road Equipment - August equipment

Off-road Equipment - June equipment

Trips and VMT - 20 workers over entire duration

On-road Fugitive Dust - Hauling is all offroad.

Grading - Excavation, balanced onsite.

Construction Off-road Equipment Mitigation - Comply with ICAPCD fugitive dust control measures: water three times daily and limit vehicle speeds to 15 mph on unpaved roads.

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadMoistureContent	0	0.5
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	20.00	22.00
tblConstructionPhase	NumDays	20.00	22.00
tblConstructionPhase	NumDays	10.00	21.00
tblOffRoadEquipment	HorsePower	402.00	250.00
tblOffRoadEquipment	HorsePower	84.00	10.00
tblOffRoadEquipment	HorsePower	84.00	110.00
tblOffRoadEquipment	HorsePower	84.00	10.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	PhaseName		Site Preparation
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Paving
tblOffRoadEquipment	PhaseName		Paving
tblOffRoadEquipment	PhaseName		Paving
tblOffRoadEquipment	PhaseName		Paving
tblOffRoadEquipment	PhaseName		Paving
tblOnRoadDust	HaulingPercentPave	50.00	80.00
tblOnRoadDust	HaulingPercentPave	50.00	80.00
tblOnRoadDust	HaulingPercentPave	50.00	80.00
tblOnRoadDust	VendorPercentPave	50.00	80.00
tblOnRoadDust	VendorPercentPave	50.00	80.00
tblOnRoadDust	VendorPercentPave	50.00	80.00
tblOnRoadDust	WorkerPercentPave	50.00	80.00
tblOnRoadDust	WorkerPercentPave	50.00	80.00
tblOnRoadDust	WorkerPercentPave	50.00	80.00
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	4.00
tblTripsAndVMT	WorkerTripNumber	5.00	24.00
tblTripsAndVMT	WorkerTripNumber	13.00	24.00
tblTripsAndVMT	WorkerTripNumber	13.00	24.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	2.6437	21.9233	19.6120	0.0396	79.2313	1.1661	79.6587	7.9361	1.1445	8.3759	0.0000	3,757.5895	3,757.5895	0.6359	0.0000	3,773.4865
2019	3.0105	25.2949	21.5633	0.0412	86.2555	1.3590	87.6144	8.6407	1.3383	9.9790	0.0000	3,856.9592	3,856.9592	0.4073	0.0000	3,867.1414
Maximum	**3.0105**	**25.2949**	**21.5633**	**0.0412**	**86.2555**	**1.3590**	**87.6144**	**8.6407**	**1.3383**	**9.9790**	**0.0000**	**3,856.9592**	**3,856.9592**	**0.6359**	**0.0000**	**3,867.1414**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	2.6437	21.9233	19.6120	0.0396	48.5763	1.1661	49.0037	4.8706	1.1445	5.5821	0.0000	3,757.5895	3,757.5895	0.6359	0.0000	3,773.4865
2019	3.0105	25.2949	21.5633	0.0412	52.8841	1.3590	54.2431	5.3035	1.3383	6.6418	0.0000	3,856.9592	3,856.9592	0.4073	0.0000	3,867.1414
Maximum	**3.0105**	**25.2949**	**21.5633**	**0.0412**	**52.8841**	**1.3590**	**54.2431**	**5.3035**	**1.3383**	**6.6418**	**0.0000**	**3,856.9592**	**3,856.9592**	**0.6359**	**0.0000**	**3,867.1414**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**38.69**	**0.00**	**38.28**	**38.62**	**0.00**	**33.40**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	11/1/2018	11/29/2018	5	21	
2	Grading	Grading	11/30/2018	12/31/2018	5	22	
3	Paving	Paving	1/1/2019	1/30/2019	5	22	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 10

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Off-Highway Trucks	1	8.00	250	0.38
Site Preparation	Rubber Tired Dozers	0	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Grading	Bore/Drill Rigs	1	8.00	221	0.50
Grading	Excavators	1	8.00	158	0.38
Grading	Generator Sets	1	24.00	84	0.74
Grading	Graders	0	8.00	187	0.41
Grading	Plate Compactors	1	8.00	8	0.43
Grading	Pumps	1	24.00	10	0.74
Grading	Rubber Tired Dozers	0	8.00	247	0.40
Grading	Scrapers	0	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Paving	Cement and Mortar Mixers	1	8.00	9	0.56
Paving	Cranes	1	8.00	231	0.29

Paving	Generator Sets	1	24.00	84	0.74
Paving	Pavers	0	8.00	130	0.42
Paving	Paving Equipment	0	8.00	132	0.36
Paving	Pumps	1	8.00	110	0.74
Paving	Pumps	1	24.00	10	0.74
Paving	Rollers	0	8.00	80	0.38

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	2	24.00	2.00	0.00	10.20	11.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	5	24.00	0.00	0.00	10.20	11.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	5	24.00	4.00	0.00	10.20	11.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Site Preparation - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.8369	8.4114	4.9225	0.0112		0.4230	0.4230		0.3892	0.3892		1,129.8153	1,129.8153	0.3517		1,138.6085
Total	**0.8369**	**8.4114**	**4.9225**	**0.0112**	**0.0000**	**0.4230**	**0.4230**	**0.0000**	**0.3892**	**0.3892**		**1,129.8153**	**1,129.8153**	**0.3517**		**1,138.6085**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0140	0.3186	0.1025	8.0000e-004	7.0241	3.1000e-003	7.0272	0.7046	2.9700e-003	0.7076		83.2339	83.2339	4.5400e-003		83.3473
Worker	0.1972	0.1754	1.3908	1.7000e-003	72.2072	1.2900e-003	72.2085	7.2315	1.1900e-003	7.2327		167.5555	167.5555	0.0147		167.9229
Total	**0.2112**	**0.4940**	**1.4933**	**2.5000e-003**	**79.2313**	**4.3900e-003**	**79.2357**	**7.9361**	**4.1600e-003**	**7.9402**		**250.7894**	**250.7894**	**0.0192**		**251.2702**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.8369	8.4114	4.9225	0.0112		0.4230	0.4230		0.3892	0.3892	0.0000	1,129.815 3	1,129.8153	0.3517		1,138.608 5
Total	**0.8369**	**8.4114**	**4.9225**	**0.0112**	**0.0000**	**0.4230**	**0.4230**	**0.0000**	**0.3892**	**0.3892**	**0.0000**	**1,129.815 3**	**1,129.8153**	**0.3517**		**1,138.608 5**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0140	0.3186	0.1025	8.0000e-004	4.3078	3.1000e-003	4.3110	0.4330	2.9700e-003	0.4360		83.2339	83.2339	4.5400e-003		83.3473
Worker	0.1972	0.1754	1.3908	1.7000e-003	44.2684	1.2900e-003	44.2697	4.4376	1.1900e-003	4.4388		167.5555	167.5555	0.0147		167.9229
Total	**0.2112**	**0.4940**	**1.4933**	**2.5000e-003**	**48.5763**	**4.3900e-003**	**48.5807**	**4.8706**	**4.1600e-003**	**4.8747**		**250.7894**	**250.7894**	**0.0192**		**251.2702**

3.3 Grading - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	2.4466	21.7479	18.2212	0.0379		1.1648	1.1648		1.1433	1.1433		3,590.0340	3,590.0340	0.6212		3,605.5636
Total	**2.4466**	**21.7479**	**18.2212**	**0.0379**	**0.0000**	**1.1648**	**1.1648**	**0.0000**	**1.1433**	**1.1433**		**3,590.0340**	**3,590.0340**	**0.6212**		**3,605.5636**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1972	0.1754	1.3908	1.7000e-003	72.2072	1.2900e-003	72.2085	7.2315	1.1900e-003	7.2327		167.5555	167.5555	0.0147		167.9229
Total	**0.1972**	**0.1754**	**1.3908**	**1.7000e-003**	**72.2072**	**1.2900e-003**	**72.2085**	**7.2315**	**1.1900e-003**	**7.2327**		**167.5555**	**167.5555**	**0.0147**		**167.9229**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	2.4466	21.7479	18.2212	0.0379		1.1648	1.1648		1.1433	1.1433	0.0000	3,590.0340	3,590.0340	0.6212		3,605.5636
Total	**2.4466**	**21.7479**	**18.2212**	**0.0379**	**0.0000**	**1.1648**	**1.1648**	**0.0000**	**1.1433**	**1.1433**	**0.0000**	**3,590.0340**	**3,590.0340**	**0.6212**		**3,605.5636**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1972	0.1754	1.3908	1.7000e-003	44.2684	1.2900e-003	44.2697	4.4376	1.1900e-003	4.4388		167.5555	167.5555	0.0147		167.9229
Total	**0.1972**	**0.1754**	**1.3908**	**1.7000e-003**	**44.2684**	**1.2900e-003**	**44.2697**	**4.4376**	**1.1900e-003**	**4.4388**		**167.5555**	**167.5555**	**0.0147**		**167.9229**

3.4 Paving - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.8036	24.5488	20.1169	0.0380		1.3525	1.3525		1.3321	1.3321		3,529.2220	3,529.2220	0.3852		3,538.8509
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.8036**	**24.5488**	**20.1169**	**0.0380**		**1.3525**	**1.3525**		**1.3321**	**1.3321**		**3,529.2220**	**3,529.2220**	**0.3852**		**3,538.8509**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0249	0.5874	0.1799	1.5800e-003	14.0482	5.2900e-003	14.0535	1.4092	5.0600e-003	1.4143		165.3625	165.3625	8.6800e-003		165.5795
Worker	0.1820	0.1587	1.2665	1.6400e-003	72.2072	1.2500e-003	72.2085	7.2315	1.1500e-003	7.2326		162.3747	162.3747	0.0135		162.7109
Total	**0.2069**	**0.7461**	**1.4464**	**3.2200e-003**	**86.2555**	**6.5400e-003**	**86.2620**	**8.6407**	**6.2100e-003**	**8.6469**		**327.7373**	**327.7373**	**0.0221**		**328.2905**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.8036	24.5488	20.1169	0.0380		1.3525	1.3525		1.3321	1.3321	0.0000	3,529.2219	3,529.2219	0.3852		3,538.8509
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.8036**	**24.5488**	**20.1169**	**0.0380**		**1.3525**	**1.3525**		**1.3321**	**1.3321**	**0.0000**	**3,529.2219**	**3,529.2219**	**0.3852**		**3,538.8509**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0249	0.5874	0.1799	1.5800e-003	8.6157	5.2900e-003	8.6210	0.8660	5.0600e-003	0.8710		165.3625	165.3625	8.6800e-003		165.5795
Worker	0.1820	0.1587	1.2665	1.6400e-003	44.2684	1.2500e-003	44.2697	4.4376	1.1500e-003	4.4387		162.3747	162.3747	0.0135		162.7109
Total	**0.2069**	**0.7461**	**1.4464**	**3.2200e-003**	**52.8841**	**6.5400e-003**	**52.8907**	**5.3035**	**6.2100e-003**	**5.3098**		**327.7373**	**327.7373**	**0.0221**		**328.2905**

CalEEMod Version: CalEEMod.2016.3.2

Date: 6/6/2018 9:58 AM

IID EHR-Structures

Imperial County APCD Air District, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	10.00	Acre	10.00	435,600.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.4	**Precipitation Freq (Days)**	12
Climate Zone	15			**Operational Year**	2020
Utility Company	Imperial Irrigation District				
CO2 Intensity (lb/MWhr)	1270.9	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - East Highline Reservoir Project. Imperial County.

Land Use - Structures

Construction Phase - Construction would occur from February 2019 through April 2019.

Off-road Equipment - 15-month equipment

Off-road Equipment - 3-month equipment

Off-road Equipment - May equipment

Off-road Equipment - June equipment

Trips and VMT - 20 workers over entire duration

On-road Fugitive Dust - Hauling is all offroad.

Grading - Excavation, balanced onsite.

Construction Off-road Equipment Mitigation - Comply with ICAPCD fugitive dust control measures: water three times daily and limit vehicle speeds to 15 mph on unpaved roads.

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadMoistureContent	0	0.5
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	230.00	65.00
tblConstructionPhase	NumDays	20.00	23.00
tblOffRoadEquipment	HorsePower	402.00	300.00
tblOffRoadEquipment	HorsePower	84.00	10.00
tblOffRoadEquipment	HorsePower	84.00	110.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	10.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	PhaseName		Paving
tblOffRoadEquipment	PhaseName		Building Construction
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Building Construction
tblOffRoadEquipment	PhaseName		Building Construction
tblOffRoadEquipment	PhaseName		Building Construction
tblOffRoadEquipment	PhaseName		Paving

tblOffRoadEquipment	UsageHours	8.00	24.00
tblOnRoadDust	HaulingPercentPave	50.00	80.00
tblOnRoadDust	HaulingPercentPave	50.00	80.00
tblOnRoadDust	HaulingPercentPave	50.00	80.00
tblOnRoadDust	VendorPercentPave	50.00	80.00
tblOnRoadDust	VendorPercentPave	50.00	80.00
tblOnRoadDust	VendorPercentPave	50.00	80.00
tblOnRoadDust	WorkerPercentPave	50.00	80.00
tblOnRoadDust	WorkerPercentPave	50.00	80.00
tblOnRoadDust	WorkerPercentPave	50.00	80.00
tblTripsAndVMT	VendorTripNumber	71.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	24.00
tblTripsAndVMT	WorkerTripNumber	33.00	0.00
tblTripsAndVMT	WorkerTripNumber	183.00	24.00
tblTripsAndVMT	WorkerTripNumber	8.00	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	0.2076	1.9028	1.4350	3.2400e-003	2.5509	0.0911	2.6420	0.2827	0.0882	0.3709	0.0000	282.1305	282.1305	0.0519	0.0000	283.4291
Maximum	**0.2076**	**1.9028**	**1.4350**	**3.2400e-003**	**2.5509**	**0.0911**	**2.6420**	**0.2827**	**0.0882**	**0.3709**	**0.0000**	**282.1305**	**282.1305**	**0.0519**	**0.0000**	**283.4291**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	0.2076	1.9028	1.4350	3.2400e-003	1.5507	0.0911	1.6418	0.1662	0.0882	0.2543	0.0000	282.1302	282.1302	0.0519	0.0000	283.4288
Maximum	**0.2076**	**1.9028**	**1.4350**	**3.2400e-003**	**1.5507**	**0.0911**	**1.6418**	**0.1662**	**0.0882**	**0.2543**	**0.0000**	**282.1302**	**282.1302**	**0.0519**	**0.0000**	**283.4288**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**39.21**	**0.00**	**37.86**	**41.22**	**0.01**	**31.42**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Grading	Grading	2/1/2019	2/28/2019	5	20	
2	Building Construction	Building Construction	2/1/2019	5/2/2019	5	65	
3	Paving	Paving	3/1/2019	4/2/2019	5	23	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 10

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Grading	Excavators	1	8.00	158	0.38
Grading	Off-Highway Trucks	10	8.00	300	0.38
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Building Construction	Generator Sets	2	24.00	84	0.74
Building Construction	Graders	1	4.00	187	0.41
Building Construction	Off-Highway Trucks	1	4.00	402	0.38
Building Construction	Plate Compactors	1	8.00	8	0.43
Building Construction	Pumps	1	24.00	10	0.74
Paving	Cement and Mortar Mixers	1	8.00	9	0.56
Paving	Pumps	2	8.00	110	0.74

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Grading	13	0.00	0.00	0.00	7.30	8.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	6	24.00	2.00	0.00	7.30	8.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	3	0.00	24.00	0.00	7.30	8.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Grading - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0602	0.0000	0.0602	0.0331	0.0000	0.0331	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0693	0.7075	0.3968	1.1500e-003		0.0283	0.0283		0.0260	0.0260	0.0000	103.6303	103.6303	0.0328	0.0000	104.4500
Total	**0.0693**	**0.7075**	**0.3968**	**1.1500e-003**	**0.0602**	**0.0283**	**0.0885**	**0.0331**	**0.0260**	**0.0591**	**0.0000**	**103.6303**	**103.6303**	**0.0328**	**0.0000**	**104.4500**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0235	0.0000	0.0235	0.0129	0.0000	0.0129	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0693	0.7075	0.3968	1.1500e-003		0.0283	0.0283		0.0260	0.0260	0.0000	103.6302	103.6302	0.0328	0.0000	104.4499
Total	**0.0693**	**0.7075**	**0.3968**	**1.1500e-003**	**0.0235**	**0.0283**	**0.0517**	**0.0129**	**0.0260**	**0.0389**	**0.0000**	**103.6302**	**103.6302**	**0.0328**	**0.0000**	**104.4499**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.3 Building Construction - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1169	1.0277	0.8730	1.7200e-003		0.0551	0.0551		0.0545	0.0545	0.0000	146.7653	146.7653	0.0170	0.0000	147.1910
Total	**0.1169**	**1.0277**	**0.8730**	**1.7200e-003**		**0.0551**	**0.0551**		**0.0545**	**0.0545**	**0.0000**	**146.7653**	**146.7653**	**0.0170**	**0.0000**	**147.1910**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.3000e-004	8.3900e-003	2.4100e-003	2.0000e-005	0.1651	6.0000e-005	0.1652	0.0166	6.0000e-005	0.0166	0.0000	1.9899	1.9899	1.2000e-004	0.0000	1.9928
Worker	4.8700e-003	3.8000e-003	0.0352	4.0000e-005	1.6244	3.0000e-005	1.6244	0.1627	3.0000e-005	0.1627	0.0000	3.7453	3.7453	3.2000e-004	0.0000	3.7534
Total	**5.2000e-003**	**0.0122**	**0.0376**	**6.0000e-005**	**1.7895**	**9.0000e-005**	**1.7896**	**0.1793**	**9.0000e-005**	**0.1794**	**0.0000**	**5.7351**	**5.7351**	**4.4000e-004**	**0.0000**	**5.7461**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1169	1.0277	0.8730	1.7200e-003		0.0551	0.0551		0.0545	0.0545	0.0000	146.7651	146.7651	0.0170	0.0000	147.1908
Total	**0.1169**	**1.0277**	**0.8730**	**1.7200e-003**		**0.0551**	**0.0551**		**0.0545**	**0.0545**	**0.0000**	**146.7651**	**146.7651**	**0.0170**	**0.0000**	**147.1908**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.3000e-004	8.3900e-003	2.4100e-003	2.0000e-005	0.1013	6.0000e-005	0.1013	0.0102	6.0000e-005	0.0102	0.0000	1.9899	1.9899	1.2000e-004	0.0000	1.9928
Worker	4.8700e-003	3.8000e-003	0.0352	4.0000e-005	0.9959	3.0000e-005	0.9960	0.0999	3.0000e-005	0.0999	0.0000	3.7453	3.7453	3.2000e-004	0.0000	3.7534
Total	**5.2000e-003**	**0.0122**	**0.0376**	**6.0000e-005**	**1.0972**	**9.0000e-005**	**1.0973**	**0.1100**	**9.0000e-005**	**0.1101**	**0.0000**	**5.7351**	**5.7351**	**4.4000e-004**	**0.0000**	**5.7461**

3.4 Paving - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0148	0.1197	0.1174	2.1000e-004		7.3300e-003	7.3300e-003		7.3300e-003	7.3300e-003	0.0000	17.5505	17.5505	1.1900e-003	0.0000	17.5804
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0148**	**0.1197**	**0.1174**	**2.1000e-004**		**7.3300e-003**	**7.3300e-003**		**7.3300e-003**	**7.3300e-003**	**0.0000**	**17.5505**	**17.5505**	**1.1900e-003**	**0.0000**	**17.5804**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.4200e-003	0.0356	0.0103	9.0000e-005	0.7012	2.8000e-004	0.7015	0.0704	2.6000e-004	0.0706	0.0000	8.4492	8.4492	5.0000e-004	0.0000	8.4616
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.4200e-003**	**0.0356**	**0.0103**	**9.0000e-005**	**0.7012**	**2.8000e-004**	**0.7015**	**0.0704**	**2.6000e-004**	**0.0706**	**0.0000**	**8.4492**	**8.4492**	**5.0000e-004**	**0.0000**	**8.4616**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0148	0.1197	0.1174	2.1000e-004		7.3300e-003	7.3300e-003		7.3300e-003	7.3300e-003	0.0000	17.5505	17.5505	1.1900e-003	0.0000	17.5803
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0148**	**0.1197**	**0.1174**	**2.1000e-004**		**7.3300e-003**	**7.3300e-003**		**7.3300e-003**	**7.3300e-003**	**0.0000**	**17.5505**	**17.5505**	**1.1900e-003**	**0.0000**	**17.5803**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.4200e-003	0.0356	0.0103	9.0000e-005	0.4301	2.8000e-004	0.4303	0.0432	2.6000e-004	0.0435	0.0000	8.4492	8.4492	5.0000e-004	0.0000	8.4616
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.4200e-003**	**0.0356**	**0.0103**	**9.0000e-005**	**0.4301**	**2.8000e-004**	**0.4303**	**0.0432**	**2.6000e-004**	**0.0435**	**0.0000**	**8.4492**	**8.4492**	**5.0000e-004**	**0.0000**	**8.4616**

CalEEMod Version: CalEEMod.2016.3.2

Date: 6/6/2018 10:00 AM

IID EHR-Structures

Imperial County APCD Air District, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	10.00	Acre	10.00	435,600.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.4	**Precipitation Freq (Days)**	12
Climate Zone	15			**Operational Year**	2020
Utility Company	Imperial Irrigation District				
CO2 Intensity (lb/MWhr)	1270.9	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - East Highline Reservoir Project. Imperial County.

Land Use - Structures

Construction Phase - Construction would occur from February 2019 through April 2019.

Off-road Equipment - 15-month equipment

Off-road Equipment - 3-month equipment

Off-road Equipment - May equipment

Off-road Equipment - June equipment

Trips and VMT - 20 workers over entire duration

On-road Fugitive Dust - Hauling is all offroad.

Grading - Excavation, balanced onsite.

Construction Off-road Equipment Mitigation - Comply with ICAPCD fugitive dust control measures: water three times daily and limit vehicle speeds to 15 mph on unpaved roads.

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadMoistureContent	0	0.5
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	230.00	65.00
tblConstructionPhase	NumDays	20.00	23.00
tblOffRoadEquipment	HorsePower	402.00	300.00
tblOffRoadEquipment	HorsePower	84.00	10.00
tblOffRoadEquipment	HorsePower	84.00	110.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	10.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	PhaseName		Paving
tblOffRoadEquipment	PhaseName		Building Construction
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Building Construction
tblOffRoadEquipment	PhaseName		Building Construction
tblOffRoadEquipment	PhaseName		Building Construction
tblOffRoadEquipment	PhaseName		Paving

tblOffRoadEquipment	UsageHours	8.00	24.00
tblOnRoadDust	HaulingPercentPave	50.00	80.00
tblOnRoadDust	HaulingPercentPave	50.00	80.00
tblOnRoadDust	HaulingPercentPave	50.00	80.00
tblOnRoadDust	VendorPercentPave	50.00	80.00
tblOnRoadDust	VendorPercentPave	50.00	80.00
tblOnRoadDust	VendorPercentPave	50.00	80.00
tblOnRoadDust	WorkerPercentPave	50.00	80.00
tblOnRoadDust	WorkerPercentPave	50.00	80.00
tblOnRoadDust	WorkerPercentPave	50.00	80.00
tblTripsAndVMT	VendorTripNumber	71.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	24.00
tblTripsAndVMT	WorkerTripNumber	33.00	0.00
tblTripsAndVMT	WorkerTripNumber	183.00	24.00
tblTripsAndVMT	WorkerTripNumber	8.00	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	10.7114	102.7337	67.9344	0.1705	119.9712	4.5236	122.3309	12.0263	4.2785	14.3659	0.0000	16,610.0274	16,610.0274	4.2082	0.0000	16,715.2320
Maximum	**10.7114**	**102.7337**	**67.9344**	**0.1705**	**119.9712**	**4.5236**	**122.3309**	**12.0263**	**4.2785**	**14.3659**	**0.0000**	**16,610.0274**	**16,610.0274**	**4.2082**	**0.0000**	**16,715.2320**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	10.7114	102.7337	67.9344	0.1705	73.5664	4.5236	75.9261	7.3858	4.2785	9.7254	0.0000	16,610.0274	16,610.0274	4.2082	0.0000	16,715.2320
Maximum	**10.7114**	**102.7337**	**67.9344**	**0.1705**	**73.5664**	**4.5236**	**75.9261**	**7.3858**	**4.2785**	**9.7254**	**0.0000**	**16,610.0274**	**16,610.0274**	**4.2082**	**0.0000**	**16,715.2320**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**38.68**	**0.00**	**37.93**	**38.59**	**0.00**	**32.30**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Grading	Grading	2/1/2019	2/28/2019	5	20	
2	Building Construction	Building Construction	2/1/2019	5/2/2019	5	65	
3	Paving	Paving	3/1/2019	4/2/2019	5	23	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 10

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Grading	Excavators	1	8.00	158	0.38
Grading	Off-Highway Trucks	10	8.00	300	0.38
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Building Construction	Generator Sets	2	24.00	84	0.74
Building Construction	Graders	1	4.00	187	0.41
Building Construction	Off-Highway Trucks	1	4.00	402	0.38
Building Construction	Plate Compactors	1	8.00	8	0.43
Building Construction	Pumps	1	24.00	10	0.74
Paving	Cement and Mortar Mixers	1	8.00	9	0.56
Paving	Pumps	2	8.00	110	0.74

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Grading	13	0.00	0.00	0.00	7.30	8.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	6	24.00	2.00	0.00	7.30	8.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	3	0.00	24.00	0.00	7.30	8.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Grading - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.0221	0.0000	6.0221	3.3102	0.0000	3.3102			0.0000			0.0000
Off-Road	6.9259	70.7472	39.6767	0.1154		2.8252	2.8252		2.5992	2.5992		11,423.2864	11,423.2864	3.6142		11,513.6416
Total	**6.9259**	**70.7472**	**39.6767**	**0.1154**	**6.0221**	**2.8252**	**8.8473**	**3.3102**	**2.5992**	**5.9094**		**11,423.2864**	**11,423.2864**	**3.6142**		**11,513.6416**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.3486	0.0000	2.3486	1.2910	0.0000	1.2910			0.0000			0.0000
Off-Road	6.9259	70.7472	39.6767	0.1154		2.8252	2.8252		2.5992	2.5992	0.0000	11,423.2864	11,423.2864	3.6142		11,513.6416
Total	**6.9259**	**70.7472**	**39.6767**	**0.1154**	**2.3486**	**2.8252**	**5.1738**	**1.2910**	**2.5992**	**3.8902**	**0.0000**	**11,423.2864**	**11,423.2864**	**3.6142**		**11,513.6416**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.3 Building Construction - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.5953	31.6228	26.8611	0.0530		1.6955	1.6955		1.6766	1.6766		4,977.8789	4,977.8789	0.5775		4,992.3170
Total	**3.5953**	**31.6228**	**26.8611**	**0.0530**		**1.6955**	**1.6955**		**1.6766**	**1.6766**		**4,977.8789**	**4,977.8789**	**0.5775**		**4,992.3170**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0103	0.2503	0.0709	6.6000e-004	5.2533	1.9800e-003	5.2553	0.5270	1.9000e-003	0.5289		68.5150	68.5150	3.7900e-003		68.6097
Worker	0.1799	0.1134	1.3258	1.4200e-003	51.6778	9.4000e-004	51.6787	5.1755	8.7000e-004	5.1764		140.3472	140.3472	0.0127		140.6637
Total	**0.1902**	**0.3637**	**1.3967**	**2.0800e-003**	**56.9311**	**2.9200e-003**	**56.9341**	**5.7025**	**2.7700e-003**	**5.7052**		**208.8622**	**208.8622**	**0.0165**		**209.2734**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.5953	31.6228	26.8611	0.0530		1.6955	1.6955		1.6766	1.6766	0.0000	4,977.8789	4,977.8789	0.5775		4,992.3170
Total	**3.5953**	**31.6228**	**26.8611**	**0.0530**		**1.6955**	**1.6955**		**1.6766**	**1.6766**	**0.0000**	**4,977.8789**	**4,977.8789**	**0.5775**		**4,992.3170**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0103	0.2503	0.0709	6.6000e-004	3.2219	1.9800e-003	3.2238	0.3238	1.9000e-003	0.3257		68.5150	68.5150	3.7900e-003		68.6097
Worker	0.1799	0.1134	1.3258	1.4200e-003	31.6824	9.4000e-004	31.6833	3.1759	8.7000e-004	3.1768		140.3472	140.3472	0.0127		140.6637
Total	**0.1902**	**0.3637**	**1.3967**	**2.0800e-003**	**34.9042**	**2.9200e-003**	**34.9072**	**3.4998**	**2.7700e-003**	**3.5025**		**208.8622**	**208.8622**	**0.0165**		**209.2734**

3.4 Paving - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.2905	10.4091	10.2115	0.0179		0.6375	0.6375		0.6375	0.6375		1,682.2735	1,682.2735	0.1144		1,685.1324
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.2905**	**10.4091**	**10.2115**	**0.0179**		**0.6375**	**0.6375**		**0.6375**	**0.6375**		**1,682.2735**	**1,682.2735**	**0.1144**		**1,685.1324**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1238	3.0033	0.8502	7.8700e-003	63.0401	0.0238	63.0639	6.3238	0.0228	6.3466		822.1800	822.1800	0.0455		823.3163
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.1238**	**3.0033**	**0.8502**	**7.8700e-003**	**63.0401**	**0.0238**	**63.0639**	**6.3238**	**0.0228**	**6.3466**		**822.1800**	**822.1800**	**0.0455**		**823.3163**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.2905	10.4091	10.2115	0.0179		0.6375	0.6375		0.6375	0.6375	0.0000	1,682.2735	1,682.2735	0.1144		1,685.1324
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.2905**	**10.4091**	**10.2115**	**0.0179**		**0.6375**	**0.6375**		**0.6375**	**0.6375**	**0.0000**	**1,682.2735**	**1,682.2735**	**0.1144**		**1,685.1324**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1238	3.0033	0.8502	7.8700e-003	38.6621	0.0238	38.6860	3.8860	0.0228	3.9088		822.1800	822.1800	0.0455		823.3163
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.1238**	**3.0033**	**0.8502**	**7.8700e-003**	**38.6621**	**0.0238**	**38.6860**	**3.8860**	**0.0228**	**3.9088**		**822.1800**	**822.1800**	**0.0455**		**823.3163**

CalEEMod Version: CalEEMod.2016.3.2

Date: 6/6/2018 10:02 AM

IID EHR-Structures

Imperial County APCD Air District, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	10.00	Acre	10.00	435,600.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.4	**Precipitation Freq (Days)**	12
Climate Zone	15			**Operational Year**	2020
Utility Company	Imperial Irrigation District				
CO2 Intensity (lb/MWhr)	1270.9	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - East Highline Reservoir Project. Imperial County.

Land Use - Structures

Construction Phase - Construction would occur from February 2019 through April 2019.

Off-road Equipment - 15-month equipment

Off-road Equipment - 3-month equipment

Off-road Equipment - May equipment

Off-road Equipment - June equipment

Trips and VMT - 20 workers over entire duration

On-road Fugitive Dust - Hauling is all offroad.

Grading - Excavation, balanced onsite.

Construction Off-road Equipment Mitigation - Comply with ICAPCD fugitive dust control measures: water three times daily and limit vehicle speeds to 15 mph on unpaved roads.

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadMoistureContent	0	0.5
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	230.00	65.00
tblConstructionPhase	NumDays	20.00	23.00
tblOffRoadEquipment	HorsePower	402.00	300.00
tblOffRoadEquipment	HorsePower	84.00	10.00
tblOffRoadEquipment	HorsePower	84.00	110.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	10.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	PhaseName		Paving
tblOffRoadEquipment	PhaseName		Building Construction
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Building Construction
tblOffRoadEquipment	PhaseName		Building Construction
tblOffRoadEquipment	PhaseName		Building Construction
tblOffRoadEquipment	PhaseName		Paving

tblOffRoadEquipment	UsageHours	8.00	24.00
tblOnRoadDust	HaulingPercentPave	50.00	80.00
tblOnRoadDust	HaulingPercentPave	50.00	80.00
tblOnRoadDust	HaulingPercentPave	50.00	80.00
tblOnRoadDust	VendorPercentPave	50.00	80.00
tblOnRoadDust	VendorPercentPave	50.00	80.00
tblOnRoadDust	VendorPercentPave	50.00	80.00
tblOnRoadDust	WorkerPercentPave	50.00	80.00
tblOnRoadDust	WorkerPercentPave	50.00	80.00
tblOnRoadDust	WorkerPercentPave	50.00	80.00
tblTripsAndVMT	VendorTripNumber	71.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	24.00
tblTripsAndVMT	WorkerTripNumber	33.00	0.00
tblTripsAndVMT	WorkerTripNumber	183.00	24.00
tblTripsAndVMT	WorkerTripNumber	8.00	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	10.6761	102.7455	67.6201	0.1702	119.9712	4.5236	122.3313	12.0263	4.2786	14.3662	0.0000	16,584.9728	16,584.9728	4.2061	0.0000	16,690.1262
Maximum	**10.6761**	**102.7455**	**67.6201**	**0.1702**	**119.9712**	**4.5236**	**122.3313**	**12.0263**	**4.2786**	**14.3662**	**0.0000**	**16,584.9728**	**16,584.9728**	**4.2061**	**0.0000**	**16,690.1262**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	10.6761	102.7455	67.6201	0.1702	73.5664	4.5236	75.9264	7.3858	4.2786	9.7257	0.0000	16,584.9727	16,584.9727	4.2061	0.0000	16,690.1262
Maximum	**10.6761**	**102.7455**	**67.6201**	**0.1702**	**73.5664**	**4.5236**	**75.9264**	**7.3858**	**4.2786**	**9.7257**	**0.0000**	**16,584.9727**	**16,584.9727**	**4.2061**	**0.0000**	**16,690.1262**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**38.68**	**0.00**	**37.93**	**38.59**	**0.00**	**32.30**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Grading	Grading	2/1/2019	2/28/2019	5	20	
2	Building Construction	Building Construction	2/1/2019	5/2/2019	5	65	
3	Paving	Paving	3/1/2019	4/2/2019	5	23	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 10

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Grading	Excavators	1	8.00	158	0.38
Grading	Off-Highway Trucks	10	8.00	300	0.38
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Building Construction	Generator Sets	2	24.00	84	0.74
Building Construction	Graders	1	4.00	187	0.41
Building Construction	Off-Highway Trucks	1	4.00	402	0.38
Building Construction	Plate Compactors	1	8.00	8	0.43
Building Construction	Pumps	1	24.00	10	0.74
Paving	Cement and Mortar Mixers	1	8.00	9	0.56
Paving	Pumps	2	8.00	110	0.74

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Grading	13	0.00	0.00	0.00	7.30	8.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	6	24.00	2.00	0.00	7.30	8.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	3	0.00	24.00	0.00	7.30	8.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Grading - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.0221	0.0000	6.0221	3.3102	0.0000	3.3102			0.0000			0.0000
Off-Road	6.9259	70.7472	39.6767	0.1154		2.8252	2.8252		2.5992	2.5992		11,423.2864	11,423.2864	3.6142		11,513.6416
Total	**6.9259**	**70.7472**	**39.6767**	**0.1154**	**6.0221**	**2.8252**	**8.8473**	**3.3102**	**2.5992**	**5.9094**		**11,423.2864**	**11,423.2864**	**3.6142**		**11,513.6416**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.3486	0.0000	2.3486	1.2910	0.0000	1.2910			0.0000			0.0000
Off-Road	6.9259	70.7472	39.6767	0.1154		2.8252	2.8252		2.5992	2.5992	0.0000	11,423.2864	11,423.2864	3.6142		11,513.6416
Total	**6.9259**	**70.7472**	**39.6767**	**0.1154**	**2.3486**	**2.8252**	**5.1738**	**1.2910**	**2.5992**	**3.8902**	**0.0000**	**11,423.2864**	**11,423.2864**	**3.6142**		**11,513.6416**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.3 Building Construction - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.5953	31.6228	26.8611	0.0530		1.6955	1.6955		1.6766	1.6766		4,977.8789	4,977.8789	0.5775		4,992.3170
Total	**3.5953**	**31.6228**	**26.8611**	**0.0530**		**1.6955**	**1.6955**		**1.6766**	**1.6766**		**4,977.8789**	**4,977.8789**	**0.5775**		**4,992.3170**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0106	0.2564	0.0801	6.3000e-004	5.2533	2.0100e-003	5.2554	0.5270	1.9200e-003	0.5289		66.0755	66.0755	4.2000e-003		66.1805
Worker	0.1443	0.1191	1.0023	1.1900e-003	51.6778	9.4000e-004	51.6787	5.1755	8.7000e-004	5.1764		117.7320	117.7320	0.0102		117.9872
Total	**0.1549**	**0.3755**	**1.0824**	**1.8200e-003**	**56.9311**	**2.9500e-003**	**56.9341**	**5.7025**	**2.7900e-003**	**5.7053**		**183.8075**	**183.8075**	**0.0144**		**184.1676**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.5953	31.6228	26.8611	0.0530		1.6955	1.6955		1.6766	1.6766	0.0000	4,977.8789	4,977.8789	0.5775		4,992.3170
Total	**3.5953**	**31.6228**	**26.8611**	**0.0530**		**1.6955**	**1.6955**		**1.6766**	**1.6766**	**0.0000**	**4,977.8789**	**4,977.8789**	**0.5775**		**4,992.3170**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0106	0.2564	0.0801	6.3000e-004	3.2219	2.0100e-003	3.2239	0.3238	1.9200e-003	0.3258		66.0755	66.0755	4.2000e-003		66.1805
Worker	0.1443	0.1191	1.0023	1.1900e-003	31.6824	9.4000e-004	31.6833	3.1759	8.7000e-004	3.1768		117.7320	117.7320	0.0102		117.9872
Total	**0.1549**	**0.3755**	**1.0824**	**1.8200e-003**	**34.9042**	**2.9500e-003**	**34.9072**	**3.4998**	**2.7900e-003**	**3.5026**		**183.8075**	**183.8075**	**0.0144**		**184.1676**

3.4 Paving - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.2905	10.4091	10.2115	0.0179		0.6375	0.6375		0.6375	0.6375		1,682.2735	1,682.2735	0.1144		1,685.1324
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.2905**	**10.4091**	**10.2115**	**0.0179**		**0.6375**	**0.6375**		**0.6375**	**0.6375**		**1,682.2735**	**1,682.2735**	**0.1144**		**1,685.1324**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1277	3.0768	0.9608	7.5900e-003	63.0401	0.0241	63.0642	6.3238	0.0231	6.3469		792.9054	792.9054	0.0504		794.1657
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.1277**	**3.0768**	**0.9608**	**7.5900e-003**	**63.0401**	**0.0241**	**63.0642**	**6.3238**	**0.0231**	**6.3469**		**792.9054**	**792.9054**	**0.0504**		**794.1657**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.2905	10.4091	10.2115	0.0179		0.6375	0.6375		0.6375	0.6375	0.0000	1,682.2735	1,682.2735	0.1144		1,685.1324
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.2905**	**10.4091**	**10.2115**	**0.0179**		**0.6375**	**0.6375**		**0.6375**	**0.6375**	**0.0000**	**1,682.2735**	**1,682.2735**	**0.1144**		**1,685.1324**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.1277	3.0768	0.9608	7.5900e-003	38.6621	0.0241	38.6863	3.8860	0.0231	3.9091		792.9054	792.9054	0.0504		794.1657
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.1277**	**3.0768**	**0.9608**	**7.5900e-003**	**38.6621**	**0.0241**	**38.6863**	**3.8860**	**0.0231**	**3.9091**		**792.9054**	**792.9054**	**0.0504**		**794.1657**

APPENDIX C

Biological Resources Report
for the
East Highline Reservoir Project
Imperial County, California

Lead Agency:

Imperial Irrigation District
235 East Barioni Boulevard
Imperial, California 92251
Contact: Jessica Lovecchio

Project Proponent:

Imperial Irrigation District
235 East Barioni Boulevard
Imperial, California 92251
Contact: Jessica Lovecchio

Prepared by:

DUDEK
605 Third Street
Encinitas, California 92024

Brock Ortega

NOVEMBER 2019

Printed on 30% post-consumer recycled material.

TABLE OF CONTENTS

Section | **Page No.**

TABLE OF CONTENTS (CONTINUED)

Section **Page No.**

APPENDICES

TABLE OF CONTENTS (CONTINUED)

Page No.

FIGURES

TABLES

INTENTIONALLY LEFT BLANK

GLOSSARY OF TERMS AND ACRONYMS

% cc	percent cloud cover
ÁF	degrees Fahrenheit
AC	alternating current
ACOE	U.S. Army Corps of Engineers
amsl	above mean sea level
APLIC	Avian Power Line Interaction Committee
BCC	Birds of Conservation Concern
BLM	Bureau of Land Management
BMP	best management practice
CALFIRE	California Department of Forestry and Fire Protection
Cal-IPC	California Invasive Plant Council
CDFG	California Department of Fish and Game
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
County	County of San Diego
CRPR	California Rare Plant Rank
DC	direct current
DG	disintegrated granite
ECMSCP	East County Multiple Species Conservation Program
ECO	East County
ESA	federal Endangered Species Act
FCA	Focused Conservation Area
GIS	geographic information system
GPS	Global Positioning System
I-8	Interstate 8
kV	kilovolt
MBTA	Migratory Bird Treaty Act
MSCP	Multiple Species Conservation Program
MW	megawatt
NBMMRP	Nesting Bird Management, Monitoring, and Reporting Plan
NCCP	Natural Communities Conservation Plan
NESC	National Electrical Safety Code
OHWM	ordinary high water mark
PCA	pest control adviser

PCS	plant control system
PDS	Planning and Development Services
RMP	Resource Management Plan
RPO	Resource Protection Ordinance
RPW	relatively permanent water
RWQCB	Regional Water Quality Control Board
SCADA	supervisory control and data acquisition
SDG&E	San Diego Gas & Electric
SDRFPD	San Diego Rural Fire Protection District
SSC	Species of Special Concern
TNW	traditional navigable water of the United States
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Service
WL	Watch List

SUMMARY

The East Highline (EHL) Reservoir Project (Proposed Project) involves the development of a main canal off-line reservoir storage project and related infrastructure. The reservoir would be a single 2,500-3,400 acre-feet (AF) capacity reservoir on a parcel of farm ground located approximately 1.25-miles north of the All-American Canal (AAC) and on the east side of the EHL Canal at Verde School Road, in Imperial County, California. A proposed intake structure off the north side of the AAC would direct Colorado River flows along a proposed intake canal to the reservoir at up to approximately 1,500 cubic feet per second (cfs). The construction and use of this large operational reservoir is a planned strategy to manage reduced downstream demands due to increase in grower requests for 12-hour deliveries or any reduction to a 24-hour order. Stored water would be delivered through an automated gate outlet and structure with a gravity flow capacity of approximately 1,500 cfs for delivery into the EHL Canal. The proposed project consistent with the intent of the Water Conservation and Transfer Project.

The Proposed Project encompasses a total of approximately 552.84 acres in Imperial County located approximately 1.6 miles north of the Mexican Border, and bisects Interstate 98 (I-98).

Dudek conducted biological surveys within the Proposed Project study area including vegetation mapping, a formal jurisdictional delineation and a habitat assessment in January 2018.

Based on the jurisdictional delineation, there are approximately 0.12 acre of wetlands regulated by the U.S. Army Corps of Engineers (ACOE) and the Regional Water Quality Control Board (RWQCB). Additional vegetation communities that may be subject to regulation by RWQCB and/or California Department of Fish and Wildlife total approximately 0.59 acre and include: open water and arrow weed thickets. The All American Canal is subject to the U.S. Army Corps of Engineers (ACOE) jurisdiction under Section 404 of the CWA.

There will be direct impacts to a total of 439.25 acres of vegetation communities within the Proposed Project study area, which includes permanent direct impacts to 3.73 acres of special-status vegetation communities.

There are significant impacts as a result of potential direct and indirect effects to special-status plants, special-status wildlife species, special-status vegetation communities, and jurisdictional resources. In addition, there are significant impacts as a result of potential direct effects to foraging or breeding habitat, wildlife movement for small animals, and the Migratory Bird Treaty Act. Mitigation measures for each of these impacts are included and reduce the significant impacts to a level of less than significant. Mitigation measures include the conservation of restoration and enhancement of vegetation communities within other IID land, and mitigation for special-status plants and habitat for special-status wildlife species. Impacts to wildlife movement for large

animals, and to local policies, ordinances and adopted plans would be less than significant with implementation of the Proposed Project.

1 INTRODUCTION

This biological resources technical report (BTR) provides the following items: (1) describes the existing conditions of biological resources within the Project site in terms of vegetation, jurisdictional resources, flora, wildlife, and wildlife habitats; (2) discusses potential impacts to biological resources that would result from development of the seepage recovery wells and describe those impacts in terms of biological significance in view of federal, state, and local laws and policies; and (3) recommends mitigation measures for potential impacts to special-status biological resources, if necessary. Recommendations will follow federal, state, and local rules and regulations, including the California Environmental Quality Act (CEQA).

1.1 Project Location

The Proposed Project is located in Imperial County, California, southeast of the Salton Sea, west of the Imperial Sand Dunes and east of Calexico, as shown on Figures 1-1 and 1-2. The Proposed Project is located approximately 2 miles north of the Mexican Border, with the southern most boundary at Interstate 98 (I-98). The Proposed Project is located within Township 16 South, Range 16 East, Sections 25, 26 and 36; and Township 17 South, Range 17 East, Section 6 in the Bonds Corner U.S. Geological Survey 7.5-minute quadrangle. Latitude and longitude coordinates at the center of the Proposed Project boundary is 32Á43'37.53"N and 115Á16ô28.35òW. Holrdidge Road and Verde School Road provide the primary vehicular access through the project area.

1.2 Project Description

The Imperial Irrigation District (IID) proposes the development of a main canal off-line reservoir storage project and related infrastructure (Figure 1-3). The reservoir would be a single 2,500-3,400 acre-feet (AF) capacity reservoir on a parcel of farm ground located approximately 1.25-miles north of the All-American Canal (AAC) and on the east side of the East Highline (EHL) Canal at Verde School Road, in Imperial County, California. A proposed intake structure off the north side of the AAC would direct Colorado River flows along a proposed intake canal to the reservoir at up to approximately 1,500 cubic feet per second (cfs). The construction and use of this large operational reservoir is a planned strategy to manage reduced downstream demands due to increase in grower requests for 12-hour deliveries or any reduction to a 24-hour order. Stored water would be delivered through an automated gate outlet and structure with a gravity flow capacity of approximately 1,500 cfs for delivery into the EHL Canal.

1.2.1 Construction

Construction of the reservoir would take a total of approximately 15 months and involve six principal phases:

Reservoir (Phase 1): The construction of the reservoir is anticipated to occur over about a 15-month construction period. Construction of the reservoir will require a crew consisting of an average of 20 workers over the duration of the construction period. The total area that will be graded is approximately 525 acres. The total volume of excavation is estimated to be about 2.4 million cubic yards. The disposal facility is adjacent to the reservoir. The quantity of concrete lining is approximately 11,500 cubic yards. Table 1-1, Phasing and Equipment, presents the construction equipment that will likely be required at various times during the construction of the reservoir.

Highway 98 Detour Roadway (Phase 2): The Highway 98 Detour Roadway would occur during the first month of construction. The detour would be a temporary, while construction of the intake route intersects with Highway 98. Table 1-1 presents the construction equipment that would likely be required at various times during the construction of the detour roadway.

Sedimentation Basin (Phase 3): The construction of the sedimentation basin would be anticipated to occur over about a 3-month construction period. Construction of the sedimentation basin would require a crew consisting of an average of 15 workers over the duration of the construction period. The total area that will be graded is approximately 10 acres. The total volume of excavation is estimated to be about 120,000 cubic yards. The disposal facility is adjacent to the reservoir. The quantity of concrete lining is approximately 3,000 cubic yards. Table 1-1 presents the construction equipment that would likely be required during the construction of the sedimentation basin. This phase would overlap with phase 4, Canal and Measurement Flume.

Canal and Measurement Flume (Phase 4): The construction of the canal and measurement flume would be anticipated to occur over about a 3-month construction period. Construction of the canal and measurement flume would require a crew consisting of an average of 20 workers over the duration of the construction period. The total area that will be graded is approximately 40 acres. The total volume of canal embankment is estimated to be about 225,000 cubic yards. The material will be hauled primary from the reservoir excavation for the construction of the canal embankment. The quantity of concrete lining is approximately 4,000 cubic yards. Table 1-1 presents the construction equipment that would likely be required during the construction of the canal and measurement flume.

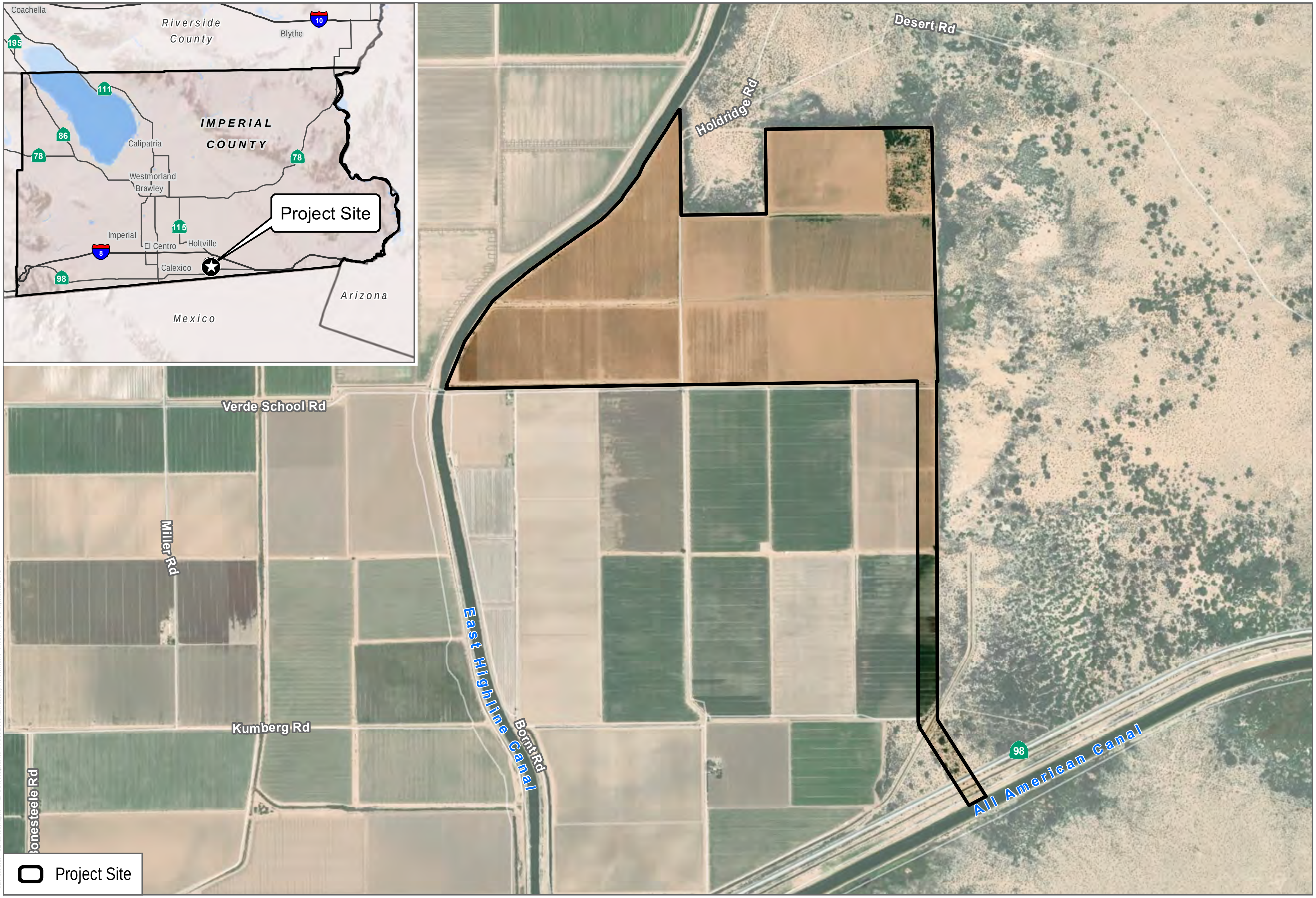
Canal Tie-Ins (Phase 5): The construction of the AAC Tie-In and EHC Tie-In would occur over an approximately three-month period and would require a crew consisting of an average of 10 workers over the duration of the construction period, after the Highway 98 Detour Roadway, and would overlap partially with the sedimentation basin (Phase 5) and the canal and measurement flume (Phase 6). Table 1-1 presents the construction equipment that would likely be required at various times during the construction of the tie-ins.

Structures (Phase 6): The construction of the Hwy 98 Crossing, canal inlet structure, reservoir outlet structure, meter vault, and EHC outfall structure would occur over an approximately six-month period and would require a crew consisting of an average of 12 workers over the duration of the construction period. Table 1-1 presents the construction equipment that would likely during the construction of the structures.

Table 1-1
Phasing and Equipment

Phase Number	Phase Name	Months of Construction	List of Equipment*
Phase 1	Reservoir	15	Pickups, Dozer, Large Excavator Backhoe, Dump Truck (40 ton wagons), Flat Bed Truck, Vibratory Compactor, Ready-mix Concrete Trucks, Shotcrete Pump, Concrete Curing Applicator, Water Truck, Caterpillar motor grader, Small Crane or Large Boom Truck, 25 kVA Portable Generator, Dewatering Pump System
Phase 2	Highway 98 Detour	1	Pickups, Caterpillar 633 Self-loading scraper, Dump Truck, Vibratory Compactor, Asphalt/Road Base Trucks, Asphalt Pavers, Smooth Drum Roller Compactor, Water Truck, Caterpillar motor grader
Phase 3	Sedimentation Basin	3	Pickups, Dozer, Large Excavator Backhoe, Dump Truck (40 cy wagons), Gradall (Trimming), Ready-mix Concrete Trucks, Shotcrete Pump, Concrete Curing Applicator, Flat Bed Truck, Vibratory Compactor, Water Truck, Caterpillar motor grader, 25 kVA Portable Generator, Dewatering Pump System
Phase 4	Canal and Measurement Flume	3	Pickups, Gradall (Trimming), Ready-mix Concrete Trucks, Shotcrete Pump, Concrete Curing Applicator, Flat Bed Truck, Vibratory Compactor, Caterpillar 633 Self-loading scraper, Small Boom Truck, Water Truck, Caterpillar motor grader, 25 kVA Portable Generator, Dewatering Pump System
Phase 5	Canal Tie-Ins	3	Pickups, Large Excavator Backhoe, Dump Truck, Pile Driving, Vibratory Compactor, Gradall (Trimming), Ready-mix Concrete Trucks, Shotcrete Pump, Concrete Curing Applicator, Small Crane or Large Boom Truck, Water Truck, 15 kVA Portable Generator, Dewatering Pump System
Phase 6	Structures	3	Pickups, Dozer, Large Excavator Backhoe, Dump Truck (40 cy wagons), Gradall (Trimming), Ready-mix Concrete Trucks, Shotcrete Pump, Concrete Curing Applicator, Flat Bed Truck, Vibratory Compactor, Water Truck, Caterpillar motor grader, 25 kVA Portable Generator, Dewatering Pump System

* Not all equipment listed is used in all months of the identified construction phase



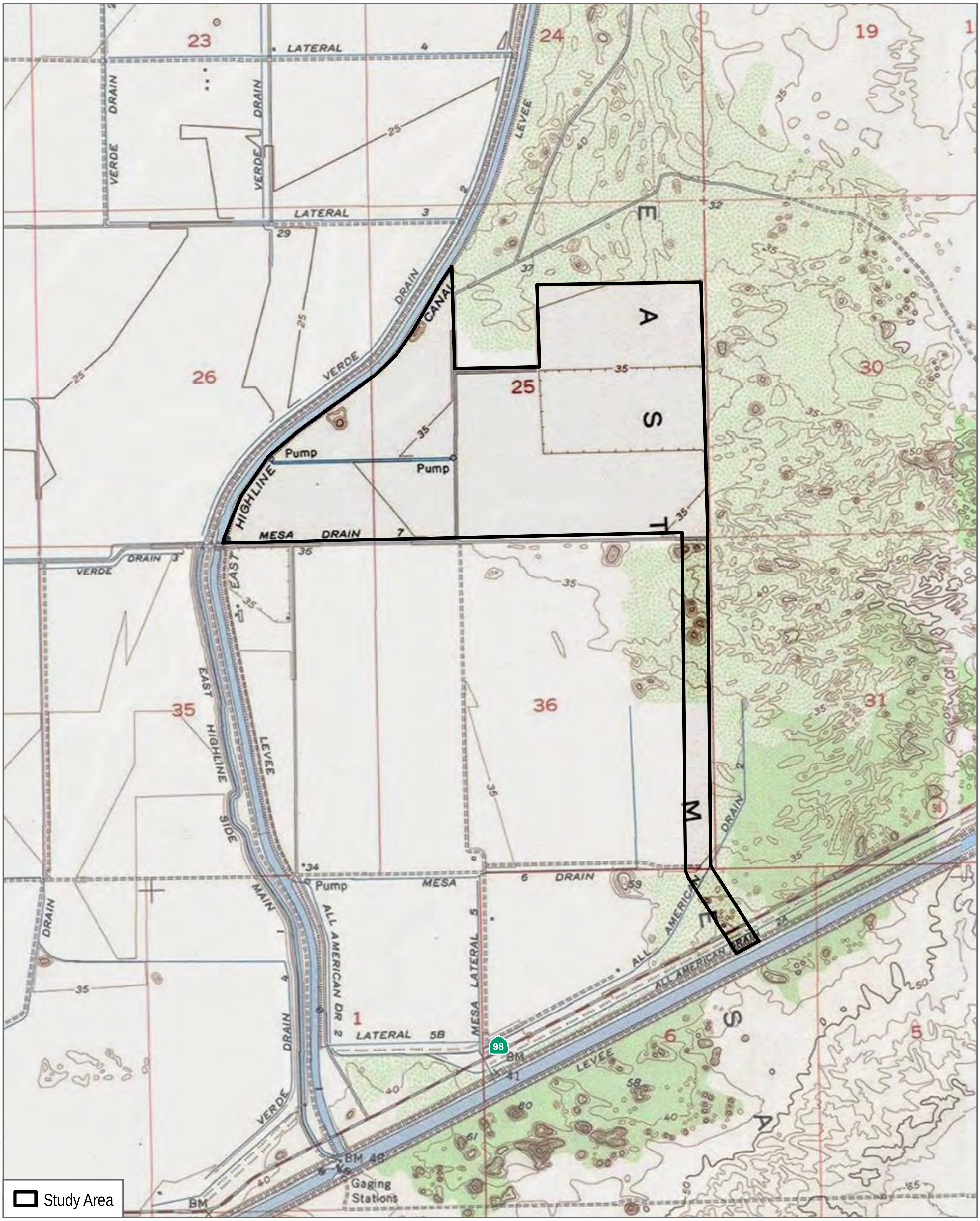
SOURCE: NAIP 2016

DUDEK

0 1,000 2,000 Feet

FIGURE 1-1
Project Location
East Highline Reservoir and Intake Channel Project

INTENTIONALLY LEFT BLANK



SOURCE: SOURCE: USGS 7.5-Minute Series Bonds Corner Quadrangle

DUDEK

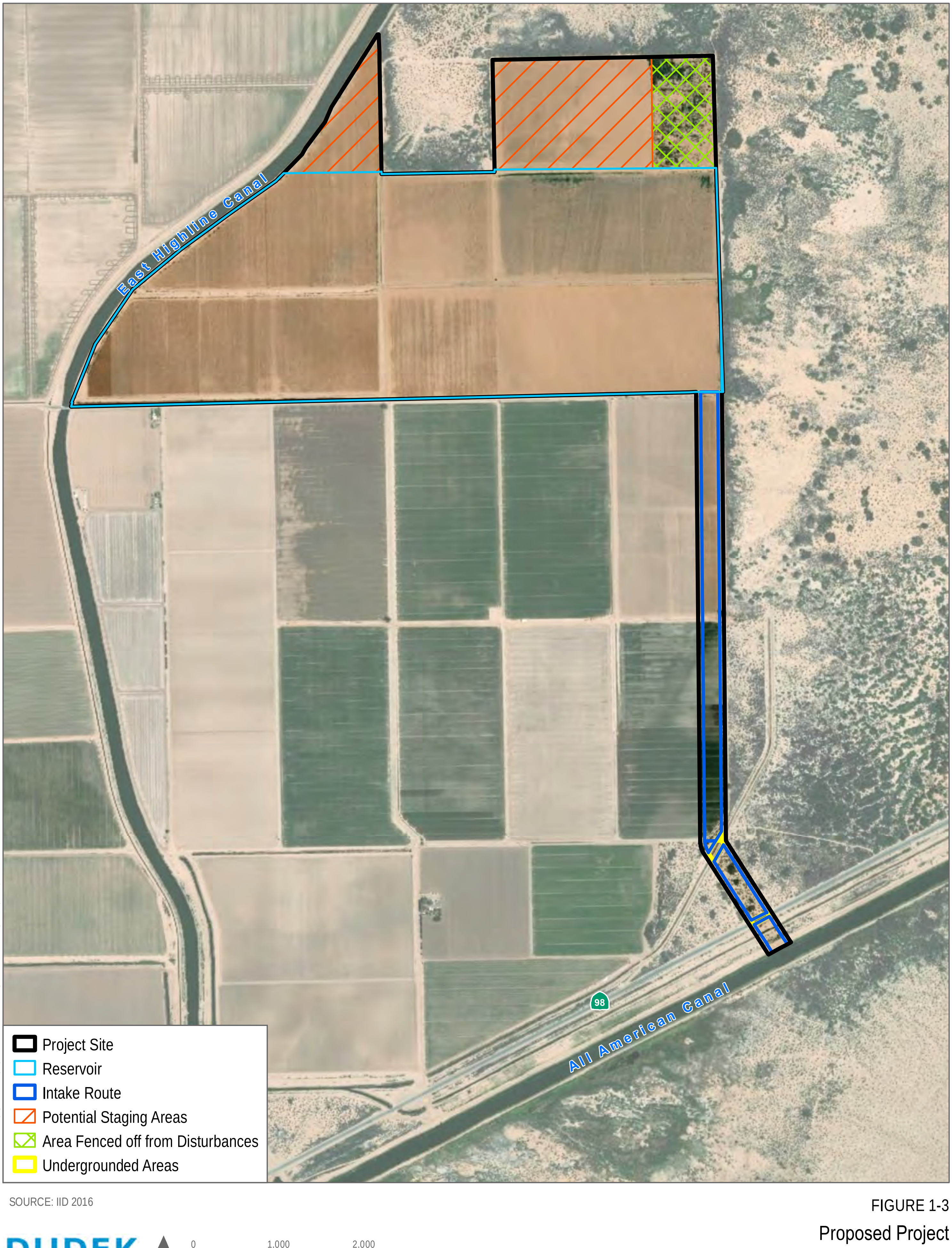
0 1,000 2,000 Feet

FIGURE 1-2

Vicinity Map

East Highline Reservoir and Intake Channel Project

INTENTIONALLY LEFT BLANK



SOURCE: IID 2016

DUDEK

FIGURE 1-3

Proposed Project

East Highline Reservoir and Intake Channel Project

INTENTIONALLY LEFT BLANK

The proposed project consists of a main canal off-line reservoir storage project and related infrastructure. The reservoir would store approximately 2,500-3,400 AF of water and be used to augment current levels of operational flexibility while creating an additional tool to assist meeting main-system and on-farm conservation program goals. The proposed reservoir is anticipated to receive water by gravity flow from an intake structure off the north side of the AAC that will be sized to deliver approximately 1,500 cfs of Colorado River flows to the proposed site. This large operational reservoir is a planned strategy to manage reduced downstream demands due to increase in grower requests for 12-hour deliveries, or any reduction to a 24-hour order. The intake conveyance canal to the proposed reservoir site would use gravity only (i.e., no pumping) and cross open desert at the edge of farm ground that is situated between the AAC and the reservoir site. Water that is stored for a later operational delivery from the proposed reservoir would be delivered through an automated gate outlet and structure with a gravity flow capacity of approximately 1,500 cfs for delivery into the EHL Canal. The outlet gate would be controlled by a remote operated automated mechanism.

Maintenance would be undertaken by IID in accordance with existing practices for inspections and repair. No on-site operations and maintenance facilities would be provided. Inspections would be made via crew trucks and using the existing roads infrastructure and the constructed access and maintenance roads for the intake channel and reservoir.

INTENTIONALLY LEFT BLANK

2 METHODS

Endangered, rare, or threatened species, as defined in CEQA Guidelines Section 15380(b) (14 CCR 15000 et seq.), are referred to as ñspecial-status speciesò in this BTR and include (1) endangered or threatened species recognized in the context of the California Endangered Species Act and the federal Endangered Species Act; (2) plant species with a California Rare Plant Rank (CRPR) (CDFW 2018a) (Lists 1A, 1B, and 2); (3) California Species of Special Concern (SSC), as designated by the California Department of Fish and Wildlife (CDFW; CDFW 2018b); (4) mammals and birds that are fully protected (FP) species, as described in Fish and Game Code, Sections 4700 and 3511 (CDFW 2018b); and (5) Birds of Conservation Concern (BCC), as designated by the U.S. Fish and Wildlife Service (USFWS; USFWS 2008; CDFW 2018b). Vegetation communities are considered sensitive natural communities or special-status vegetation communities if they have a conservation status of S1, S2, or S3 (CDFG 2010).

Focused surveys were conducted in the Proposed Project study area totaling 552.84 acres and a 300-foot corridor buffer along the intake. Focused surveys conducted within the Proposed Project study area included vegetation mapping, habitat assessment, and a jurisdictional delineation.

2.1 Literature Review

Special-status biological resources present or potentially present on site were identified through an extensive literature search using the following sources: U.S. Fish and Wildlife Service (USFWS) (2018a), California Department of Fish and Wildlife (CDFW) California Natural Diversity Database (CNDDB) (CDFW 2018c), California Native Plant Societyôs (CNPS) *Online Inventory of Rare and Endangered Vascular Plants* (CNPS 2018). The literature review also included review of the *Final Environmental Impact Statement/Final Environmental Impact Report for the All American Canal Lining Project* (USDI 1994).

For the jurisdictional delineation, Dudek reviewed aerial maps from Bing (2018); the USFWS National Wetlands Inventory (NWI) (USFWS 2018b); the USGS National (USGS 2018); the State List of Hydric Soils (USDA 2018); and historical aerials and topographic maps (Google Earth 2018; Historic Aerials Online 2018). The NHD contains water features such as lakes, ponds, streams, rivers, canals, dams, and stream gages (USGS 2018). The USFWS created the NWI to ñprovide biologists and others with information on the distribution and type of wetlands to aid in conservation effortsò (USFWS 2018b). Potential wetlands and waters are mapped by the USFWS based on aerial images and that data is provided to the public. This compilation of data was reviewed to gain a better understanding of the hydrologic setting of the study area.

2.2 Field Surveys

In January 2018, Dudek conducted vegetation mapping, habitat assessments, and a jurisdictional delineation within the Project site including a 300-foot buffer around the intake area; this area is collectively referred to as the study area. Table 2-1 lists the dates, conditions, and survey focus for each survey.

Table 2-1
Schedule of Field Surveys

Date	Time	Personnel	Study area	Survey Type	Conditions
1/16/2018	7:00 AM–11:35 AM	Callie Amoaku	Proposed Intake Study Area	Vegetation mapping; Habitat Assessment; Jurisdictional Delineation	45–57°F; 0–80% cloud cover; 0–1 mph wind
1/29/2018	10:05 AM–2:55 PM	Callie Amoaku	Proposed Project Study Area	Vegetation mapping; Habitat Assessment; Jurisdictional Delineation	74–82°F; 0% cloud cover; 0–3 mph wind

Legend
°F = degrees Fahrenheit; cc = cloud cover; mph = miles per hour

2.2.1 Vegetation Mapping

In September 2010, the California Department of Fish and Game (CDFG)[1] published the *List of Vegetation Alliances and Associations: Natural Communities List Arranged Alphabetically by Life Form* (Natural Communities List; CDFG 2010) based on the *Manual of California Vegetation*, Second Edition (Sawyer et al. 2009), which is the California expression of the National Vegetation Classification Standard, Version 2 (FGDC 2008). These classification systems focus on a quantified, hierarchical approach that includes both floristic (plant species) and physiognomic (community structure and form) factors as currently observed (as opposed to predicting climax or successional stages). The nomenclature for vegetation communities in the study area follows the *Manual of California Vegetation* and the Natural Communities List (CDFG 2010). Natural vegetation communities were mapped using the *Manual of California Vegetation* and Natural Communities List. Each natural community was mapped to the association level where possible. Non-natural land covers (including disturbed habitats, agriculture, open water, and urban/developed) were classified and described in Section 3.2.5.

[1] The California Department of Fish and Game (CDFG) was officially renamed the California Department of Fish and Wildlife (CDFW) as of January 1, 2013. Where references in this document are made to the department for background information, documents, permits, consultations, etc. (guidance) prior to January 1, 2013, the title CDFG is used and for references to guidance after January 1, 2013, CDFW is used.

Prior to conducting the on-site visit, Dudek reviewed available relevant data on vegetation communities and land covers to determine those resources that were applicable and of appropriate quality for use during the mapping effort. Specifically, the following data was reviewed: (1) the vegetation map in support of the DRECP (CDFW 2013) and (2) California GAP Vegetation Data (UCSB 1998). Vegetation community classifications were made directly onto hard copy maps at a 200-scale (1 inch = 200 feet) in the field and were later digitized into the program geodatabase by Dudek biologists. Geographic information system (GIS) analysts digitized the delineated vegetation community boundaries from field maps to create a base vegetation layer using ArcGIS.

The minimum mapping unit was 1 acre or less for communities that are considered high priority for inventory in the *Natural Communities List* (CDFG 2010). Data were collected for representative vegetation communities and land covers, including aspect, dominant layer, structure of dominant layer, associated species and estimated absolute cover, total vegetative cover of each strata, approximate stand size, disturbance information, other observations, and photographs.

2.2.2 Jurisdictional Delineation

In January 2018, Dudek conducted a formal (routine) jurisdictional wetlands delineation within the Proposed Project study area. All areas within the study area were surveyed on foot for waters of the state, including riparian areas or wetlands under the jurisdiction of the ACOE and Regional Water Quality Control Board (RWQCB) pursuant to Sections 404 and 402 of the federal Clean Water Act, and the California Department of Fish and Wildlife (CDFW) pursuant to Section 1600 of the California Fish and Game Code.

CDFW asserts jurisdiction over rivers, streams, and lakes, and riparian vegetation associated with these features. Waters of the state were delineated based on watercourse characteristics present in the field, which include surface flow, sediment transportation and sorting, physical indicators of channel forms, channel morphology, and drainage swales. These characteristics are based on the CDFW guidance document, A Review of Stream Processes and Forms in Dryland Watersheds (Vyverberg 2010).

The RWQCB defines wetlands as follows (SWRCB 2017):

> An area is wetland if, under normal circumstances, (1) the area has continuous or recurrent saturation of the upper substrate caused by groundwater, or shallow surface water, or both; (2) the duration of such saturation is sufficient to cause anaerobic conditions in the upper substrate; and (3) the areaôs vegetation is dominated by hydrophytes or the area lacks vegetation.

Since the RWQCB typically asserts jurisdiction over the same areas as ACOE, guidance from ACOE documents was used to determine the extent of resources regulated by the RWQCB under the Porter-Cologne Act, and are described as follows. Non-wetland waters subject to RWQCB jurisdiction were delineated based on the presence of an OHWM, as determined by ACOE guidance, or any other surface water regulated under the Porter-Cologne Act. Wetland waters subject to RWQCB jurisdiction were mapped based on methods described in the 1987 *Corps of Engineers Wetlands Delineation Manual* (ACOE 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (ACOE 2008a). *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* (ACOE 2008b) and the *Updated Datasheet for the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* (ACOE 2010) were reviewed to assist in determining the limits of non-wetland waters under the jurisdiction of the RWQCB. Pursuant to the federal Clean Water Act (CWA), RWQCB jurisdictional areas include those supporting all three wetlands criteria described in the ACOE manual: hydric soils, hydrology, and hydrophytic vegetation.

To assist in the determination of jurisdictional areas on site, data was collected at two data stations (Appendix A). Representative photographs are included in Appendix B. Hydrology, vegetation, and soils were assessed, and data were collected on approved ACOE forms. The site was evaluated for evidence of an ordinary high water mark (OHWM), surface water, saturation, and wetland vegetation. The extent of any identified jurisdictional areas was determined by mapping the areas with similar vegetation and topography to the sampled locations. The location of data stations and the limits of wetlands were collected in the field using a 200-scale (1 inch = 200 feet) aerial photograph, topographic base, and Trimble GeoXT GPS unit with sub-meter accuracy. The jurisdictional extents were digitized in GIS based on the GPS data and data collected directly onto field maps into a project-specific GIS using ArcGIS software. A more detailed description of the methods is described below.

Hydrophytic Vegetation

Seasonal changes in species composition, human land-use practices, wildfires, and other natural disturbances can adversely affect the wetlands vegetation determination. During the delineation, a data station point was considered positive for hydrophytic vegetation if it passed the basic dominance test (Indicator 1), meaning that more than 50% of the dominant species sampled were characterized as either obligate, facultative wetland, and/or facultative per the *Arid West 2016 Regional Wetland Plant List (Lichvar et al. 2016)*,or if it passed the prevalence index (Indicator 2), which takes into account all plant species in the community, not just dominants. The standard plot sampling technique was used to sample vegetation within a 10-foot radius for herbaceous vegetation and a 30-foot radius for trees, shrubs, and woody vines (ACOE 1987). All plant species observed during the surveys were identified and recorded (see Appendix C).

Hydric Soils

According to the National Technical Committee for Hydric Soils, hydric soils are soils that are ñformed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper partò (59 FR, Number 133). Soil pits were prepared using a ñsharp shooterò shovel to determine if hydric soils were present. The presence of hydric soils was determined through consultations with the ACOE 1987 Wetlands Delineation Manual (ACOE 1987) as well as Field Indicators of Hydric Soils in the United States (USDA and NRCS 2018) and ACOEôs Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0) (ACOE 2008a). Munsell Soil Color Charts were used to determine soil chroma and value. Where feasible, soil pits were prepared to depths ranging from 16 to 18 inches. Dry soils were moistened to obtain the most accurate color. In general, soils from test pits were determined to be hydric if found to be of a chroma one or chroma two with mottles. Excavated soils were examined for evidence of hydric conditions, including low chroma values and mottling, vertical streaking, sulfidic odor, and high organic matter content in the upper horizon. Evidence of previous ponding or flooding was assessed, along with the slope, slope shape, existing landform characteristics, soil material/composition, and hydrophytic vegetation to determine if hydric soils were present.

Hydrology

In accordance with the guidelines prescribed in ACOEôs Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region(Version 2.0) (ACOE 2008a), wetland hydrology indicators are separated into four major groups: Group A, B, C, and D. Group A indicators are based on direct observations of surface flow, ponding, and soil saturation/groundwater. Group B indicators consist of evidence that the site has been or is currently subjected to ponding, including, but not limited to water marks, drift deposits, and sediment deposits. Group C indicators include signs of previous and/or current saturation, including oxidized rhizospheres surrounding living roots and the presence of reduced iron or sulfur, both of which are indicative of extended periods of soil saturation. Group D indicators consist of ñvegetation and soil features that are indicative of current rather than historic wet conditions and include a shallow aquitard and results of the FAC-Neutral test.ò Each group is subdivided into primary and secondary categories based on their frequency and reliability to occur in the Arid West region. See Appendix A for the completed data station forms.

2.2.3 Wildlife

Focused surveys were not conducted for special-status wildlife species; however, wildlife species observed or detected during field surveys by sight, calls, tracks, scat, or other signs were recorded. Binoculars (10 mm Ĭ 40 mm) were used to aid in the identification of observed wildlife. In addition to species actually observed, expected wildlife usage of the site was determined according to known habitat preferences of regional wildlife species and knowledge of their relative distributions in the area. Latin and common names of animals follow Crother (2012) for reptiles and amphibians, American Ornithologistsô Union (AOU) (2018) for birds, Wilson and Reeder (2005) for mammals, North American Butterfly Association (NABA) (2001) or SDNHM (2002) for butterflies, and Moyle (2002) for fish. All wildlife species observed during the surveys were identified and recorded (see Appendix D).

2.2.4 Survey Limitations

The vegetation mapping, habitat assessment and jurisdictional delineation were conducted during the day and during the months of the year when most blooming annuals and perennials were not evident or identifiable. Focused surveys for wildlife and plants were not conducted.

Surveys specifically aimed at detection of the full range of wildlife species were not conducted. However, notes were taken for incidental wildlife observations made during vegetation mapping, and the jurisdictional delineation to establish a general baseline of wildlife diversity within the project area. These surveys were conducted during the daytime, which usually results in few observations of mammals, many of which may be active at night. In addition, many species of reptiles and amphibians are nocturnal or cryptic in their habits and are difficult to observe using standard meandering transects.

The current survey effort provides an accurate representation of the potential for special-status species to occur in the project area. The surveys conducted to date were thorough and comprehensive, and the results of the study contained herein provide a reasonable, accurate assessment of the Proposed Project area.

3 ENVIRONMENTAL SETTING

This section describes the physical setting (Section 3.1), vegetation communities (Section 3.2), jurisdictional delineation and determinations (Section 3.3), plant resources (Section 3.4), wildlife resources (Section 3.5), and wildlife movement (Section 3.6) for the Proposed Project site. The environmental setting was prepared using multiple sources of information, including a literature review and publicly available documents and data and a review of aerial photography and topographic maps. Following review of existing information on biological resources on the site and in the region, project-specific reconnaissance surveys were conducted.

The specific sources of information and data reviewed prior to conducting on-site field work, and a schedule of surveys, including the survey type, date of survey, biologists who conducted the survey, survey timeframe, and the weather conditions during the survey are provided in Section 2.

3.1 Physical Setting

The existing physical conditions of the Proposed Project site that are related to biological resources are discussed in this section of the BTR.

3.1.1 Topography and Soils

The Proposed Project site is located within the Sonoran Desert which is bounded on the west by the Peninsular Ranges and on the east by the Colorado River. The Proposed Project site is relatively flat and ranges from approximately 30 feet above mean sea level (AMSL) at its western extent to 50 feet near I-98. The dominate topography of the Proposed Project site consists of flat fallow agriculture fields.

According to the U.S. Department of Agriculture (USDA and NRCS 2018), there are eight soil types found in the Proposed Project study area: Meloland and Holtville loams, wet; Meloland very fine sandy loam, wet; Rositas fine sand, wet, 0 to 2 percent slopes; Rositas fine sand, 0 to 2 percent slopes; Rositas fine sand, 2 to 9 percent slopes; Rositas sand, 0 to 2 percent slopes; Vint and Indio very fine sandy loams, wet; and Vint loamy very fine sand, wet (Figure 3-1). In addition to the soil types below, the Proposed Project site includes mapped water (USDA and NRCS 2018). Descriptions of these soil types, based on the Web Soil Survey (USDA and NRCS 2018) appear below.

Holtville Family Series. This soil series consists of very deep, well drained soils that formed in mixed and stratified alluvium. Holtville soils are on flat, level floodplains and basins at elevations of 230 feet below to 800 feet above mean sea level (AMSL). The soils are well drained, low runoff, with slow permeability. Holtville soils are widely distributed in the lower Colorado basin of California and supports irrigated areas used for production of cotton, sugar beets, alfalfa, barely, carrots and lettuce. Vegetation in uncultivated areas is mainly annual desert shrubs and weeds.

Indio Family Series. This soil series consists of very deep, well or moderately well drained soils that formed in alluvium derived from mixed rock sources. Indio soils are on alluvial fans, flood plains and lacustrine basins at elevations from 230 feet below sea level up to 1,400 feet above mean sea level (AMSL). The soils are well drained with slow runoff. Indio soils are extensive and are distributed in southeastern southern California; supporting livestock grazing and irrigated cropland. Vegetated in uncultivated areas includes shadscale, bursage, and arrowweed.

Meloland Family Series. This soil series consists of very deep, well drained soils that formed in mixed and stratified alluvium. Holtville soils are on flat, level floodplains and basins at elevations of 230 feet below to 800 feet above mean sea level (AMSL). The soils are well drained, low runoff, with slow permeability. Holtville soils are widely distributed in the lower Colorado basin of California and supports irrigated areas used for production of cotton, sugar beets, alfalfa, barely, carrots and lettuce. Vegetation in uncultivated areas is mainly annual desert shrubs and weeds.

Rositas Family Series. This soil series consists of very deep, somewhat excessively drained soils that formed in sandy eolian material. Rositas soils are on dunes and sand sheets, with slopes from 0% to 30%, at elevations of 270 feet below to 2,000 feet above mean sea level (AMSL). The soils are somewhat excessively drained; negligible to low runoff, with rapid permeability. Rositas soils are widely distributed in southern California and the Sonoran Desert. Rositas soils are used for rangeland and wildlife habitat, and growing citrus fruits, grapes, alfalfa and truck crops. Vegetation in uncultivated areas is mainly creosote bush, white bursage, desert buckwheat and mesquite.

Vint Family Series. This soil series consists of very deep, somewhat excessively drained soils that formed in stratified stream alluvium. Vint soils are on flood plains at elevations from 230 feet below sea level to 2,500 feet above mean sea level (AMSL). The soils are somewhat excessively drained; very slow runoff with rapid permeability. Vint soils are distributed in southeastern California and support livestock grazing and irrigated cropland. Vegetated in uncultivated areas includes mesquite, catclaw, and annual grasses and weeds.

3.1.2 Climate

The Peninsular Ranges are located to the west and as a result is the creation of a ñrain-shadowò effect that creates the arid desert climate. There are two distinct wet seasons in this portion of the desert: annual winter rains and North American monsoons during the end of summer and beginning of fall (from July to late September (NOAA 2004)). The Proposed Project site is located in the Sonoran Desert, which is characterized by hot, dry summers accompanied by mild to cold winters. Rain events, while typically spread out in frequency, are derived from winter frontal storms coming off the Pacific Ocean and intermittent summer convective monsoons. The average high temperature during the summer approaches 104 degrees Fahrenheit (ÅF) with an annual average of 86.2ÅF. Low temperatures range from approximately 39ÅFï 76ÅF, with an annual average low temperature of 55.9ÅF. The average annual precipitation is 2.69 inches. The majority of the rainfall (precipitation over 0.2 inch/month) during the year occurs between August and March with the highest amount of precipitation (0.41-0.42 inch per month) occurring in the winter (December and January) and summer monsoons occurring in August (WRCC 2017).

3.1.3 Hydrologic Setting

The project is located within the Imperial Valley Planning Area that comprises 2,500 square miles within the Colorado River Basin (RWQCB 2017). Surface flows from the Imperial Valley drain north towards the Salton Sea. The project is located within the Deer Peak Watershed and Brawley Hydrologic Area (HA) (Figure 3-2). The Colorado River is the main feature found within the Colorado River Basin and is located approximately 40 miles east of the Proposed Project site. The EHL Canal is located adjacent to the western side of the study area. The EHL Canal receives water from the AAC to the south distributes water to agricultural fields to the north, eventually draining into the Salton Sea. Water is diverted to the AAC at the Imperial Dam along the Colorado River. The AAC is the main source used for irrigation, industrial and domestic purposes (RWQCB 2017). Other major hydrologic features of the region include the New and Alamo Rivers which convey irrigation drainage from agricultural, surface runoff, and waste waters from Imperial Valley.

3.2 Vegetation Communities and Land Covers

The study area consists of seven vegetation communities: arrow weed thickets, bush seepweed scrub, cattail marshes, creosote bush scrub, creosote bush-white bursage scrub, mesquite bosque/mesquite thicket, and tamarisk thickets; and four land covers (disturbed habitat, general agriculture, open water, and urban/developed). Vegetation communities and land cover types are described below and their acreages are presented in Table 3-1. Their spatial distributions are presented in Figure 3-3 series.

Table 3-1
Vegetation Communities and Land Covers

General Habitat	Vegetation Community or Land Cover Type[1]	Study Area
Marsh	Cattail Marshes	0.12
	Marsh Subtotal	*0.12*
Low to High Elevation Riparian Scrub	Arrow weed thickets[2]	0.57
	Tamarisk thickets	10.35
	Low to High Elevation Riparian Scrub Subtotal	*10.92*
Riparian Forest and Woodland	Mesquite bosque, mesquite thicket[2]	5.08
	Riparian Forest and Woodland Subtotal	*5.08*
Chenopod Scrub	Bush seepweed scrub	11.96
	Chenopod Scrub Subtotal	*11.96*

Table 3-1
Vegetation Communities and Land Covers

General Habitat	Vegetation Community or Land Cover Type[1]	Study Area
Sonoran and Mojavean Desert Scrub	Creosote bush scrub	0.35
	Creosote bush-white bursage	0.61
Sonoran and Mojavean Desert Scrub Subtotal		*0.96*
Disturbed and Developed	Disturbed Habitat	31.78
	General Agriculture	491.40
	Open Water	0.02
	Urban/Developed	0.60
Disturbed and Developed Subtotal		*523.80*
Total[3]		552.84

Notes: (NA) = not applicable (i.e., not mapped at this level of detail or not described by CDFW (CDFG 2010))
1 CDFW (CDFG 2010)).
2 Considered special status by CDFW (CDFG 2010)).
3 May not total due to rounding.

3.2.1 Marsh

Cattail Marshes Alliance

The cattail marshes alliance (*Typha* [*angustifolia, domingensis, latifolia*] alliance) includes cattails as the dominant or co-dominant herb in the herbaceous layer. Cattail marshes alliance has a continuous to intermittent canopy less than 1.5 meters (4.9 feet) in height (Sawyer et al. 2009). For a stand of vegetation to be classified as cattail marshes, cattails (*Typha* ssp.) must be greater than 50% relative cover[2] in the herbaceous layer. The cattail marshes alliance occurs throughout California at elevations ranging from sea level to 350 meters (1,148 feet) amsl. The cattail marshes alliance occurs on clay or silty soils in semi-permanently flooded freshwater or brackish marshes (Sawyer et al. 2009).

Proposed Project Information

Cattail marshes occur within the Proposed Project site within a small unnamed canal. On-site cattail marshes alliance is characterized as having greater than 50% relative cover of southern cattail (*Typha domingensis*). Other species present at a low cover include arrow weed (*Pluchea sericea*). This alliance is shown on Figure 3-3f.

2 Relative cover refers to the amount of the stand sampled that is covered by one species as compared to (relative to) the amount of the stand covered by all species (in that group). Thus, 50% relative cover means that half of the total cover of all species is composed of the single species. Relative cover values are proportional numbers and, if added, total 100% for each stand (CNPS and CDFG 2007).

Status

The cattail marshes alliance has a rank of G5S5; therefore, are not considered a sensitive biological resource under CEQA (CDFG 2010). However, it is a wetland community, which is typically afforded protection under CEQA and the Clean Water Act.

3.2.2 Riparian Scrub

Arrow Weed Thickets Alliance

The arrow weed thickets alliance (*Pluchea sericea* alliance) includes arrow weed as the dominant or codominant shrub in the canopy. Arrow weed thickets have an intermittent to continuous shrub canopy less than 5 meters (16 feet) in height and a sparse ground layer with seasonal annuals. For a stand of vegetation to be classified as arrow weed thickets, arrow weed must be greater than or equal to 2% absolute cover[3] in the shrub canopy. This alliance occurs in wetlands that are seasonally flooded and saturated with fresh water located around seeps, canyon bottoms, irrigation ditches, stream sides, and washes (Sawyer et al. 2009).

Proposed Project Information

Arrow weed thickets occurs along the banks of two small unnamed canals. On-site, arrow weed thickets are characterized as having 25-50% absolute cover of arrow weed in the shrub canopy. Other species noted in this association include five-stamen tamarisk, alkali goldenbush (*Isocoma acradenia* var. *eremophila*), and salt grass (*Distichlis spicata*). This alliance is shown on Figure 3-3f.

Status

The arrow weed thickets alliance is ranked as a G3S3 alliance; therefore, is considered a sensitive biological resource under CEQA (CDFG 2010).

3.2.3 Chenopod Scrub

Bush Seepweed Scrub

The bush seepweed alliance (*Suaeda moquinii* alliance) includes alkali goldenbush or bush seepweed as the dominant or codominant shrub in the canopy. Bush seepweed scrub has an open to continuous shrub canopy less than 1.5 meters (5 feet) in height and a sparse ground layer with seasonal annuals. For a stand of vegetation to be classified as bush seepweed alliance, alkali

---

3 Absolute cover refers to the actual percentage of the ground that is covered by a species. For example, arrow weed covers between 5% and 15% of the stand. Absolute cover of all species if added in a stand or plot may total greater or less than 100% because it is not a proportional number (CNPS and CDFG 2007).

goldenbush must be greater than 50% relative cover in the shrub canopy or be characteristically present in the herbaceous layer; or bush seepweed must be greater than 2% absolute cover or 50% relative cover in the shrub canopy. This alliance occurs in flat to gently sloping landscapes, playas, toes of slopes and bajadas on saline or alkaline soils (Sawyer et al. 2009).

Proposed Project Information

On site, bush seepweed is entirely dominated by alkali goldenbush and does not have any bush seepweed in its species composition; however, there are no other alliances with alkali goldenbush as a dominant or codominant species. It occurs in the undisturbed area in the northeastern portion of the study area. On site, bush seepweed scrub is characterized as having 25-50% absolute cover of alkali goldenbush in the shrub canopy. Other species noted in this association include fanleaf crinklemat (*Tiquilia plicata*), Arabian schismus (*Schismus arabicus*), and desert palafox (*Palafoxia arida*). This alliance is shown on Figure 3-3d.

Status

The bush seepweed scrub alliance is ranked as a G4S3 alliance; therefore, is considered a sensitive biological resource under CEQA (CDFG 2010).

Tamarisk Thickets Semi-Natural Stands

The tamarisk thickets or Tamarix spp. semi-natural stands alliance includes the non-native invasive tamarisk as the dominant shrub in the canopy. Tamarisk thickets have a continuous to open shrub canopy less than 8 meters (26 feet) in height with possible emergent trees and a sparse ground layer (Sawyer et al. 2009). For a stand of vegetation to be classified as tamarisk thickets, tamarisk must be greater than 3% absolute cover and 60% relative cover in the shrub canopy. This semi-natural stand occurs in and along ditches, rivers, washes, lake margins, and watercourses (Sawyer et al. 2009).

Proposed Project Information

Tamarisk thickets occurs along the bottom of a berm created from a concrete-lined irrigation canal (which was dry at the time of the surveys) as well as in the undisturbed land in the northeast corner where it is not associated with a canal. On-site, tamarisk thickets are characterized as having 25-75% absolute cover of five-stamen tamarisk in the shrub canopy. Other species noted in this semi-natural stand include alkali goldenbush at low to moderate cover. This alliance is shown on Figures 3-3b through 3-3d.

Status

Tamarisk thickets semi-natural stands are not considered a sensitive biological resource under CEQA (CDFG 2010).

3.2.4 Riparian Forest and Woodland

Mesquite Bosque/Mesquite Thickets Alliance

The mesquite bosque/mesquite thicket alliance (*Prosopis glandulosa* alliance) includes honey mesquite as the dominant or codominant species in the low tree canopy. The mesquite bosque/mesquite thicket alliance has an open to continuous canopy less than 10 meters (33 feet) in height. For a stand of vegetation to be classified as mesquite bosque/mesquite thicket, mesquite must be greater than or equal to 2% absolute cover and greater than 50% relative cover in the tree or tall shrub canopy. This alliance occurs at elevations ranging from sea level to 2,400 meters (7,874 feet) amsl. The mesquite bosque/mesquite thicket alliance occurs on playa lakes, stream banks, river terraces, sand dunes or flooded margins of arroyos and washes (Sawyer et al. 2009).

Proposed Project Information

The mesquite bosque/mesquite thicket alliance occurs within the southern portion of the Proposed Project, just north of I-98. On-site, mesquite bosque/mesquite thickets are characterized as having greater than 15-25% absolute cover of western honey mesquite (*Prosopis glandulosa* var. *torreyana*). Other species noted in this alliance include Arabian schismus, white bursage (*Ambrosia dumosa*), and creosote (*Larrea tridentate*), and alkali goldenbush. This alliance is shown on Figures 3-3f.

Status

The mesquite bosque, mesquite thicket alliance is ranked as a G5S3 alliance; therefore, is considered a sensitive biological resource under CEQA (CDFG 2010).

3.2.5 Sonoran and Mojavean Desert Scrub

Creosote Bush Scrub Alliance

The creosote bush scrub alliance (*Larrea tridentata* alliance) has an open to intermittent shrub canopy cover with shrubs less than 3 meters (10 feet) in height with a open to intermittent ground layer containing seasonal annuals or perennial grasses (Sawyer et al. 2009). For a stand of vegetation to be classified as creosote bush scrub, creosote must exceed other shrubs in cover including emergent small trees and taller shrubs except for white bursage. The creosote bush scrub alliance occurs in the Mojave, Sonoran, and Colorado Deserts; southeastern great basin; and Southern California mountains and valleys. This alliance occurs at elevations ranging from 75 meters below sea level to 1,000 meters (3,280 feet) amsl. The creosote bush scrub alliance occurs on upland slopes, alluvial fans, bajadas, and intermittent washes (Sawyer et al. 2009).

Proposed Project Information

The creosote bush scrub alliance occurs in the southern portion of the Proposed Project study area, between I-98 and the AAC. On-site, the creosote bush scrub alliance is characterized as having 15% to 25% absolute cover of creosote bush in the shrub canopy. Other species noted in this alliance include white bursage and alkali goldenbush with an understory comprised of Arabian schismus (*Schismus arabicus*). This alliance is shown on Figures 3-3f.

Status

The creosote bush scrub alliance is ranked by CDFW (2010) as a G5S5 alliance; therefore, CDFW does not consider the creosote bush scrub alliance a sensitive biological resource under CEQA (CDFG 2010).

Creosote Bush-White Bursage Scrub Alliance

The creosote bushï white bursage scrub alliance (*Larrea tridentata – Ambrosia dumosa* alliance) includes creosote bush and white bursage as co-dominant shrubs in the canopy. Creosote bush ï white bursage scrub has a two-tiered shrub canopy less than 3 meters (10 feet) in height with an open to intermittent ground layer in which annuals are seasonally present (Sawyer et al. 2009). For a stand of vegetation to be classified as creosote bush scrub-white bursage sage scrub, both creosote bush and white bursage must be greater than or equal to 1% absolute cover in the shrub canopy. The creosote bush scrub-white bursage scrub alliance occurs in the Mojave, Sonoran, and Colorado Deserts; southeastern great basin; and Southern California mountains and valleys. This alliance occurs at elevations ranging from 75 meters below sea level to 1,200 meters (3,937 feet) amsl. The creosote bush scrub-white burr sage scrub alliance occurs on upland slopes, alluvial fans, bajadas, and minor washes (Sawyer et al. 2009).

Proposed Project Information

The creosote bush scrub-white bursage scrub alliance occurs in the southern portion of the Proposed Project study area, between Highway-98 and the AAC. On-site, the creosote bush scrub-white bursage scrub alliance is characterized as having greater than 35% relative cover of creosote bush and white bursage in the shrub canopy, including 5% to 15% absolute cover of creosote bush and 5% to 15% absolute cover of white bursage. The understory of this alliance is characterized by Arabian schismus. This alliance is shown on Figures 3-3f.

Status

The creosote bush-white bursage scrub alliance is ranked as a G5S5 alliance; therefore, CDFW does not consider the creosote bush-white bursage scrub alliance a sensitive biological resource under CEQA (CDFG 2010).

3.2.6 Disturbed and Developed

Disturbed Habitat

Disturbed habitat refers to areas that are not developed yet lack vegetation, and generally are the result of severe or repeated mechanical perturbation. Areas mapped as disturbed habitat include primarily dirt roads, but also include areas that have been a result of repeated disturbance (e.g., grading/disking).

Status

Disturbed habitat typically does not support any vegetation; therefore, disturbed habitats are not considered a sensitive biological resource under CEQA (CDFG 2010).

General Agriculture

Agricultural land includes the following agricultural types: agriculture (general), nurseries, orchard agriculture, pastures and crop agriculture, tilled earth, and vineyardï shrub agriculture. Agricultural lands were not mapped within the Proposed Project study area. Nearly the entire Proposed Project study area is mapped as general agriculture occur. All of the agricultural fields were fallow at the time of the surveys. This land cover is shown on Figures 3-3a through 3-3f.

Status

General agriculture is not considered a sensitive biological resource under CEQA (CDFG 2010).

Open Water

The open water mapping unit is not recognized by the Natural Communities List (CDFG 2010). Open water consists of standing water with no emergent vegetation. Open water is mapped within an unnamed canal located immediately south of the Highway-98. Open water is shown on Figure 3-3f.

Status

Open water does not support any vegetation; therefore, open water is not considered a sensitive biological resource under CEQA (CDFG 2010).

Urban/Developed

Urban/developed areas include areas that have been constructed upon or otherwise physically altered to an extent that native vegetation is no longer supported. Urban/developed land is characterized by permanent or semi-permanent structures, pavement or hardscape, and landscaped areas that often require irrigation (Oberbauer et al. 2008). Within the study area, developed areas include Highway-98. This land cover is shown on Figure 3-3f.

Status

Urban/developed land typically does not support any vegetation or is a landscaped area; therefore, urban/developed lands are not considered a sensitive biological resource under CEQA (CDFG 2010).

3.3 Jurisdictional Delineation and Determinations

Dudek performed a formal jurisdictional delineation within the Proposed Project study area in January 2018, with methods described in detail in Section 2.2. A total of two data stations were collected (Appendix A). Representative photographs are included in Appendix B; and the results of the delineations are shown on the Figure 3-3 series.

3.3.1 Federal Jurisdiction

Based on the jurisdictional delineation, two unnamed canals were documented within the Proposed Project study area. The unnamed canals ultimately flow to the AAC and the AAC is subject to the ACOE jurisdiction under Section 404 of the CWA.

There are approximately 0.12 acre of wetlands and 0.02 acre of non-wetland waters under the jurisdiction of ACOE as shown on the Figure 3-3 series. The wetlands on the site are associated with an unnamed canal, located in the southern portion of the intake area (Figure 3-3f). This canal originates in the BLM land east of the study area and appears to outlet into the AAC. It supports perennial water and scattered cattails in the canal bottom with arrowweed growing along the banks. The 0.02 acre of wetlands met all three parameters for a wetland: hydrology, hydrophytic vegetation, and hydric soils (Table 3-3).

3.3.2 State Jurisdiction

Water resources are also subject to state laws administered by CDFW and the RWQCB. Resources subject to the jurisdiction of the CDFW pursuant to Section 1602 of the California Fish and Game Code and RWQCB pursuant to the Porterï Cologne Water Quality Control Act include ephemeral, intermittent, and perennial stream channels. RWQCB asserts jurisdiction over 3-parameter wetlands (SWRCB 2017); and CDFW asserts jurisdiction over riparian habitat associated with a streambed.

Based on the jurisdictional delineation, there are approximately 0.12 acre of wetlands under the jurisdiction of RWQCB described in Table 3-2 and shown on the Figure 3-3 series. These areas met all three parameters for a wetland: hydrology, hydrophytic vegetation, and hydric soils.

Table 3-2
Jurisdictional Waters of the State in the Proposed Project study area

Jurisdiction	Vegetation Community	Acreage
Wetland	Cattail Marshes	0.12
Non-Wetland Water – Perennial	Open Water	0.02
Riparian Vegetation (CDFW only)	Arrow Weed Thickets	0.57
	Grand Total[1]	0.72

1 May not total due to rounding.

The wetlands on the site are associated with an unnamed canal, located in the southern portion of the intake area (Figure 3-3f). This canal originates in the BLM land east of the study area and appears to outlet into the AAC. It supports perennial water and scattered cattails in the canal bottom with arrowweed growing along the banks.

As described above in Section 2.2.2, hydrology, vegetation, and soils were assessed at two data station locations (see Figure 3-3 series and Appendix A) to determine the presence or absence of wetlands field indicators. Results of the data stations are included in Table 3-3.

Table 3-3
Data Station Summary

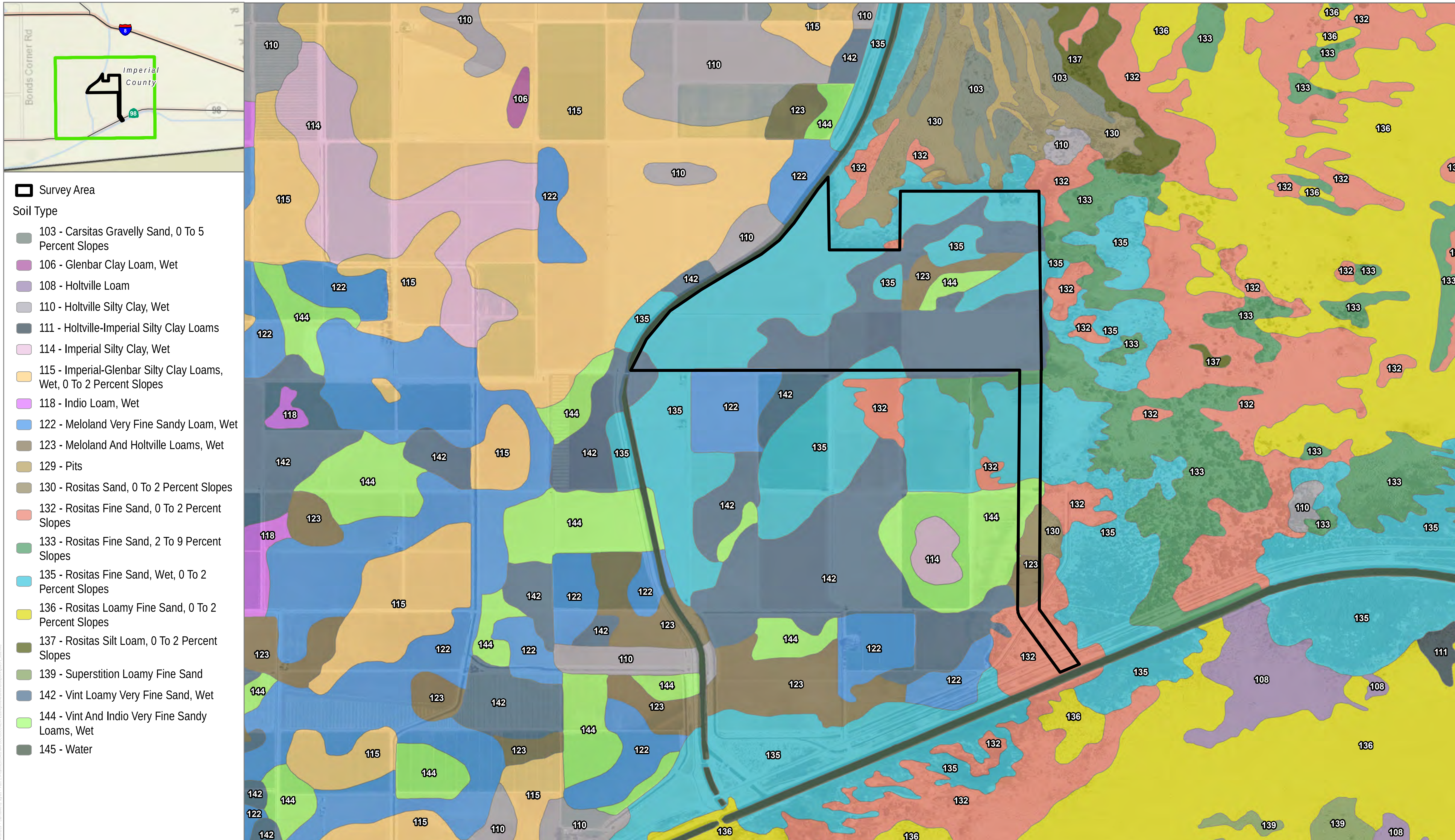
Data Station	Wetland Determination Field Indicators			Stream Association
	Vegetation	*Hydric Soils*	*Hydrology*	
1a	✓	✓	✓	Yes
1b	✓	None	None	Yes

Vegetation communities and/or land covers that may be subject to regulation by ACOE, RWQCB and/or CDFW include: arrow weed thickets and open water. These communities are described in further detail in Section 3.2.

3.4 Plant Resources

A total of 20 species of native or naturalized vascular plants, 12 native (60%) and eight non-native (40%), were recorded within the Proposed Project study area and study area (see Appendix C). As noted in the discussion of survey limitations, surveys were conducted in January, which resulted in detection and identification of most perennial plant species that occur in the area.

No focused special-status plant surveys were conducted in 2018. Special-status plants that are not expected to occur due to lack of suitable vegetation or because the site is outside of the known elevation range of the species are listed in Appendix E. These species are not discussed further because no significant direct, indirect, or cumulative impacts are expected. Table 3-4 evaluates the potential for special-status plants that are in the known elevation range of the project site and that occur in the vegetation communities present in the study area. Based on the literature review, the following special-status plants have a moderate potential to occur within the focused study area: gravel milk-vetch (*Astragalus sabulonum*; CRPR 2B.2), Abrams' spurge (*Euphorbia abramsiana*; CRPR 2B.2), California satintail (*Imperata brevifolia*; CRPR 2B.1), and sand food (*Pholisma sonorae*; CRPR 1B.2).



SOURCE: NAIP 2016, USDA 2015

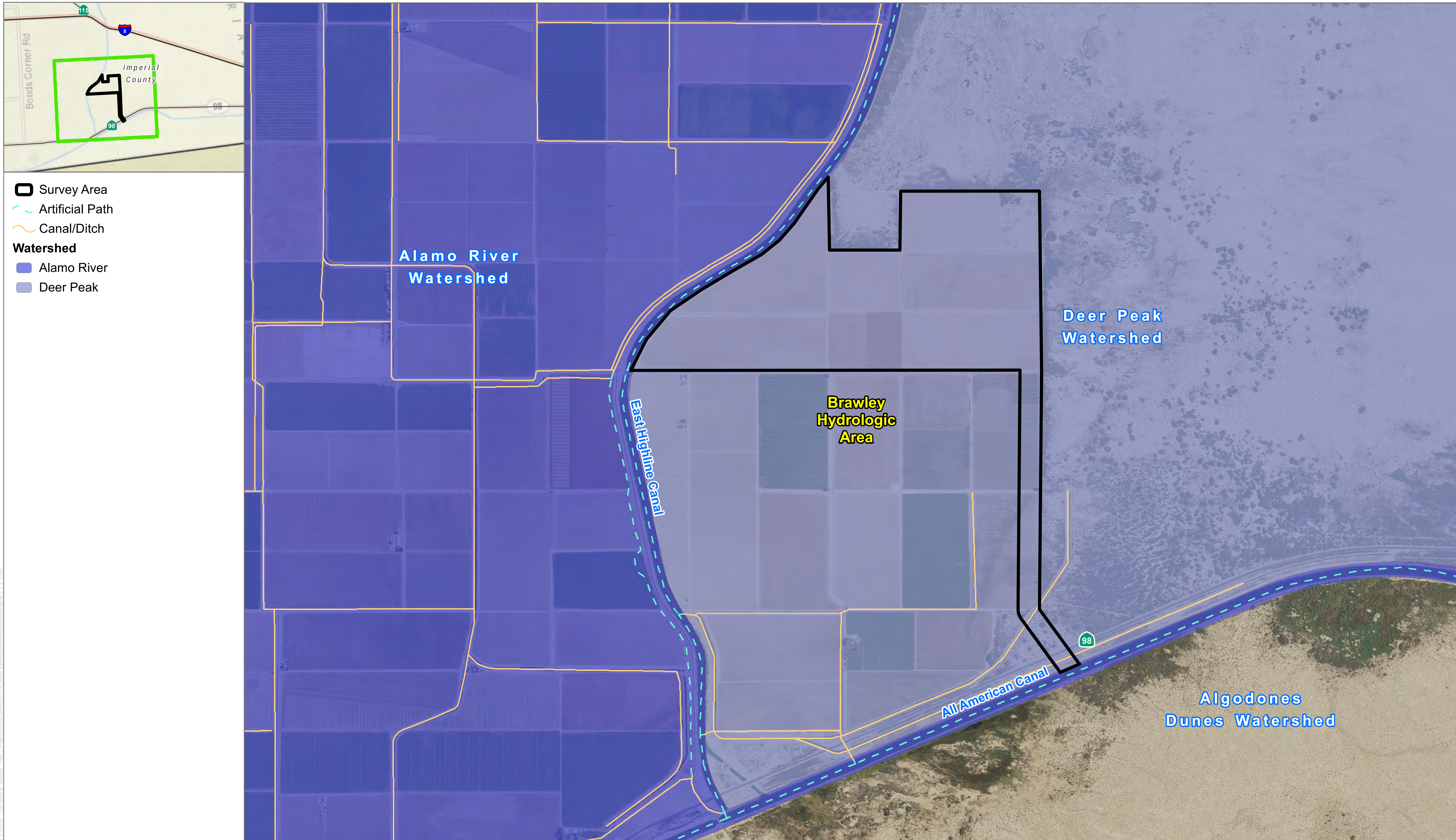
DUDEK

0 1,000 2,000 Feet

FIGURE 3-1

Soils

East Highline Reservoir and Intake Channel Project



SOURCE: NAIP 2016, USGS NHD

DUDEK

0 1,000 2,000 Feet

FIGURE 3-2

Hydrological Setting

East Highline Reservoir and Intake Route Project

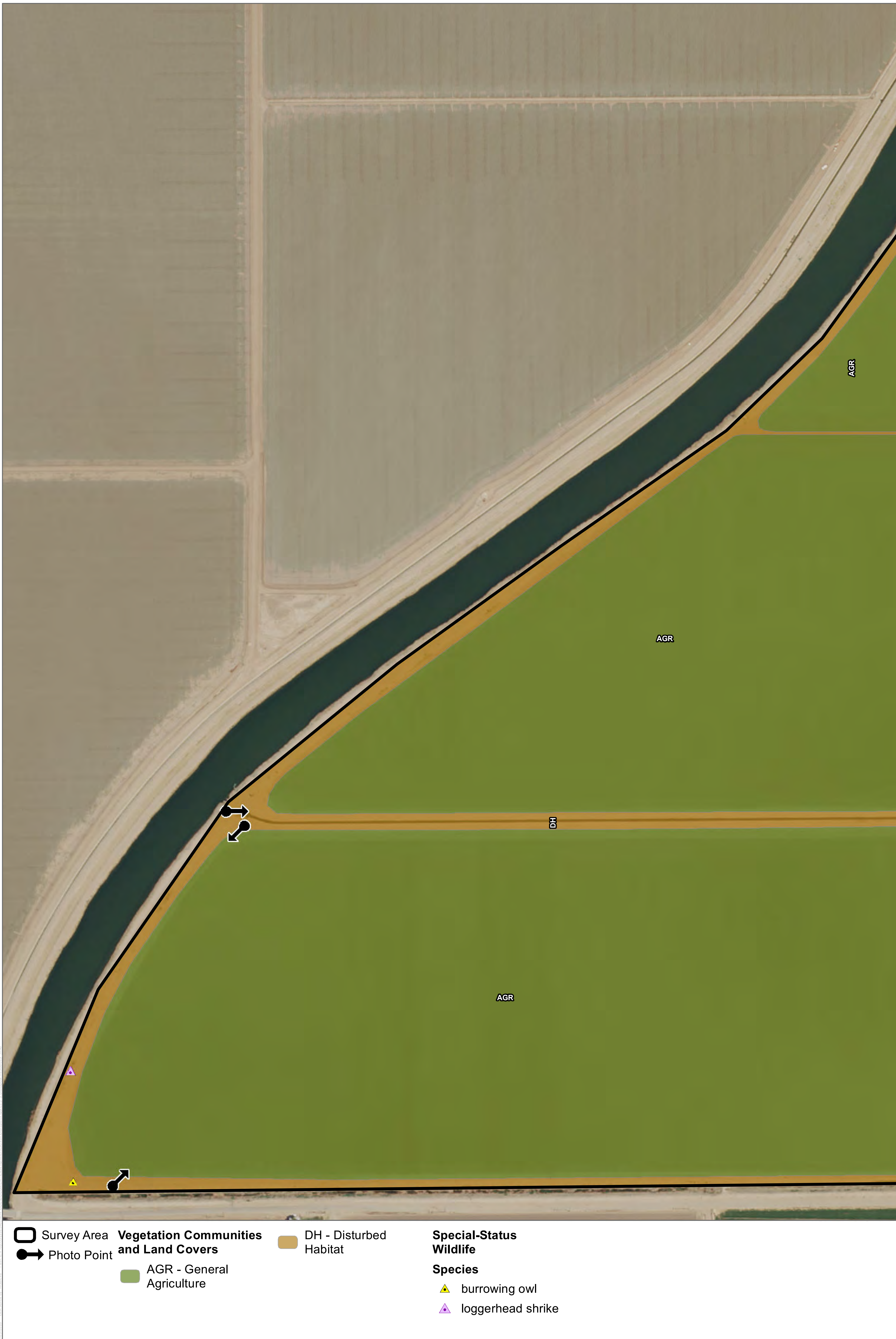
SOURCE: NAIP 2016, DUDEK 2018

DUDEK

FIGURE 3-3

Biological Resources - Index Map

East Highline Reservoir and Intake Channel Project



SOURCE: NAIP 2016, DUDEK 2018

DUDEK

FIGURE 3-3a

Biological Resources - Map 1

East Highline Reservoir and Intake Channel Project

SOURCE: NAIP 2016, DUDEK 2018

DUDEK

FIGURE 3-3b

Biological Resources - Map 2

East Highline Reservoir and Intake Channel Project

Survey Area
Photo Point

Vegetation Communities and Land Covers

AGR - General Agriculture

DH - Disturbed Habitat

TAM - Tamarisk thickets

Special-Status Wildlife Species

prairie falcon

SOURCE: NAIP 2016, DUDEK 2018

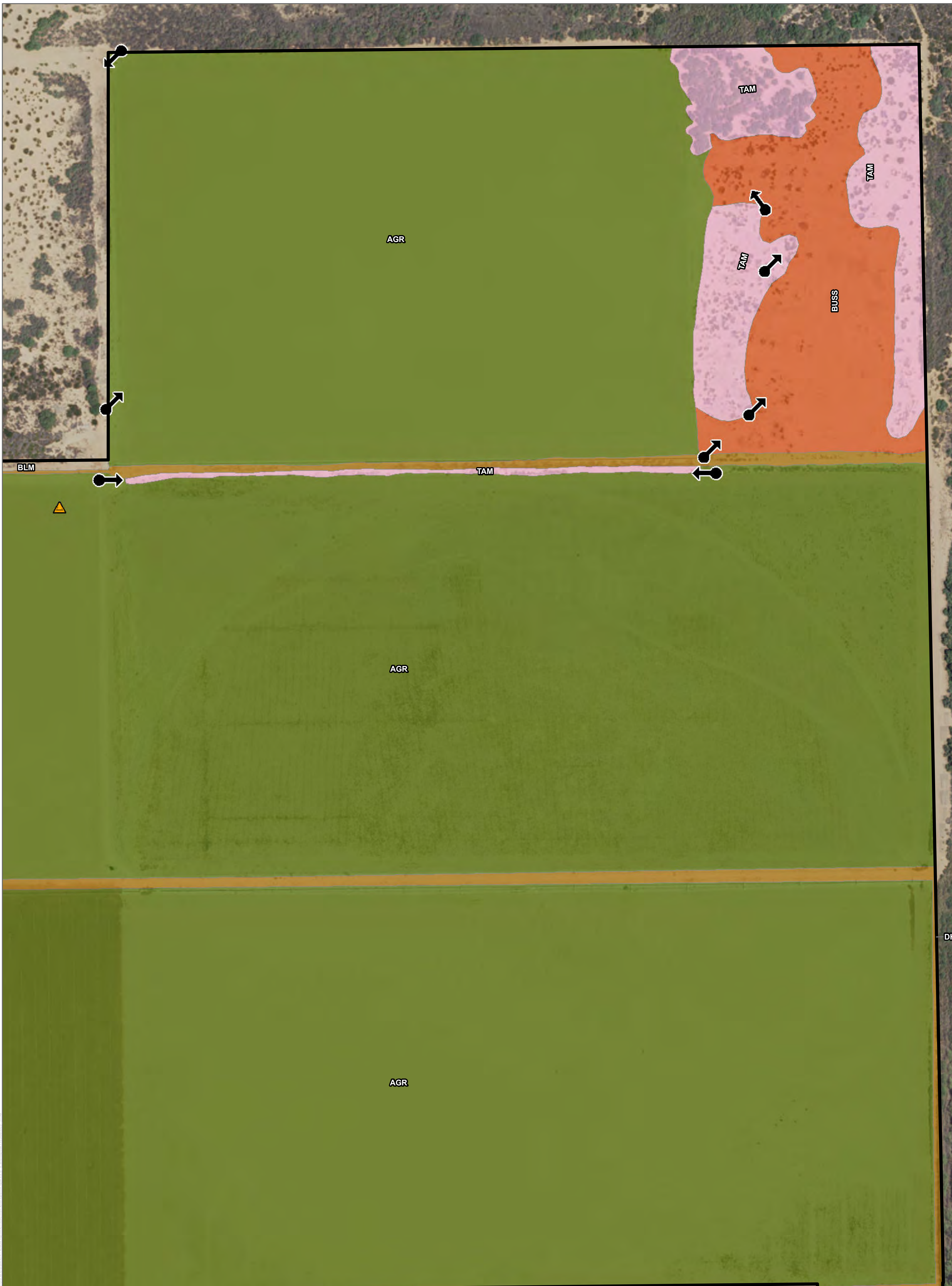
DUDEK

0 150 300 Feet

FIGURE **3-3c**

Biological Resources - Map 3

East Highline Reservoir and Intake Channel Project



Survey Area
Photo Point

Vegetation Communities and Land Covers

AGR - General Agriculture

BUSS - Bush seepweed scrub

DH - Disturbed Habitat

TAM - Tamarisk thickets

Special-Status Wildlife Species

prairie falcon

SOURCE: NAIP 2016, DUDEK 2018

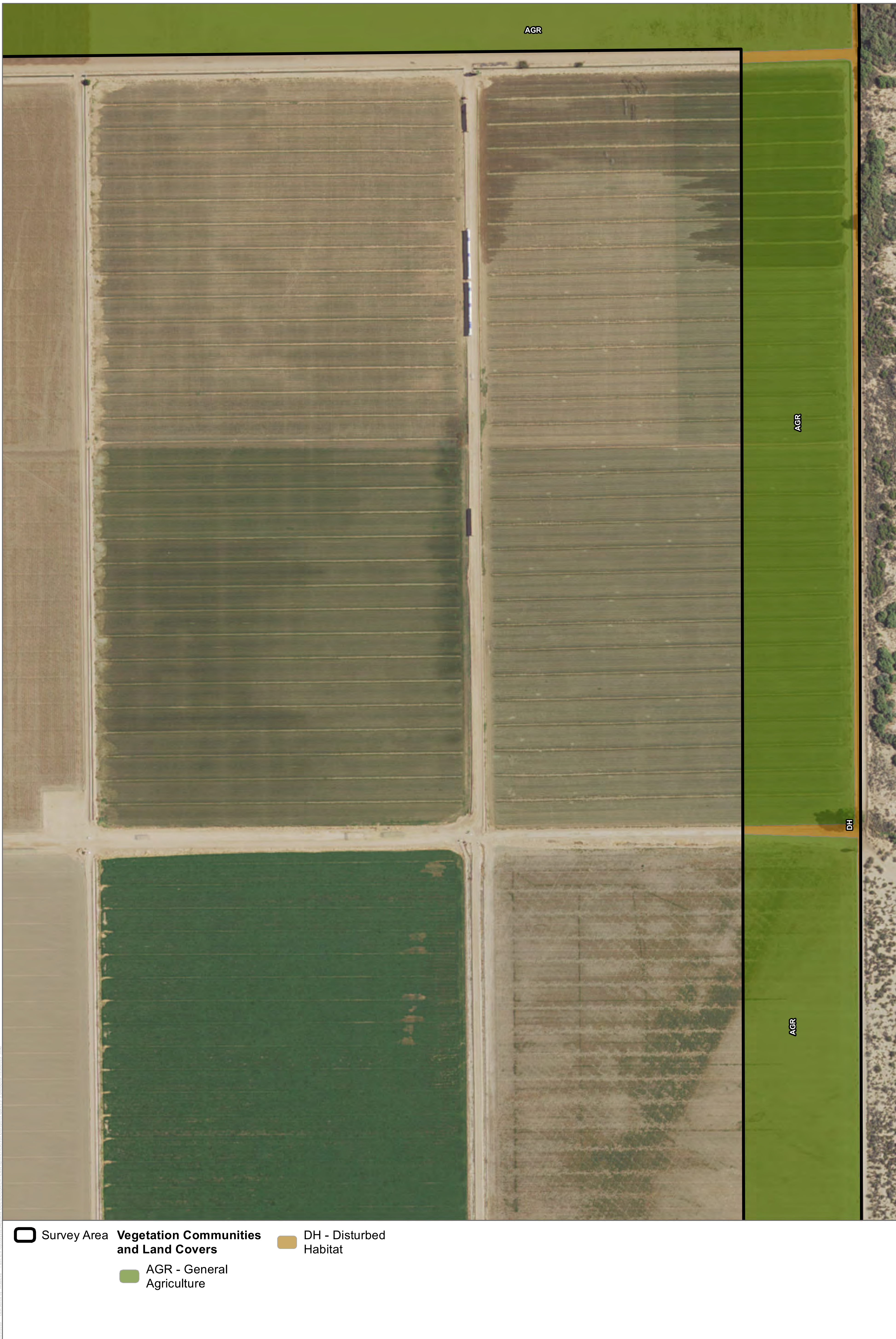
DUDEK

0 150 300 Feet

FIGURE 3-3d

Biological Resources - Map 4

East Highline Reservoir and Intake Channel Project



SOURCE: NAIP 2016, DUDEK 2018

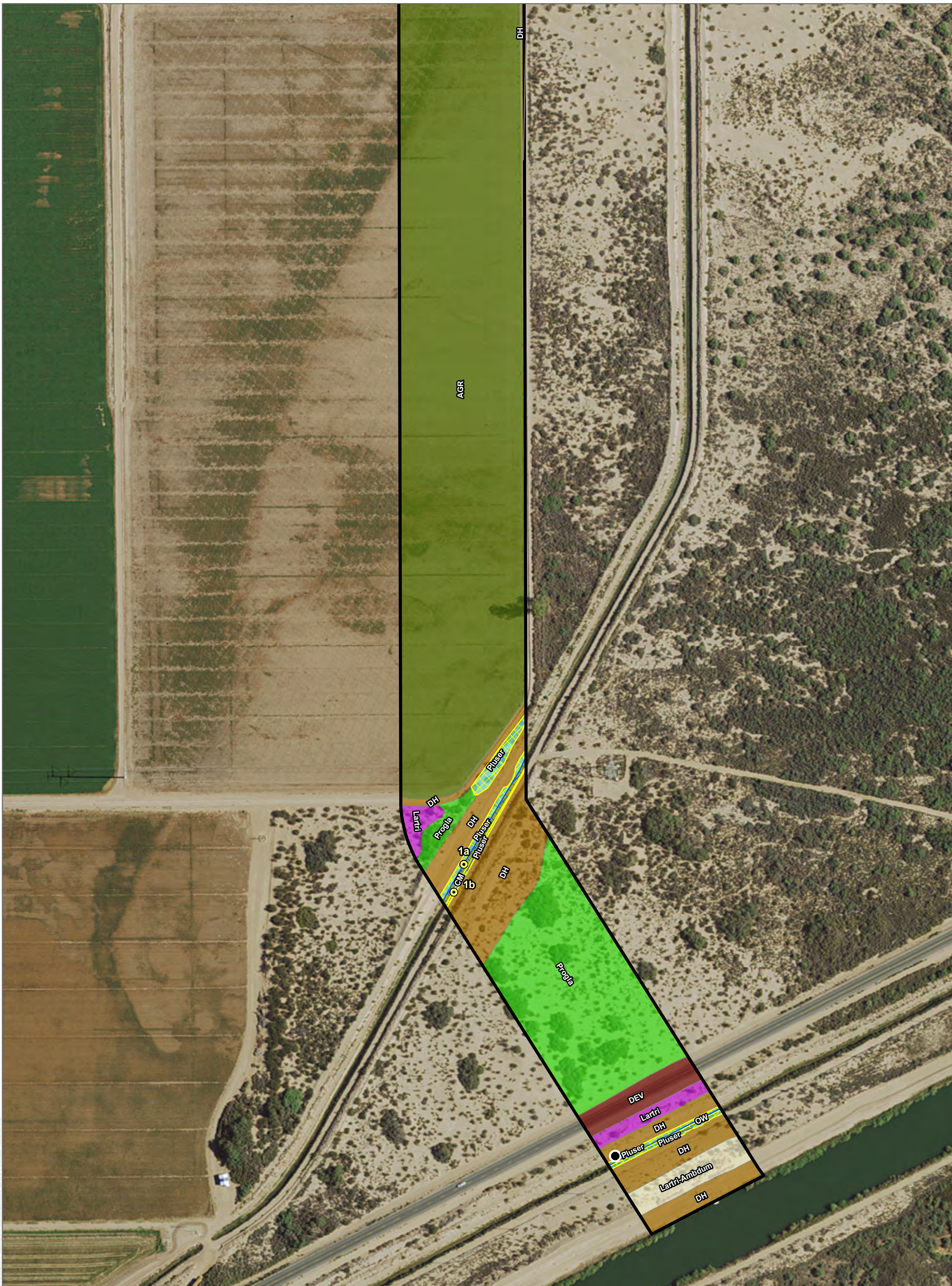
DUDEK

0 150 300 Feet

FIGURE 3-3e

Biological Resources - Map 5

East Highline Reservoir and Intake Channel Project



Survey Area
Data Station

Vegetation Communities and Land Covers

AGR - General
CM - Cattail marshes
DEV - Urban/Developed
DH - Disturbed Habitat
Lartri - Creosote bush
Lartri-Ambdum - Creosote bush-white bursage
OW - Open water
Pluser - Arrow
Progla - Mesquite

Jurisdictional Delineation

ACOE/CDFW/RWQCB
CDFW Only

SOURCE: NAIP 2016; DUDEK 2018

DUDEK

0 175 350 Feet

FIGURE 3-3f

Biological Resources

East Highline Reservoir and Intake Channel Project

INTENTIONALLY LEFT BLANK

Table 3-4
Special-Status Plants with Potential to Occur in the Proposed Project Study Area

Scientific Name	Common Name	Status (Federal/State/ CRPR)	Primary Habitat Associations/ Life Form/ Blooming Period/ Elevation Range (feet)	Potential to Occur
Astragalus sabulonum	gravel milk-vetch	None/None/2B.2	Desert dunes, Mojavean desert scrub, Sonoran desert scrub; Usually sandy, sometimes gravelly. Flats, washes, and roadsides/annual / perennial herb/Feb–June/-195–3050	Potential to occur. Suitable desert scrub and sandy soils are present within portions of the study area.
Euphorbia abramsiana	Abrams' spurge	None/None/2B.2	Mojavean desert scrub, Sonoran desert scrub; sandy/annual herb/(Aug)Sep–Nov/-15–4300	Potential to occur. Suitable desert scrub and sandy soils are present within portions of the study area.
Imperata brevifolia	California satintail	None/None/2B.1	Chaparral, Coastal scrub, Mojavean desert scrub, Meadows and seeps (often alkali), Riparian scrub; mesic/perennial rhizomatous herb/Sep–May/0–3985	Potential to occur. Suitable desert scrub present within portions of the study area.
Pholisma sonorae	sand food	None/None/1B.2	Desert dunes, Sonoran desert scrub (sandy)/perennial herb (parasitic)/(Mar)Apr–June/0–655	Potential to occur. Suitable desert scrub and sandy soils are present within portions of the study area.

Status Legend:
CRPR: California Rare Plant Rank
1B: Plants Rare, Threatened, or Endangered in California and Elsewhere
CRPR 2B: Plants Rare, Threatened, or Endangered in California, But More Common Elsewhere
CRPR 4: Plants of Limited Distribution - A Watch List
Threat Rank
0.1 Seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat)
0.2 – Moderately threatened in California (20%–80% occurrences threatened/moderate degree and immediacy of threat)
0.3 – Not very threatened in California (<20% of occurrences threatened/low degree and immediacy of threat or no current threats known)

Gravel Milk-Vetch

Gravel milk-vetch, a CRPR 2B.2, is an annual herb in the legume family (*Fabaceae*) that occurs within creosote bush scrub. This species occurs in Imperial, Inyo, Riverside, and San Diego Counties between 160 feet below mean sea level and 2,950 feet above mean sea level. Gravel milk-vetch blooms from February to July (Calflora 2018). Suitable desert scrub vegetation is present within portions of the Proposed Project study area.

Abram's Spurge

Abramôs spurge, a CRPR 2B.2, is an annual herb in the spurge family (*Euphorbiaceae*) that occurs within sandy flats. This species occurs in Imperial, Riverside, San Bernardino, and San Diego Counties below 650 feet and blooms from September to November (Calflora 2018). Suitable desert scrub vegetation is present within portions of the Proposed Project study area.

California Satintail

California satintail, a CRPR 2B.1, is a perennial grass in the grass family (*Poaceae*) that occurs within chaparral, coastal sage scrub, creosote bush scrub, and wetland-riparian vegetation communities. This species occurs in 13 counties in California, including Imperial, Los Angeles, and Riverside Counties below 1,640 feet and blooms between September to May (Calflora 2018). Suitable desert scrub and riparian vegetation is present within portions of the Proposed Project study area.

Sand Food

Sand food, a CRPR 1B.2, is perennial parasitic herb in the borage family (*Boraginaceae*) that occurs on sandy soils desert dunes and Sonoran desert scrub. This species occurs in Imperial County from sea level to 656 feet and blooms from April to June (Calflora 2018). Suitable desert scrub vegetation is present within portions of the project.

3.5 Wildlife Resources

A total of 22 wildlife species were recorded within the Proposed Project study area (see Appendix B). Nineteen (19) bird species were observed which included common raven (*Corvus corax*), black phoebe (*Sayornis nigricans*), mourning dove (*Zenaida macroura*), western meadowlark (*Sturnella neglecta*), and American kestrel (*Falco sparverius*). One mammal species, coyote (*Canis latrans*), was detected within the study area. Two invertebrate species were observed which included harvester ant (*Pogonomyrmex sp.*) and queen butterfly (*Danaus gilippus*).

No focused special-status wildlife surveys were conducted in 2018. Five special-status wildlife species were observed during the 2018 biological surveys: burrowing owl (*Athene cunicularia*), Southern California rufous-crowned sparrow (*Aimophila ruficeps canescens*), northern harrier (*Circus hudsonius*), prairie falcon (*Falco mexicanus*), and loggerhead shrike (*Lanius ludovicianus*). Several other special-status wildlife species have the potential to occur in the Proposed Project study area (Table 3-5). Those that occur in the region but that are not expected to occur in the Proposed Project study area, due for example, to a lack of suitable habitat, are included in Appendix F. These species are not discussed further because no significant direct, indirect, or cumulative impacts are expected. Table 3-5 evaluates the potential for special-status wildlife to occur in the Proposed Project study area. Because no focused surveys were conducted, the potential for the species to occur is based on a literature review and observations made during the 2018 site visits.

Table 3-5
Special-Status Wildlife Species Potential to Occur in the Proposed Project study area

Scientific Name	Common Name	Status (Federal/State)	Habitat	Potential to Occur
Reptiles				
Phrynosoma mcallii	flat-tailed horned lizard	None/SSC	Desert washes and flats with sparse low-diversity vegetation cover and sandy soils	High potential to occur in the non-agriculture portions of the study area. Suitable habitat present throughout and surrounding the study area.
Birds				
Athene cunicularia (burrow sites & some wintering sites)	burrowing owl	BCC/SSC	Nests and forages in grassland, open scrub, and agriculture, particularly with ground squirrel burrows	Observed on site during the January 2018 survey. High potential to nest on or adjacent to the study area.
Aimophila ruficeps canescens	Southern California rufous-crowned sparrow	None/WL	Nests and forages in open coastal scrub and chaparral with low cover of scattered scrub interspersed with rocky and grassy patches	Observed on site during the January 2018 survey.The study area is outside of this species' yearlong range (Collins 1999), but may have been wintering or migrating through the site.
Buteo regalis (wintering)	ferruginous hawk	BCC/WL	Winters and forages in open, dry country, grasslands, open fields, agriculture	Moderate potential to occur on site during the winter. Suitable foraging habitat present.
Circus hudsonius (nesting)	northern harrier	None/SSC	Nests in open wetlands (marshy meadows, wet lightly-grazed pastures, old fields, freshwater and brackish marshes); also in drier habitats (grassland and grain fields); forages in grassland, scrubs, rangelands, emergent wetlands, and other open habitats	Observed foraging on site during the January 2018 survey. Unlikely to nest on site because the study area is outside of its known nesting range (Smith et al. 2011).
Falco mexicanus (nesting)	prairie falcon	BCC/WL	Forages in grassland, savanna, rangeland, agriculture, desert scrub, alpine meadows; nest on cliffs or bluffs	Observed foraging on site during the January 2018 survey. Unlikely to nest on site due to disturbance and lack of nesting areas.
Lanius ludovicianus (nesting)	loggerhead shrike	BCC/SSC	Nests and forages in open habitats with scattered shrubs, trees, or other perches	Observed on site during the January 2018 survey. High potential to nest on or adjacent to the study area in scrub or tree habitat.

Table 3-5
Special-Status Wildlife Species Potential to Occur in the Proposed Project study area

Scientific Name	Common Name	Status (Federal/State)	Habitat	Potential to Occur
Laterallus jamaicensis coturniculus	California black rail	BCC/ST, FP	Tidal marshes, shallow freshwater margins, wet meadows, and flooded grassy vegetation; suitable habitats are often supplied by canal leakage in Sierra Nevada foothill populations	Moderate potential to occur within the unnamed canal in the intake area. This species is known to occur in the All American Canal further east (CDFW 2018c).
Rallus obsoletus yumanensis	Yuma Ridgway's rail	FE/ST, FP	Freshwater marsh dominated by Typha spp., Scirpus spp., Schoenoplectus spp., and Bolboschoenus spp.; mix of riparian tree and shrub species along the marsh edge; many occupied areas are now man-made, such as managed ponds or effluent-supported marshes	Moderate potential to occur within the unnamed canal in the intake area. This species is known to occur in the All American Canal further east (CDFW 2018c).
Mammals				
Taxidea taxus	American badger	None/SSC	Dry, open, treeless areas; grasslands, coastal scrub, agriculture, and pastures, especially with friable soils	Moderate potential to occur. There is some potential suitable habitat present in the study area.

Federal:
FE: Federally Endangered
BCC: USFWS bird of conservation concern
State:
SSC: California Species of Special Concern
ST: State Threatened
FP: California Fully Protected Species
WL: California Watch List

3.5.1 Amphibians and Reptiles

Flat-Tailed Horned Lizard

The flat-tailed horned lizard (*Phrynosoma mcallii*) is an SSC species that occupies the Coachella Valley at its northern range limit and extends southeast to the Imperial and Borrego valleys and into Baja California, Mexico. The western limit of the speciesôrange is Anza-Borrego Desert State Park in eastern San Diego County, and to the east they are found in Glamis and Ogilby northwest of Yuma, Arizona, and then into the lower Colorado subdivision of the Sonoran Desert in Arizona (Jones and Lovich 2009). Suitable habitat is characterized as stabilized sand dunes that fall within the creosote-white bursage series of Sonoran Desert Scrub community (Turner and Brown 1982;

Jones and Lovich 2009). They also occur in loose, active sand dunes, although often at the dune periphery or in more stable regions within the active dune habitat. Flat-tailed horned lizard feed almost exclusively on harvester ants, but opportunistically eat small beetles, caterpillars, and termites. No focused surveys were conducted for the flat-tailed horned lizard; none were observed during the 2018 biological surveys of the project footprint. Birds

Burrowing Owl

The burrowing owl (*Athene cunicularia*) is a SSC and Bird of Conservation Concern (BCC) species that inhabits much of California. Burrowing owls prefer open, dry, annual or perennial grasslands, deserts, and scrublands characterized by low-growing vegetation. They usually nest in the old burrow of a ground squirrel, badger, or other small mammal, although they may dig their own burrow in soft soil. Their prey consists mostly of insects, small mammals, reptiles, birds, and carrion. No focused surveys were conducted for burrowing owl, although the species is relatively detectable during the morning hours, when many surveys took place. No burrowing owls were detected in the Proposed Project study area during the 2018 biological surveys but readily colonize new areas if suitable habitat is present.

Ferruginous Hawk

The ferruginous hawk (*Buteo regalis*) is a USFWS Bird of Conservation Concern (BCC) and California Watch List (WL) species. Ferruginous hawk occurs throughout western North America from southernmost Canada between the Great Plains and Rocky Mountains, south to northern Arizona and New Mexico. This species breeds from southeast Alberta and extreme southwest Manitoba south to the northwest corner of Texas, and west to the Great Basin, Columbia River Basin regions of eastern Oregon, and southeast Washington. Ferruginous hawk most commonly winters from Southern California, Colorado, Arizona, and New Mexico to northern Texas. Northern populations are completely migratory, and birds from southern breeding locations appear to migrate short distances or to be sedentary (Bechard and Schmutz 1995). Ferruginous hawk is an uncommon winter resident and migrants at lower elevations and open grasslands in the Modoc Plateau, Central Valley, and Coast Ranges of California (Polite and Pratt 1999).

Northern Harrier

The northern harrier (*Circus hudsonius*) is an SSC species. Northern harriers use a wide variety of open habitats in California, including deserts, coastal sand dunes, pasturelands, croplands, dry plains, grasslands, estuaries, flood plains, and marshes. This species can also forage over coastal sage scrub or other open scrub communities. They nest in western San Diego County in areas associated with marshes, pastures, grasslands, prairies, croplands, desert shrub-steppe, and riparian woodland (Smith et al. 2011; Macwhirter and Bildstein 2011). Winter habitats similarly include a variety of open habitats dominated by herbaceous cover. Northern harrier populations are most concentrated in areas with low vegetation.

Prairie Falcon

The prairie falcon (*Falco mexicanus*) is a BCC and WL species. Prairie falcon is found from southeastern deserts northwest throughout the Central Valley and along the inner Coast Ranges and Sierra Nevada (Zeiner et al. 1990a). This species uses a variety of open habitats, including annual and perennial grasslands, savannahs, rangeland, agricultural fields, desert scrub, and alpine meadows. Prairie falcon requires sheltered cliff ledges for cover and dives from a perch of 50 to 300 feet above ground to catch prey in the air and on the ground in open areas. This species primarily eats small mammals, small birds, and reptiles.

Loggerhead Shrike

The loggerhead shrike (*Lanius ludovicianus*) is a BCC and SSC species. It is found in lowlands and foothills throughout California, and it remains in the southern portion of the state year-round. Preferred habitats for the loggerhead shrike are open areas that include scattered shrubs, trees, posts, fences, utility lines, or other structures that provide hunting perches with views of open ground, as well as nearby spiny vegetation or built structures (such as the top of chain-link fences or barbed wire) that provide means to skewer prey items. This species occurs most frequently in riparian areas along the woodland edge, grasslands with sufficient perch and butcher sites, scrublands, and open-canopied woodlands, although they can be quite common in agricultural and grazing areas. They can sometimes be found in mowed roadsides, cemeteries, and golf courses, although they occur rarely in heavily urbanized areas (Zeiner et al. 1990a). Loggerhead shrike builds nests in stable shrubs or trees requiring dense foliage for well-concealed nests.

California Black Rail

The California black rail (*Laterallus jamaicensis coturniculus*) is designated as threatened in California and primarily occurs in California, Arizona, Baja California, and the Colorado River delta in Sonora. Suitable California black rail habitat generally includes salt marshes, freshwater marshes, and wet meadows. The species is typically identified in conjunction with common threesquare (*Schoenoplectus pungens*), arrowweed (*Pluchea sericea*), Fremont cottonwood (*Populus fremontii*), and seepwillow (*Baccharis salicifolia*). The California black rail typically prey on small (<1 centimeter [0.39 inch]) invertebrates, chiefly insects, gleaned from marsh vegetation and mudflats; they also eat small seeds (Eddleman et al. 1994). No California black rail were detected in the Proposed Project study area during the 2018 biological surveys.

Yuma Ridgeway's Rail

The Yuma Ridgeways rail (*Rallus obsoletus yumanensis*) is designated as threatened in California and is federally listed as endangered. The Yuma Ridgeways rail is primarily known to breed in freshwater, but winter in brackish water (Anderson and Ohmart 1985). The preferred habitat consists of cattails (*Typha* spp.) and bulrush (*Scirpus* ssp.). The Yuma Ridgeways rail primarily feeds on introduced species of crayfish, small fish, insects, amphibian larvae, clams, and other aquatic invertebrates. No Yuma Ridgeways rail were detected in the Proposed Project study area during the 2018 biological surveys. Mammals

American Badger

The American badger (*Taxidea taxus*) is an SSC species. In California they are found throughout the state except in coastal Northern California (Zeiner et al. 1990b). American badger typically occurs in open, sparsely vegetated habitats, but also uses modified habitats such as agriculture. It is found in dry, open areas with friable soils, and can occur throughout the Project Area. Its distribution in a landscape coincides with the availability of prey, burrowing sites, and mates, with distribution of males ranging wider than distribution of females during the breeding season and summer months (Minta 1993). In general, badger activity within a home range tends to concentrate in areas with suitable soils for burrowing or with colonies of ground squirrels.

3.6 Wildlife Movement

Wildlife species generally inhabit suitable habitat patches distributed across a landscape. These habitat blocks, which may make up the speciesôhome range or breeding territory, support most, if not all, of the speciesô life history needs (e.g., food resource, mates, refuge). For those species with wide ranges throughout a landscape, movement corridors are crucial for dispersal, to access food and/or shelter during the winter months, to escape catastrophic events (e.g., flood, fire, etc.), and to ward against genetic in-breeding (Rosenberg et al. 1997). In areas with open landscapes, wildlife has the potential to move across the landscape unimpeded and are not necessarily restricted to movement corridors. Where landscapes have movement constraints such as dense vegetation, steep slopes and canyons, or man-made impediments such as roads and human activity, wildlife may be restricted to wildlife corridors. Wildlife corridors are defined as areas that connect suitable wildlife habitat in a region otherwise fragmented by rugged terrain, changes in vegetation, or human disturbance. Natural features, such as canyon drainages, ridgelines, or areas with vegetation cover, provide corridors for wildlife travel. Wildlife corridors contribute to population viability by (1) assuring the continual exchange of genes between populations, which helps maintain genetic diversity; (2) providing access to adjacent habitat areas, representing additional territory for foraging and mating; (3) allowing for a greater carrying capacity; and (4) providing routes for colonization of habitat lands following local population extinctions or habitat recovery from ecological catastrophes (e.g., fires).

Habitat linkages are patches of native habitat that function to join two larger patches of habitat. They serve as connections between habitat patches and help reduce the adverse effects of habitat fragmentation. The linkage represents a potential route for gene flow and long-term dispersal. Habitat linkages may serve as both habitat and avenues of gene flow for small animals such as reptiles and amphibians. Habitat linkages may be represented by continuous patches of habitat or by nearby habitat ñislandsò that function as ñstepping stonesò for dispersal.

A report prepared for the Wildlands Conservancy and the Bureau of Land Management identifies the corridors within Californiaõs deserts that require maintenance or restoration in order to conserve the wildlife utilizing those corridors as linkages between habitat. The report, *A Linkage Network for the California Deserts* (Penrod et al. 2012), is a finer-scale analysis based on the *California Essential Habitat Connectivity Project* (Spencer et al. 2010), which provides a statewide Essential Habitat Connectivity Map designed to help to inform land-planning efforts across the state (Penrod et al. 2012). Since the Essential Habitat Connectivity Map was created at the state level, it was assumed that additional analysis of connectivity would be required at a more local level, and thus the California Desert Connectivity Project was formed. Unlike the statewide initiative, the California Desert Connectivity Project includes large military bases and areas managed by the Bureau of Land Management. As described in *A Linkage Network for the California Deserts*, the California Desert Connectivity Project focuses on 22 linkages within the Mojave and Sonoran Deserts. The project addresses the habitat and movement requirements of 47 focal species (10 amphibians and reptiles, 13 mammals, 10 birds, 9 plants, and 5 invertebrates) (Penrod et al. 2012). Based on Figure 1, Linkage Planning Areas, of the report, the closest linkage planning area is located northeast of the Proposed Project study area and connects East Mesa with the Chocolate Mountains. Therefore, the Proposed Project study area is located adjacent to, but outside of, any identified regional wildlife movement corridors.

As stated in Section 3.1, the Proposed Project study area consists of primarily agricultural land, disturbed areas (roads), irrigation canals, and small amounts of scrub habitat. Topography across the study area is relatively flat as the site is east of the Peninsular Ranges.

Wildlife can move freely though open landscapes with minimal impediments such as paved roads and development. In denser landscapes where cover is harder for larger animals to penetrate, wildlife will often utilize man-made movement corridors such as scarcely travelled dirt roads and trails, as well as natural paths such as washes and small drainages. The study area is largely agricultural, but is adjacent to undeveloped BLM land to the east where wildlife can move freely throughout the area. Certain wildlife species, such as coyotes and bobcats, may utilize dirt roads and agricultural areas within the Proposed Project study area to move throughout the area. Constraints to wildlife movement include the Mexican Border wall, I-98, and the AAC. While these features may constrain wildlife movement, the low traffic volume, along with light human presence, likely does not preclude wildlife from utilizing the site and surrounding areas.

While not large areas on site, the riparian and wetland habitats in the Proposed Project study area (e.g., cattail marshes, arrow weed thickets etc.), may serve as foraging or resting habitat for migratory birds and other species traveling through the area.

4 IMPACTS AND MITIGATION

The purpose of Section 4 is to describe the direct, indirect, and cumulative impacts of the proposed project on special-status biological resources. The significance determinations for proposed or potential impacts are described in Section 5. Impacts were analyzed within the Proposed Project study area only; therefore, the study area is not further analyzed.

4.1 Methods

4.1.1 Ground-Disturbing Activities

All ground-disturbing impacts will occur in the Proposed Project study area. The approximate acreage of impacts is provided in Table 4-1 and Table 4-2. As described in Section 1.2.1, construction of the main canal off-line reservoir storage project and related infrastructure includes excavating the reservoir, construction of the perimeter roadway, and excavating and concrete lining the intake canal. It is anticipated that the components identified below would be constructed in parallel.

Table 4-1
Potential Ground-Disturbing Impacts to Vegetation Communities from Proposed Project

Vegetation Community/Land Cover	Impact	
	Temporary (Acres)	*Permanent (Acres)*
General Agriculture	83.21	407.73
Bush seepweed scrub	--	--
Cattail Marshes	0.04	0.08
Urban/Developed	0.20	0.41
Disturbed Habitat	5.53	25.89
Creosote bush scrub	0.14	0.21
Creosote bush-white bursage	0.20	0.41
Open Water	0.01	0.02
Arrow weed thickets1	0.16	0.40
Mesquite bosque, mesquite thicket1	1.75	3.32
Tamarisk thickets	0.23	0.77
Total	91.47	439.25

[1] Considered special status by CDFW (CDFG 2010).

Table 4-2
Potential Ground-Disturbing Impacts to Jurisdictional Resources from Proposed Project

Jurisdictional Resource	Impact	
	Temporary (Acres)	*Permanent (Acres)*
Jurisdictional Wetland or Riparian Area		
Cattail Marshes	0.04	0.08
Subtotal Jurisdictional Wetland or Riparian Area	*0.04*	*0.08*
Non-Wetland Waters		
Open Water	0.01	0.02
Subtotal Jurisdictional Non-Wetland Waters	*0.01*	*0.02*
CDFW only Riparian		
Arrow weed thickets	0.16	0.40
Subtotal Non-Wetland Waters and/or CDFW Riparian	*0.16*	*0.40*
Total	0.22	0.50

4.1.2 Description of Impact Types

The definition of the various impact types described herein are defined in this section.

4.1.2.1 Construction-Related Impacts

Construction-Related (Short-Term Temporary) Direct Impacts: Absent the recommended mitigation measures, potential construction-related direct impacts to biological resources could result from unintentional clearing, trampling, or grading outside of the proposed construction zone. Accidental clearing, trampling, or grading outside designated construction zones may occur during construction activities for various reasons, such as incorrect construction grading plans, human error in interpreting grading plans, human error or accidents in operating construction equipment, and misunderstandings by construction personnel in adhering to construction plan requirements, including avoidance of biological resources.

Temporary ground-disturbing activities would occur from the proposed project. Temporary impacts may occur within a 300 foot buffer from the intake channel to allow for activities like vehicles passing, laydown, and staging.

Staging areas during construction would be located within existing disturbed areas to the maximum extent feasible, including existing dirt roads and disturbed areas. Additionally, the permanent loss of or harm to individual special-status plant and wildlife species from construction-related activities is addressed as a construction-related direct impact.

Construction-Related (Short-Term Temporary) Indirect Impacts: For the proposed project, the construction-related (short-term temporary) impacts would primarily be indirect and include temporary effects that are immediately related to construction, such as the generation of construction-related dust or noise.

4.1.2.2 Operations-Related Impacts

The proposed project would consist of a reservoir and intake conveyance canal used to provide water to farms. Water stored for a later devliery would be delivered through an automated gate outlet, which would operate unmanned; therefore, minimal operational activities would occur after completion of the construction activities. Maintenance would be undertaken by IID in accordance with existing practices for inspections and repair. No on-site operations and maintenance facilities would be provided. Inspections would be made via crew trucks and using the existing roads infrastructure and the access and maintenance roads for the intake channel and reservoir.

Operations-Related (Long-Term Permanent) Direct Impacts: Operations-related (long-term) direct impacts are permanent impacts that result in the direct loss of biological resources due to a project (e.g., the permanent loss of wildlife habitat or the permanent loss of or harm to individual special-status plant and wildlife species from operations and maintenance). Permanent ground-disturbing activities would occur from the construction of the reservoir, automated gate outlet, and intake canal. The acreages are estimated in Table 4-1.

Operations-Related (Long-Term Permanent) Indirect Impacts: Operations-related (long-term permanent) indirect impacts could result from the proximity to biological resources after construction. Operations-related (long-term permanent) indirect impacts from the proposed project are expected to be minimal. Examples of operations-related (long-term permanent) to biological resources could include impacts such as dust from maintenance vehicles, human presence, vehicle collision, and noise.

4.2 Thresholds of Significance

The following are the significance thresholds for biological resources provided in the CEQA Appendix G Environmental Checklist, which states that a project could potentially have a significant affect if it:

1. 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 the CDFW or USFWS (**Threshold Bio-1**).

2. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the CDFW or USFWS (**Threshold Bio-2**).
3. Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means (**Threshold Bio-3**).
4. 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 (**Threshold Bio-4**).
5. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance (**Threshold Bio-5**).
6. Conflict with the provisions of an adopted HCP, Natural Community Conservation Plan, or other approved local, regional, or state HCP (**Threshold Bio-6**).

4.3 Threshold Bio-1

Would the project 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 the CDFW or USFWS?

4.3.1 Special-Status Plants

As described in Section 3.4, the following species have potential to occur in the Proposed Project study area:

- gravel milk-vetch (CRPR 2B.2)
- Abrams' spurge (CRPR 2B.2)
- California satintail (CRPR 2B.1)
- sand food (None/None/1B.2)

4.3.1.1 Construction (Short-Term) Impacts

4.3.1.1.1 Direct

Absent the recommended mitigation measures, potential construction-related direct impacts to special-status plants could result during construction from unintentional clearing, trampling, or grading outside of the proposed construction zone. There is a moderate potential that the following special-status plants could be directly impacted by the proposed project: gravel milk-vetch, Abramsôspruge, California satintail, and sand food. If any of these species are present on site, the proposed project could potentially result in significant construction-related direct impacts to special-status plants (Impact BIO-1).

Construction mitigation measures MM-BIO-1 (general construction-related avoidance and minimization measures) and MM-BIO-2 (WEAP training, biological monitoring, and compliance) would apply and these measures would avoid and minimize potential temporary direct impacts to special-status plants because they require the project biologist to conduct a Worker Environmental Awareness Program (WEAP) for all construction/contractor personnel to ensure compliance with the mitigation measures and they require ongoing biological construction monitoring. This includes demarcation of the construction area using highly visible materials in the field that minimize unintentional impacts to special-status plants and their habitat outside the designated construction area. Training and ongoing monitoring would aid in enforcing the requirements that construction must be restricted to designated areas and special-status plants outside the designated construction zone would be avoided.

Additionally, MM-BIO-3 (focused surveys for special-status plants) requires special-status plant surveys for the Proposed Project study area. If special-status plants are found, direct impacts would be avoided, minimized, and/or mitigated. Also, areas that are temporarily impacted shall be recontoured to natural grade and revegetated with application of a native seed mix in accordance with MM-BIO-4 (restoration of temporary impacts to upland habitat). The application of a native seed mix would promote passive restoration of temporary impact areas.

Construction-related direct impacts to special-status species would be less than significant with incorporation of MM-BIO-1, MM-BIO-2, MM-BIO-3, and MM-BIO-4. These biological mitigation measures are described in full in Section 4.3.3.

4.3.1.1.2 Indirect

Special-status plants and suitable habitat for special-status plants may be indirectly impacted during construction if they are present in the undisturbed areas on site.

Potential short-term or temporary indirect impacts to special-status plants resulting from construction activities include: the generation of fugitive dust; the release of chemical pollutants; and the adverse effect of invasive plant species. Potential short-term or temporary indirect impacts to special-status plants are considered significant absent mitigation (Impact BIO-2).

MM-BIO-1 (general avoidance and minimization measures) would minimize the potential effects of construction-related impacts by requiring vehicle maintenance restrictions to avoid chemical spills. MM-BIO-2 (WEAP training, biological monitoring, and compliance) would minimize the potential effects of construction-related impacts by requiring all construction/contractor personnel to attend WEAP training, conducting biological monitoring during construction activities, and requiring compliance with all environmental documents and permits. MM-BIO-4 (restoration of temporary impacts) would help prevent future adverse effects associated with leaving bare ground, such as increased dust and erosion, and would help prevent adverse effects of invasive plant species that may alter the composition of the habitat if introduced during restoration or allowed to passively colonize the area post-construction. MM-BIO-5 (preparation and implementation of a dust control plan) would minimize the effects of dust during construction by implementing a dust control plan, which would require that construction-related dust is suppressed in compliance with the Imperial County Air Pollution Control District (ICAPCD) requirements.

These potential short-term or temporary indirect impacts to special-status plants would be less than significant with implementation of MM-BIO-1, MM-BIO-2, MM-BIO-4, and MM-BIO-5.

4.3.1.2 Operations (Long-Term) Impacts

4.3.1.2.1 Direct

There is a moderate potential that the following special-status plants could be permanently and directly impacted by the proposed project: gravel milk-vetch, Abramsôspruge, California satintail, and sand food. If these plants are present on site, the proposed project could result in significant operations-related direct impact to special-status plants (Impact BIO-3).

MM-BIO-3 (focused surveys for special-status plants) requires special-status plant surveys for the Proposed Project study area, and, if special-status plants are found, direct permanent impacts would be avoided, minimized, and/or mitigated.

These potential long-term or permanent direct impacts to special-status plants would be less than significant with implementation MM-BIO-3.

4.3.1.2.2 Indirect

Potential long-term indirect impacts that could result from development near special-status plants or their suitable habitat include: chemical releases such as oils and grease from vehicles that could degrade habitat; increased invasive plant species that may degrade habitat; and trampling of vegetation and soil compaction by humans, which could affect soil moisture, water penetration, surface flows, and erosion. These potential long-term indirect impacts to special-status plants would be significant absent mitigation (Impact BIO-4).

MM-BIO-1 (general avoidance and minimization measures) requires that vehicles and equipment will be limited to maintenance access roads and the minimal area necessary to perform the work to minimize chemical releases and trampling of vegetation and soils compaction by humans. MM-

BIO-4 (restoration of temporary impacts) would help prevent adverse effects of invasive plant species that may alter the composition of the habitat if introduced during restoration or allowed to passively colonize the area post-construction if these areas are not revegetated.

These potential long-term indirect impacts to special-status plants would be less than significant with implementation of MM-BIO-1 and MM-BIO-4.

4.3.2 Special-Status Wildlife

As described in Table 3-5 and Section 3.5, several special-status wildlife species have been observed or have at least a moderate potential to occur in the Proposed Project study area during some or all seasons. These include flat-tailed horned lizard, burrowing owl, Southern California rufous-crowned sparrow, ferruginous hawk (*Buteo regalis*), northern harrier, prairie falcon, loggerhead shrike, California black rail (*Laterallus jamaicensis coturniculus*), Yuma Ridgewayǿs rail (*Rallus obsoletus yumanensis*), and American badger (*Taxidea taxus*). Potential impacts to each are discussed under both short-term and long-term impacts.

4.3.2.1 Construction (Short-Term) Impacts

4.3.2.1.1 Direct

Two types of short-term direct impacts can potentially occur to special-status wildlife species: impacts to habitat and impacts to the species from injury or mortality of individuals of the species. Total temporary direct impacts would be approximately 91.47 acres. Absent the proposed mitigation measures, impacts causing injury or mortality of individuals could include, for example, crushing of low-mobility species during grading, entombment of burrowing species during grading, collisions with construction equipment, and destruction of bird nests during vegetation removal or grading.

Reptiles

Flat-Tailed Horned Lizard

Suitable habitat occurs in the Proposed Project study area. Focused surveys were not conducted within the Proposed Project study area; therefore, impacts are based upon the presence of suitable habitat and the potential for the species to occur.

Absent the recommended mitigation measures, potential construction-related direct impacts to flat-tailed horned lizard could result from unintentional clearing, trampling, or grading outside of the construction zone in the native habitat areas. These impacts could result in the temporary loss of flat-tailed horned lizard habitat, permanent alteration of habitat, and crushing of flat-tailed horned lizards. Short-term direct impacts to habitat would be significant absent mitigation (Impact BIO-5). Additionally, these low-mobility species would likely not be able to escape construction activity to occupy suitable adjacent habitats and therefore would be particularly susceptible to injury and mortality. In fact, impacts to a relatively small area could mean the loss of a population, which could substantially reduce the speciesô potential survival in the vicinity. This impact would be significant absent mitigation (Impact BIO-6).

Short-term direct impacts to individuals would be reduced through MM-BIO-1 (general construction-related avoidance and minimization measures), which would limit vehicles and construction equipment to identified impact areas and would limit ingress and egress to established roads; MM-BIO-2 (WEAP training, biological monitoring, and compliance) which would require the project biologist to conduct a WEAP for all construction/contractor personnel and would require ongoing biological construction monitoring to ensure compliance with mitigation measures; and MM-BIO-6 (surveys for flat-tailed horned lizard), which will require surveys for flat-tailed horned lizard using protocol surveys, avoidance of these species, where possible, and relocation of individuals that may be captured.

Construction-related direct impacts to flat-tailed horned lizard would be less than significant with incorporation of MM-BIO-1, MM-BIO-2, and MM-BIO-6.

Birds

Burrowing Owl

One burrowing owl was observed during the January 29, 2018 site visit and suitable habitat occurs in the Proposed Project study area. Focused surveys were not conducted within the Proposed Project study area. Absent the recommended mitigation measures, potential construction-related direct impacts to burrowing owl could result from unintentional clearing, trampling, or grading outside of the construction zone. Short-term direct impacts to habitat would be significant absent mitigation (Impact BIO-7). Additionally, ground disturbances could potentially result in destruction of burrowing owl dens, destruction of nests, eggs, and young, and entombment of adults. Burrowing owl is an SSC that has experienced declines in California and loss of individuals and destruction of nests is considered a significant impact (Impact BIO-8).

Construction mitigation measure MM-BIO-7 (burrowing owl pre-construction surveys and avoidance/relocation plan) would result in identification of any burrowing owls within areas potentially impacted by the project, establishment of appropriate buffers, and avoidance of impacts to burrowing owl. MM-BIO-1 (general construction-related avoidance and minimization measures) would limit vehicles and construction equipment to identified impact areas and would limit ingress and egress to established roads. MM-BIO-2 (WEAP training, biological monitoring, and compliance) would further ensure avoidance of impacts to burrowing owls.

Construction-related direct impacts to burrowing owl would be less than significant with incorporation of MM-BIO-1, MM-BIO-2, and MM-BIO-7.

Southern California Rufous-Crowned Sparrow and Ferruginous Hawk

Southern California rufous-crowned sparrow was observed in the northeast corner of the Proposed Project study area in bush seepweed scrub during the January 29, 2018 site visit. The study area is outside of its normal range, and this occurrence is likely a migrant or wintering individual. Ferruginous hawk was not observed, but has potential to forage during the winter when it occurs in this region. Absent the recommended mitigation measures, potential construction-related direct impacts to suitable foraging/wintering habitat could result from unintentional clearing, trampling, or grading outside of the proposed project impact area during construction. These impacts could result in temporary loss of habitat and permanent alteration of habitat for these species. Short-term direct impacts to habitat would be significant absent mitigation (Impact BIO-7). MM-BIO-1 (general construction-related avoidance and minimization measures) would limit vehicles and construction equipment to identified impact areas and would limit ingress and egress to established roads. MM-BIO-2 (WEAP training, biological monitoring, and compliance) would further ensure avoidance of impacts to suitable habitat.

Construction-related direct impacts to suitable habitat would be less than significant with incorporation of MM-BIO-1 and MM-BIO-2.

Northern Harrier

Northern harrier was observed foraging over the agricultural areas in the Proposed Project study area during the January 29, 2018 site visit. Northern harrier does not nest in this region, but does occur in the winter. Absent the recommended mitigation measures, potential construction-related direct impacts to suitable foraging habitat could result from unintentional clearing, trampling, or grading outside of the proposed project impact area during construction. These impacts could result in temporary loss of habitat and permanent alteration of habitat for these species. Short-term direct impacts to habitat would be significant absent mitigation (Impact BIO-7). MM-BIO-1 (general construction-related avoidance and minimization measures) would limit vehicles and construction equipment to identified impact areas and would limit ingress and egress to established roads. MM-BIO-2 (WEAP training, biological monitoring, and compliance) would further ensure avoidance of impacts to suitable habitat.

Construction-related direct impacts to suitable habitat would be less than significant with incorporation of MM-BIO-1 and MM-BIO-2.

Prairie Falcon and Loggerhead Shrike

Praire falcon was observed foraging over the agricultural areas in the Proposed Project study area during the January 29, 2018 site visit; however, there is no suitable nesting habitat on site. Loggerhead shrike was observed perched on power lines within and adjacent to the study area on January 29, 2018. There is some suitable nesting habitat within the scrub habitat in the study area.

Absent the recommended mitigation measures, potential construction-related direct impacts to suitable habitat and/or nests (loggerhead shrike) could result from unintentional clearing, trampling, or grading outside of the proposed project impact area during construction. These impacts could result in temporary loss of habitat, permanent alteration of habitat for these species, and impacts to active nests. Short-term direct impacts to habitat would be significant absent mitigation (Impact BIO-7). Construction mitigation measure MM-BIO-8 (nesting bird pre-construction surveys and avoidance plan) would result in identification of any active nests within areas potentially impacted by the project, establishment of appropriate buffers, and avoidance of impacts to loggerhead shrike nests. MM-BIO-1 (general construction-related avoidance and minimization measures) would limit vehicles and construction equipment to identified impact areas and would limit ingress and egress to established roads. MM-BIO-2 (WEAP training, biological monitoring, and compliance) would further ensure avoidance of impacts to suitable habitat.

Construction-related direct impacts to suitable habitat and/or active nests would be less than significant with incorporation of MM-BIO-1, MM-BIO-2, and MM-BIO-8.

California Black Rail and Yuma Ridgeway's Rail

California black rail and Yuma Ridgewayôs rail were not observed during the 2018 site visits; however, suitable habitat occurs in some of the canals in Proposed Project study area and there are CNDDB occurrences from 2008 for both of these species within the AAC, which is located immediately to the south of the intake area and flows in an east-west direction (CDFW 2018c; Figure 1). Focused surveys were not conducted within the Proposed Project study area; therefore, impacts are based upon the presence of suitable habitat and the potential for the species to occur. Absent the recommended mitigation measures, potential construction-related direct impacts to California black rail and Yuma Ridgewayôs rail could result from unintentional clearing, trampling, or grading outside of the construction zone. Also, temporary ground-disturbing activities, such as vehicles passings, laydown, and staging areas, would occur from the proposed project; the acreages for temporary impacts are estimated in Table 4-1. Short-term direct impacts to habitat would be significant absent mitigation (Impact BIO-8). Additionally, ground disturbances could potentially result in destruction of nests, eggs, and/or young. Loss of individuals or destruction of nests is considered a significant impact (Impact BIO-9).

Construction mitigation measure MM-BIO-8 (nesting bird pre-construction surveys and avoidance plan) would result in identification of any California black rails and Yuma Ridgewayôs rails within areas potentially impacted by the project, establishment of appropriate buffers, and avoidance of impacts to California black rail and Yuma Ridgewayôs rail. MM-BIO-1 (general construction-related avoidance and minimization measures) would limit vehicles and construction equipment to identified impact areas and would limit ingress and egress to established roads. MM-BIO-2

(WEAP training, biological monitoring, and compliance) would further ensure avoidance of impacts to California black rails and Yuma Ridgewayôs rails.

Construction-related direct impacts to California black rail and Yuma Ridgewayôs rail would be less than significant with incorporation of MM-BIO-1, MM-BIO-2, and MM-BIO-8.

Mammals

American Badger

No badgers or badger burrows were observed during the 2018 site visits, but there are some historical occurrences in the El Centro area west of the project site (CDFW 2018c).

Absent the recommended mitigation measures, potential construction-related direct impacts to American badger could result from unintentional clearing, trampling, or grading outside of the proposed project impact area during construction. Also, temporary ground-disturbing activities, such as vehicles passings, laydown, and staging areas, would occur from the proposed project; the acreages for temporary impacts are estimated in Table 4-1. These impacts could result in temporary loss of American badger habitat, permanent alteration of habitat, and crushing of badgers, either above ground or in burrows. Short-term direct impacts to habitat would be significant absent mitigation (Impact BIO-7). MM-BIO-1 (general construction-related avoidance and minimization measures) would limit vehicles and construction equipment to identified impact areas and would limit ingress and egress to established roads. MM-BIO-2 (WEAP training, biological monitoring, and compliance) would further ensure avoidance of impacts to American badger or their suitable habitat.

Construction-related direct impacts to American badger and/or suitable habitat would be less than significant with incorporation of MM-BIO-1 and MM-BIO-2.

4.3.2.1.2 Indirect

Short-term indirect impacts to special-status wildlife species are those that occur during construction to species present near the site, but not within the construction zone. These include fugitive dust that can degrade habitat and result in health implications for wildlife species; noise and vibration that can stress wildlife species or cause them to leave an area of otherwise suitable habitat, or that can result in disruption of bird nesting and abandonment of nests; increased human presence, which can also disrupt daily activities of wildlife and cause them to leave an area; night-time lighting, which can disrupt the activity patterns of nocturnal species, including many mammals and some birds, amphibians, and reptiles; and release of chemical pollutants, such as from oil leaks from construction vehicles and machinery. These potential indirect impacts to special-status wildlife species would be significant absent mitigation (Impact BIO-10).

Short-term direct impacts from injury or mortality of individuals would be reduced through MM-BIO-1 (general construction-related avoidance and minimization measures) would further reduce this impact by requiring demarcation of the construction area using highly visible materials, so as to minimize unintentional impacts to surrounding resources; limit work to daytime hours to reduce night-time lighting; enforce speed limits to reduce collisions; and vehicles and equipment stored over drip-pans to reduce contaminants. MM-BIO-2 (WEAP training, biological monitoring, and compliance) would require the project biologist to conduct a WEAP for all construction/contractor personnel and would require ongoing biological construction monitoring to ensure compliance with mitigation measures. Training and ongoing monitoring would aid in enforcing the requirements that construction must be restricted to designated areas and impacts would not occur to special-status species outside the designated construction zone.

4.3.2.2 Operations (Long-Term) Impacts

4.3.2.2.1 Direct

Long-term direct impacts to special-status wildlife species, as with short-term direct impacts, include habitat impacts and impacts resulting in injury or mortality of individuals. Habitat impacts are permanent impacts from loss of vegetation communities and land covers. As shown in Table 4-1, the project would result in permanent impacts to 5.21 acres of vegetation communities and 434.04 acres of land covers. Long-term direct impacts from injury or mortality of individuals include impacts occurring from activities related to operations and maintenance. For example, occasional road grading could result in crushing of low-mobility wildlife species occurring along the existing road or entombment of burrowing species in previously disturbed areas (although some of the burrowing species occurring in the project area avoid such areas).

Reptiles

Flat-Tailed Horned Lizard

There is suitable habitat for flat-tailed horned lizard in the scrub habitat within the Proposed Project study area. Focused surveys were not conducted within the Proposed Project study area; therefore, impacts are based upon the presence of suitable habitat and the potential for the species to occur.

Permanent direct impacts from construction of the reservoir, roads, and intake canal are estimated in Table 4-1. However, due to the small size of the permanent impacts to native habitat, these impacts are not considered a significant impact.

Birds

Burrowing Owl

Burrowing owl was observed during the 2018 site visit. Focused surveys were not conducted within the Proposed Project study area to determine the number of individuals; therefore, impacts are based upon the presence of suitable habitat and the potential for the species to occur. Permanent direct impacts from construction of the reservoir, roads, and intake canal are estimated in Table 4-1. Burrowing owls can occur in some portions of the agriculture land; however, these areas are currently subject to regular disturbance and therefore, are not considered to be suitable over the entire area. Permanent impacts to primarily agriculture lands are not considered a significant impact.

Southern California Rufous-Crowned Sparrow and Ferruginous Hawk

Southern California rufous-crowned sparrow was observed during the 2018 site visit; however, the Proposed Project study area is located outside of the speciesô yearlong range. It is assumed the species may have been wintering or migrating through the site. Ferruginous hawlk was not recorded during the 2018 site vistis; however, suitable habitat occurs in the Proposed Project study area. Permanent direct impacts from construction of the reservoir, roads, and intake canal are estimated in Table 4-1. However, due to the small size of the permanent impacts to native habitat, these impacts are not considered a significant impact.

Northern Harrier

Northern harrier was recorded foraging during the 2018 site visits; however, the species is unlikely to nest on site because the Proposed Project study area is located outside of its known nesting range (Smith et al. 2011). Permanent direct impacts from construction of the reservoir, roads, and intake canal are estimated in Table 4-1. However, due to the small size of the permanent impacts to native habitat, these impacts are not considered a significant impact.

Prairie Falcon and Loggerhead Shrike

Prairie falcon and loggerhead shrike were both observed within the Proposed Project study area during the 2018 site visits. Permanent direct impacts from construction of the reservoir, roads, and intake canal are estimated in Table 4-1. However, due to the small size of the permanent impacts to native habitat, these impacts are not considered a significant impact.

California Black Rail and Yuma Ridgeway's Rail

California black rail and Yuma Ridgewayôs rail were not recorded during the 2018 site visits; however, suitable habitat occurs in the Proposed Project study area and there are CNDDB occurrences from 2008 for both of these species within the AAC near the project site (CDFW 2018c). Permanent direct impacts from construction of the reservoir, roads, and intake canal are estimated in Table 4-1. However, due to the small size of the permanent impacts to native habitat, these impacts are not considered a significant impact.

Mammals

American badger

This species has a moderate potential to occur in or adjacent to the Proposed Project study area. Permanent direct impacts from construction of the reservoir, roads, and intake canal are estimated in Table 4-1. However, due to the small size of the permanent impacts to native habitat, these impacts are not considered a significant impact.

4.3.2.2.2 Indirect

Long-term indirect impacts to special-status wildlife species include impacts that could occur after construction is completed during operations and maintenance. These impacts occur when operations and maintenance activities occur within or adjacent to habitat occupied by special-status wildlife species. The primary potential long-term indirect impacts to special-status wildlife species from the proposed project are long-term habitat degradation from temporary impacts, vehicle collisions, and increased human presence. Habitat degradation can occur because the introduction of non-native plant species affects aspects of habitat structure and food resources that are essential to some species. Vehicle collisions have the potential to occur along access roads. Although vehicle traffic is expected to be low, the presence of moving vehicles on roads through occupied habitat could pose a hazard to low and moderate mobility mammals and reptiles and even to some birds. Absent mitigation measures, these impacts would be significant (Impact BIO-11).

Due to the limited operations and maintenance, human presence during operations and maintenance activities is not anticipated to disrupt breeding, nesting, and foraging behaviors.

Long-term direct impacts from injury or mortality of individuals would be reduced through MM-BIO-1 (general avoidance and minimization measures) would reduce this impact by limiting work to daytime hours to reduce night-time lighting; restrictions on activities for personnel; and enforce speed limits to reduce collisions.

4.3.2.2.3 Beneficial Impacts

The creation of a single bay reservoir facility, covering approximately 370 acres, as well as the intake channel, would potentially provide an open water source in the area. This would primarily benefit birds that can use it as a water source or for stop over during migration. Bats would be attracted to the site for insect foraging. Other small mammals and wildlife species can access the reservoir, but larger wildlife would be deterred by the proposed fence surrounding the reservoir.Given the location between the Salton Sea and the Gulf of California, it is expected to be used by a variety of wildlife species, particularly birds during migration.

4.3.3 Mitigation Measures

MM-BIO-1 General Avoidance and Minimization Measures

The following avoidance and minimization measures shall be implemented during project construction and operations and maintenance. These measures have been organized into subcategories for ease of reading.

Work Hours

- Construction and operations and maintenance activities within 50 feet of the outside edge of the construction zone or work area containing habitat for special-status wildlife will be prohibited between sunset and sunrise, and all construction-related or maintenance-related lighting will be turned off during that period, with the exception of lighting for maintenance during operations and maintenance and emergencies (defined as an imminent threat to life or significant property) activities. If necessary, lighting for maintenance during operations and maintenance and emergencies within 50 feet of habitat for special-status wildlife will be directed away from natural areas.

Debris/Non-native Vegetation/Pollution

- Fully covered trash receptacles that are animal-proof will be installed and used during construction to contain all food, food scraps, food wrappers, beverage containers, and other miscellaneous trash. Trash contained within the receptacles will be removed at least once a week from the Proposed Project site.
- No litter, construction materials, or debris will be discharged into state-jurisdictional waters.
- Construction work and operations and maintenance areas shall be kept clean of debris, such trash, and construction materials.

Vehicle and Equipment Restrictions and Maintenance

- Night-time construction should be minimized to the extent possible. However, if night-time activity (e.g., equipment maintenance) is necessary, then the speed limit shall be 10 mph.
- Vehicle operation within state-jurisdictional waters when surface water is present will be prohibited. Any equipment or vehicles driven and/or operated within or adjacent to a state-jurisdictional channel will be checked and maintained by the

operator daily to prevent leaks of oil or other petroleum products that could be deleterious to aquatic life if introduced to the watercourse.

- During construction, vehicles and equipment access will be limited to the identified impact areas, and ingress and egress will be limited to existing roads. During operations and maintenance, vehicles and equipment will be limited to maintenance access roads and the minimal area necessary to perform the work.
- Staging and storage areas for spoils, equipment, materials, fuels, lubricants, and solvents will be located outside the state-jurisdictional channels and within the designated impact area. Stationary equipment, such as motors, pumps, generators, compressors, and welders, located within or adjacent to state-jurisdictional waters shall be positioned over drip-pans or other containment. Prior to refueling and lubrication, vehicles and other equipment shall be moved away from the state-jurisdictional channels.

Other Restrictions on Activities and Personnel

- No pets, such as cats or dogs, should be permitted on the Proposed Project site during construction or operations and maintenance.
- Any contractor, employee, or agency personnel who is responsible for inadvertently killing, injuring, or trapping a listed species shall immediately report the incident to the project biologist during construction and the operations manager during operations and maintenance. The project biologist or operations manager shall contact the U.S. Fish and Wildlife Service (USFWS) (for federal Endangered Species Act species) and California Department of Fish and Wildlife (CDFW) (for California Endangered Species Act species) immediately in the case of a dead, injured, or entrapped listed species. The Sacramento USFWS Office and CDFW shall be notified in writing within 3 working days of the accidental death or injury to a listed species during project-related activities. Notification must include the date, time, and location of the incident or of the finding of a dead or injured animal and any other pertinent information. The USFWS office that covers Imperial County is located at 2177 Salk Avenue, Suite 250, Carlsbad, California 92008, 760.431.9440. The CDFW Inland Desert Region office is located at 3602 Inland Empire Boulevard, Suite C-220, Ontario, California 91764, 909.484.0167.
- To prevent inadvertent entrapment of special-status wildlife during construction, all excavated, wells, steep-walled holes or trenches more than 2 feet deep shall be covered with plywood or similar materials at the close of each working day, or be provided with one or more escape ramps constructed of earth fill or wooden planks. Before such holes or trenches are filled, they shall be thoroughly inspected for

trapped wildlife. If trapped animals are observed, escape ramps or structures shall be installed immediately to allow escape.

- All pipes, culverts, or similar structures with a diameter of 4 inches or more that are stored at a construction site for one or more overnight periods shall be thoroughly inspected for special-status wildlife or nesting birds before the pipe is subsequently buried, capped, or otherwise used or moved in any way. If an animal is discovered inside a pipe, that section of pipe shall not be moved until the project biologist has been consulted and the animal has either moved from the structure on its own accord or until the animal has been captured and relocated by the project biologist. If a federally or state-listed species is discovered, that section of pipe shall not be moved until the USFWS and/or CDFW has been consulted. If necessary, under the direct supervision of the project biologist, the pipe may be moved once to remove it from the path of construction activity until the species has escaped.

MM-BIO-2 Environmental Awareness Training, Biological Monitoring, and Compliance

Worker Environmental Awareness Program and Ongoing Training

Prior to the initiation of any on-site grading, all construction/contractor personnel working on site must complete training through a Worker Environmental Awareness Program (WEAP). New construction workers engaged in construction activities (e.g., grading, utility installation, etc.) shall complete WEAP training within the first week of deployment on the site. Additionally, operational staff shall complete WEAP training prior to deployment on the site.

The training shall include the following:

- Provide the training materials for WEAP training. These materials shall include the measures and mitigation requirements for protected plant and wildlife species (e.g., avoidance and buffer requirements, night-time construction limitations, etc.); and the location and mitigation requirements for waters of the state. WEAP training will also include driver training to avoid and minimize collision risks with protected species, and reporting protocols in the event that any dead or injured wildlife are discovered.
- Copies of mitigation measures and permits from resource agencies, such as the CDFW, ACOE, and RWQCB, will be made available.

Biological Monitoring and Compliance Documentation

The project biologist shall perform the biological monitoring and compliance documentation for the project during construction, including the following:

- Prior to the initiation of any on-site grading, the project biologist will document that required pre-construction surveys and/or relocation efforts have been implemented.
- The project biologist will periodically monitor activities during initial grading.
- The project biologist will note any evidence of trash or microtrash and, if present, communicate the presence and requirement to remove the trash to the construction manager.

MM-BIO-3 Focused Surveys and Avoidance and Minimization Measures for Special-Status Plants

Focused Surveys

Focused surveys shall be conducted for special-status plant species the season prior to construction. Focused surveys for special-status plant species shall be conducted by a qualified biologist according to: the *CNPS Botanical Survey Guidelines* (CNPS 2001); *Protocols for Surveying and Evaluating Impacts to Special Status Native Populations and Natural Communities* (CDFG 2009); and *U.S. Fish and Wildlife Service General Rare Plant Survey Guidelines* (Cypher 2002). The focused survey shall be conducted during a period when the target species would be observable and identifiable (e.g., blooming period for annuals). The target species list will include Wigginsô croton, slender cottonheads, and sand food that have a moderate potential to occur in the Proposed Project study area. If special-status plants are not observed during focused surveys, no additional mitigation is required.

Avoidance, Minimization, and Mitigation Measures

If a special-status plant species is detected, the full extent of the occurrence within the Proposed Project study area shall be recorded. The location of each special-status plant occurrence shall be mapped and number of individuals for each occurrence documented. If impacts to special-status plants cannot be avoided, the following measures will be implemented:

1. Special-status plants in the vicinity of the disturbance will be temporarily fenced or prominently flagged and a 50-foot buffer established around the

populations to prevent inadvertent encroachment by vehicles and equipment during the activity;

2. Seeds will be collected and stored in appropriate storage conditions (e.g., cool and dry), and dispersed/transplanted following the construction activity and reapplication of salvaged topsoil; and
3. The top 6 inches of topsoil will be salvaged, stockpiled, and replaced as soon as practicable after project completion. The salvaged topsoil shall be redistributed at the same depth and contoured to blend with surrounding grades.

Additionally, while it is not expected that a federally or state-listed plant would be observed during these surveys, the applicant shall consult with the applicable agency (i.e., CDFW and/or USFWS) and written concurrence for measures required for federally or state-listed plant species, if observed.

MM-BIO-4 Restoration of Temporary Impacts to Riparian and Uplands with Non-invasive Species

Site construction areas subjected to temporary ground disturbance from laydown, staging areas, and temporary roads, shall be recontoured to natural grade (if the grade was modified during the temporary disturbance activity), and revegetated with an application of a native riparian or upland seed mix, if necessary, prior to or during seasonal rains to promote passive restoration of the area to pre-project conditions (except that no invasive plants will be restored). An area subjected to ñtemporaryò disturbance means any area that is disturbed but will not be subjected to further disturbance as part of the project. This measure does not apply to situations that are urban/developed that are temporarily impacted and will be returned to an urban/developed land use. Prior to seeding temporary ground disturbance areas, the project biologist will review the seeding palette to ensure that no seeding of invasive plant species, as identified in the most recent version of the California Invasive Plant Inventory for the region, will occur.

A revegetation plan shall be prepared and outline the specific revegetation, monitoring, and success criteria for these areas.

MM-BIO-5 Dust Control Plan

Prior to issuance of a grading or building permit, IID shall submit the dust control plan to Imperial County Air Pollution Control District (ICAPCD) for review and approval, and shall provide the plan to Imperial County, to demonstrate compliance with

ICAPCD Regulation VIII (Fugitive Dust Rules), Rules 800 through 806. The plan shall address construction-related dust as required by ICAPCD.

MM-BIO-6 Flat-Tailed Horned Lizard Surveys and Avoidance and Minimization Measures

Focused surveys shall be conducted within the Proposed Project study area prior to start of ground-disturbing activities between April and September to determine the status of flat-tailed horned lizard on-site. The surveys shall be conducted in accordance to the Flat-tailed Horned Lizard Interim Survey Protocol in order to provide an assessment of flat-tailed horned lizard presence or absence at a specific site. Surveys should be conducted between April and September when surface temperatures are between 95ÜF and 122ÜF (Flat-Tailed Horned Lizard Working Group of Interagency Coordinating Committee 2003).

If the flat-tailed horned lizard is found during the 2018 survey, pre-construction surveys shall be conducted prior to ground-disturbing construction activities. Surveys and relocation (if needed) shall be conducted in accordance with the Fencing and Removal Survey Protocols (Appendix 7 of the Flat-tailed Horned Lizard Interagency Coordinating Committee 2003).

To the extent feasible, methods to find flat-tailed horned lizards will be designed to achieve a maximal capture rate and will include, but not be limited to, using strip transects, tracking, and raking around shrubs. During construction, the minimum survey effort will be 30 minutes per 0.40 hectare (1 acre). Persons that handle flat-tailed horned lizards will first obtain all necessary permits and authorization from the CDFW. Flat-tailed horned lizard removal surveys also will include:

1. Accurate records maintained by the biological monitor(s) for each relocated flat-tailed horned lizard including sex, snout-vent length, weight, air temperature, location, date, time of capture and release, a close-up photo of the lizard, and a photo of the habitat where it was first encountered. To the extent feasible, a sample of the lizard scat will be collected. A Horned Lizard Observation Data Sheet and a Project Reporting Form, from Appendix 8 of the Flat-tailed Horned Lizard Rangewide Management Strategy (Flat-tailed Horned Lizard Interagency Coordinating Committee 2003) will be completed. During construction, quarterly reports describing flat-tailed horned lizard removal activity will be submitted to the IID and CDFW.

The removal of flat-tailed horned lizards out of harmҫs way, including those found on access or maintenance roads, will include their relocation to nearby suitable burrowing habitat away from proposed project components and roads. Relocated flat-tailed horned lizards will be placed in the shade of a large shrub in undisturbed habitat. The Project Biologist or biological monitor will be allowed some judgment and discretion when relocating lizards to maximize survival of flat-tailed horned lizards found on the Proposed Project site.

MM-BIO-7 Burrowing Owl Surveys and Avoidance/Relocation.

No less than 14 days prior to ground-disturbing activities (vegetation clearance, grading), a qualified wildlife biologist (i.e., a wildlife biologist with previous burrowing owl survey experience) shall conduct pre-construction take avoidance surveys on and within 200 meters (656 feet) of the construction zone to identify occupied breeding or wintering burrowing owl burrows. The take avoidance burrowing owl surveys shall be conducted in accordance with the Staff Report on Burrowing Owl Mitigation (2012 Staff Report; CDFG 2012) and shall consist of walking parallel transects 7 to 20 meters apart, adjusting for vegetation height and density as needed, and noting any burrows with fresh burrowing owl sign or presence of burrowing owls. As each burrow is investigated, biologists shall also look for signs of American badger and desert kit fox. Copies of the burrowing owl survey results shall be submitted to the CDFW.

If burrowing owls are detected on site, no ground-disturbing activities shall be permitted within 200 meters (656 feet) of an occupied burrow during the breeding season (February 1 to August 31), unless otherwise authorized by CDFW. During the nonbreeding season (September 1 to January 31), ground-disturbing work can proceed near active burrows as long as the work occurs no closer than 50 meters (165 feet) from the burrow. Depending on the level of disturbance, a smaller buffer may be established in consultation with CDFW.

If avoidance of active burrows is infeasible during the nonbreeding season, then, before breeding behavior is exhibited and after the burrow is confirmed empty by site surveillance and/or scoping, a qualified biologist shall implement a passive relocation program in accordance with Appendix E (i.e., Example Components for Burrowing Owl Artificial Burrow and Exclusion Plans) of the 2012 CDFW Staff Report on Burrowing Owl Mitigation (CDFG 2012). Passive relocation consists of excluding burrowing owls from occupied burrows and providing suitable artificial burrows nearby for the excluded burrowing owls. A burrowing owl monitoring and mitigation plan will be prepared that outlines how passive relocation would occur and where the replacement burrows would be constructed. It would also outline the monitoring and maintenance requirements for the artificial burrows.

MM-BIO-8 Nesting Bird Pre-construction Surveys and Avoidance Plan.

This measure would protect these nesting special-status species and more common species protected under the Migratory Bird Treaty Act, which prohibits the ñtakeò of any migratory bird or any part, nest, or eggs of any such bird. The Migratory Bird Treaty Act applies to over 800 species of birds, including rare and common species. Burrowing owl is addressed separately in a species-specific biological resource protection measure (MM-BIO-7).

The project biologist shall conduct pre-construction surveys no earlier than 7 days prior to any on-site grading and construction activities within each construction area and a 500-foot buffer that occurs during the nesting/breeding season of special-status bird species potentially nesting on the site, with the exception of burrowing owl, which is addressed in MM-BIO-7. The pre-construction surveys shall be conducted between March and September, or as determined by the project biologist.

The purpose of the pre-construction surveys will be to determine whether occupied nests are present in the construction zone or within 500 feet of the construction zone boundary.

If occupied nests are found, then limits of construction to avoid occupied nests shall be established by the project biologist in the field with flagging, fencing, or other appropriate barriers (e.g., 250 feet around active passerine nests to 500 feet around active non-listed raptor nests), and construction personnel shall be instructed on the sensitivity of nest areas. The project biologist shall serve as a construction monitor during those periods when construction activities are to occur near active nest areas to avoid inadvertent impacts to these nests. The project biologist may adjust the 250-foot or 500-foot setback at his or her discretion depending on the species and the location of the nest (e.g., if the nest is well protected in an area buffered by dense vegetation). Once a qualified biologist has determined that the birds have fledged and are no longer reliant upon the nest or parental care for survival, construction may proceed in the setback areas.

4.4 Threshold Bio-2

Would the project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the CDFW or USFWS?

Sensitive Vegetation Communities

Special-status or sensitive vegetation communities in the Proposed Project study area include: arrow weed thickets and mesquite bosque/mesquite thickets. Impacts to these communities are described below.

State-Jurisdictional Waters

As discussed in Section 3.3.2 and Table 3-2, there are jurisdictional wetlands and waters within the Proposed Project study area (Figure 3-4 series). Impacts to these resources are described below.

4.4.1 Construction (Short-Term) Impacts

4.4.1.1 Direct

Short-term construction-related direct impacts to vegetation communities are similar to those described for special-status plants in Section 4.3.1 above, and include impacts to native vegetation communities from unintentional clearing, trampling, or grading outside of the proposed construction zone. Additionally, temporary direct impacts to habitat will occur from temporary ground-disturbing activities, such as laydown and staging areas.

The proposed project will temporarily impact two sensitive vegetation communities: 0.16 acre of arrow weed thickets and 1.75 acres of mequite bosque/mesquite thickets (Table 4-1; Figure 3-4 series). These impacts would be a significant impact (Impact BIO-12).

The proposed project will temporarily impact approximately 0.04 acre of ACOE/RWQCB wetlands (Table 4-2; Figure 3-4 series). There are additional vegetation communities that may be subject to regulation by ACOE, RWQCB and/or CDFW. Impacts to jurisdictional resources would be a significant impact (Impact BIO-13).

Construction mitigation measures MM-BIO-1 (general construction-related avoidance and minimization measures) and MM-BIO-2 (WEAP training, biological monitoring, and compliance) would apply and these measures would avoid and minimize potential temporary direct impacts to vegetation communities and jurisdictional waters/wetlands because they require the project biologist to conduct a Worker Environmental Awareness Program (WEAP) for all construction/contractor personnel to ensure compliance with the mitigation measures and they require ongoing biological construction monitoring. This includes demarcation of the construction area using highly visible materials in the field that minimize unintentional impacts to vegetation communities and jurisdictional waters/wetlands outside the designated construction area. Training and ongoing monitoring would aid in enforcing the requirements that construction must be restricted to designated areas and vegetation communities and jurisdictional waters/wetlands outside the designated construction zone would be avoided.

The application of a native seed mix would promote passive restoration of temporary impact areas (MM-BIO-4). MM-BIO-9 (state agency coordination and permits) requires the applicant to obtain the necessary permits from ACOE and RWQCB for impacts to jurisdictional resources.

Construction-related direct impacts to vegetation communities and jurisdictional waters/wetlands would be less than significant with incorporation of MM-BIO-1, MM-BIO-2, MM-BIO-4, and MM-BIO-9. These biological mitigation measures are described in full in Section 4.3.3 and 4.4.3.

4.4.1.2 Indirect

Short-term construction-related indirect impacts to vegetation communities are similar to those described for special-status plants in Section 4.3.1 above, and include impacts from the generation of fugitive dust; the release of chemical pollutants; and the adverse effect of invasive plant species. Potential short-term or temporary indirect impacts to special-status plants are considered significant absent mitigation (Impact BIO-14).

As previously stated, the proposed project would consist of the construction of the main canal off-line reservoir and related infrastructure including excavating the reservoir, construction of the perimeter roadway, and excavating and concrete lining the intake canal. The proposed reservoir is anticipated to receive water by gravity flow from an intake structure off the north side of the AAC. The intake conveyance canal to the proposed reservoir site would use gravity only (i.e., no pumping) and cross open desert at the edge of farm ground that is situated between the AAC and the reservoir site. Additionally, the proposed project is required to comply with the NPDES State Water Resources Control Board Construction General Permit Order No. 2009-0009-DWQ, which includes a SWPPP, BMPs for construction waste handling and disposal, and a Monitoring Program and Reporting Requirements. Compliance with the regulations of the NPDES General Permit, local grading ordinances, as well as the Federal Clean Water Act Title 33, would reduce stormwater runoff and water quality impacts to acceptable levels. Therefore, construction impacts associated with water quality standards and degradation would be less than significant.

MM-BIO-1 (general avoidance and minimization measures) requires that vehicles and equipment will be limited to maintenance access roads and the minimal area necessary to perform the work to minimize chemical releases and trampling of vegetation and soils compaction by humans. MM-BIO-4 (restoration of temporary impacts) would help prevent adverse effects of invasive plant species that may alter the composition of the habitat if introduced during restoration or allowed to passively colonize the area post-construction if these areas are not revegetated.

These potential long-term indirect impacts to special-status plants would be less than significant with implementation of MM-BIO-1 and MM-BIO-4.

4.4.2 Operations (Long-Term) Impacts

4.4.2.1 Direct

Permanent direct impacts from construction of the main canal off-line reservoir storage project and related infrastructure includes excavating the reservoir, construction of the perimeter roadway, and excavating and concrete lining the intake canal are estimated in Table 4-1 and Table 4-2. The proposed project will permanently impact two sensitive vegetation communities: 0.40 acre of arrow weed thickets and 3.32 acres of mequite bosque/mesquite thickets (Table 4-1; Figure 3-4 series). These impacts would be a significant impact (Impact BIO-15).

The proposed project will permanently impact approximately 0.08 acre of wetlands (Table 4-2; Figure 3-4 series). There are additional vegetation communities that may be subject to regulation by ACOE, RWQCB and/or CDFW. Impacts to jurisdictional resources would be a significant impact (Impact BIO-16).

Long-term direct impacts to loss of vegetation communities will be mitigated through MM-BIO-10, which requires restoration and enhancement within nearby disturbed areas. Permanent impacts to jurisdictional waters/wetlands will be mitigated through MM-BIO-9 (state agency coordination and permits), which requires the applicant to obtain the necessary permits from for impacts to jurisdictional resources.

Permanent direct impacts to vegetation communities and jurisdictional waters/wetlands would be less than significant with incorporation of MM-BIO-9 and MM-BIO-10. These biological mitigation measures are described in full in Section 4.4.3.

4.4.2.2 Indirect

Potential long-term construction-related indirect impacts to vegetation communities and jurisdictional waters/wetlands are similar to those described for special-status plants in Section 4.3.1 above, and include: chemical releases such as oils and grease from vehicles that could degrade habitat; increased invasive plant species that may degrade habitat; and trampling of vegetation and soil compaction by humans, which could affect soil moisture, water penetration, surface flows, and erosion. These potential long-term indirect impacts to vegetation communities and jurisdictional waters/wetlands would be significant absent mitigation (Impact BIO-17).

MM-BIO-1 (general avoidance and minimization measures) requires that vehicles and equipment will be limited to maintenance access roads and the minimal area necessary to perform the work to minimize chemical releases and trampling of vegetation and soils compaction by humans. MM-BIO-9 (state agency permits) requires the applicant to obtain the necessary permits from ACOE, RWQCB and CDFW for impacts to jurisdictional resources.

Permanent indirect impacts to vegetation communities and jurisdictional waters/wetlands would be less than significant with incorporation of MM-BIO-1 and MM-BIO-9. These biological mitigation measures are described in full in Section 4.3.3 and 4.4.3.

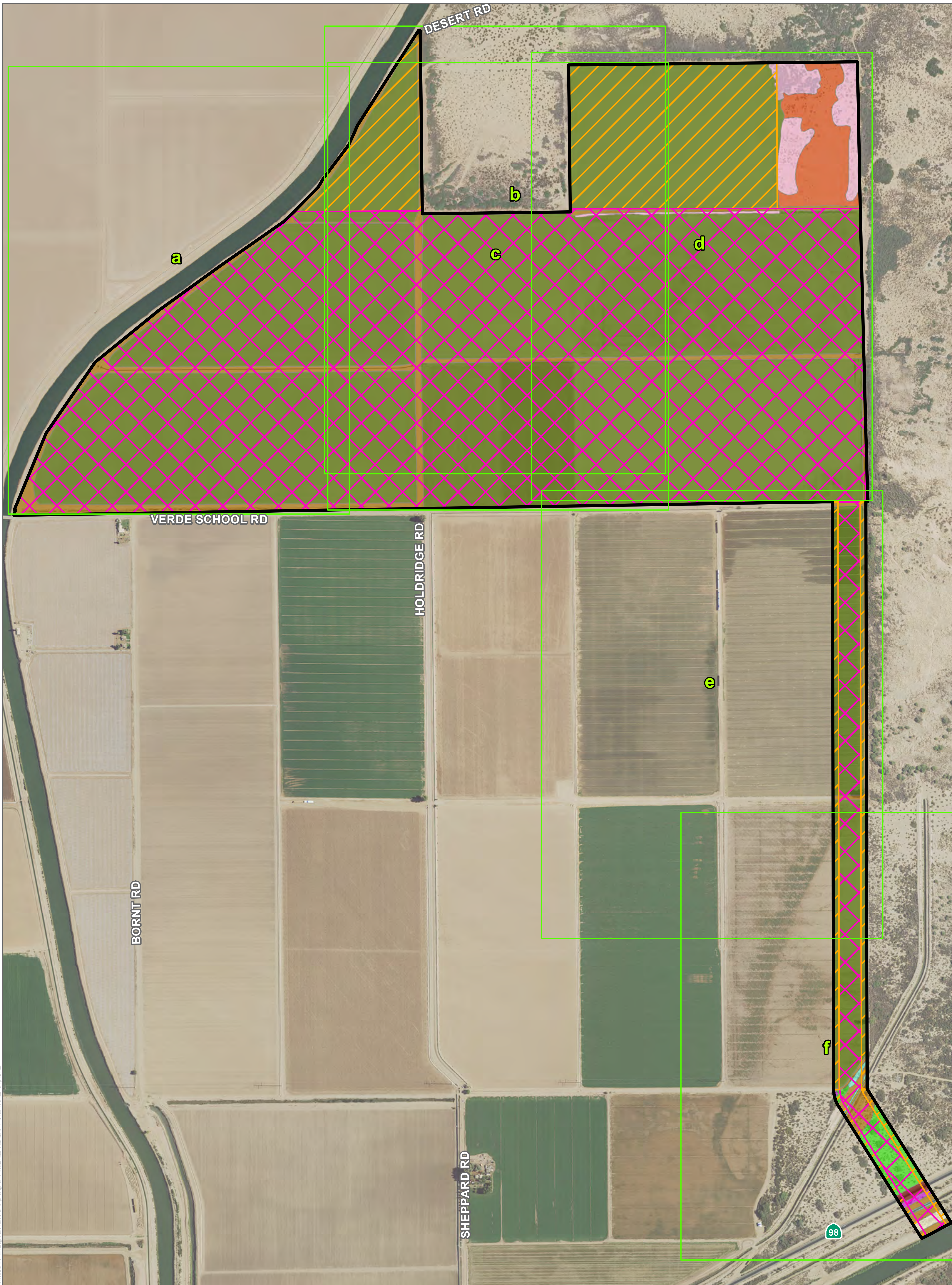
4.4.3 Mitigation Measures

MM-BIO-9 To comply with the state regulations for impacts to ñwaters of the State,ò the following agency permits are required, or verification that they are not required shall be obtained. The following permit and agreement shall be obtained, or provide evidence from the respective resource agency that such an agreement or permit is not required:

1. A Clean Water Act, Section 404 permit issued by the ACOE for all project-related disturbances of waters of the state and/or associated wetlands.
2. A Clean Water Act, Section 402 permit issued by the California RWQCB for all project-related disturbances of waters of the state and/or associated wetlands.
3. A Section 1602 Streambed Alteration Agreement issued by the CDFW for all project-related disturbances of any streambed.

MM-BIO-10 The IID will restore and enhance sensitive, riparian and wetland communities to mitigate for permanent impacts to 0.40 acre of arrow weed thickets and 0.08 acre of cattail marshes at a 1:1 mitigation ratio.

A site-specific wetlands mitigation plan shall be prepared prior to disturbance activities. The wetlands mitigation plan shall include detailed information on installation, monitoring, success criteria, and monitoring of groundwater elevation within the mitigation area.



Project Site
Impacts
Permanent
Temporary

Vegetation Communities and Land Covers
AGR - General Agriculture
BUSS - Bush seepweed scrub
CM - Cattail marshes
DEV - Urban/Developed
DH - Disturbed Habitat
Lartri - Creosote bush
Lartri-Ambdum - Creosote bush-white bursage
OW - Open water
Pluser - Arrow weed
Progla - Mesquite
TAM - Tamarisk thickets

SOURCE: NAIP 2016, DUDEK 2018

DUDEK

0 425 850 Feet

FIGURE 3-4
Biological Resources - Proposed Project Footprint
East Highline Reservoir and Intake Channel Project

SOURCE: NAIP 2016, DUDEK 2018

DUDEK

FIGURE 3-4a

Biological Resources - Proposed Project Footprint

East Highline Reservoir and Intake Channel Project

SOURCE: NAIP 2016, DUDEK 2018

DUDEK

0 150 300 Feet

FIGURE 3-4b

Biological Resources - Proposed Project Footprint

East Highline Reservoir and Intake Channel Project

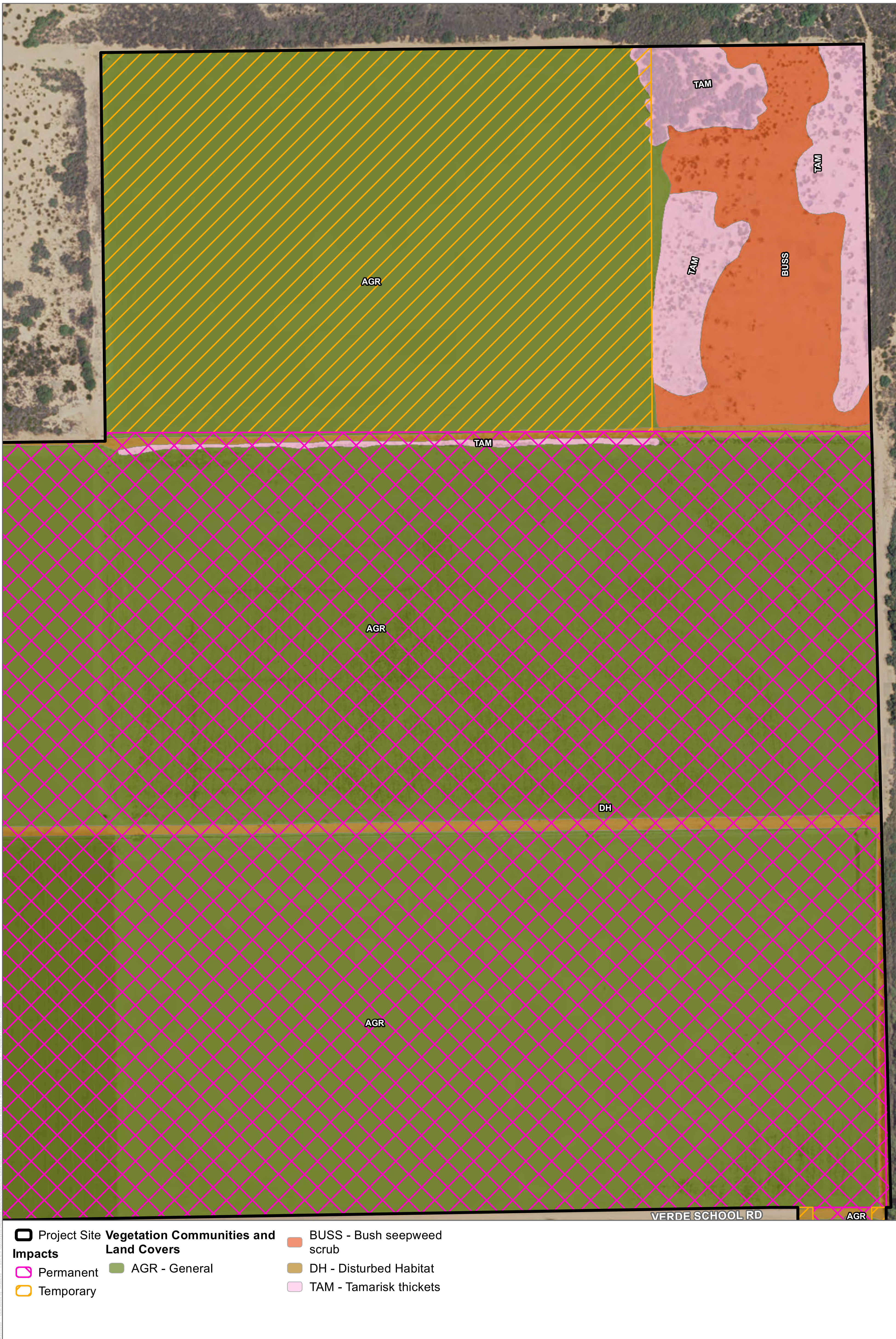
SOURCE: NAIP 2016, DUDEK 2018

DUDEK 0 150 300 Feet

FIGURE 3-4c

Biological Resources - Proposed Project Footprint

East Highline Reservoir and Intake Channel Project



SOURCE: NAIP 2016, DUDEK 2018

DUDEK

FIGURE 3-4d

Biological Resources - Proposed Project Footprint

East Highline Reservoir and Intake Channel Project

Project Site

Impacts

Permanent

Temporary

Vegetation Communities and Land Covers

AGR - General Agriculture

DH - Disturbed Habitat

SOURCE: NAIP 2016, DUDEK 2018

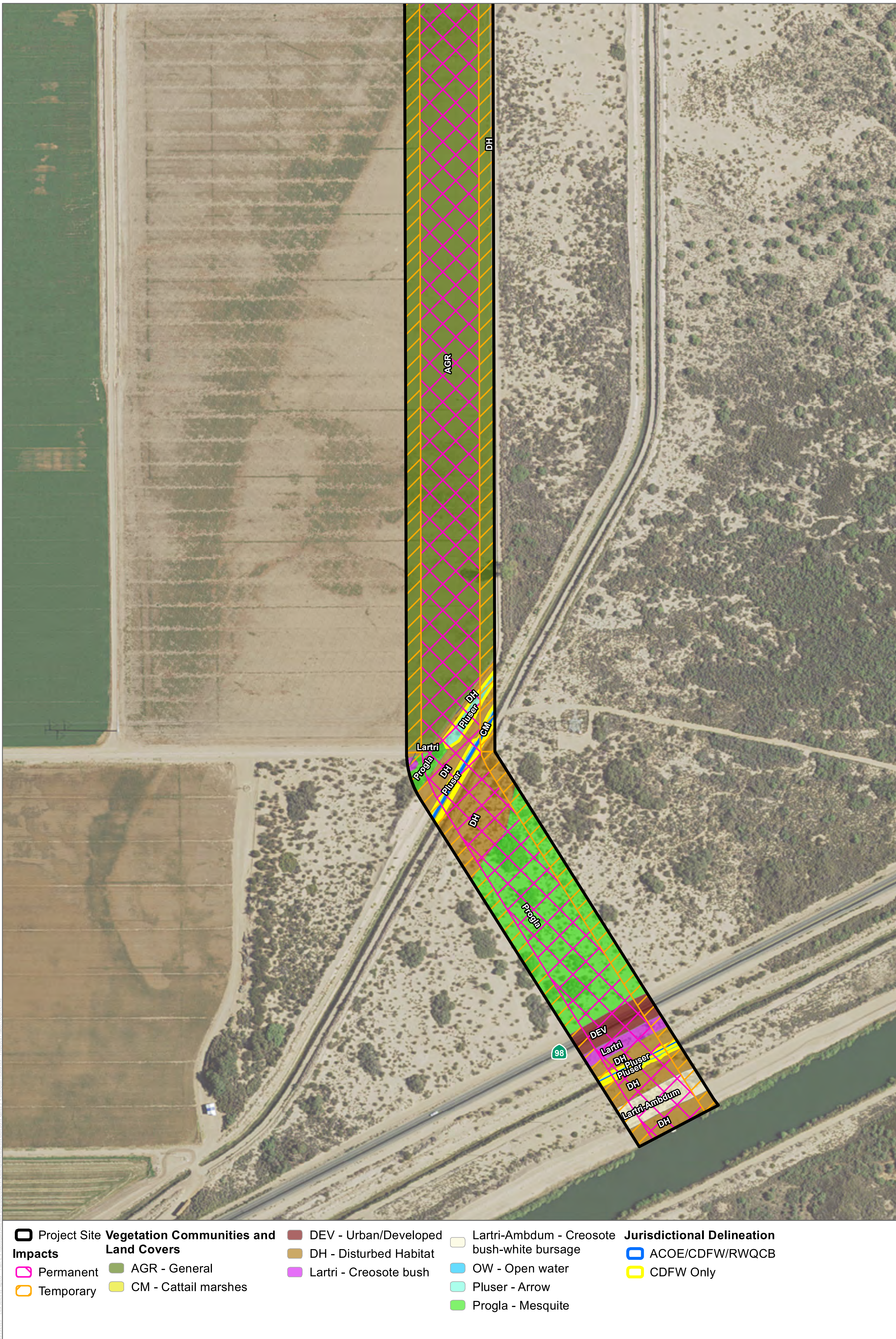
DUDEK

0 150 300 Feet

FIGURE 3-4e

Biological Resources - Proposed Project Footprint

East Highline Reservoir and Intake Channel Project



SOURCE: NAIP 2016, DUDEK 2018

DUDEK

0 150 300 Feet

FIGURE 3-4f

Biological Resources - Proposed Project Footprint

East Highline Reservoir and Intake Channel Project

INTENTIONALLY LEFT BLANK

4.5 Threshold Bio-3

Would the project have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

As discussed in Section 3.3.1, the Proposed Project study area does contain waters, including wetlands, subject to federal jurisdiction under Section 404 of the Clean Water Act. As described in Section 4.4, approximately 0.04-acre of potential ACOE jurisdictional resources would be impacted temporarily during construction and approximately 0.08-acre permanently impacted by the project. With implementation of mitigation measures MM-BIO-9 and MM-BIO-10 (Section 4.4.3), the proposed project would not result in a significant impact or have a substantial adverse effect on federally protected wetland waters, as defined by Section 404 of the Clean Water Act.

4.6 Threshold Bio-4

Would the project 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?

4.6.1 Construction (Short-Term) Impacts

Construction within the Proposed Project study area could have both a direct and indirect impact on wildlife movement. Wildlife may be deterred from the construction area due to increased human presence, loud noises, and physical disruptions of habitat. However, construction will be temporary at any location, and wildlife would be able to use temporary construction areas freely after work crews are gone. Also, typical construction methods would not impede wildlife movement over a large area at any one time. Therefore, short-term impacts to movement of native wildlife species and from impediments to use of native wildlife nursery sites would be less than significant.

4.6.2 Operations (Long-Term) Impacts

As described in Section 3.6, the Proposed Project study area is not located within a regional wildlife movement corridor or linkage planning area as identified in *A Linkage Network for the California Deserts* (Penrod et al. 2012). However, the Proposed Project would have the potential to act as adequate stopover habitat for migratory birds, should the Project area ever be in the flight path of migrating birds. The Proposed Project study area is largely agricultural, but is adjacent to undeveloped BLM land to the east where wildlife can move freely throughout the area with little impediment. The proposed reservoir and associated infrastructure would be constructed primarily within the open agriculture area. Wildlife that currently uses this area for wildlife movement likely uses the native habitat in the northeast portion of the study area and adjacent native habitat in BLM land. These areas will not be impacted by the project, and therefore, the project would not result in long-term impacts to wildlife movement through the area.

4.7 Threshold Bio-5

Would the project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

The Imperial County General Plan Conservation and Open Space Element establishes goals and objectives, together with implementation programs and policies related to the protection of threatened or endangered plant and wildlife species and cooperation with federal, state, and local agencies (Imperial County General Plan 2016). The project is consistent with the Imperial County General Plan biological resource policies. Table 4-3 includes the goals and objectives related to the conservation of biological resources and Table 4-4 includes the program measures related to biological resources, and describe how the project is consistent with the general plan.

Table 4-3
Imperial County General Plan Goals and Objectives

Conservation of Biological Resources Goals and Objectives
Objective 2.1: Designate critical habitats for Federally and State-listed species.
Objective 2.2: Develop management programs, including preservation of habitat for flat tailed horned lizard, desert pupfish, and burrowing owl.
Objective 2.3: Support investigation of long-term climate change effects on biological resources.
Objective 2.4: Use the CEQA and NEPA process to identify, conserve and restore sensitive vegetation and wildlife resources.
Objective 2.5: Give conservation of sensitive species and habitat a high priority in County park acquisition and development programs.
Objective 2.6: Attempt to identify, reduce, and eliminate all forms of pollution; including air, noise, soil, and water.

Table 4-4
Imperial County General Plan Consistency Analysis

General Plan Policies and Implementation Measures	Consistency	Analysis
Implementing Programs and Policies		
Policy 1. Provide a framework for the conservation and enhancement of natural and created open space which provides habitat values.	Yes, with mitigation	MM-BIO-1 through MM-BIO-10 will reduce impacts to special-status species, sensitive vegetation communities, and jurisdictional resources to a less-than-significant level. The proposed project would be in compliance with federal and state laws.

Table 4-4
Imperial County General Plan Consistency Analysis

General Plan Policies and Implementation Measures	Consistency	Analysis
1a. Identify Resource Areas to conserve and enhance native vegetation and wildlife. These areas include agency designated sensitive habitats with USFWS, BLM Areas of Critical Environmental Concern (ACECs), and CDFW. These designated lands are designed for the protection and perpetuation of rare, endangered, and threatened species and areas important for scientific study.	Yes, with mitigation	MM-BIO-9 will reduce impacts to sensitive vegetation communities designated by CDFW's Natural Communities List (CDFG 2010).
1b. Projects within or in the vicinity of a Resource Area should be designed to minimize adverse impacts on the biological resources it was created to protect.	Yes, with mitigation.	MM-BIO-1 through MM-BIO-10 will reduce impacts to special-status species, sensitive vegetation communities, and jurisdictional resources to a less-than-significant level. The proposed project would be in compliance with federal and state laws. The applicant has been in consultation with both state and federal resource agencies.
1c. Accept donations of land which have high wildlife value. Where appropriate, Imperial County shall attempt to exchange donated lands of high wildlife value with other State, Federal, or other resource agencies equipped to protect and manage such lands for other lands more appropriate to County needs.	N/A	No land will be exchanged or donated as part of the proposed project.
1d. Develop an environmental mitigation program that protects, and restores Salton Sea wildlife habitats as offsets to biological disturbances identified through the CEQA review process for development projects. The program would allow the County and/or Salton Sea JPA to restore habitat through financing mechanisms including land banks and/or direct financial contributions from the developers to mitigate their impacts	N/A	The wetlands mitigation will occur on site.
1e. Conserve the native habitat of sensitive plants and animals through the dedication of open space easements, or other means that will ensure their long-term protection and survival. Such	Yes	MM-BIO-4 restore temporary impacts to riparian and upland vegetation and monitored for success per criteria outlined in a revegetation plan; MM-BIO-10 will restore and enhance

Table 4-4
Imperial County General Plan Consistency Analysis

General Plan Policies and Implementation Measures	Consistency	Analysis
easements may preclude the erecting of any structures (temporary or permanent), vegetation removal, or any other activities. These dedicated open space easements would also serve to reduce potential indirect impacts to sensitive biological resources that may result from human activities associated with future developments		sensitive vegetation communities and success will be monitored through the criteria in a wetlands mitigation plan.
1f. Areas designated for biological open space conservation shall include buffers, which provide important breeding and foraging habitats for native and migratory birds and animals. Such buffers shall serve to separate future development from adjacent native habitat areas to ensure the perpetual regeneration of these habitats	N/A	The majority of the native vegetation communities will not be impacted and impacts to sensitive vegetation communities will be mitigated at a 1:1 ratio (MM-BIO-10); therefore, habitat for birds and animals will be maintained.
1g. Protect riparian habitat and other types of wetlands from loss or modification by dedicating open space easements with adequate buffer zones, and by other means to avoid impacts from adjacent land uses. Road crossings or other disturbances of riparian habitat should be minimized and only allowed when alternatives have been considered and determined infeasible.	Yes, with mitigation	MM-BIO-10 and MM-BIO-10 will reduce impacts to sensitive vegetation communities designated by CDFW's Natural Communities List (CDFG 2010) and riparian areas subject to regulation by CDFW and/or RWQCB and/or ACOE.
1h. Rock outcrops which serve as significant boulder habitat for sensitive biological resources should be considered within open space easements.	N/A	There are no rock outcrops within the Proposed Project study area.
1i. Preserve existing California fan palms in natural settings and other individual specimen trees which contribute to the community character and provide wildlife habitat.	N/A	There are no California fan palms within the Proposed Project study area.
1j. Preserve and encourage the open space designation of wildlife corridors which are essential to the long-term viability of wildlife populations.	N/A	The majority of the native vegetation communities will not be impacted and impacts to sensitive vegetation communities will be mitigated at a 1:1 ratio (MM-BIO-10); therefore, habitat for birds and animals will be maintained.

Table 4-4
Imperial County General Plan Consistency Analysis

General Plan Policies and Implementation Measures	Consistency	Analysis
1k. Integrate open space dedications in private developments with surrounding uses to maximize a functional open space/recreation and wildlife management system.	N/A	There are no private developments as part of the proposed project.

Impacts to biological resources would be less than significant or mitigated to a less-than-significant level. The project would comply with requirements of local policies and ordinances protecting biological resources through the implementation of the recommended mitigation measures. Therefore, the project would not conflict with local policies or ordinances protecting biological resources

4.8 Threshold Bio-6

Would the project conflict with the provisions of an adopted HCP, NCCP, or other approved local, regional, or state HCP?

The IID is currently in the process of preparing a Natural Community Conservation Plan (NCCP) and Habitat Conservation Plan (HCP) which is anticipated to cover 96 fish, wildlife, and plant species for a term of up to 75 years (Imperial Irrigation District 2017). Since these plans are still awaiting approval, the proposed project is not subject to the IIDôs NCCP and HCP.

Desert Renewable Energy Conservation Plan

BLM has adopted the Desert Renewable Energy Conservation Plan (DRECP), which provides protection and conservation of desert ecosystems while allowing for appropriate development of renewable energy projects. The Draft DRECP was originally developed as an HCP/Natural Community Conservation Plan (NCCP) and a BLM Land Use Plan Amendment covering both public and private lands across seven counties, including Imperial County. In October 2015, the DRECP BLM Land Use Plan Amendment and Final EIS, which addresses renewable energy, land use, and conservation on BLM lands only, was released (BLM 2015). Although the DRECP plan area includes the project area, the DRECP currently only applies to renewable energy projects and would not be applicable to the proposed project. Furthermore, the project is not within BLM lands. Therefore, the proposed program would not conflict with the goals and policies of the DRECP. Regardless, determination of significant impacts and recommendations for mitigation measures to preserve or protect habitat and to otherwise ensure protection of identified species have been included in this report.

The Proposed Project study area is not located within any other local, regional, or state conservation planning areas. Impacts of the project on an adopted HCP, NCCP, or other approved local, regional, or state habitat conservation plan would be less-than-significant.

INTENTIONALLY LEFT BLANK

5 LEVEL OF SIGNIFICANCE AFTER MITIGATION

All direct and indirect impacts to special-status biological resources that would result from implementation of the proposed project would be either less than significant or less than signification after mitigation. Further, as described in Section 4.3.2, the construction of the reservoir will provide a beneficial source of water for a variety of wildlife species that use the area, particularly birds during migration and bats for insect foraging.

INTENTIONALLY LEFT BLANK

6 REFERENCES

14 CCR 15000ï 15387 and Appendix Aï L. Guidelines for Implementation of the California Environmental Quality Act, as amended.

59 FR, Number 133. Notice of change: ñChanges in Hydric Soils of the United States.ò July 13, 1994.

ACOE (U.S. Army Corps of Engineers). 1987. *Corps of Engineers Wetland Delineation Manual.* Online ed. Environmental Laboratory, Wetlands Research Program Technical Report Y-87-1. Vicksburg, Mississippi: U.S. Army Engineer Waterways Experiment Station. January 1987. https://www.fedcenter.gov/_kd/go.cfm?destination=ShowItem &Item_ID=6403.

ACOE. 2008a. *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States.* ERDC/CRREL TR-08-12. Hanover, New Hampshire: U.S. Army Engineer Research and Development Center, Cold Regions Research and Engineering Laboratory.

ACOE. 2008b. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0).* Environmental Laboratory, ERDC/EL TR-08-28. Vicksburg, Mississippi: U.S. Army Engineer Research and Development Center. September 2008. http://el.erdc.usace.army.mil/elpubs/pdf/trel08-28.pdf.

ACOE. 2010. *Updated Datasheet for the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States.* Wetland Regulatory Assistance Program, ERDC/DRREL TN-10-1. Prepared by K.E. Curtis and R.W. Lichvar. Hanover, New Hampshire: U.S. Army Engineer Research and Development Center Cold Regions Research and Engineering Laboratory. July 2010.

Anderson, B.W., and R.D. Ohmart. 1985. ñHabitat Use by Clapper Rails in the Lower Colorado River Valley.ò Condor 87:116ï 126.

AOU (American Ornithologistsô Union). 2018. ñCheck-List of North American Birds: List of the 2,127 Bird Species Known from the A.O.U. Check-List Area.ò Accessed March, 2018. http://checklist.aou.org/.

Bechard, M.J., and J.K. Schmutz. 1995. ñFerruginous Hawk (*Buteo regalis*).ò In *The Birds of North America Online*, edited by A. Poole. Ithaca, New York: Cornell Lab of Ornithology. http://bna.birds.cornell.edu/bna/species/172.

Calflora. 2018. Information on California Plants for Education, Research, and Conservation. Berkeley, California: The Calflora Database. Accessed Feburary 2018. http://www.calflora.org/.

CDFG (California Department of Fish and Game). 2009. ñProtocols for Surveying and Evaluating Impacts to Special Status Native Populations and Natural Communities.ò November 24, 2009. https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=18959&inline.

CDFG. 2010. *List of Vegetation Alliances and Associations: Hierarchical List of Natural Communities with Holland Types.* September 2010. Accessed September 2017. https://www.wildlife.ca.gov/Data/VegCAMP/Natural-Communities/List.

CDFW (California Department of Fish and Wildlife). 2013. ñ2013 California Vegetation Map in Support of the Desert Renewable Energy Conservation Plan.ò California Department of Fish and Wildlife, Renewable Energy Program. April 2013.

CDFW. 2018a. ñSpecial Vascular Plants, Bryophytes, and Lichens List.ò California Natural Diversity Database. January 2018. Accessed February 2018. https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=109383&inline=1.

CDFW. 2018b. ñSpecial Animals List.ò California Natural Diversity Database. CDFW, Biogeographic Data Branch. October 2017. Accessed February 2018. https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=109406&inline=1.

CDFW. 2018c. Element Occurrence Query. California Natural Diversity Database (CNDDB). RareFind, Version 5.2.14 (Commercial Subscription). Sacramento, California: CDFG, Biogeographic Data Branch. Accessed February 2018. http://www.dfg.ca.gov/biogeodata/cnddb/mapsanddata.asp.

CNPS (California Native Plant Society). 2001. ñCNPS Botanical Survey Guidelines.ò Published December 9, 1983; revised June 2, 2001. http://www.cnps.org/cnps/rareplants/pdf/cnps_survey_guidelines.pdf.

CNPS. 2018. *Inventory of Rare and Endangered Plants* (online edition, v8-02). Sacramento, California: California Native Plant Society. Accessed October 2017.

Collins, Paul W. 1999. Rufous-crowned Sparrow (Aimophila ruficeps), version 2.0. In The Birds of North America (P. G. Rodewald, editor). Cornell Lab of Ornithology, Ithaca, New York, USA. https://doi.org/10.2173/bna.472.

Crother, B.I. 2012. Scientific and Standard English Names of Amphibians and Reptiles of North America North of Mexico, with Comments Regarding Confidence in our Understanding. 7th ed. Herpetological Circular No. 39. Ed. J.J. Moriarty. Shoreview, Minnesota: Society for the Study of Amphibians and Reptiles.

Eddleman, W.R., R.E. Flores, and M. Legare. 1994. ñBlack Rail (Laterallus jamaicensis),ò The Birds of North America Online. Edited by A. Poole. Ithaca, New York: Cornell Lab of Ornithology. Accessed April 29, 2011. http://bna.birds.cornell.edu/bna/species/123.

FGDC (Federal Geographic Data Committee). 2008. National Vegetation Classification Standard, Version 2. FGDC-STD-005-2008 (Version 2). February 2008. http://usnvc.org/data-standard/.

Google Earth. 2018. Aerial photograph. 1:200 scale.

Historic Aerials Online. 2018. Historic Aerials. Accessed February 2018. http://www.historicaerials.com/.

Imperial County General Plan 2016. Conservation and Open Space Element. http://www.icpds.com/CMS/Media/Conservation-&-Open-Space-Element-2016.pdf

Imperial Irrigation District 2017. HCP/NCCP Process. http://www.iid.com/water/library/qsa-water-transfer/environmental-assessments-permits/hcp-nccp-process.

Jones, L.C. and R. E. Lovich. 2009. Lizards of the American Southwest. Tucson, Arizona: Rio Nuevo Publishers.

Lichvar, R.W., D.L. Banks, W.N. Kirchner, and N.C. Melvin. 2016. ñThe National Wetland Plant List: 2016 Wetland Ratings.ò *Phytoneuron* 2016-30:1ï 17. April 28, 2016. ISSN 2153 733X.

Macwhirter, R.B., and K.L. Bildstein. 2011. ñNorthern Harrier (*Circus cyaneus*),ò revised by K.G. Smith and S.R. Wittenberg. In *The Birds of North America Online*, edited by A. Poole. Ithaca, New York: Cornell Lab of Ornithology. doi: 10.2173/bna.210.

Minta, S.C. 1993. ñSexual Differences in Spatio-Temporal Interaction among Badgers.ò *Oecologia* 96:402ï 409.

Moyle, P.B. 2002. Inland Fishes of California, University of California Press, Berkeley and Los Angeles, 502 pp.

NABA (North American Butterfly Association). 2001. ñChecklist of North American Butterflies Occurring North of Mexico.ò Adapted from North American Butterfly Association (NABA) Checklist & English Names of North American Butterflies, eds. B. Cassie, J. Glassberg, A. Swengel, and G. Tudor. 2nd ed. Morristown, New Jersey: NABA. Accessed October 14, 2016. http://www.naba.org/pubs/enames2.html

NOAA (National Oceanic and Atmospheric Administration). 2004. ñThe North American Monsoon.ò http://www.cpc.ncep.noaa.gov/products/outreach/Report-to-the-Nation-Monsoon_aug04.pdf.

Oberbauer, T., M. Kelly, and J. Buegge. 2008. *Draft Vegetation Communities of San Diego County.* Prepared by Robert F. Holland, PhD, for the State of California, The Resources Agency, Department of Fish and Game (October 1986). March 2008.

Penrod, K., P. Beier, E. Garding, and C. Caba¶ero. 2012. *A Linkage Network for the California Deserts*. Produced for the Bureau of Land Management and The Wildlands Conservancy. Fair Oaks, California: Science and Collaboration for Connected Wildlands. www.scwildlands.org and http://oak.ucc.nau.edu/pb1/.

Polite, C., and J. Pratt. 1999. Life History Accounts and Range Maps ï California Wildlife Habitat Relationships System. Accessed August 4, 2008. http://www.dfg.ca.gov/ biogeodata/cwhr/cawildlife.aspx.

Rosenberg, D., Berkes, F., Bodaly, R., Hecky, R., Kelly, C., Rudd, J. 1997. ñLarge-scale impacts off hydroelectric development.ò *Environmental Review* 5: 27ï 54.

RWQCB (Regional Water Quality Control Board). 2017. *Water Quality Control Plan for Colorado River Basin – Region 7*. Includes amendments adopated by the Regional Board through August 2017.

Sawyer, J.O., T. Keeler-Wolf, and J. M. Evans. 2009. *A Manual of California Vegetation*, 2nd edition. Sacramento, California: California Native Plant Society.

SDNHM (San Diego Natural History Museum). 2002. "Butterflies of San Diego County. Revised September 2002." Accessed October 14, 2016.

Smith, Kimberly G., Sara Ress Wittenberg, R. Bruce Macwhirter and Keith L. Bildstein. 2011. Northern Harrier (Circus cyaneus), version 2.0. In The Birds of North America (P. G. Rodewald, editor). Cornell Lab of Ornithology, Ithaca, New York, USA. https://doi.org/10.2173/bna.210.

Spencer, W.D., P. Beier, K. Penrod, K. Winters, C. Paulman, H. Rustigian-Romsos, J. Strittholt, M. Parisi, and A. Pettler. 2010. *California Essential Habitat Connectivity Project: A Strategy for Conserving a Connected California*. Prepared for California Department of Transportation, California Department of Fish and Game, and Federal Highways Administration.

SWRCB (State Water Resources Control Board). 2017. *State Wetland Definition and Procedures for Discharges of Dredged or Fill Materials to Waters of the State*. Preliminary Draft. July 21, 2017.

Turner, R.M., and D.E. Brown. 1982. Sonoran desert scrub. In Biotic Communities of the American Southwest-United States and Mexico. Desert Plants 4 (1ï 4):181ï 221.

UCSB (University of California, Santa Barbara). 1998. Land Ownership and Management for California: GAPMA layer, UC Santa Barbara analysis of managed areas coverage for the State of California [GIS data]. August 1998.

USDA. 2018. ñState Soil Data Access (SDA) Hydric Soils List, California.ò USDA, Natural Resources Conservation Service. Accessed February 2018. https://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/use/hydric/.

USDA and NRCS (Natural Resources Conservation Service). 2018. Web Soil Survey [web application]. Accessed February 2018. http://websoilsurvey.nrcs.usda.gov/ app/HomePage.htm.

USDI (U.S. Department of Interior). 1994. *Final Environmental Impact Statement/Final Environmental Impact Report for the All American Canal Lining Project*. Prepared for Imperial Irrigation District. March 1994.

USFWS (United States Fish and Wildlife Service). 2008. *Birds of Conservation Concern 2008*. December 2008.

USFWS. 2018a. ñCritical Habitat and Occurrence Dataò [GIS data]. Accessed February 2018 http://www.fws.gov/data.

USFWS. 2018b. ñNWI Wetlands for Californiaò [Shapefiles]. National Wetlands Inventory. Data last updated May 8, 2017. Accessed February 2018. http://www.fws.gov/wetlands/Data/State-Downloads.html.

USGS (U.S. Geological Survey). 2018. ñFlow lines, water points, watershed boundaries for hydrologic units 12 and 8, water bodiesò [digital GIS data]. National Hydrography Dataset website. August 18, 2017. http://nhd.usgs.gov/.

Vyverberg, K. 2010. *A Review of Stream Processes and Forms in Dryland Watersheds.* California Department of Fish and Game. December 2010.

Wilson, D.E., and D.M. Reeder, eds. 2005. Mammal Species of the World: A Taxonomic and Geographic Reference. 3rd ed. Baltimore, Maryland: Johns Hopkins University Press.

WRCC (Western Regional Climate Center). 2017. ñClimate Summary List.ò Accessed August 28, 2017. https://wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca1288.

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

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

APPENDIX A

Data Station Forms

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: EHL Reservoir Intake Channel | City/County: El Centro/Imperial | Sampling Date: 1/16/2018

Applicant/Owner: Imperial Irrigation District | State: CA | Sampling Point: 1a

Investigator(s): Callie Amoaku | Section, Township, Range: S6, T17S, R17E

Landform (hillslope, terrace, etc.): Canal | Local relief (concave, convex, none): Concave | Slope (%): 0

Subregion (LRR): D - Interior Deserts | Lat: 32Á42'30.67"N | Long: 115Á15'51.12"W | Datum:

Soil Map Unit Name: Rositas Fine Sand, 0%-2% slopes | NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ( ) (If no, explain in Remarks.)

Are Vegetation ☐ Soil ☐ or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes (●) No ( )

Are Vegetation ☐ Soil ☐ or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	(●)	( )
Hydric Soil Present?	(●)	( )
Wetland Hydrology Present?	(●)	( )

Is the Sampled Area within a Wetland? **Yes** (●) **No** ( )

Remarks:

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	%		
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:	%		
Herb Stratum			
1. *Typha domingensis*	1	No	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	1 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum ____ % | % Cover of Biotic Crust ____ %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 0 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 % (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	1	x 1 =	1
FACW species		x 2 =	0
FAC species		x 3 =	0
FACU species		x 4 =	0
UPL species		x 5 =	0
Column Totals:	1 (A)		1 (B)

Prevalence Index = B/A = 1.00

Hydrophytic Vegetation Indicators:

- ☐ Dominance Test is >50%
- ☒ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** (●) **No** ( )

Remarks:

SOIL

Sampling Point: 1a

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture[3]	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.
[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☒ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ◉ No ○

Remarks: Data station is within open water; assumed hydric

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☒ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☒ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☒ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☒ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ◉ No ○ Depth (inches): 12+

Water Table Present? Yes ○ No ◉ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ○ No ◉ Depth (inches):

Wetland Hydrology Present? Yes ◉ No ○

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: EHL Reservoir Intake Channel — City/County: El Centro/Imperial — Sampling Date: 1/16/2018

Applicant/Owner: Imperial Irrigation District — State: CA — Sampling Point: 1b

Investigator(s): Callie Amoaku — Section, Township, Range: S6, T17S, R17E

Landform (hillslope, terrace, etc.): Bank — Local relief (concave, convex, none): Concave — Slope (%): 30

Subregion (LRR): D - Interior Deserts — Lat: 32Á42'30.04"N — Long: 115Á15'51.47"W — Datum:

Soil Map Unit Name: Rositas Fine Sand, 0%-2% slopes — NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (•) No ( ) (If no, explain in Remarks.)

Are Vegetation [ ] Soil [ ] or Hydrology [ ] significantly disturbed? Are "Normal Circumstances" present? Yes (•) No ( )

Are Vegetation [ ] Soil [ ] or Hydrology [ ] naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	(•)	( )
Hydric Soil Present?	( )	(•)
Wetland Hydrology Present?	( )	(•)

Is the Sampled Area within a Wetland? **Yes** ( ) **No** (•)

Remarks:

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	%		
Sapling/Shrub Stratum			
1. *Pluchea sericea*	20	Yes	FACW
2.			
3.			
4.			
5.			
Total Cover:	20 %		
Herb Stratum			
1. *Distichlis spicata*	1	No	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	1 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum ____ % — % Cover of Biotic Crust ____ %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0 % (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	0
FACW species	20	x 2 =	40
FAC species	1	x 3 =	3
FACU species		x 4 =	0
UPL species		x 5 =	0
Column Totals:	21 (A)		43 (B)

Prevalence Index = B/A = 2.05

Hydrophytic Vegetation Indicators:

- [X] Dominance Test is >50%
- [X] Prevalence Index is ≤3.0[1]
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** (•) **No** ( )

Remarks:

SOIL

Sampling Point: 1b

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture[3]	Remarks
0-16	7.5YR 4/4	100					Loamy sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.
[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):
Type:
Depth (inches):

Hydric Soil Present? Yes ○ No ◉

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☒ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ○ No ◉ Depth (inches):
Water Table Present? Yes ○ No ◉ Depth (inches):
Saturation Present? (includes capillary fringe) Yes ○ No ◉ Depth (inches):

Wetland Hydrology Present? Yes ○ No ◉

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

APPENDIX B

Jurisdictional Delineation Photos

APPENDIX B
Representative Site Photographs

<table>
<tr><td></td><td></td></tr>
<tr><td>06 – Active Agriculture</td><td>11 – Creosote Scrub</td></tr>
<tr><td></td><td></td></tr>
<tr><td>Iso – Isocoma and Tamarisk</td><td>Fal – Fallow Field</td></tr>
</table>

INTENTIONALLY LEFT BLANK

APPENDIX C

Compendium of Plant Species Observed

APPENDIX C
Plant Compendium

VASCULAR SPECIES

MONOCOTS

POACEAE—GRASS FAMILY

*Distichlis spicata*ð salt grass
* *Arundo donax*ð giant reed
* *Cynodon dactylon*ð Bermudagrass
* *Polypogon monspeliensis*ð annual rabbitsfoot grass
* *Schismus arabicus*ð Arabian schismus

TYPHACEAE—CATTAIL FAMILY

*Typha domingensis*ð southern cattail

EUDICOTS

ASTERACEAE—SUNFLOWER FAMILY

Isocoma acradenia var. *eremophila*ð alkali goldenbush
*Palafoxia arida*ð desert palafox
*Pluchea sericea*ð arrow weed
*Ambrosia dumosa*ð white bursage

BORAGINACEAE—BORAGE FAMILY

*Tiquilia plicata*ð fanleaf crinklemat
*Heliotropium curassavicum*ð salt heliotrope
Cryptantha sp.ð no common name

CHENOPODIACEAE—GOOSEFOOT FAMILY

* *Salsola tragus*—prickly Russian thistle

FABACEAE—LEGUME FAMILY

Prosopis glandulosa var. *torreyana*ð western honey mesquite

MALVACEAE—MALLOW FAMILY

*Sphaeralcea ambigua*ð desert globemallow

MYRTACEAE—MYRTLE FAMILY

* *Eucalyptus* sp.ð no common name

SOLANACEAE—NIGHTSHADE FAMILY

* *Nicotiana glauca*ð tree tobacco

TAMARICACEAE—TAMARISK FAMILY

* *Tamarix chinensis*ð five-stamen tamarisk

ZYGOPHYLLACEAE—CALTROP FAMILY

*Larrea tridentata*ð creosote bush

* Non-native species

APPENDIX D

Compendium of Wildlife Species Observed

APPENDIX D
Wildlife Species Compendium

BIRD

BLACKBIRDS, ORIOLES & ALLIES

ICTERIDAE—BLACKBIRDS

*Sturnella neglecta*ð western meadowlark

FALCONS

FALCONIDAE—CARACARAS & FALCONS

*Falco mexicanus*ð prairie falcon
*Falco sparverius*ð American kestrel

FINCHES

FRINGILLIDAE—FRINGILLINE & CARDUELINE FINCHES & ALLIES

*Haemorhous mexicanus*ð house finch

FLYCATCHERS

TYRANNIDAE—TYRANT FLYCATCHERS

*Sayornis nigricans*ð black phoebe
*Sayornis saya*ð Say's phoebe

HAWKS

ACCIPITRIDAE—HAWKS, KITES, EAGLES, & ALLIES

*Buteo jamaicensis*ð red-tailed hawk
*Circus hudsonius*ð northern harrier

HUMMINGBIRDS

TROCHILIDAE—HUMMINGBIRDS

*Calypte anna—*Anna's hummingbird

JAYS, MAGPIES & CROWS

CORVIDAE—CROWS & JAYS

*Corvus corax*ð common raven

MOCKINGBIRDS & THRASHERS

MIMIDAE—MOCKINGBIRDS & THRASHERS

*Oreoscoptes montanus*ð sage thrasher

NEW WORLD QUAIL

ODONTOPHORIDAE—NEW WORLD QUAIL

*Callipepla californica*ð California quail

OWLS

STRIGIDAE—TYPICAL OWLS

*Athene cunicularia*ð burrowing owl

PIGEONS & DOVES

COLUMBIDAE—PIGEONS & DOVES

*Zenaida macroura*ð mourning dove

SHRIKES

LANIIDAE—SHRIKES

*Lanius ludovicianus*ð loggerhead shrike

WOOD WARBLERS & ALLIES

PARULIDAE—WOOD-WARBLERS

Setophaga coronata—yellow-rumped warbler

NEW WORLD SPARROWS

PASSERELLIDAE—NEW WORLD SPARROWS

Aimophila ruficeps—rufous-crowned sparrow
Melospiza lincolnii—Lincoln's sparrow
Zonotrichia leucophrys—white-crowned sparrow

INVERTEBRATE

BUTTERFLIES

NYMPHALIDAE—BRUSH-FOOTED BUTTERFLIES

*Danaus gilippus*ð queen

ANTS

FORMICIDAE—ANTS

* *Pogonomyrmex* sp.ð Harvester ant

MAMMAL

CANIDS

CANIDAE—WOLVES & FOXES

*Canis latrans*ð coyote

* Non-native species

INTENTIONALLY LEFT BLANK

APPENDIX E

Special-Status Plant Species Not Expected to Occur

APPENDIX E
Special-Status Plant Species Not Expected to Occur in the Proposed Project Footprint

Scientific Name	Common Name	Status (Federal/State/CRPR)	Primary Habitat Associations/ Life Form/ Blooming Period/ Elevation Range (feet)	Potential to Occur
Abronia villosa var. *aurita*	chaparral sand-verbena	None/None/1B.1	Chaparral, Coastal scrub, Desert dunes; sandy/annual herb/(Jan)Mar–Sep/245–5250	Not expected to occur. The site is outside of the species' known elevation range.
Croton wigginsii	Wiggins' croton	None/SR/2B.2	Desert dunes, Sonoran desert scrub (sandy)/perennial shrub/Mar–May/160–330	Not expected to occur. The site is outside of the species' known elevation range and there is no suitable vegetation present.
Johnstonella holoptera	winged cryptantha	None/None/4.3	Mojavean desert scrub, Sonoran desert scrub/annual herb/Mar–Apr/325–5545	Not expected to occur. The site is outside of the species' known elevation range.

Status Legend:
State:
SR: State Rare
CRPR: California Rare Plant Rank
CRPR 1B: Plants Rare, Threatened, or Endangered in California and Elsewhere
CRPR 2B: Plants Rare, Threatened, or Endangered in California, But More Common Elsewhere
CRPR 4: Plants of Limited Distribution - A Watch List
Threat Rank
.1 Seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat)
.2 Moderately threatened in California (20-80% occurrences threatened / moderate degree and immediacy of threat)
.3 Not very threatened in California (<20% of occurrences threatened / low degree and immediacy of threat or no current threats known)

INTENTIONALLY LEFT BLANK

APPENDIX F

Special-Status Wildlife Species Not Expected to Occur

APPENDIX F
Special-Status Wildlife Species – Low Potential or Not Expected to Occur in the Proposed Project Footprint

Scientific Name	Common Name	Status (Federal/State)	Habitat	Potential to Occur
Amphibians				
Incilius alvarius	Sonoran desert toad	None/SSC	Desert and semi-arid habitats including desert scrub, semi-arid grasslands and woodlands; usually associated with large permanent streams	Low potential to occur. No suitable large permanent stream within the study area and there are no extant records for this species within the vicinity.
Reptiles				
Kinosternon sonoriense	Sonoran mud turtle	None/SSC	Desert ponds, slow-moving shaded streams and rivers, and cattle tanks; usually in woodlands and occasionally grasslands	Not expected to occur. No suitable desert ponds present.
Birds				
Setophaga petechia (nesting)	yellow warbler	BCC/SSC	Nests and forages in riparian and oak woodlands, montane chaparral, open ponderosa pine, and mixed-conifer habitats	Not expected to occur. No suitable vegetation present.
Mammals				
Eumops perotis californicus	western mastiff bat	None/SSC	Chaparral, coastal and desert scrub, coniferous and deciduous forest and woodland; roosts in crevices in rocky canyons and cliffs where the canyon or cliff is vertical or nearly vertical, trees, and tunnels	Not expected to roost on site. Potential to forage through study area.
Lasiurus xanthinus	western yellow bat	None/SSC	Valley–foothill riparian, desert riparian, desert wash, and palm oasis habitats; below 2,000 feet above mean sea level; roosts in riparian and palms	Not expected to roost on site. Potential to forage through study area.
Nyctinomops femorosaccus	pocketed free-tailed bat	None/SSC	Pinyon–juniper woodlands, desert scrub, desert succulent shrub, desert riparian, desert wash, alkali desert scrub, Joshua tree, and palm oases; roosts in high cliffs or rock outcrops with drop-offs, caverns, and buildings	Not expected to roost on site. Potential to forage through study area.

Scientific Name	Common Name	Status (Federal/State)	Habitat	Potential to Occur
Sigmodon hispidus eremicus	Yuma hispid cotton rat	None/SSC	Backwater sloughs, marshy areas adjacent to Colorado River	Low potential to occur. There is no marsh habitat in the area with the exception of cattail marsh within an unnamed canal.

Federal:
BCC: USFWS bird of conservation concern
State:
SSC: California Species of Special Concern

APPENDIX D

Cultural and Paleontological Resources Inventory Report for the East Highline Reservoir Project in El Centro, Imperial County, California

Prepared for:

Imperial Irrigation District
333 East Barioni Boulevard
Imperial, California 92251-0937
Contact: Jessica Lovecchio

Prepared by:

Matthew DeCarlo, MA; Sarah Siren, MSc; Samantha Murray, MA; and Micah J. Hale, PhD, RPA

DUDEK
605 Third Street
Encinitas, California 92024

OCTOBER 2018

Printed on 30% post-consumer recycled material.

TABLE OF CONTENTS

Section **Page No.**

TABLE OF CONTENTS (CONTINUED)

Section **Page No.**

TABLE OF CONTENTS (CONTINUED)

Page No.

APPENDICES

FIGURES

TABLES

TABLE OF CONTENTS (CONTINUED)

Page No.

ACRONYMS AND ABBREVIATIONS

Acronym/Abbreviation	Definition
AAC	All-American Canal
APE	area of potential effect
BLM	Bureau of Land Management
BP	before present
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CRHR	California Register of Historical Resources
EHL	East Highline Reservoir
GPS	Global Positioning System
IID	Imperial Irrigation District
MLD	Most Likely Descendent
NAHC	Native American Heritage Commission
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
PI	Principal Investigator
Reclamation	United States Bureau of Reclamation
SCIC	South Coastal Information Center
SR-	State Route
SSU	shovel scrape units
STP	shovel test pit

INTENTIONALLY LEFT BLANK

NATIONAL ARCHAEOLOGICAL DATABASE INFORMATION

Authors:	Matthew DeCarlo, MA; Sarah Siren, MS; Samantha Murray, MA; Micah J. Hale, PhD, RPA
Firm:	Dudek
Project Proponent:	Imperial Irrigation District
Report Date:	September 2018
Report Title:	Cultural and Paleontological Resources Inventory Report for the East Highline Reservoir Project in El Centro, Imperial County, California
Type of Study:	Cultural and Paleontological Resources Inventory
Resources:	P-13-000305; P-13-000316; P-13-007130; P-13-008333; P-13-008668; P-13-014631; P-13-017218; P-13-017219; P-13-017220; P-13-017221; P-13-017222; P-13-017223; P-13-017224; P-13-017225; P-13-017226; P-13-017227; P-13-017228; P-13-017229
USGS Quads:	Bonds Corner (1990); Section 25, 26, and 36 of Township 16S, Range 16E; Section 6 of Township 17S, Range 17E.
Acreage:	Approximately 563
Permit Numbers:	N/A
Keywords:	All-American Canal; irrigation system; intensive pedestrian survey; Kumeyaay; ceramic; brownware; buffware; Salton Brown; Colorado Buff; prehistoric; isolate; historic refuse scatter; P-13-000305; P-13-000316; P-13-007130; P-13-008333; P-13-008668; P-13-014631; P-13-017218; P-13-017219; P-13-017220; P-13-017221; P-13-017222; P-13-017223; P-13-017224; P-13-017225; P-13-017226; P-13-017227; P-13-017228; P-13-017229

INTENTIONALLY LEFT BLANK

MANAGEMENT SUMMARY

The East Highline Reservoir Project (proposed EHL Project) is a proposed project of the Imperial Irrigation District (IID) to construct a main canal off-line storage reservoir and related infrastructure. The IID, with the United States Bureau of Reclamation (Reclamation) acting as the federal lead agency, contracted Dudek to initiate the processing of environmental documents pursuant to the California Environmental Quality Act (CEQA) and the National Environmental Policy Act for the proposed EHL Project. A cultural and paleontological resources inventory was conducted for the proposed EHL Project's area of potential effect (APE).

This inventory included a records search of data obtained from the South Coastal Information Center (SCIC) at San Diego State University. The records search identified 37 previously identified cultural resources within 1 mile of the APE (see Table 1, Cultural Resources within 1 mile of Area of Potential Effect, in Section 5.1, South Coastal Information Center Records Search). Of the 37 identified, 6 cultural resources intersect the APE. The records search also identified 32 previous archaeological studies that have been conducted within 1 mile of the APE (see Table 2, Previous Archaeological Studies Conducted within 1 Mile of Area of Potential Effect, in Section 5.1). Of the 32 studies, 23 studies cover portions of the APE. Dudek requested a search of the Native American Heritage Commission's Sacred Lands File, which resulted in no Tribal Cultural Resources. Outreach letters were sent to regionally relevant Native American groups. To date, only the Viejas Band of Kumeyaay Indians responded requesting that a Kumeyaay Native American Monitor be on site during any ground disturbing activities.

A records search of paleontological locality information was requested through the Natural History Museum of Los Angeles County to determine whether there are any known fossil localities in or near the APE. The search identified no fossil localities within the APE or within 1 mile of the APE.

The proposed EHL Project APE was surveyed on July 27 and 28, 2017, and between January 22 and 24, 2018. The APE is dominated by previously cultivated land, but the proposed intake canal passes through a segment of undeveloped terrain. The survey relocated four of the six previously identified resources within the EHL APE. The survey also identified one new archaeological resource and 11 new built environment resources (Table 3, Resources within the Area of Potential Effect, in Section 5.3, Survey). No fossil bone or shell was observed on the ground surface during the pedestrian survey, and the surface mapped deposits were confirmed to be consistent with those mapped throughout the proposed EHL Project site.

The current survey identified one prehistoric ceramic scatter that will be impacted by the proposed EHL Project: P-13-017218. Dudek conducted formal evaluation of the proposed EHL

Project site which included close-interval survey, Global Positioning System (GPS) mapping, and excavation of three shovel test pit units and two shovel scrape units. Excavation revealed that the proposed EHL Project site has a very shallow subsurface deposit.

Of the 18 cultural resources located within the APE, the proposed EHL Project can avoid two resources, P-13-008668 and P-13-014631. Of the remaining 16 sites, two resources, P-13-000305 and P-13-000316, are no longer extant within the EHL APE. The proposed EHL Project cannot avoid impacts to the remaining 14 cultural resources identified within the APE. An impact and significance evaluation was conducted for each of the resources (see Table 5, Impact and Significance Evaluation of Cultural Resources Located within the Area of Potential Effect, in Section 7.1, Cultural Resource Impact Evaluation). Dudek recommends P-13-017218 through P-13-017229 not eligible for listing in the National Register of Historic Places (NRHP) nor the California Register of Historical Resources (CRHR).

The All American Canal and the East Highline Canal, P-13-007130 and P-13-008333, respectively, have been previously recommended eligible for the NRHP. Both resources will be altered by the proposed EHL Project. The proposed EHL Project will not impact the integrity or feel of any major feature that contributes to the two canals' inclusion in the NRHP. Dudek finds that the proposed EHL Project will have no adverse effect on these historic properties under Section 106 of the National Historic Preservation Act (NHPA). From a CEQA perspective, Dudek finds that the proposed EHL Project will not have a significant impact on these historical resources.

1 PROJECT DESCRIPTION AND LOCATION

The East Highline Reservoir Project (proposed EHL Project) is a proposed project of the Imperial Irrigation District (IID) to construct a main canal off-line storage reservoir and related infrastructure. The IID, with the United States Bureau of Reclamation (Reclamation) acting as the federal lead agency, contracted Dudek to initiate the processing of environmental documents pursuant to the California Environmental Quality Act (CEQA) and the National Environmental Policy Act for the proposed EHL Project. A cultural and paleontological resources inventory was conducted for the proposed EHL Project's area of potential effect (APE).

The proposed reservoir would manage up to 3,400 acre-feet of water on a parcel of farm ground. A proposed open turnoff on the north side of the All-American Canal (AAC) would direct water north along a proposed intake canal to the reservoir. The construction and use of this large operational reservoir is a planned strategy to manage reduced downstream demands due to increase in grower requests for 12-hour deliveries or any reduction to a 24-hour order. Stored water would be delivered through an automated gate outlet and structure with a gravity flow for delivery into the East Highline Canal.

The proposed EHL Project is located approximately 1.25 miles north of the AAC and on the east side of the East Highline Canal at Verde School Road, in Imperial County, California. The proposed EHL Project footprint is located in Sections 25, 26, and 36 of Township 16S, Range 16E, and Section 6 of Township 17S, Range 17E on the U.S. Geological Survey Bonds Corner 7.5' quadrangle (Figure 1, Project Location Map). The proposed EHL Project footprint includes the reservoir, intake canal, outlet gate, and intake structure.

The proposed EHL Project APE includes the footprint of the reservoir and a 400-foot corridor for the intake canal (Figures 2A–2C, Area of Potential Effect Map). Immediately east of the APE is the Area of Critical Environmental Concern, managed by the Bureau of Land Management (BLM). All proposed EHL Project activities will avoid the Area of Critical Environmental Concern. The entire APE was subject to pedestrian survey.

This report documents the results of the proposed EHL Project cultural resources inventory including a records search, pedestrian survey, resource documentation, and Native American outreach. The goal of this inventory is to provide data to the IID to aid in their management of cultural resources during the development of the proposed EHL Project.

1.1 Regulatory Context

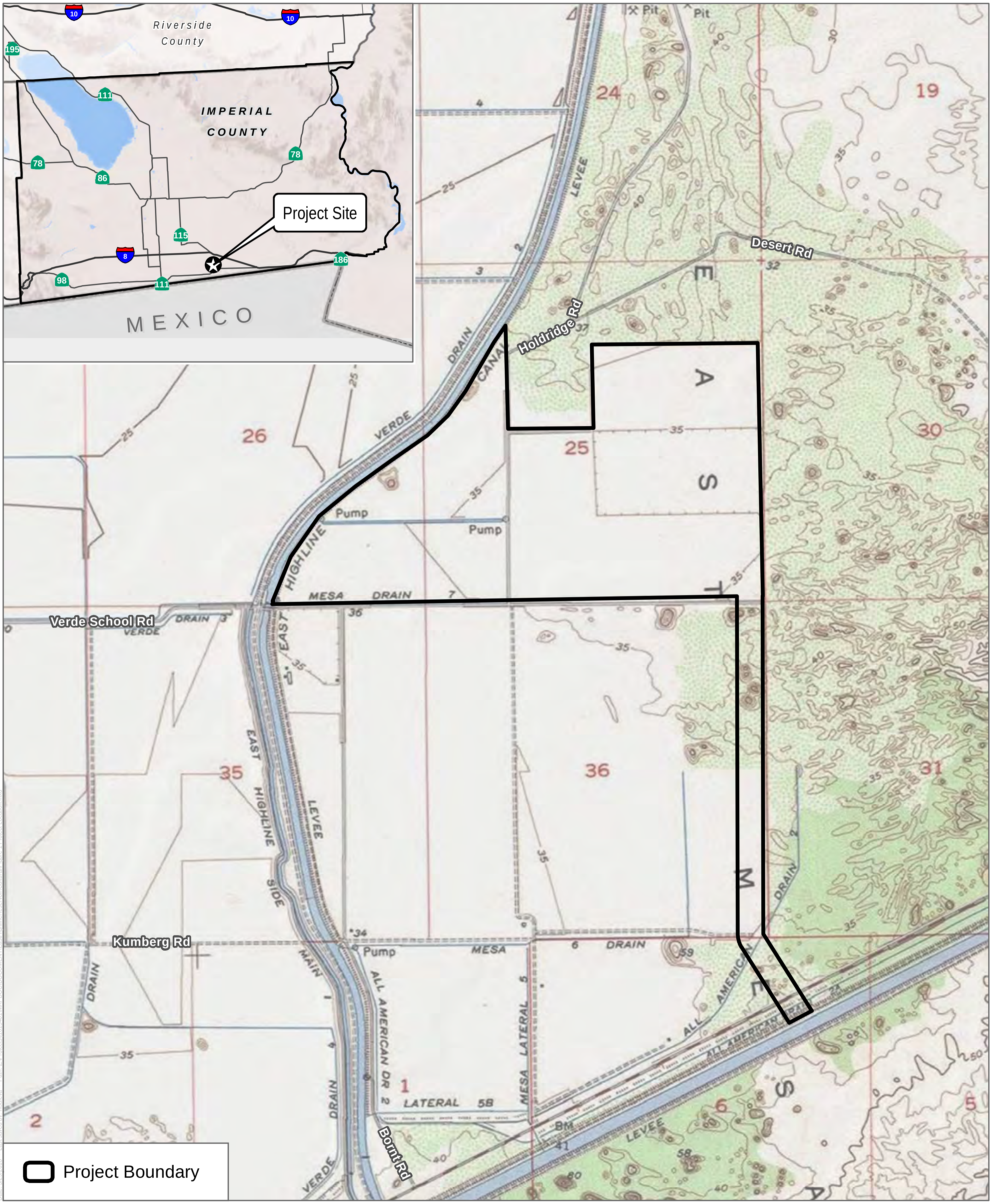
The proposed EHL Project is subject to federal, state, and local regulations regarding cultural resources. The following section provides a summary of the applicable regulations, policies, and guidelines relating to the proper management of cultural resources for the proposed EHL Project.

1.1.1 36 CFR 800 and Section 106 of the National Historic Preservation Act

The National Historic Preservation Act (NHPA) established the National Register of Historic Places (NRHP) and the President's Advisory Council on Historic Preservation, and provided that states may establish State Historic Preservation Officers to carry out some of the functions of the NHPA. Most significantly for federal agencies responsible for managing cultural resources, Section 106 of the NHPA directs that "[t]he head of any Federal agency having direct or indirect jurisdiction over a proposed Federal or federally assisted undertaking in any State and the head of any Federal department or independent agency having authority to license any undertaking shall, prior to the approval of the expenditure of any Federal funds on the undertaking or prior to the issuance of any license, as the case may be, take into account the effect of the undertaking on any district, site, building, structure, or object that is included in or eligible for inclusion in the NRHP." Section 106 also affords the President's Advisory Council on Historic Preservation a reasonable opportunity to comment on the undertaking (16 USC 470(f)).

The content of 36 Code of Federal Regulations (CFR), Part 800 implements Section 106 of the NHPA. It defines the steps necessary to identify historic properties (i.e., those cultural resources listed in or eligible for listing in the NRHP), including consultation with federally recognized Native American tribes to identify resources with important cultural values; to determine whether or not they may be adversely affected by a proposed undertaking; and to outline the process for eliminating, reducing, or mitigating the adverse effects.

The content of 36 CFR 60.4 defines criteria for determining eligibility for listing in the NRHP. Cultural resources identified during an inventory must be formally evaluated for historical significance in consultation with the California State Historic Preservation Officer to determine if the resources are eligible for inclusion in the NRHP. Cultural resources may be considered eligible for listing if they possess integrity of location, design, setting, materials, workmanship, feeling, and association. The criteria for determining eligibility are essentially the same in content and order as those outlined under the CEQA, but the criteria under NHPA are labeled A through D (rather than 1–4 under CEQA).



SOURCE: USGS 7.5-Minute Series Bonds Corner Quadrangle

DUDEK

0 1,000 2,000 Feet

FIGURE 1
Project Location
East Highline Reservoir Project

INTENTIONALLY LEFT BLANK

SOURCE: NAIP 2016

DUDEK

0 500 1,000 Feet
0 150 300 Meters
1:7,000

FIGURE 2A
Area of Potential Effect
East Highline Reservoir Project

INTENTIONALLY LEFT BLANK

SOURCE: NAIP 2016

DUDEK

0 500 1,000 Feet
0 150 300 Meters
1:7,000

FIGURE 2B
Area of Potential Effect
East Highline Reservoir Project

INTENTIONALLY LEFT BLANK

SOURCE: NAIP 2016

DUDEK

0 500 1,000 Feet
0 150 300 Meters
1:7,000

FIGURE 2C
Area of Potential Effect
East Highline Reservoir Project

INTENTIONALLY LEFT BLANK

Regarding criteria A through D of Section 106, the quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, cultural resources, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and that (36 CFR 60.4):

A. Are associated with events that have made a significant contribution to the broad patterns of our history; or

B. Are associated with the lives of persons significant in our past; or

C. 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. Have yielded or may be likely to yield, information important in prehistory or history.

The President's Advisory Council on Historic Preservation provides methodological and conceptual guidance for identifying historic properties. In 36 CFR 800.4, the steps necessary for identifying historic properties include:

- Determine and document the APE (36 CFR 800.16(d)).
- Review existing information on historic properties within the APE, including preliminary data.
- Confer with consulting parties to obtain additional information on historic properties or concerns about effects to these.
- Consult with Native American tribes (36 CFR 800.3(f)) to obtain knowledge on resources that are identified with places which they attach cultural or religious significance.
- Conduct appropriate fieldwork (including phased identification and evaluation).
- Apply NRHP criteria to determine a resource eligibility for NRHP listing.

Fulfilling these steps is generally thought to constitute a reasonable effort to identify historic properties within the APE for an undertaking. The obligations of a federal agency must also assess whether an undertaking will have an adverse effect on cultural resources. An undertaking will have an adverse effect when:

> [...] an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design,

> setting, materials, workmanship, feeling, or association. Consideration shall be given to all qualifying characteristics of a historic property, including those that may have been identified subsequent to the original evaluation of the property's eligibility for the National Register. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance or be cumulative. (36 CFR 800.5(1))

The process of determining whether an undertaking may have an adverse effect requires the federal agency to confer with consulting parties in order to appropriately consider all relevant stakeholder concerns and values. Consultation regarding the treatment of a historic property may result in a Programmatic Agreement and/or Memorandum of Agreement between consulting parties that typically include the lead federal agency, State Historic Preservation Officer, and Native American tribes if they agree to be signatories to these documents. Treatment documents—whether resource-specific or generalized—provide guidance for resolving potential or realized adverse effects to known historic properties or to those that may be discovered during implementation of the undertaking. In all cases, avoidance of adverse effects to historic properties is the preferred treatment measure and it is generally the burden of the federal agency to demonstrate why avoidance may not be feasible. Avoidance of adverse effects may not be feasible if it would compromise the objectives of an undertaking that can be reasonably said to have public benefit. Other non-archaeological considerations about the benefit of an undertaking may also apply, resulting in the determination that avoidance is not feasible. In general, avoidance of adverse effects is most difficult when a resource is discovered while a permitted undertaking is being implemented, such as identification of an NRHP-eligible archaeological resource during earthmoving.

1.1.2 Bureau of Reclamation Cultural Resources Management Policy

Reclamation is responsible for the cultural resources it owns, controls, or administers on behalf of the United States and must assure their management in accordance with federal laws, regulations, executive orders, and Department of the Interior policies. According to its policy manual, Reclamation (2016) shall:

A. identify, document, and evaluate cultural resources for listing in the National Register;

B. actively nominate eligible properties to the National Register;

C. to the fullest extent possible, manage and maintain historic properties, both reserved and transferred works, in a manner that preserves the character defining features that qualify them for listing in the National Register;

D. integrate cultural resources concerns early in project planning processes in order to identify opportunities to protect historic properties from adverse effects and avoid unnecessary delays, conflicts, and costs for Reclamation undertakings;

E. consider the effects of its undertakings on historic properties;

F. where adverse effects cannot be avoided, commit to fully completing mitigation measures prescribed in agreements executed with one or more of the following: State or Tribal Historic Preservation Offices, the Advisory Council on Historic Preservation, Native American tribes, and other interested parties;

G. seek input and involvement from Federal, state, tribal, and local agencies, as well as the interested public, in carrying out Reclamation's CRM Program;

H. support an education and outreach program to inform the public of Reclamation's cultural resources stewardship responsibilities, activities, and accomplishments;

I. maintain accurate information on the types, location, status, and condition of its cultural resources, which shall be used in collaboration with other Reclamation programs such as asset management;

J. preserve and protect its museum property as prescribed in RM Policy, Museum Property Management, LND P05; D&S, Museum Property Management, LND 02-02; and D&S, Museum Records, LND 02-05;

K. identify NAGPRA cultural items under its control to ensure their appropriate protection, and repatriation or disposition in a timely manner according to statute and regulation;

L. to the extent possible, establish and implement alternatives for the continued use of historic properties that are no longer needed for current or projected Reclamation purposes in compliance with section 111 of NHPA;

M. to the extent possible, follow the Secretary of the Interior's Standards for the Treatment of Historic Properties for historic buildings and structures when complying with sustainability, accessibility, life safety and other applicable mandates;

N. as per RM D&S, Administration of the Archaeological Resources Protection Act (ARPA) on Bureau of Reclamation Land, LND 02-04, support management actions to prevent the theft of, damage to, or destruction of archaeological resources; and

O. as per LND 02-04, allow archaeological investigation and work on Reclamation land only after issuing a permit for such activity.

1.1.3 California Register of Historical Resources (California Public Resources Code, Section 5020 et seq.)

In California, the term "cultural resource" includes but is not limited to "any object, building, structure, site, area, place, record, or manuscript which is historically or archaeologically significant, or is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California" (California Public Resources Code, Section 5020.1(j)). In 1992, the California legislature established the California Register of Historical Resources (CRHR) "to be used by state and local agencies, private groups, and citizens to identify the state's cultural resources and to indicate what properties are to be protected, to the extent prudent and feasible, from substantial adverse change" (California Public Resources Code, Section 5024.1(a)). A resource is eligible for listing in the CRHR if the State Cultural Resources Commission determines that it is a significant resource and that it meets any of the following NRHP criteria (California Public Resources Code, Section 5024.1(c)):

1. Associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.
2. 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.
4. Has yielded, or may be likely to yield, information important in prehistory or history.

Resources less than 50 years old are not considered for listing in the CRHR, but may be considered if it can be demonstrated that sufficient time has passed to understand the historical importance of the resource (see 14 CCR 4852(d)(2)).

The CRHR protects cultural resources by requiring evaluations of the significance of prehistoric and historic resources. The criteria for the CRHR are nearly identical to those for the NRHP, and properties listed or formally designated as eligible for listing on the NRHP are automatically listed on the CRHR, as are the state landmarks and points of interest. The CRHR also includes properties designated under local ordinances or identified through local cultural resource surveys. The State Historic Preservation Officer maintains the CRHR.

1.1.4 Native American Historic Cultural Sites (California Public Resources Code, Section 5097 et seq.)

The Native American Historic Resources Protection Act (California Public Resources Code, Section 5097 et seq.) addresses the disposition of Native American burials in archaeological sites and protects such remains from disturbance, vandalism, or inadvertent destruction; establishes procedures to be implemented if Native American skeletal remains are discovered during construction of a project; and establishes the NRHC to resolve disputes regarding the disposition of such remains. In addition, the Native American Historic Resource Protection Act makes it a misdemeanor punishable by up to 1 year in jail to deface or destroy an Indian historic or cultural site that is listed or may be eligible for listing in the CRHR.

1.1.5 California Native American Graves Protection and Repatriation Act

The California Native American Graves Protection and Repatriation Act, enacted in 2001, requires all state agencies and museums that receive state funding and that have possession or control over collections of California Native American human remains or cultural items, as defined, to complete an inventory and summary of these remains and items on or before January 1, 2003, with certain exceptions. The California Native American Graves Protection and Repatriation Act also provides a process for the identification and repatriation of these items to the appropriate tribes.

1.1.6 California Environmental Quality Act

As described further below, the following CEQA Statute and CEQA Guidelines are relevant to the analysis of archaeological and historic resources:

1. California Public Resources Code, Section 21083.2(g): Defines “unique archaeological resource.”
2. California Public Resources Code, Section 21084.1 and CEQA Guidelines, Section 15064.5(a): Define cultural resources. In addition, CEQA Guidelines, Section 15064.5(b) defines the phrase “substantial adverse change” in the significance of a cultural resource. It also defines the circumstances when a project would materially impair the significance of a cultural resource.
3. California Public Resources Code, Section 21074 (a): defines “Tribal cultural resources” and Section 21074(b): defines a “cultural landscape.”

4. California Public Resources Code, Section 5097.98 and CEQA Guidelines, Section 15064.5(e): These statutes set forth standards and steps to be employed following the accidental discovery of human remains in any location other than a dedicated ceremony.
5. California Public Resources Code, Sections 21083.2(b)–(c) and CEQA Guidelines, Section 15126.4: These statutes and regulations provide information regarding the mitigation framework for archaeological and historic resources, including options of preservation-in-place mitigation measures; identifies preservation in place as the preferred manner of mitigating impacts to significant archaeological sites.

Under CEQA, a project may have a significant effect on the environment if it may cause "a substantial adverse change in the significance of an [sic] cultural resource" (California Public Resources Code, Section 21084.1; 14 CCR 15064.5(b)). A "cultural resource" is any site listed or eligible for listing in the CRHR. The CRHR listing criteria are intended to examine whether the resource in question: (a) is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage; (b) is associated with the lives of persons important in our past; (c) 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 (d) has yielded, or may be likely to yield, information important in pre-history or history.

The term "cultural resource" also includes any site described in a local register of historic resources, or identified as significant in a cultural resources survey (meeting the requirements of California Public Resources Code, Section 5024.1(q)).

CEQA also applies to "unique archaeological resources." California Public Resources Code, Section 21083.2(g) defines a "unique archaeological resource" as any 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:

1. Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information.
2. Has a special and particular quality such as being the oldest of its type or the best available example of its type.
3. Is directly associated with a scientifically recognized important prehistoric or historic event or person.

In 2014, CEQA was amended through Assembly Bill 52 to apply to "tribal culture resources" as well. Specifically, California Public Resources Code, Section 21074 provides guidance for defining Tribal Cultural Resources as either of the following:

1. Sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe that are either of the following: (A) Included or determined to be eligible for inclusion in the California Register of Cultural Resources. (B) Included in a local register of cultural resources as defined in subdivision (k) of §5020.1.
2. A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of §5024.1. In applying the criteria set forth in subdivision (c) of §5024.1 for the purposes of this paragraph, the lead agency shall consider the significance of the resource to a California Native American tribe. (b) A cultural landscape that meets the criteria of subdivision (a) is a tribal cultural resource to the extent that the landscape is geographically defined in terms of the size and scope of the landscape.

All cultural resources and unique archaeological resources—as defined by statute—are presumed to be historically or culturally significant for purposes of CEQA (California Public Resources Code, Section 21084.1; 14 CCR 15064.5(a)). The lead agency is not precluded from determining that a resource is a cultural resource even if it does not fall within this presumption (California Public Resources Code, Section 21084.1; 14 CCR 15064.5(a)). A site or resource that does not meet the definition of "cultural resource" or "unique archaeological resource" is not considered significant under CEQA and need not be analyzed further (California Public Resources Code, Section 21083.2(a); 14 CCR 15064.5(c)(4)).

Under CEQA and CEQA Guidelines, significant cultural impact results from a "substantial adverse change in the significance of an [sic] cultural resource [including a unique archaeological resource]" due to the "physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an cultural resource would be materially impaired" (14 CCR 15064.5(b)(1); California Public Resources Code, Section 5020.1(q)). In turn, the significance of a cultural resource is materially impaired when a project (14 CCR 15064.5(b)(2)):

1. Demolishes or materially alters in an adverse manner those physical characteristics of an [sic] cultural resource that convey its historical significance and that justify its inclusion in, or eligibility for, inclusion in the California Register; or
2. Demolishes or materially alters in an adverse manner those physical characteristics that account for its inclusion in a local register of cultural resources pursuant to Section 5020.1(k) of the Public Resources Code or its

identification in an [sic] cultural resources survey meeting the requirements of Section 5024.1(g) of the Public Resources Code, unless the public agency reviewing the effects of the project establishes by a preponderance of evidence that the resource is not historically or culturally significant; or

3. Demolishes or materially alters in an adverse manner those physical characteristics of a cultural resource that convey its historical significance and that justify its eligibility for inclusion in the California Register as determined by a lead agency for purposes of CEQA.

Pursuant to these sections, the CEQA first evaluates whether a project site contains any "cultural resources," then assesses whether that project will cause a substantial adverse change in the significance of a cultural resource such that the resource's historical significance is materially impaired.

When a project significantly affects a unique archaeological resource, CEQA imposes special mitigation requirements. Specifically (California Public Resources Code, Sections 21083.2(b)(1)– (4)):

> [i]f it can be demonstrated that a project will cause damage to a unique archaeological resource, the lead agency may require reasonable efforts to be made to permit any or all of these resources to be preserved in place or left in an undisturbed state. Examples of that treatment, in no order of preference, may include, but are not limited to, any of the following:
>
> 1. Planning construction to avoid archaeological sites.
> 2. Deeding archaeological sites into permanent conservation easements.
> 3. Capping or covering archaeological sites with a layer of soil before building on the sites.
> 4. Planning parks, greenspace, or other open space to incorporate archaeological sites.

If these "preservation in place" options are not feasible, mitigation may be accomplished through data recovery (California Public Resources Code, Section 21083.2(d); 14 CCR 15126.4(b)(3)(C)). California Public Resources Code, Section 21083.2(d) states that:

> [e]xcavation as mitigation shall be restricted to those parts of the unique archaeological resource that would be damaged or destroyed by the project. Excavation as mitigation shall not be required for a unique archaeological resource if the lead agency determines that testing or studies already completed have adequately

recovered the scientifically consequential information from and about the resource, if this determination is documented in the environmental impact report.

These same requirements are set forth in slightly greater detail in CEQA Guidelines, Section 15126.4(b)(3), as follows:

A. Preservation in place is the preferred manner of mitigating impacts to archaeological sites. Preservation in place maintains the relationship between artifacts and the archaeological context. Preservation may also avoid conflict with religious or cultural values of groups associated with the site.

B. Preservation in place may be accomplished by, but is not limited to, the following:

   1. Planning construction to avoid archaeological sites;

   2. Incorporation of sites within parks, greenspace, or other open space;

   3. Covering the archaeological sites with a layer of chemically stable soil before building tennis courts, parking lots, or similar facilities on the site[; and]

   4. Deeding the site into a permanent conservation easement.

C. When data recovery through excavation is the only feasible mitigation, a data recovery plan, which makes provision for adequately recovering the scientifically consequential information from and about the cultural resource, shall be prepared and adopted prior to any excavation being undertaken.

Note that, when conducting data recovery, "[i]f an artifact must be removed during project excavation or testing, curation may be an appropriate mitigation" (14 CCR 15126.4(b)(3)). However, "[d]ata recovery shall not be required for an [sic] cultural resource if the lead agency determines that testing or studies already completed have adequately recovered the scientifically consequential information from and about the archaeological or historic resource, provided that determination is documented in the CEQA document and that the studies are deposited with the California Historical Resources Regional Information Center" (14 CCR 15126.4(b)(3)(D)).

Finally, CEQA Guidelines, Section 15064.5 assigns special importance to human remains and specifies procedures to be used when Native American remains are discovered. These procedures are set forth in California Public Resources Code, Section 5097.98.

Paleontological resources are also considered under CEQA. Appendix G of the CEQA Guidelines includes the following question in the Environmental Checklist: "Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?" Additionally, California Public Resources Code, Section 5097.5 specifies that any unauthorized removal of paleontological remains is a misdemeanor. Further, the California Penal Code, Section 622.5 sets the penalties for damage to or removal of paleontological resources.

1.1.7 California Health and Safety Code Section 7050.5

California law protects Native American burials, skeletal remains, and associated grave goods, regardless of their antiquity, and provides for the sensitive treatment and disposition of those remains. California Health and Safety Code, Section 7050.5 requires that if human remains are discovered in any place other than a dedicated cemetery, no further disturbance or excavation of the site or nearby area reasonably suspected to contain human remains shall occur until the County coroner has examined the remains (California Health and Safety Code, Section 7050.5(b)). If the coroner determines or has reason to believe the remains are those of a Native American, the coroner must contact the Native American Heritage Commission (NAHC) within 24 hours (California Health and Safety Code, Section 7050.5(c)). The NAHC will notify the Most Likely Descendent (MLD). With the permission of the landowner, the MLD may inspect the site of discovery. The inspection must be completed within 24 hours of notification of the MLD by the NAHC. The MLD may recommend means of treating or disposing of, with appropriate dignity, the human remains and items associated with Native Americans.

1.1.8 Paleontological Resources Protection Act

The Paleontological Resources Protection Act of 2009 requires the Secretaries of the Interior and Agriculture to manage and protect paleontological resources on federal land. The Federal Highway Act of 1935 (20 USC 78) addresses paleontological resources. Section 305 of the Act (20 USC 78(a)) gives authority to use federal funds to salvage archaeological and paleontological sites that are impacted by highway projects. There are several other laws and regulations that address paleontological resources either directly or indirectly, including the Antiquities Act of 1906 (16 USC 431–433), Archeological and Paleontological Salvage (23 USC 305), and the National Environmental Policy Act of 1969 (42 USC 138; 49 USC 1653).

1.2 Project Personnel

Micah Hale, PhD, RPA, served as project manager and co-authored the technical report. Matthew DeCarlo, BA, served as principle investigator and field director and co-authored the technical report. Architectural Historian Samantha Murray, MA, and archaeologist Brad Comeau, MS, RPA, served as contributing authors. Sarah Siren, MS, conducted the paleontological analysis. Sarah Lewis, Javier Hernandez, and Dave Faith acted as field crew members (see Appendix A, Project Personnel Qualification).

1.3 Report Structure

Following this introduction, in Section 2, Setting, a cultural and environmental context is provided for characterizing cultural resources. In Section 3, Research Design, a research design is outlined and, in Section 4, Methods, the inventory methods are reviewed. In Section 5, Results, a description of the archival review and survey results are presented. In Section 6, Analysis, laboratory analysis results are described. In Section 7, Management Consideration, Dudek's management considerations, which consist of an impacts analysis and recommended mitigation, are presented. Two sets of appendices (confidential and non-confidential) are attached. The non-confidential appendices include Appendix A: Project Personnel Qualifications; Appendix C: NAHC Sacred Lands File Search Results and Tribal Correspondence; Appendix F: Paleontological Records Search; and Appendix G: Artifact Catalog. The confidential appendices include Appendix B: SCIC Records Search Results; Appendix D: New and Updated DPR Site Records; and Appendix E: Resources in APE Maps.

INTENTIONALLY LEFT BLANK

2 SETTING

2.1 Natural Setting

The proposed EHL Project APE is located within the Sonoran Desert, bounded on the west by the Peninsular Ranges and bounded on the east by the Colorado River. The reservoir portion of the APE is located entirely within agricultural fields, but the intake channel extends south, bisecting earthworks including irrigation drains and State Route (SR-) 98 before it reaches the AAC. The APE elevation does not vary greatly and averages approximately 35 feet above mean sea level. The APE is dominated by levelled agricultural land and linear earthworks; however, there is a section of unmodified desert land that is bisected by the intake channel. Creosote bush (*Larrea tridentata*) scrub dominates this area.

For detailed discussion relating to the environmental context of this area, please consult the biological, geological, and other technical studies prepared for the proposed EHL Project.

2.2 Cultural Setting

The general cultural sequence for the Colorado Desert can be viewed in terms of three or more time periods based on the evolutionary stages proposed by Willey and Phillips (1958). Among contemporary archaeologists and cultural resource managers, the Paleoindian and Archaic evolutionary stages of Willey and Phillips (1958) have evolved into time periods and, in Southern California, their formative stage became the Late Prehistoric time period. For this report, actual geological time periods and the evolutionary stage labels intended by Willey and Phillips will be employed. Within the time periods, various archaeological complexes occur on a regional basis. Various labels such as horizon, pattern, and culture have been used, but the more universal term “complex” is preferred for this effort.

2.2.1 Late Pleistocene

Several researchers posit a Pre-Projectile Point Period that occurred in the Late Pleistocene prior to the better documented Clovis, San Dieguito, and Lake Mojave complexes (e.g., Begole 1974; Childers 1980; Hayden 1976). Archaeological material from the greater Southwest dating to this posited Pre-Projectile Point Period is often called the Malpais Complex. Malpais is a term that was adapted from the early work of Malcolm Rogers, who used it to refer to what is now the first portion of the San Dieguito Lake Mojave Complex. The term was resurrected by Hayden (1976) to refer to a tool assemblage including choppers, scrapers, and other crude, core-based tools typically found on old desert pavements in the Sonoran Desert and in the Sierra Pinacate. These materials generally are heavily weathered, very darkly patinated, and found deeply embedded in desert pavements. Lacking subsurface deposits, Hayden depended to a large degree upon the amount of patination and relative dates of geological formations to obtain relative dates. He argued that most of the Malpais Complex dates to some time prior to an altithermal period that occurred about 20,000 years ago. At a shell scatter on a sand dune near Adair Bay on the Gulf of California, Hayden was able to obtain, through radiocarbon dating, two subsurface dates on shell that were greater than 37,000 years before present (BP). At the same site, he also obtained a surface date of approximately 33,950 BP (corrected) (Hayden 1976). These very early dates are rather troubling to traditional "Clovis First" archaeologists and many are skeptical of the existence of this period (e.g., Schaefer 1994). Obtaining corroborating radiocarbon dates to support or refute this very early age for the Malpais Complex continues to prove elusive.

2.2.2 Terminal Pleistocene to Very Early Holocene

The earliest well-documented sites in the southern Alta California desert region belong to the San Dieguito Complex, which is thought to date from approximately 11,000 to 9,300 BP to perhaps as late as 7,500 BP (Justice 2002). Beginning in 1924, Malcolm Rogers, of the San Diego Museum of Man, conducted surveys in the Colorado Desert during which he noted what became known as the San Dieguito Complex. Eventually, Rogers documented San Dieguito Complex materials in the Mojave Desert, in Arizona, and as far south as San Quintin, in Baja California. The proposed EHL Project site is within Roger's Central Aspect for the San Dieguito Complex (Rogers 1966).

Closely related to the San Dieguito Complex are materials that have been identified in the Mojave Desert and in the Great Basin, called the Lake Mojave Complex (Warren and Crabtree 1986). No San Dieguito Complex radiocarbon dates have been published for the Colorado Desert, although many surface sites have been reported (Schaefer 1994).

Elsewhere, materials associated with human bone excavated on Santa Rosa Island were dated to 11,500 years BP (Johnson 1999). Materials at Daisy Cave on San Miguel Island were also radiocarbon dated from approximately 11,600 to 11,000 BP (Erlandson and Braje 2007). Radiocarbon dated cultural deposits going back to approximately 15,000 BP have just been reported from the Debra L. Friedkin Site in Texas by Michael Waters (Ehrenberg 2011). While these scholars have substantiated the notion of terminal Pleistocene occupations in the American West, the relationships among these early sites and the San Dieguito Lake Mojave Complex in the Colorado Desert are not yet understood.

The San Dieguito assemblage is typically dominated by finely flaked scrapers, planes, choppers, and leaf-shaped projectile points made of slate-green felsite of the Santiago Peak Formation or fine-grained basalt. Evidence of seed grinding technology (e.g., manos and metates) is scarce or absent. Desert assemblages often contain Lake Mojave and Silver Lake projectile points that are rare along the coast. These points appear in the California deserts from about 11,000 to about 7,000 BP (Justice 2002:91; Warren and Crabtree 1986:184). San Dieguito sites in the deserts are typically found around dry Pleistocene playas and above ancient stream channels, not modern water sources. Rogers and many others have found numerous trails and cleared circles that they attribute to the San Dieguito in the Colorado Desert. The cleared circles are typically somewhat circular, but ovals and rectangles are also noted. These are also known as sleeping circles. Despite the problem with geometry, the terms cleared circles and sleeping circles are well established in the archaeological literature. They are commonly interpreted as house or windbreak remains, or just a smooth place to sleep. The desert site locations and assemblages suggest a subsistence emphasis on lacustrine resources, but the coastal San Dieguito sites seem to reflect a more generalized hunting and gathering economy with a special emphasis on marine resources, especially shellfish (Erlandson and Colten 1991).

2.2.3 Mid-Holocene

During the early and mid-Holocene, a generalized hunting and gathering economy, based to a large degree on collecting and grinding grasses and other hard seeds, appeared in the California deserts and along the coast. Beginning at approximately 8,500 years ago in southern Alta California, the assemblage is dominated by portable basin metates, manos, and crudely-fashioned core-based scrapers, choppers, and hammerstones. In the California deserts, Pinto series projectile points appear at about 8,000 BP and continue to about 4,000 BP (Justice 2002:135). Gypsum series points begin to appear in desert sites at approximately 4,000 BP, with the Elko series appearing shortly thereafter (Justice 2002:294, 304). This assemblage suggests the mid-Holocene economy was more diversified and focused on gathering hard seeds and grasses, and hunting small and big game. Near the proposed EHL Project site, McDonald (1992) found mid-Holocene cultural deposits in her excavation of Indian Hill rock shelter. Located in the Jacumba Mountains northwest of the current proposed EHL Project site, this is the only published excavation of a mid-Holocene archaeological site in the Colorado Desert. McDonald posits that the site was first occupied at about 5,000 BP. She recovered 21 Elko dart points, one Gypsum Cave point, and four dart points that she was unable to type. She suggests that Indian Hill rock shelter functioned as a hunting camp for the mid-Holocene occupants (McDonald 1992).

2.2.4 Late Holocene

Around 2,000 BP, patterns begin to emerge that suggest cultural links to the peoples found in the Colorado Desert at the time of the Spanish explorers (e.g., Alarcón and Diaz, in 1540 AD). This Late Holocene period is often referred to as the Late Prehistoric. The archaeological complex at this time in the Colorado Desert is referred to as the Yuman or Patayan Complex. It is recognized archaeologically by the presence of smaller projectile points, signaling the advent of the bow and arrow, the replacement of flexed inhumations with cremations, the introduction of ceramics, and an emphasis on plant food collection and processing, especially acorns and mesquite (Kroeber 1925; Schaefer 1994; Schaefer and Laylander 2007). Semi-sedentary *rancherias* were established along the Colorado River and around springs. These *rancherias* were not compact villages, but were loose collections of residences and agricultural plots. Surrounding desert and mountain areas were seasonally occupied to exploit mesquite, acorns, and pinyon nuts. Mortars for mesquite and acorn processing become common for the first time in the area, and bedrock milling features (e.g., slicks, basins, and mortars) first appear (Schaefer and Laylander 2007).

The most numerous archaeological resources in the Imperial Valley date to the Late Holocene. Most sites are small processing loci, associated with the grinding of plant resources. Larger habitation sites were less common, but displayed a wider range of activities and longer periods of occupation (Jefferson 1974; Schaefer and Laylander 2007). The typical Late Prehistoric assemblage includes Desert Side-Notched series and Cottonwood Triangular arrow points and Lower Colorado Buffware and Tizon Brownware ceramics. In the vicinity of the proposed EHL Project site, Salton Brownware ceramics are also found (Schaefer and Laylander 2007). Lithic artifacts are typically made from chert, volcanics, metavolcanics, or quartz materials (Jefferson 1974). The economy along the Colorado River and its sloughs, the Alamo River and New River, was based on mesquite collecting and flood plain horticulture. Corn, beans, and squash were the primary crops, but mesquite was the mainstay of the Kamia diet, even in years of good horticultural production (Cassetter and Bell 1951; Gifford 1931).

During the Late Holocene, there were four or more events when Lake Cahuilla filled the Salton Sink up to the 40-foot elevation level. Lake Cahuilla occurred periodically when the Colorado River filled up its river bed with silt in the area south of Pilot Knob. At these times the river changed course out of its silt-elevated channel and, instead of flowing into the Upper Gulf of California, flowed west down the Alamo River and New River, then north into the Salton Sink (Schaefer 1994).

When Lake Cahuilla was full or filling, the entire flow of the Colorado River was probably diverted and the area from Pilot Knob south to the Gulf of California was dry. Since Hernando de Alarcón estimated (or overestimated) about 20,000 people living south of Pilot Knob in 1540, it was presumably densely populated during the Late Prehistoric as well (Forbes 1965). These people had to migrate when the Colorado River flowed into Lake Cahuilla, and they may be who left the huge number of archaeological sites around the southern shore of Lake Cahuilla (Schaefer and Laylander 2007). The southwestern shoreline of Lake Cahuilla lies approximately 12 miles east of Ocotillo. Although the shoreline of this huge freshwater lake was outside the proposed EHL Project site, the lake would have had a profound influence on prehistoric American Indians within the proposed EHL Project site.

2.2.5 Ethnohistoric Period

According to early ethnographers (e.g., Gifford 1931; Kroeber 1925) the proposed EHL Project site was in the traditional territory of the Kamia or Desert Kumeyaay. Their neighbors to the north are the Cahuilla, whose territory extended to meet the Kamia at the San Felipe or Scissors Crossing area (where County Road S2 meets SR-78). To the east of the proposed EHL Project site are the Quechan, who live along the Colorado River just west of Yuma (Forde 1931). The traditional territory of the Cocopah, their neighbors to the southeast, lies at the head of the Gulf of California (Gifford 1931, Kelly 1977); to the west are the Kumeyaay proper.

It is important to understand that the Kamia did not occupy all of their traditional territory at one time. They tended to occupy a few farming *rancherias* or camping places within their territory at any given time, based largely on the availability of water. The Kamia were quite friendly with the Quechan, who lived in the vicinity of Yuma, and some bands occasionally lived with them on the Colorado. They also were very closely related to the Kumeyaay, with whom they shared clans or lineages (Gifford 1931). The Kumeyaay *rancheria* of Jacum, near the town of present-day Jacumba, was perhaps the easternmost Kumeyaay settlement. Jacumba is about 19 miles southwest of Ocotillo. Ethnographic sources indicate that the cold season was a favorite time for the Kumeyaay, who lived in the mountains bordering the desert, to visit the Kamia (Gifford 1931:17). Kroeber noted that Diegueno (Kumeyaay) clans spent winter "in mixed groups in the eastern foothills, at the desert's edge" (Kroeber 1925:720). Also, the Indians who lived in the Mount Laguna area wintered in the desert around Vallecitos, Agua Caliente, and Mason Valley.

The Kamia lived primarily along the Alamo River and New River and along other sloughs of the Colorado River in what is now Mexico as far south as Volcano Lake. The nearest documented Kamia *rancheria* was Xachupai. This was a loose collection of farmsteads scattered along the north–south trending New River for several miles. Xachupai extended both north and south of where I-8 intersects the river today (Gifford 1931; Forbes 1965; Kroeber 1925; Shipek 1982).

2.2.6 Historic Period

The first Spanish exploration of what is now Imperial County occurred in 1540, when Hernando de Alarcón ascended the Colorado River probably up to modern-day Yuma and Winterhaven. Juan Cabrillo was the first Spanish explorer to visit coastal southern Alta California, when he anchored in what would become known as San Diego Bay in 1542. Both explorers claimed Alta California for the king of Spain, thus initiating the Spanish Period in Alta California. From that time on, Spanish explorers visited what was to become Imperial Valley on a sporadic basis. Travel in the vicinity of the proposed EHL Project site began in 1774 during the first Anza Expedition, when Juan Bautista de Anza of the Spanish Army and Francisco Garcés of the

Franciscan Order established what became known as the Anza Trail. Their guide was Sebastian Taraval, an Indian from Baja California who also served as translator. Captain Juan Bautista de Anza was the commanding officer of the presidio at Tubac, south of Tucson. The Anza Trail passed east of the proposed EHL Project site from Yuha Wells onward to San Francisco. The Yuha Wells were used by Anza, who called them Santa Rosa de las Lajas (Flat Rocks) (Bolton 1930). They are on the southwest side of Dunaway Road, about 12 miles east of Ocotillo. Anza's observations establish the fact that prehistoric wells were dug by the Kamia, at least in the Yuha Desert. This suggests that other wells may also have been dug in washes to support prehistoric Indian camps in the proposed EHL Project site.

In 1770, Pedro Fages was appointed military governor of California Nueva, which later became known as Alta California. In 1772, he discovered an Indian trail in the mountains of eastern San Diego County near Cuyamaca State Park. It passed down Oriflamme Canyon and then connected with a north trending trail. This trail went north through the Warner Springs area. Fages continued on to Mission San Gabriel de Arcangel, founded in 1771 in what is now San Gabriel Valley. Later, a trail was discovered that split from the Anza Trail in the vicinity of Yuha Wells and passed north through Vallecito and Agua Caliente. This linked up with the Fages Trail at the foot of Oriflamme Canyon, southeast of where the town of Julian is today. This combined Fages and Anza Trail became the principal route linking Sonora and Alta California in the late eighteenth and early nineteenth centuries. This route, followed today by County Road S2, became known as the Sonora Trail (Guerrero 2006).

In addition to the well-known Franciscan missions along the coast of Alta California, missions were also founded at Concepción, in the vicinity of present-day Yuma and San Pablo, near Pilot Knob in 1780. A number of Spanish settlers accompanied the Franciscans and a small number of Spanish Army personnel; however, no presidio was established. Friction between the Spanish and the Quechan rapidly developed. The missions and settlements were destroyed in the successful Quechan Revolt of 1781. Padre Garcés and some 50 Spanish settlers were killed in that revolt. The dead included Fernando Rivera y Moncada, leader of the first overland party of the Portolá Expedition to reach San Diego in 1769, and former military governor of Alta California in 1777 (Forbes 1965:185–202).

The Mexican people chafed under Spanish rule in the late 1700s and early 1800s. After a long struggle, the Spanish were expelled from Mexico in 1821. The Mexican Republic retained many Spanish institutions and laws, but they were very concerned about the abuses of the Catholic Church. Several reforms were passed, including the secularization of the mission system in 1834. Large tracts of former church land were granted to individuals and families, and the Alta California rancho system flourished. Cattle ranching dominated the economy. The hide and tallow trade with Yankee ships increased during the 1830s. The Pueblo of Los Angeles, established in 1781, began to grow rapidly during this period and Native American influence and control greatly declined (Starr 2007).

The Mexican Republic had encouraged Americans to settle in Tejas in the 1820s, and by the 1830s, the Americans greatly outnumbered the Mexicans. Friction developed between the two cultures and in 1835, Texas fought and won its independence. Disputes continued over the placement of the border, and Mexico never recognized the legitimacy of the new Texas Republic. The United States Congress admitted Texas to the Union in 1845 provoking Mexico into a disastrous war. Many Americans, including Abraham Lincoln and John Quincy Adams, denounced the rush to war as a Southern ploy to expand slavery.

Early in the war, Colonel Stephen Watts Kearney was dispatched to take charge of what became known as the Army of the West. After taking Santa Fe without a shot, Kearney headed west at the head of a column of dragoons. Captain Philip St. George Cook took charge of the Mormon Battalion, whose task was to follow behind Kearney's column and build a wagon road from Santa Fe to San Diego. The dragoons and the Mormon Battalion both used the Old Sonora Trail in 1846 (Starr 2007; Guerrero 2006).

The war ended with the Treaty of Guadalupe Hidalgo on February 2, 1848, and as part of the treaty, Mexico ceded Alta California to the United States. At that time, the Mexican territory of Alta California also included southern Nevada, southern Utah, and most of Arizona. By the time Alta California was admitted to the Union as the State of California in 1850, it was only a small fraction of its former self. Prior to the end of the war, gold had been discovered in what is now known as the Mother Lode of California; however, it was not made public until March 1848, when the Americans were firmly in control of the territory. The sudden influx of Americans and Europeans quickly drowned out much of the old *Californio* culture of the Spanish-speaking Catholics born in California prior to 1848.

Tens of thousands of gold seekers (known as the “49ers”) flooded into California over the Old Sonora Trail and through passes in the Sierra Nevada to the north. The Old Sonora Trail became known as the Southern Emigrant Trail during this period. This influx of gold-seekers and adventurers hastened the decline of the Indians, particularly in the Mother Lode area (Starr 2007). In Southern California, the rancho system prospered for several years by supplying beef to the tens of thousands of “49ers” flooding the Mother Lode area (Starr 2007:111). These little-known California cattle drives preceded the better known Texas drives by about 15 years.

In the 1850s, communication and trade between California and the other states remained expensive, time-consuming, and difficult. In 1857, Congress authorized the first transcontinental mail, known as the San Antonio and San Diego Mail. Today, it is sometimes called the Birch

Overland Mail after its founder James E. Birch (Lake 1957). The Birch Overland Mail used the Southern Emigrant Trail (formerly the western reach of the Santa Fe Trail) along what is now County Road S2. It branched off of the Southern Emigrant Trail at Oriflamme Canyon and headed west to San Diego. In the next year, a bigger mail contract was awarded to the Butterfield Overland Mail. This bypassed San Diego and continued north through Los Angeles and on to San Francisco. These historic mail and stage lines used the same route in this area passing through the Ocotillo vicinity.

As mentioned previously, Yuha Wells were first noted by Anza, who called them Santa Rosa de las Lajas. These wells are sometimes confused with Coyote Wells, southeast of Ocotillo. Coyote Wells were "discovered" by James E. Mason of the Birch Overland Mail in 1857 (Lake 1957). It is highly likely that these wells were originally dug by the Kumeyaay. Coyote Wells were not listed as a stage stop and presumably was used as an auxiliary water source by the mail lines and packers.

During the American Period, the homestead system rapidly increased American settlement beyond the coastal plain, which subsequently accelerated the decline of the California Indians (Starr 2007). Under Mexican rule, full property and civil rights were provided for women and people of color, including Indians. The Treaty of Guadalupe Hidalgo preserved these rights, although the American and California state governments ignored these provisions completely in the case of the Indians; they forced the *Californio* land holders to abandon their vast landholdings through lengthy, expensive, and complicated legal proceedings. In less than 20 years, very few ranchos in Alta California remained intact (Starr 2007:104–105). However, Spanish remained one of the two official languages of California until 1879 (Starr 2007: 93).

The Colorado Desert area remained largely unaffected by the transition to American control until after 1904, when the Imperial Canal brought water to the Imperial Valley. A small boom in farming and homesteading began, but in 1905, the Colorado River breached the head gate of the Imperial Canal and began to fill the Salton Sink. This created the Salton Sea and threatened to fill the entire valley, recreating Lake Cahuilla. The river was brought under control in 1907, after a heroic effort led by the Southern Pacific Railroad. In 1935, Hoover Dam was completed, finally ending the dramatic floods and containing the Colorado River, which paved the way for other dams and more dependable canal systems.

US Route 80 linked El Centro and San Diego in 1915, and the portion of the San Diego Eastern and Arizona Railroad between these towns was completed in 1919. US Route 80 and the railroad facilitated the transport of farm products from Imperial Valley and were a benefit to the local economy.

No factor contributed more to the development of the Imperial Valley than irrigation. The following historical information is summarized from *IID: The First 40 Years* (Dowd 1954). This manuscript presents the history of the Imperial Irrigation District and the subsequent development of the Imperial Valley from early development to the 1940s, and identifies important periods, events, and patterns of development for Imperial Valley.

It was on one of the railroad corridor expeditions in 1853, led by Lieutenant R. S. Williamson of the U.S. Topographical Engineers, that geologist Dr. W. P. Blake discovered the possibility of irrigating Imperial Valley from the Colorado River. Blake observed a region of fertile soil capable of sustaining agriculture but lacking in water. He measured the dry bed of the Salton Sea at below sea level, a fact that made feasible the cutting of a canal from the Colorado River to the interior of the desert, which would bring with it a constant supply of water. Dr. Oliver Wozencraft, a proponent of irrigating Imperial Valley, lobbied support from the California legislature, who, in turn, asked Congress to convey 6 million acres to Wozencraft. He endeavored to secure action by Congress on his plan to bring potable water to the desert for over 30 years without success. Despite Wozencraft's failed attempts at reclamation, by his death in 1887, settlers and developers were eager to bring water to Imperial Valley.

Preliminary investigations into the feasibility of irrigating the Colorado Desert began in 1893 with the Colorado River Irrigation Company, but inability to procure financing quickly led to the company's demise. In 1896, the California Development Company was organized, under the direction of Charles Rockwood and George Chaffey, to take hold of the project. The proposed canal route would run from the diversion point at the Colorado River through lower California, Mexico, and back into the United States in order to reach Imperial Valley. To gain title to the Mexican lands, the California Development Company organized a Mexican subsidiary company in 1898, known as *La Sociedad de Yrrigacion y Terrenos de la Baja California*, S. A. With plans to colonize the region, the California Development Company divided Imperial Valley into districts of varying size, each with its own mutual water company.

By August 1900, construction of the first diversion canal and irrigation system was underway. The canal was excavated from the point of diversion from the Colorado River south about 4 miles into Mexico, where it swung west and connected for 40 miles within the Alamo River channel until it reached Sharp's Heading and turned north to the Salton Sea. A series of main canals was constructed to divert from Sharp's Heading into various stretches of Imperial Valley: Central Main, Boundary, West Side Main, and East Side Main. The Central Main Canal continued from the international boundary line and traveled north through the present cities of Brawley and Imperial; the Boundary Canal diverted west towards Calexico; the West Side Main Canal traveled west towards Calexico then north; and the East Side Main Canal traveled east then north to the eastern Salton Sea. Water delivery reached Calexico through the Boundary Canal less than 1 year after the start of construction. That same year, nearly 1,500 acres of land was put under crops.

Few natural resources existed for potable water prior to the construction of the irrigation system. Domestic use water had to be hauled to the Valley via the Southern Pacific Railroad. Once considered a barren wasteland, Imperial Valley was making good progress with colonization by the early 1900s. The Imperial Land Company, under the direction of the California Development Company, began laying out townsites in Imperial Valley based primarily on the density of purchased water stock. The town of Imperial was the first to be laid out, with settlement commencing in 1901. Over a period of 10 years from 1901 to 1911, irrigable land in Imperial Valley jumped from 1,500 acres to 220,000 acres. As the water flowed into the valley, so did the people. In 1902, a year after the first water reached Calexico, nearly 2,000 settlers came to Imperial Valley. The population grew to seven times that amount within 4 years. To accommodate the growing population, the Southern Pacific Railroad constructed the Niland to Calexico branch rail. At the same time, the newly developed Imperial Valley broke apart from San Diego County to form its own government as Imperial County, with El Centro designated as the county seat.

The rapid colonization of Imperial Valley in the early 1900s strained the relationship between settlers and the California Development Company. Initial land and soil surveys were inaccurate, leading to discrepancies with land titles, and water rights held by the California Development Company were called into question. The Reclamation Act was proposed in 1902 to take the Imperial Valley project from the California Development Company and organize it under government control. Further dissatisfaction with California Development Company arose after hurried and negligible attempts to correct the heavily silt-laden waters of the Colorado River ultimately led to grave damage to Imperial Valley following the massive flooding events of 1905 and 1906. The river break destroyed nearly 12,000 acres of cultivated land and over 30,000 acres of irrigable land, caused immense damage to Southern Pacific Company railroad lines, and severed the ties between settlers and the California Development Company. The river break took 2 years to repair, during which time the Salton Sea filled and expanded to a length of 50 miles and a width of 10 to 15 miles.

Preceding litigation brought to the California Development Company following the flood ultimately resulted in bankruptcy. In 1911, a petition for formation of an irrigation district was presented to the Imperial County Board of Supervisors. The IID was formed to acquire properties of the bankrupt California Development Company and its Mexican subsidiary. Over the span of a decade, IID completed improvements and repairs to the canal and distribution system, rebuilt the entire Westside Main Canal, received deeds to all of the properties of the California Development Corporation, and acquired 13 mutual water companies. Within a few years of acquiring the mutual companies, IID was delivering water to nearly 550,000 acres of Imperial Valley. Over a century later, IID is still servicing communities of the Imperial Valley. IID is the largest irrigation district in the nation and Imperial County ranks among the top 10 agricultural counties in the nation. Ninety-eight percent of the water IID transports is used for agriculture and the remaining 2% is treated potable and delivered to the nine Imperial Valley cities.

2.3 Paleontological Setting

The proposed EHL Project APE is located in the East Mesa portion of the Salton Trough, within the physiographic Colorado Desert geomorphic province of Southern California. The proposed EHL Project site is located east of the mapped Ancient Lake Cahuilla high stand, within younger (Holocene age, <11,000 years old) alluvial deposits, between the Algodones Dune field to the east and the Imperial Valley to the west (Strand 1962). Dune deposits are also mapped north of the proposed EHL Project site within this region, on the north side of the Interstate 8 freeway and the AAC. Lakebed deposits of ancient Lake Cahuilla have yielded fossil remains from numerous localities in Imperial Valley. Lake Cahuilla deposits have also yielded vertebrate fossils, including teeth and bones of birds, horses, bighorn sheep, and reptiles. Older, Pleistocene age deposits, such as the above referenced lakebeds, presumably underlie surface-mapped Holocene alluvium at an unknown depth (Stand 1962).

INTENTIONALLY LEFT BLANK

3 RESEARCH DESIGN

While innumerable concepts and theoretical perspectives have been used to interpret archaeological findings in the Colorado Desert region, several broad themes can be outlined that generally guide interpretations. These themes include integrity, chronological placement, site function, paleoenvironmental change and resource use, settlement organization, and interregional connections. The research themes are designed to provide information that can be used to direct evaluation with the goal of determining NRHP/CRHR eligibility. Finally, this research design has been developed primarily with prehistoric resources in mind, given that no historic-period archaeological sites will be impacted by the proposed EHL Project and require evaluation.

3.1 Integrity

Integrity is potentially a critical dimension in assessing the potential status of the study site as a historical resource. The ability of archaeological sites to contribute significant information concerning regional prehistory is often closely linked with the degree to which the contextual relations of cultural residues have either been preserved intact or have been lost through postdepositional disturbances. Several varieties of integrity that are relevant to prehistoric archaeological resources can be distinguished. These include site integrity, or the degree to which the site area as a whole is still available for investigation; assemblage integrity, or the extent to which complete original assemblages have been preserved, in contrast to the loss of particular types of materials, for instance through erosion or undocumented collecting; and vertical and horizontal integrity, or the preservation of the original relative positions of the cultural materials, in contrast to the loss of those spatial relationships, for instance through bioturbation.

The aspect of integrity that is probably most frequently addressed in archaeological studies is vertical integrity. However, this is a significant concern only to the degree that multiple chronological components are present and that distinguishing between them is important for interpreting the site's contents.

Integrity has been assessed primarily on the basis of surface observations concerning natural erosion or modern disturbance, plus subsurface assessments of site stratigraphy and of patterning in the vertical distribution of prehistoric and modern cultural materials within the deposit.

3.2 Chronological Placement

Efforts to place the study site chronologically are important in assessing its research value. Site components dating from periods that are poorly represented in the local archaeological record may have a high importance for their potential to fill in major gaps in the regional chronological record. However, components from later periods may also be able to contribute important additional detail to the emerging picture of paleoenvironmental events in this region (notably the rises and recessions of Lake Cahuilla) and the cultural responses to them. Assemblages that cannot be securely placed chronologically, either because they lack datable material or because of extensive intermixing of chronologically diverse components, would be less likely to possess a significant research potential.

Potential chronometric evidence from the study site includes radiocarbon dates, obsidian hydration measurements, and diagnostic artifact forms. Radiocarbon dates are generally the most precise and reliable form of chronometric evidence, and they provide the foundation for the region's prehistoric chronology. However, in some cases, obsidian hydration measurements may have a more direct cultural interpretation; they are individually less expensive, and they are able to address very late prehistoric to protohistoric time periods that cannot be distinguished through radiocarbon dating. Chronologically diagnostic artifacts include various projectile point forms and pottery, although these only define very broad time periods. Specific types or attributes of buffware ceramics may have a potential to define somewhat more precise time ranges, but that potential is not yet well established.

3.3 Site Function

Interpretation of the study site depends upon an assessment of its place within the larger settlement–subsistence system of its occupants. Sites belonging to functional types that are relatively ubiquitous within the region would be less likely to be considered significant than unusual site types. Sites with evidence of multiple functions may possess a richer information content than relatively simple sites; on the other hand, single-function sites may have a greater research potential than multiple-function sites if the residues from the various activities at the latter cannot be effectively differentiated.

Evidence for the functional purpose represented by the site comes from surface observations made during both the survey and testing phases, as well as through the results of subsurface excavations. Interpretations of functions rest upon both the range and the relative and absolute frequencies of various classes of features, artifacts, and ecofacts.

3.4 Paleoenvironmental Change and Resource Use

Prehistoric Lake Cahuilla dominated the region's prehistoric landscape. Reconstructing the lake's chronology and its changing character is a key to understanding prehistoric cultural adaptations to this rich but uniquely unstable environment.

The potential of the study sites to address these issues depends primarily upon the presence of the substantial samples of faunal remains, in particular the remains of freshwater fish and seasonally migrant aquatic birds. It also depends upon the occurrence of such residues in contexts that can be placed within a relative or absolute chronology.

3.5 Settlement Organization

The role of Lake Cahuilla sites within larger regional settlement systems has been an issue of considerable debate. An early scientific argument concerned whether the lake was a major focus of permanent or semipermanent settlement or whether it was used more sporadically and incidentally. Subsequent studies have suggested that there was substantial variability between different portions of the shoreline, with relatively intensive use of the lake's northwestern margin in the Coachella Valley and a much lower level of occupation along most of the eastern shoreline (Schaefer and Laylander 2007). The contrast may be partially attributable to differences in the hinterlands of the two areas: the nearby, relatively resource-rich Peninsular and Transverse mountain ranges lie to the west and north, and provide some runoff into the Whitewater River and San Felipe Creek, whereas the very arid Orocopia and Chocolate mountains and Algodones sand dunes lie to the east, separated by a gap of 35 to 80 km from the lower Colorado River. The present study area, located in the eastern portion of Lake Cahuilla's basin, may shed light on settlement patterns in this area and on the factors causing intraregional differences in such patterns.

Two main types of evidence may be able to clarify the nature of the occupation at the study site. One is the intensity and duration of the occupation, for instance as suggested by the accumulation of midden deposits and evidence for prehistoric investment in the construction of features such as house structures or storage areas. The other type of evidence comes from the activities that are attested at the study site. These may suggest multifunctional, full-community occupation (for instance, through the presence of flake lithic tools, milling tools, various types of ceramic vessels, and ceremonial items), perhaps with nonlocal resources being brought to this base. Alternatively, the assemblage may reflect a specialized task area, such as a fish-processing camp, that was likely used by a small logistical party.

3.6 Interregional Connections

Colorado Desert ethnography and ethnohistory attest to cultural, social, and economic connections between the peoples of this region and those in surrounding regions to the north, south, east, and west. Archaeological evidence in the form of exotic raw materials or regionally distinctive manufactured items may shed further light on these connections and the ways they evolved during the prehistoric past.

Extraregional exotic lithic materials that might occur at the study site include obsidian from San Felipe in northeastern Baja California, from Coso in the northern Mojave Desert, or possibly from sources in Arizona and Sonora. Exotic obsidian may have substituted for material from the local Obsidian Butte source, which would have been inaccessible when Lake Cahuilla was present. Another identifiably exotic lithic material was wonderstone, a silicic rock that was quarried both at the Rainbow Rock source to the north of the study site and at Cerro Colorado, south of the site and just across the international border in northern Baja California.

Pottery may also provide valuable evidence of interregional contacts. While at least some varieties of buffware were probably manufactured locally, others may have been produced exclusively on the lower Colorado River and then brought to the study site. Tizon Brownware is a somewhat vaguely defined category that has been identified as manufactured both in Arizona to the east of the Colorado River and in the Peninsular Range west of the Colorado Desert. It is also possible that ceramics from the Puebloan or Piman areas of the American Southwest might appear as rare trade items in the study site.

Marine shell, most likely in the form of beads or ornaments but possibly also as food refuse, would attest to coastal contacts. The warm waters of the northern Gulf of California hosted different species than the cooler Pacific waters (for instance, with *Olivella dama* coming from the Gulf and *O. biplicata* from the Pacific).

The potential of the study site to shed additional light on patterns of interregional contacts is dependent on finding exotic items at the site and being able to identify their original source areas.

4 METHODS

The purpose of this study was to compile an inventory of all resources within the proposed EHL Project APE to determine possible impacts or potential effects to cultural and paleontological resources. To complete this study, a review of all known resources and the identification of all new resources was necessary.

4.1 South Coastal Information Center Records Search

An examination of existing maps, records, and reports was conducted by Dudek to determine if the proposed EHL Project could potentially impact previously recorded cultural resources. Dudek conducted a records search in January and February 2017 at the SCIC at San Diego State University. The search encompassed the APE and a 1-mile buffer around the APE. The purpose of the records search is to identify any previously recorded resources that may be located in or adjacent to the proposed EHL Project site and to identify previous studies in the vicinity of the proposed EHL Project site. In addition to a review of previously prepared site records and reports, the records search also reviewed historical maps of the proposed EHL Project site, ethnographies, the NRHP, the CRHR, the California Historic Property Data File, and the lists of California State Historical Landmarks, California Points of Historical Interest, and Archaeological Determinations of Eligibility.

4.2 Native American Heritage Commission Sacred Lands File Search

A search of the NAHC Sacred Lands File was conducted for the proposed EHL Project APE on April 10, 2017. A search of this type requires NAHC staff to review their list for the presence of Native American sites, which are organized spatially based on a Public Land Survey System section grid (measuring 1 square mile). The NAHC response letter included a list of Native American group representatives whom should be contacted for information about these sites.

Outreach letters were mailed on August 23, 2017, to all Native American group representatives included on the NAHC contact list. These letters attempt to solicit additional information relating to Tribal Cultural Resources that may be affected by the proposed EHL Project. Native American representatives were requested to define a general area where known resources intersect the proposed EHL Project APE.

Under CEQA, the lead agency is required to perform formal government-to-government consultation with Native American tribes under Assembly Bill 52. Consultation is ongoing.

4.3 Survey

Though the proposed EHL Project APE has been previously inventoried, many of the previous studied are dated; thus, the entire APE was surveyed for the current study. The survey of the proposed EHL Project APE was conducted between July 27 and 28, 2017 and between January 22 and 24, 2018. The reservoir portion of the proposed EHL Project APE consist entirely of agricultural land. The intake channel crosses earthworks including the All-American Drains 2 and 2A and SR-98. There is a small segment of undeveloped desert land located between the All-American Drain 2 and SR-98.

The intake channel portion of the proposed EHL Project APE was surveyed using transects parallel to the route at 15-meter intervals. The larger reservoir portions of the proposed EHL Project APE was surveyed using a combination of north–south and east–west transects at 15-meter intervals. In this manner, all portions of the proposed EHL Project APE were subject to pedestrian survey.

The terrain and vegetation varied little throughout the APE. The majority of the reservoir portion of the proposed EHL Project APE consisted of plowed agricultural fields with no vegetation (see Figure 3). The northeastern part of the reservoir portion of the proposed EHL Project APE, though leveled at one time, has not been modified for a substantial amount of time. Sand dunes have overtaken large portions of this section and wild plants have established a community (see Figure 4). The small segment of undeveloped desert land located between the All-American Drain 2 and SR-98 consist of loose to medium compacted sand matrix with creosote brush. Survey of these open segments was easily accomplished and ground visibility was high. Portions of the intake channel passes through an active agricultural field, resulting in complete obstruction from view (see Figure 5).

An iPad Air® with georeferenced maps and GPS capabilities was used to aid surveying and site recordation. Records of sites previously identified within the proposed EHL Project APE were loaded onto the iPad for field reference. Field work was conducted under the supervision of Dudek archaeologist Matthew DeCarlo. Sarah Lewis and Javier Hernandez participated in the survey as field crew members. No Native American monitors were present during the survey.

Documentation of cultural resources complied with the Office of Historic Preservation and Secretary of the Interior’s Standards and Guidelines for Archaeology and Historic Preservation (48 FR 44716–44740) and the California Office of Historic Preservation Planning Bulletin Number 4(a). Any sites identified during this inventory were recorded on California Department of Parks and Recreation Form DPR 523 (Series 1/95), using the Instructions for Recording Cultural Resources (Office of Historic Preservation 1995).

4.4 Excavation

Sites were evaluated using close-interval survey, surface scrapes, shovel test pits (STPs), and shovel test units. Surface scrapes are shallow (5 to 10 centimeters) and broad excavations. STPs are 0.5 meters by 0.3 meters, excavated in 20-centimeter levels. Shovel test units are 1 meter by 0.5 meters, excavated in decimeter levels. All hand-excavated soils were screened through 1/8 inch (3 millimeter) mesh. All excavated units were backfilled at the conclusion of the unit's excavation. All cultural materials recovered from the excavation units and ground surface were sorted and bagged according to unit provenience and depth.

Photographs of each unit profile were recorded to document soils and disturbances. An iPad Air with georeferenced maps and GPS capabilities was used to record the locations of excavation units and surface artifacts. Field notes were recorded on standardized forms to log artifact recovery, soil descriptions, disturbances, and any other pertinent information for the proposed EHL Project APE.

4.5 Laboratory and Cataloging Procedures

Initial laboratory procedures included cleaning (as appropriate), sorting, and cataloging of all artifacts and ecofacts. Each item was individually examined and cataloged according to class, subclass, and material; counted; and weighed on a digital scale. All coded data were entered into a Microsoft Access® database. Data manipulation of a coded master catalog combining all sites was performed in Microsoft Excel®.

The cultural material was sorted during cataloging into the following potential categories: 13 classes of prehistoric artifacts; 2 classes of ecofacts; ethnohistoric items, historic items, and modern items; and organic samples. The prehistoric artifact classes potentially included debitage, cores, utilized core tools, modified core tools, utilized flakes, retouched flakes, bifaces, percussing tools, groundstone, ceramics, bone artifacts, shell artifacts, and miscellaneous items.

Once preliminary cataloging of the material was completed, more detailed attribute analysis was performed. Ceramic artifacts were initially sorted by traditional ware (i.e., brown or buff) and sherd fragment types (i.e., body, rim, or modified). They were then inspected in order to further identify the types of brown- and buffwares (e.g., Salton Brown, Tizon Brown, Colorado Buff, Topoc Buff) and to identify other modifications. Specific analytical methods are described in Section 6, Analysis. All artifacts were subject to appropriate conservation in the field and laboratory, including proper packaging and handling.

4.6 Curation

All artifacts collected during archaeological testing for this study (see Section 5.4, Archaeological Testing) will be curated at the Lower Colorado Regional Office of the Bureau of Reclamation. Any artifacts collected as part of future archaeological studies, or confiscated from looters, should also be curated so that the materials are preserved for the benefit of the general public and for archaeologists for future study. Proper curation of collected artifacts (and other materials, including documentation) can contribute to any mitigation to offset impacts to archaeological sites. Curation could also consist of interpretive displays as part of any public awareness activities.

4.7 Paleontological Resources

A records search of paleontological locality information was requested through the Natural History Museum of Los Angeles County on December 15, 2017. The purpose of museum collections records searches is to determine whether there are any known fossil localities in or near the APE, identify the geologic units present within the proposed EHL Project site, and obtain the museum's opinion about whether mitigation measures are warranted to avoid or minimize potential adverse effects of proposed EHL Project construction on paleontological resources. Geologic maps and reports were queried to identify geologic units within the proposed EHL Project APE and determine the paleontological sensitivity of the APE. A cross-trained technician conducted the pedestrian survey.

Figure 3: Proposed Reservoir Location. Currently a plowed agricultural field. View north.

Figure 4: Northeaster section of proposed reservoir location. View south.

Figure 5: Proposed intake canal location. Currently an active agricultural field. View east.

INTENTIONALLY LEFT BLANK

5 RESULTS

5.1 South Coastal Information Center Records Search

Dudek conducted a records search in January and February 2017, at the SCIC at San Diego State University. The records search identified 37 previously identified cultural resources within 1 mile of the proposed EHL Project APE (see Confidential Appendix B, SCIC Records Search Results). Of the 37 identified cultural resources, 6 intersect the APE (see Table 1). The prehistoric resources within the proposed EHL Project APE include a habitation site and a site consisting of only midden soil. The historic-period resources include the AAC, East Highline Canal, the All-American Drain 2A, and California SR-98. The AAC, East Highline Canal, and the All-American Drain 2A have been recommended eligible for the NRHP.

Table 1
Cultural Resources within 1 Mile of Area of Potential Effect

Site Number	Trinomial	Era	Description	NRHP/CRHR Eligibility	APE Proximity
P-13-000070	CA-IMP-70	Prehistoric	Lithic and ceramic scatter	Not Evaluated	Within 1 mile
P-13-000095	CA-IMP-95	Prehistoric	Ceramic scatter with little lithics	Not Evaluated	Within 1 mile
P-13-000096	CA-IMP-96	Prehistoric	Ceramic scatter with little lithics	Not Evaluated	Within 1 mile
P-13-000097	CA-IMP-97	Prehistoric	Habitation site	Not Evaluated	Within 1 mile
P-13-000098	CA-IMP-98	Prehistoric	Artifact scatter	Not Evaluated	Within 1 mile
P-13-000099	CA-IMP-99	Prehistoric	Artifact scatter	Not Evaluated	Within 1 mile
P-13-000174	CA-IMP-174	Prehistoric	Habitation site	Not Evaluated	Within 1 mile
P-13-000231	CA-IMP-231	Prehistoric	Temporary Campsite	Not Evaluated	Within 1 mile
P-13-000302	CA-IMP-302	Prehistoric	Temporary Campsite	Not Evaluated	Within 1 mile
P-13-000305	CA-IMP-305	Prehistoric	Temporary Campsite	Not Evaluated	Intersects
P-13-000307	CA-IMP-307	Prehistoric	Ceramic scatter with little lithics	Not Evaluated	Within 1 mile
P-13-000308	CA-IMP-308	Prehistoric	Burned soil and fish bone	Not Evaluated	Within 1 mile
P-13-000310	CA-IMP-310	Prehistoric	Temporary Campsite	Not Evaluated	Within 1 mile

Table 1
Cultural Resources within 1 Mile of Area of Potential Effect

Site Number	Trinomial	Era	Description	NRHP/CRHR Eligibility	APE Proximity
P-13-000311	CA-IMP-311	Prehistoric	Artifact scatter	Not Evaluated	Within 1 mile
P-13-000313	CA-IMP-313	Prehistoric	Midden and animal bone	Not Evaluated	Within 1 mile
P-13-000315	CA-IMP-315	Prehistoric	Temporary Campsite	No longer present	Within 1 mile
P-13-000316	CA-IMP-316	Prehistoric	Midden soil	Not Evaluated	Intersects
P-13-000318	CA-IMP-318	Prehistoric	Animal bone	Not Evaluated	Within 1 mile
P-13-002408	CA-IMP-2408	Prehistoric	Ceramic scatter with little lithics	Not Evaluated	Within 1 mile
P-13-002418	CA-IMP-2418	Prehistoric	Ceramic scatter	Not Evaluated	Within 1 mile
P-13-002419	CA-IMP-2419	Prehistoric	Ceramic scatter	Not Evaluated	Within 1 mile
P-13-003508	CA-IMP-3508H	Historic	Habitation refuse	Not Evaluated	Within 1 mile
P-13-003808	CA-IMP-3808	Prehistoric	Ceramic scatter	No longer present	Within 1 mile
P-13-003809	CA-IMP-3809	Prehistoric	Ceramic scatter	No longer present	Within 1 mile
P-13-003810	CA-IMP-3810	Prehistoric	Ceramic scatter	No longer present	Within 1 mile
P-13-004186	CA-IMP-4186H	Historic	Chinese basket fragment	Not Eligible	Within 1 mile
P-13-005288	CA-IMP-5288	Prehistoric	Ceramic and lithic scatter	Not Evaluated	Within 1 mile
P-13-005289	CA-IMP-5289	Prehistoric	Midden and artifact scatter	Not Evaluated	Within 1 mile
P-13-005290	CA-IMP-5290/H	Multicomponent	Prehistoric ceramics and historic refuse	Not Evaluated	Within 1 mile
P-13-005291	CA-IMP-5291	Prehistoric	Isolated ceramic sherd	Not Eligible	Within 1 mile
P-13-005292	CA-IMP-5292	Prehistoric	Isolated pumice abrader	Not Eligible	Within 1 mile
P-13-006987	CA-IMP-6987	Prehistoric	Aboriginal trail	Not Evaluated	Within 1 mile
P-13-007130	CA-IMP-7130H	Historic	All-American Canal	Determined Eligible	Intersects
P-13-007892	CA-IMP-7691	Prehistoric	Isolated ovate abrader	Not Eligible	Within 1 mile

Table 1
Cultural Resources within 1 Mile of Area of Potential Effect

Site Number	Trinomial	Era	Description	NRHP/CRHR Eligibility	APE Proximity
P-13-008333	CA-IMP-7835H	Historic	East Highline Canal	Recommended Eligible	Intersects
P-13-008668	—	Historic	All-American Drain 2A	Recommended Eligible	Intersects
P-13-014631	CA-IMP-12237	Historic	California State Route 98	Recommended Not Eligible	Intersects

— = no data; APE = area of potential effect; CRHR = California Register of Historical Resources; NRHP = National Register of Historic Places.

The records search also identified 32 previous archaeological studies that have been conducted within 1 mile of the proposed EHL Project APE (see Confidential Appendix B). Of the 32 studies, 23 cover portions of the APE (see Table 2 and Confidential Appendix B). Previous studies have inventoried the entire 563-acre proposed EHL Project APE; however, these surveys were conducted more than 10 years ago. Similar to the current study, Schaefer and O'Neill (2001) analyzed the impact a proposed project had to the AAC as a NRHP-eligible site.

Table 2
Previous Archaeological Studies Conducted within 1 Mile of Area of Potential Effect

National Archaeological Database #	Author(s)	Year	Title	APE Proximity
IM-00010	Ellis, Robert R. and Robert H. Crabtree	1974	Archaeological Impact Statement on East Mesa Areas 1 and 2 Imperial Valley, California	Intersects
IM-00011	Barker, Michael A.	1974	Preliminary Archaeological Assessment of the East Mesa, Imperial County, California. Imperial Valley College Museum.	Intersects
IM-00119	Heller, Rod, Tim Tetherow, and Chris White	1977	An Overview of the Sundesert Nuclear Project Transmission System Cultural Resources Investigations	Intersects
IM-00142	Atlantis Scientific	1978	Environmental Impact Report Proposed 10 Mw Geothermal Power Plant East Mesa KGRA Imperial County (Republic Geothermal, Inc.)	Intersects
IM-00187	Eckhardt, William T.	1979	Cultural Resource Inventory of Areas Affected by Reject Stream Replacement Projects	Within 1 mile
IM-00189	Eckhardt, William T.	1979	Cultural Resource Inventory of Areas Affected by Reject Stream Replacement Projects	Within 1 mile
IM-00203	Gallegos, Dennis	1979	Cultural Resource Inventory East Mesa and West Mesa Regions, Imperial Valley, California	Intersects
IM-00207	Gallegos, Dennis	1980	Cultural Resource Inventory East Mesa and West Mesa Regions, Imperial Valley, California	Intersects

Table 2
Previous Archaeological Studies Conducted within 1 Mile of Area of Potential Effect

National Archaeological Database #	Author(s)	Year	Title	APE Proximity
IM-00210	Werlhof, Jay and Karen McNitt	1980	Archaeological Examinations of the Republic Geothermal Field, East Mesa, Imperial County	Intersects
IM-00224	Edney, Joseph	1980	Draft Environmental Assessment Record East Mesa Non-Competitive Leases for Geothermal Exploration/Development	Intersects
IM-00233	Walker, Carol, Charles Bull, and Jay Von Werlhof	1981	Cultural Resource Study of a Proposed Electric Transmission Line from Jade to the Sand Hills, Imperial County, California.	Intersects
IM-00297	Werlhof, Jay Von	1983	Archaeological Examinations of Petty Ray Geophysical Transects on West Mesa	Intersects
IM-00311	Townsend, Jan	1984	Southwest Powerlink Cultural Resources Management Plan	Intersects
IM-00313	Townsend, Jan	1984	Southwest Powerlink Cultural Resources Management Plan	Intersects
IM-00316	Shackley, M. Steven	1984	Volume II - Appendixes, Data Recovery on the Mountain Spring (Jade) to Sand Hills Segment: Southwest Powerlink Project	Intersects
IM-00319	Shackley, M. Steven	1984	Volume I - Archaeological Investigations in the Western Colorado Desert: A Socioecological Approach	Intersects
IM-00353	Werlhof, Jay Von	1986	Archaeological Survey of a Forty Acre Parcel, East Mesa, Imperial Valley College Museum	Within 1 mile
IM-00411	Gallegos, Dennis	1988	Cultural Resource Inventory and Data Acquisition Program Geo's East Mesa Geothermal Project, Imperial County, California	Within 1 mile
IM-00506	Green, Eileen and Joan Middleton	1994	Cultural Resource Overview All-American Canal Lining Project Final Report	Intersects
IM-00537	Wirth Associates Inc.	1979	Phase One Regional Studies APS/SDG&E Interconnection Project Transmission System Environmental Study Cultural Resources: Archaeology	Intersects
IM-00547	Cultural Systems Research Inc.	1982	Archaeological Research Design and Data Recovery Program for Cultural Resources within the Mountain Springs (Jade) to Sand Hills Portion of the APS/SDG&E Interconnection Project 500kV Transmission Line	Intersects
IM-00674	Bureau of Land Management	1994	Southern Arizona Transmission Project Preliminary Draft Environmental Impact Statement, Draft Environmental Impact Report, Draft Plan Amendment, DEIS/DEIR/DPA	Intersects
IM-00677	Dames and Moore	1993	Southern Arizona Transmission Project EIS/EIR Cultural Resources Inventory Report	Within 1 mile
IM-00681	Welch, Pat	1984	Lake Cahuilla Shoreline (East Mesa Segment) Area of Critical Environmental Concern (ACEC) Management Plan (Includes ACEC 65, 66, & 71)	Intersects

Table 2
Previous Archaeological Studies Conducted within 1 Mile of Area of Potential Effect

National Archaeological Database #	Author(s)	Year	Title	APE Proximity
IM-00829	Schaefer, Jerry and Collin O'Neill	2001	The All-American Canal: An Historic Properties Inventory and Evaluation	Intersects
IM-00914	Buysse, Johnna L. and Brian F. Smith	2002	Results of an Archaeological Survey for the Border Remote Video Surveillance Project, El Centro Sector, Imperial County, California	Within 1 mile
IM-00979	Underwood, Jackson	2003	Archaeological Survey of Four Rio-Tel Cellular Tower Locations: Tamarisk, Hawk 2E, Holtville, and Blu-In-Park, Imperial County, California	Within 1 mile
IM-01017	Bonner, Wayne H. and Marnie Aislin-Kay	2005	Cultural Resource Records Search and Site Visit Results for Cingular Telecommunications Facility Canidate SS-560-02 (Holdridge Property), 2804 East Highway 98, Holtville, Imperial County, California.	Within 1 mile
IM-01195	Imperial County Planning Department	2008	Procalamos Residential Subdivision Specific Plan (#07-0003) and Tentative Tract Map (TTM #00972) - Assessor's Parcel Numbers 059-140-007-000, ET AL. Imperial County Planning Department	Within 1 mile
IM-01288	Ellis, Robert R.	1973	Archaeological Impact Report on East Mesa - Area 1, Imperial Valley, California	Intersects
IM-01306	Wirth Associates Inc.	1980	APS/SDG&E Interconnection Project Environmental Study Phase II Corridor Studies Native American Cultural Resources Appendices	Intersects
IM-01308	Townsend, Jan	1983	Southwest Powerlink Cultural Resources Management Plan (Draft)	Intersects

APE = area of potential effect

5.2 Tile Drain Construction Maps

IID provided Dudek with tile drain construction maps which detail the installation of tile drains, a subsurface irrigation drainage system, throughout the proposed reservoir portion of the EHL APE. The construction drawings show plan views of the agricultural field and the trajectories of the subsurface drainage system. Construction information is included in the margins of the maps including feature depths, installation details, and tile type. The maps suggest that the tile drains were installed in stages between 1951 and 1983. The installers included Lidco, La Bolsa, McElvany and Son, and Beaver. Noted tile materials included red clay, plastic, "beaver," Quality Tile Co, and ADS. It appears that the system of subsurface pipes are located at depths ranging between 4.5 and 9.2 feet.

5.3 Native American Heritage Commission Sacred Lands File Search

On April 10, 2017, a search of the NAHC Sacred Lands File was conducted for the proposed EHL Project APE and a 1-mile buffer (see Appendix C, NAHC Sacred Lands File Search Results and Tribal Correspondence). The NAHC file search was negative within no Tribal Cultural Resources located in the proposed EHL Project APE. The NAHC response letter included a list of Native American group representatives whom should be contacted for information about these sites.

Outreach letters were mailed on August 21, 2017 to all Native American group representatives included on the NAHC contact list (see Appendix C). To date, only Ray Teran, resource manager of the Viejas Band of Kumeyaay Indians, has responded to these outreach letters. On August 31, 2017, Mr. Teran stated via letter that the proposed EHL Project site has cultural significance or ties to the Viejas Band of Kumeyaay Indians. Though the presence of Tribal Cultural Resources was not mentioned, Mr. Teran requested that a Kumeyaay cultural monitor be on site for ground disturbing activities associated with the proposed EHL Project. Should any other tribal representative respond to the outreach letters, Dudek will include that information in subsequent editions of this report.

5.4 Survey

The entire proposed EHL Project APE was inventoried utilizing pedestrian survey. The survey relocated four of the six previously identified resources within the proposed EHL Project APE. The survey identified 1 new archaeological resource and 11 new built environment resources (see Table 3, Resources within the Area of Potential Effect). The condition and proximity to proposed EHL Project components of each of these 18 resources are described below. New and updated site forms are included in Confidential Appendix D, New and Updated DPR Site Records, and will be submitted to the SCIC. A map of the resource located within the proposed EHL Project APE can be found in Confidential Appendix E, Resources in APE Maps.

Table 3
Resources within the Area of Potential Effect

Site Number	Trinomial	Era	Description	NRHP/CRHR Eligibility	APE Proximity
P-13-000305	CA-IMP-305	Prehistoric	Temporary Campsite	Not Evaluated	Could not relocate
P-13-000316	CA-IMP-316	Prehistoric	Midden soil	Not Evaluated	Could not relocate
P-13-007130	CA-IMP-7130H	Historic	All-American Canal	Determined Eligible	Intersects
P-13-008333	CA-IMP-7835H	Historic	East Highline Canal	Recommended Eligible	Intersects
P-13-008668	—	Historic	All-American Drain	Recommended Eligible	Intersects

Table 3
Resources within the Area of Potential Effect

Site Number	Trinomial	Era	Description	NRHP/CRHR Eligibility	APE Proximity
P-13-014631	CA-IMP-12237	Historic	California State Route 98	Recommended Not Eligible	Intersects
P-13-017218	CA-IMP-12805	Prehistoric	Ceramic Scatter	Recommended Not Eligible	Inside APE
P-13-017219	—	Historic	Irrigation Ditch	Recommended Not Eligible	Inside APE
P-13-017220	—	Historic	Irrigation Ditch	Recommended Not Eligible	Inside APE
P-13-017221	—	Historic	Irrigation Ditch	Recommended Not Eligible	Inside APE
P-13-017222	—	Historic	Irrigation Ditch	Recommended Not Eligible	Inside APE
P-13-017223	—	Historic	Irrigation Ditch	Recommended Not Eligible	Inside APE
P-13-017224	—	Historic	Irrigation Ditch	Recommended Not Eligible	Inside APE
P-13-017225	—	Historic	Irrigation Ditch	Recommended Not Eligible	Inside APE
P-13-017226	—	Historic	Irrigation Ditch	Recommended Not Eligible	Inside APE
P-13-017227	—	Historic	Irrigation Ditch	Recommended Not Eligible	Inside APE
P-13-017228	—	Historic	Irrigation Ditch	Recommended Not Eligible	Inside APE
P-13-017229	—	Historic	Irrigation Ditch	Recommended Not Eligible	Inside APE

— = no data; APE = area of potential effect; CRHR = California Register of Historical Resources; NRHP = National Register of Historic Places.

5.4.1 Previously Identified Resources

P-13-000305; CA-IMP-305

This prehistoric site was identified in 1974 and the record describes the site as a “temporary campsite.” No other information is provided on the site record. Under the “Feature” and “Artifacts” sections of the site record, it states, “not available.” The current study revisited and surveyed the reported site location for P-37-000305. The current study was unable to relocate any evidence of a temporary campsite. The reported area of the campsite has been completely disturbed and is now an active agricultural field. The original resource boundary falls within the proposed EHL Project APE and is directly in the path of the intake channel.

P-13-000316; CA-IMP-316

This prehistoric site was described as a “temporary camp and work area.” Though the site record does not specify, this site was likely recorded in 1974 as it was recorded by the same team and uses the same temporary number pattern as P-13-000316. Under the “Artifacts” sections of the site record, it states, “midden deposits” and under the “Remarks” section, it states, “test excavate.” The current study revisited and surveyed the reported site location for P-37-000316. The current study was unable to relocate any evidence of a temporary campsite. The western 90% of the reported site boundary is located within the proposed EHL Project APE and is directly in the path of the intake channel. This portion of the site boundary has been completely disturbed and is now an active agricultural field. Because the eastern 10% of the resource falls within land administered by the BLM, the current study was unable to inspect the entire site boundary without a field authorization permit.

P-13-007130; CA-IMP-7130H

Central to the proposed EHL Project, this resource consists of a large concrete and earthen canal, the AAC (see Figure 6). The feature roughly parallels the United States–Mexico border and delivers water from the Colorado River to the Imperial Valley, roughly 80 miles west. Reclamation constructed the canal between 1934 and 1940, and still owns and operates it today. In 2001, Reclamation commissioned a historic properties inventory and evaluation of the AAC in preparation for the installation of cables and buoys in the canal (Schaefer and O'Neill 2001). The 2001 inventory recorded features of the entire canal to assess impacts to the structure. As an engineering system and the most ambitious irrigation project in the American West at the time, the inventory found the AAC and any major historic features of the AAC (e.g., bridges, checks, drops, gauging stations, existing inlets, overchutes, syphons, or turnouts) to be a significant historic property and eligible for listing on the NRHP. The current study surveyed the AAC and found it to be in the same condition as previously recorded. The canal is raised from the surrounding topography with steep earthen banks. An assessment of impacts to P-13-007130 is provided in Section 7.1, Cultural Resource Impact Evaluation.

P-13-008333; CA-IMP-7835H

Central to the proposed EHL Project, this resource consists of a large earthen canal, the East Highline Canal. The feature was originally constructed in 1914, and transferred water northwest from the Lawrence Heading off of the Alamo Canal in Mexico to Niland, California (Dowd 1954). With the completion of the AAC in 1940, the East Highline Canal was incorporated into the AAC system and now connects to the AAC roughly 4 miles west of Drop 4. The proposed EHL Project reservoir is bounded to the west by the East Highline Reservoir and proposes a connection to the canal (see Figure 7). An assessment of impacts to P-13-008333 is provided in Section 7.1.

P-13-008668

This resource consists of an earthen irrigation drain, known as All-American Drain 2A. This drain was originally recorded on a DPR form in 2003, however only the segment of the drain that passes under SR-98 was recorded. The All-American Drain 2A is located between the AAC and SR-98. The All-American Drain 2A parallels the AAC for 2.25 miles where it merges with the All-American Drain 2, and then extends west for 0.3 miles and then north for 0.5 miles where it connects to East Highline Canal. All-American Drain 2 is also an earthen irrigation drain and will now be included as part of P-13-008668. The current survey recorded the condition of these two sites where they cross the proposed EHL Project APE. The intake channel of the proposed EHL Project will travel underneath both segments of this resource, All-American Drain 2 and All-American Drain 2A. An assessment of possible impacts to P-13-008668 is provided in Section 7.1.

Figure 6: All-American Canal. View southwest.

Figure 7: View of East Highline Canal's eastern bank from Verde School Road. View northeast.

P-13-014631; CA-IMP-12237

This resource consists of California SR-98, two discontinuous segments of which were originally recorded in 2012. The paved highway originates from Interstate 8 near Ocotillo, travels through Calexico, and then rejoins Interstate 8 east of Holtville. Historic California roadmaps show that portions of the road remained unpaved until 1956. The earliest available aerial photograph of the area is from 1953 and shows that the portion of the road that intersects the current proposed EHL Project APE has not changed its trajectory. Though it maintains much of its integrity, this resource has previously been recommended not eligible for listing on the NRHP. The portion of the road that crosses the proposed EHL Project APE consists of a two-lane paved road, slightly elevated above its sandy shoulders (see Figure 8). The intake channel of the proposed EHL Project will travel underneath this resource. An assessment of possible impacts to P-13-014631 is provided in Section 7.1.

5.4.2 Newly Identified Resources

P-13-017218; CA-IMP-12805

This newly discovered site was identified during the current survey and consists of a scatter of prehistoric ceramic brownware and buffware fragments. Using tight interval transects, the current survey identified 59 ceramic body sherds and 4 rim sherds. The sherds had reddish colored interiors and light grey colored exteriors (see Figure 9). Very limited, if any, temper was visible in the sherds cross section. The sherds ranged in length from 2 to 6 centimeters and were all 5 millimeters thick. One rim sherd was decorated with incisions along the rim (see Figure 10). The artifacts are scattered over 42 meters east to west and 38 meters north to south. There is evidence that erosional forces may have dispersed the ceramics from their original deposit in the north end of the site to the south end. A single tertiary, cryptocrystalline silicate flake fragment was also identified. This resource is intersected by the proposed EHL Project intake channel. An assessment of impacts to P-13-017218 is provided in Section 7.1.

P-13-017219

This historical resource consists of an earthen irrigation canal with a V-shaped in cross section that runs east to west (see Figure 11). This canal appears to receive water from the East Highline Canal, and is labeled “Mesa Lateral 7” on the 1976 Bonds Corner U.S. Geological Survey quadrangle. The canal is approximately 20 feet wide and 12 feet deep. At its western terminus, the canal has a mostly buried concrete culvert that suggests that the canal extended east under Holdridge Road, but the extension of the canal is not visible. The entire canal is approximately 0.7 miles long and is in fair condition. This resource is located within the proposed EHL Project reservoir boundary and will be completely removed during construction. An assessment of impacts to P-13-017219 is provided in Section 7.1.

P-13-017220

This historical resource consists of a U-shaped, concrete-lined irrigation ditch that runs east to west, but then veers southwest towards its western terminus. The irrigation ditch ends with a rectangular catchment that measures 134 inches long, 74 inches wide, and 65 inches deep. The ditch is approximately 7 feet wide and 3 feet deep. A series of metal panels are located within the wall of the ditch every 45 feet. There are also three metal gates used to control the flow of water within the ditch (see Figure 12). The gates consists of a U-shaped sheet of metal that can be lowered using a manual lever. The entire canal is approximately 0.7 miles long and is in fair condition. This resource is located within the proposed EHL Project reservoir boundary and will be completely removed during construction. An assessment of impacts to P-13-017220 is provided in Section 7.1.

P-13-017221

This historical resource consists of an irrigation ditch and two associated transfer pumps. The U-shaped, concrete-lined irrigation ditch runs east to west. The ditch is 5 feet deep and approximately 16 feet wide at the top. There are transfer pumps located at both the western and eastern terminus of the ditch and both are labeled "East Highline Transfer Pump 2." At the eastern terminus of the ditch is a concrete pump house labeled "EHL- PUMP 2," measuring 91 inches long, 112 inches wide, and 80 inches deep (see Figure 13). This pump house contains two 16-inch diameter pump pipes. The electrical system directly east of the East Highline Transfer Pump 2 is labeled "IID Pump EHL-IB." The transfer pump at the western extent of the irrigation ditch consists of a large gate, a water basin, two large metal transfer pipes, and electrical units. The entire apparatus measures 30 feet by 35 feet. The concrete irrigation ditch and both East Highline Transfer Pump 2 apparatuses are in fair condition. This resource is located within the proposed EHL Project reservoir boundary and will be completely removed during construction. An assessment of impacts to P-13-017221 is provided in Section 7.1.

P-13-017222

This historical resource consists of a U-shaped, concrete-lined irrigation ditch that runs north to south. It measures 75 inches wide along the top and 42 inches in depth. The southern terminus has a concrete rectangular well measuring 5 feet by 10 feet by 6 feet in depth. The canal is in fair condition. This resource is located within the proposed EHL Project reservoir boundary and will be completely removed during construction. An assessment of impacts to P-13-017222 is provided in Section 7.1.

Figure 8: State Road 98. View southwest.

Figure 9: P-13-017218 prehistoric ceramic sherds.

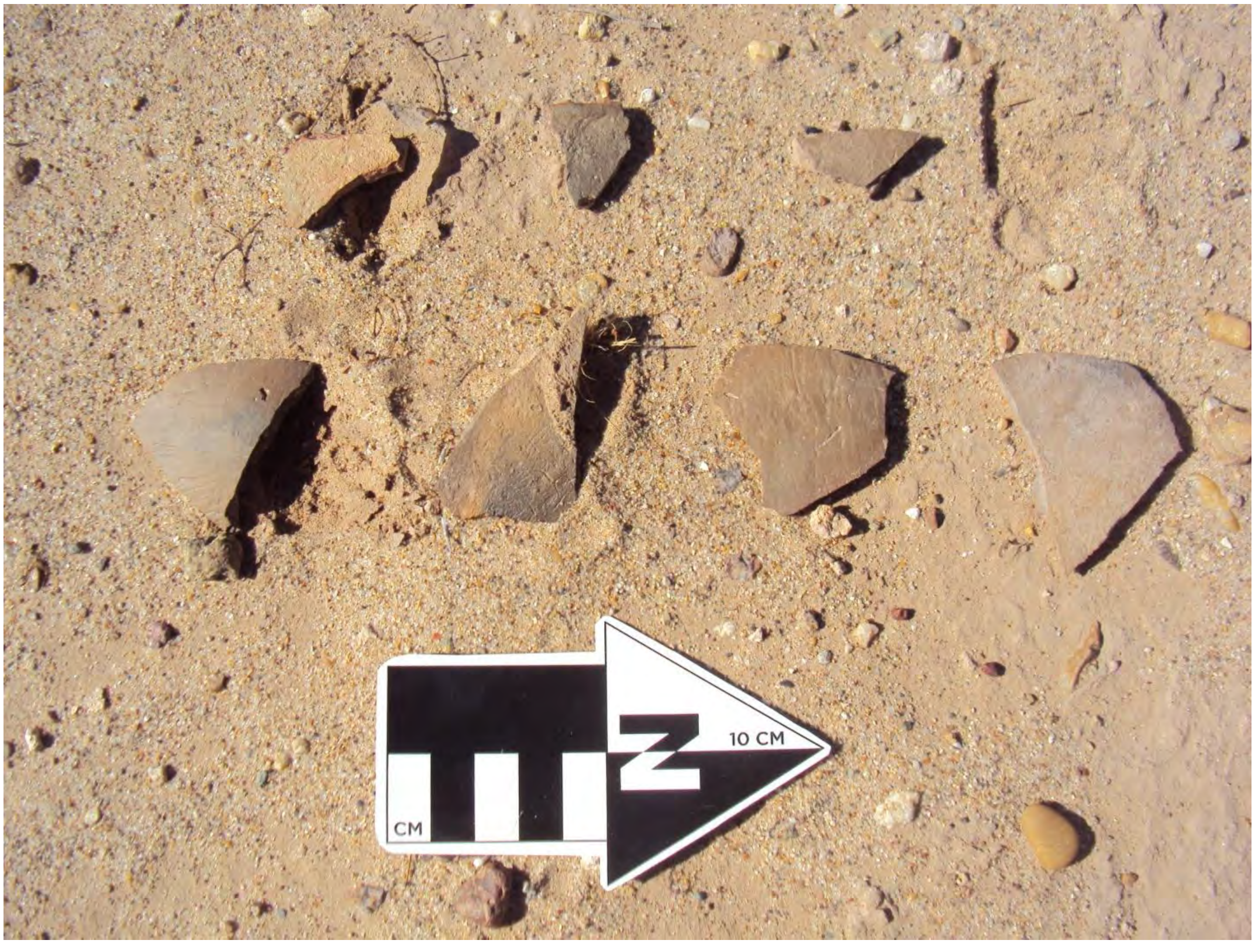


Figure 10: Decorated ceramic rim sherd at P-13-017218.

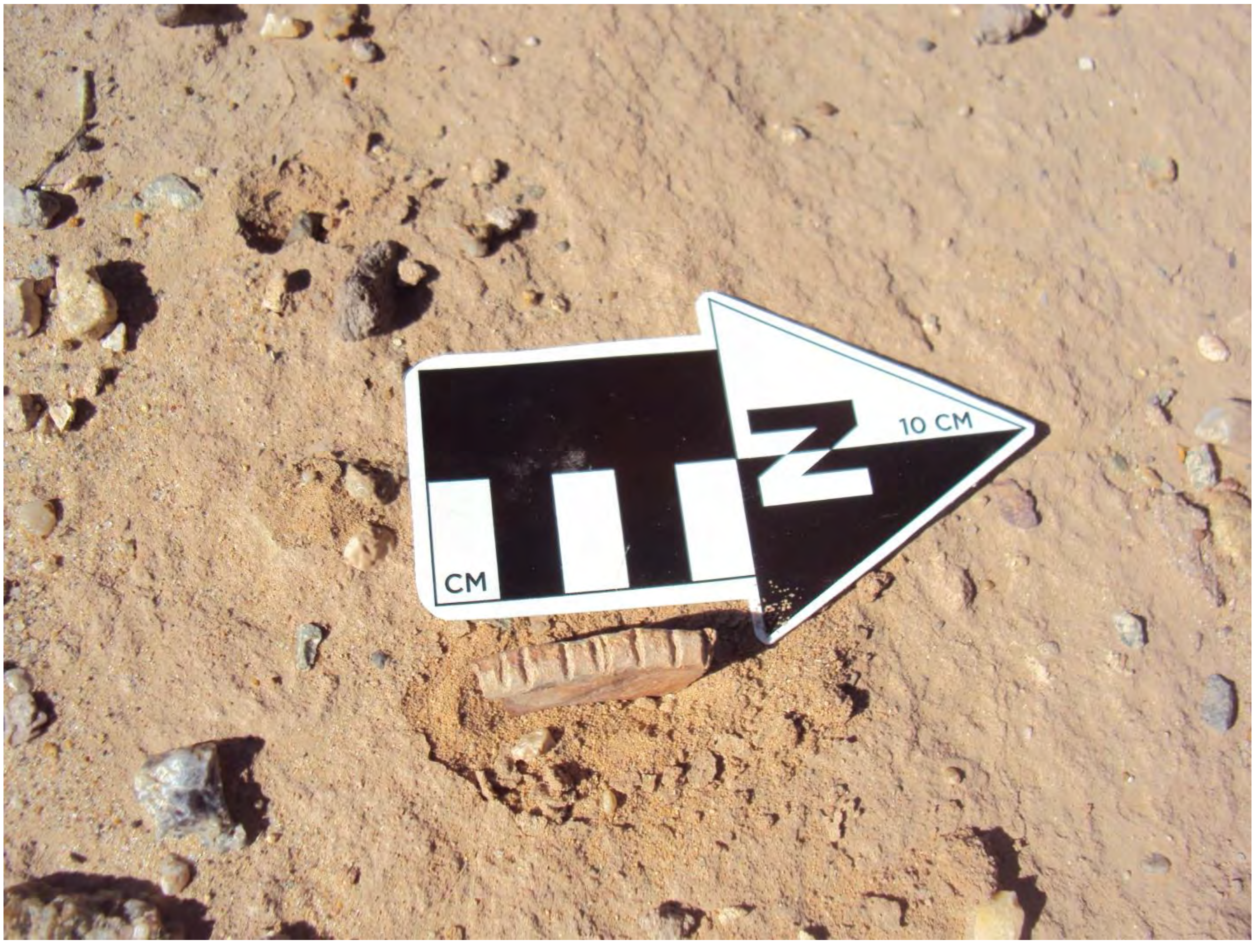


Figure 11: Eastern terminus of P-13-017219. View west.

Figure 12: View of gate in P-13-017220. View west.

Figure 13: "EHL-Pump2" located at the eastern terminus of P-13-017221. View south.

P-13-017223

This historical resource consists of a U-shaped, concrete-lined irrigation ditch that runs east to west. The ditch measures 99 inches wide along the top and approximately 39 inches in depth. The eastern extent of the ditch has a concrete rectangular well measuring 148 inches by 60 inches. The canal is in fair condition. This resource is located within the proposed EHL Project reservoir boundary and will be completely removed during construction. An assessment of impacts to P-13-017223 is provided in Section 7.1.

P-13-017224

This historical resource consists of a U-shaped, concrete-lined irrigation ditch that measures 96 inches wide at the top and approximately 40 inches in depth. The ditch contains water outlets every 69 feet, with a concrete-lined opening that measures 8 feet wide and includes a 2-foot diameter pipe. A gate is located within the ditch that consists of a U-shaped piece of sheet metal that can be lowered using a manual lever. The ditch is 3.4 miles long and encircles several agricultural fields. The ditch is in fair condition. This resource is located within the proposed EHL Project intake channel boundary and the eastern north–south portion of it will be removed during construction. An assessment of impacts to P-13-017224 is provided in Section 7.1.

P-13-017225

This historical resource consists of a U-shaped, concrete-lined irrigation ditch that runs west to east. The ditch measures 100 inches in width across its top and 38 inches in depth. Associated with the ditch are two gates that consist of a sheet metal dam operated by a manual lever. The ditch is 0.25 miles long. While the western portion of the dich is in fair condition, the eastern portion is partially filled with sediments. This resource is located within the proposed EHL Project reservoir boundary and will be completely removed during construction. An assessment of impacts to P-13-017225 is provided in Section 7.1.

P-13-017226

This historical resource consists of a U-shaped irrigation ditch that runs west to east. There is some evidence of a partial concrete lining at the eastern terminus of the ditch. The canal measures 8 feet across. The canal is in poor condition; it is very shallow and filled with sediment. This resource is located within the proposed EHL Project reservoir boundary and will be completely removed during construction. An assessment of impacts to P-13-017226 is provided in Section 7.1.

P-13-017227

This historical resource consists of a U-shaped, concrete-lined irrigation ditch that runs east to west. The ditch measures 90 inches in width across the top and 36 inches in depth. Two gates are located within the ditch and consists of a U-shaped sheet metal operated by a manual lever. The ditch extends 0.75 miles and appears to be in good physical condition, but is largely filled with sand. This resource is located within the proposed EHL Project reservoir boundary and will be completely removed during construction. An assessment of impacts to P-13-017227 is provided in Section 7.1.

P-13-017228

This historical resource consists of a U-shaped, concrete-lined irrigation ditch that runs north to south. The southern extent of the ditch contains a single gate and ends with a rectangular concrete catchment. The gate is constructed of a U-shaped piece of sheet metal operated by a manual lever. The concrete catchment measures 108 inches in width along the top and 38 inches in height. The ditch is approximately 0.25 miles in length and is in fair condition. This resource is located within the proposed EHL Project reservoir boundary and will be completely removed during construction. An assessment of impacts to P-13-017228 is provided in Section 7.1.

P-13-017229

The historical resource consists of a U-shaped, concrete-lined irrigation ditch that runs east to west. The canal measures 72 inches across and 36 inches in depth. The ditch is 0.25 miles long and appears to be in fair condition, but is partially filled with sand. This resource is located within the proposed EHL Project reservoir boundary and will be completely removed during construction. An assessment of impacts to P-13-017229 is provided in Section 7.1.

5.5 Archaeological Testing Results

The current survey identified one prehistoric cultural resource that will be impacted by the proposed EHL Project: P-13-017218. Archaeological testing was conducted to gather information to determine the eligibility of the site for listing on the NRHP or the CRHR.

P-13-017218; CA-IMP-12805

Dudek archaeologists identified the prehistoric ceramic scatter, P-13-017218, during the survey of the proposed EHL Project APE on January 4, 2018, and revisited the site to conduct formal evaluation excavations on April 4, 2018. The resource area was resurveyed using transects at less than 1-meter intervals. The close-interval survey identified 63 ceramic sherds and a single tertiary, cryptocrystalline silicate flake fragment on the surface. To investigate the presence of a subsurface deposit, three STPs and two shovel scrape units (SSUs) were excavated as shown in Figure 14. The three STPs measured 25 by 50 centimeters and were excavated to a depth ranging from 20 to 40 centimeters. The SSUs varied in size, measuring 1 by 2 meters and 1 by 1 meters. Both SSUs were excavated to 10 centimeters. The STPs were excavated near ceramic concentrations to determine if a subsurface deposit was present. STP-01 produced five ceramic sherds on its surface, three ceramic sherds in its first level (0 to 20 centimeters), and no ceramic sherds in its second level (20 to 40 centimeters). STP-02 produced four ceramic sherds on its surface but no materials were identified subsurface (0 to 40 centimeters). The SSUs were positioned in locations adjacent to surface artifact concentrations to determine if there was a near-surface extension of the ceramic scatter in the loose, alluvial sand. SSU-01 measured 1 by 2 meters and uncovered five ceramic sherds. These five sherds were identified in the upper 5 centimeters. SSU-02 measured 1 by 1 meters and only identified a single ceramic sherd. All excavations revealed that the site's subsurface consists of lightly compacted sand. Besides the ceramic sherds, no other artifacts, features, or strata were identified within the excavation units. A laboratory analysis of the collected materials from P-13-017218 is provided in Section 6.1, P-13-017218; CA-IMP-12805.

5.6 Paleontological Resources

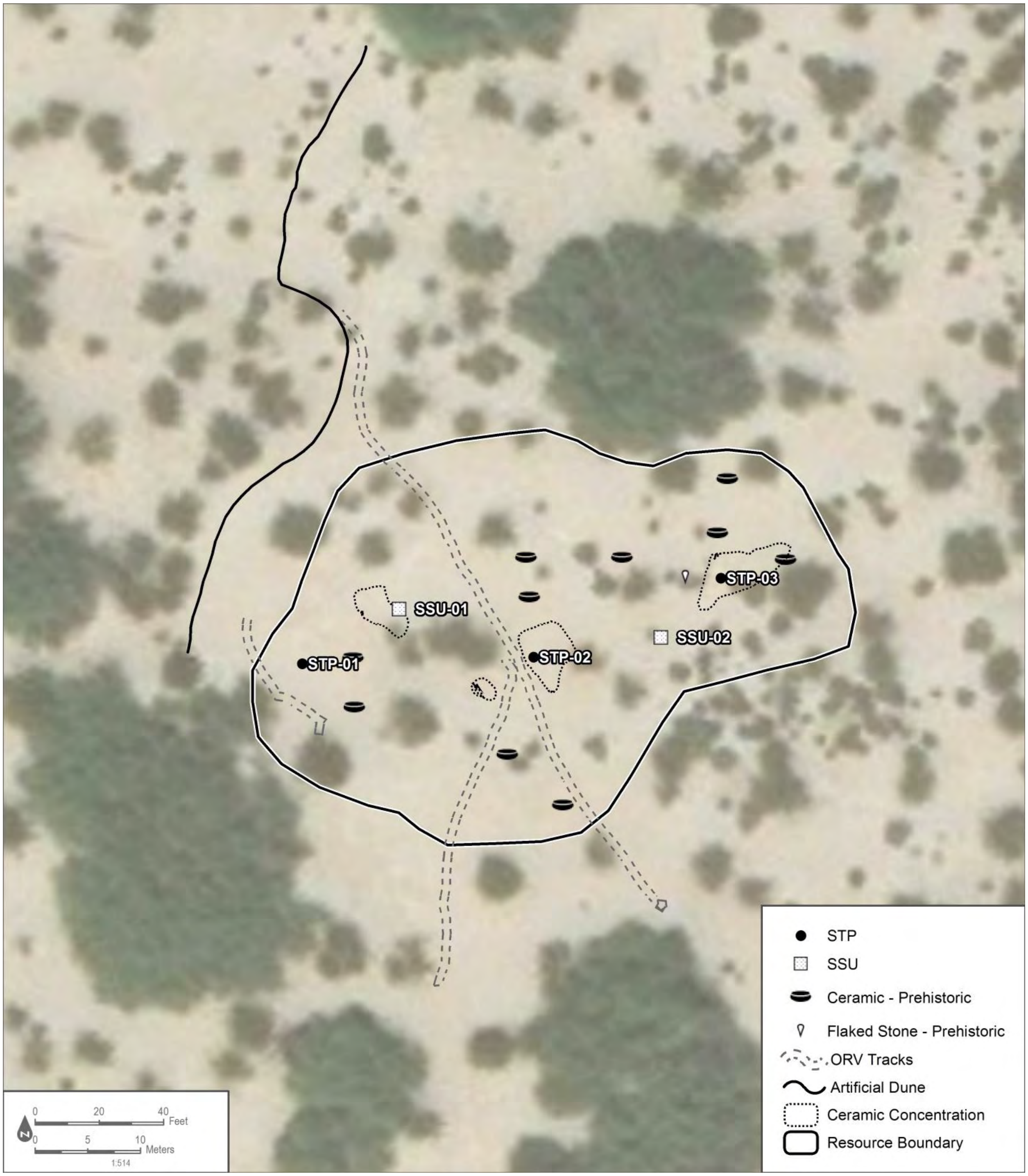
No fossil localities are documented within the proposed EHL Project APE or within a 1 mile radius buffer. No fossil bone or shell was observed on the ground surface during the pedestrian survey, and the surface-mapped deposits were confirmed to be consistent with those mapped throughout the site.

According to the records search results obtained from the Natural History Museum of Los Angeles County (see Appendix F, Paleontological Records Search), their closest fossil locality to the proposed EHL Project APE is LACM 1719, which yielded a specimen of horse (*Equidae spp.*) from older Quaternary deposits west–southwest of the APE, and west of Calexico and Mount Signal, near the international border (see Appendix F).

The BLM has outlined the Potential Fossil Yield Classification system, to characterize geological units and their respective paleontological sensitivity rankings (BLM 2016). According to the BLM's Potential Fossil Yield Classification system, the lakebed deposits of ancient Lake Cahuilla in this region have been identified as Class 4 (BLM 2016). Class 4 is defined by the BLM as an area underlain by geologic units with high potential to yield fossils but have lowered risks of human-caused adverse impacts and/or lowered risk of natural degradation due to alluvial material, or other conditions that may lessen or prevent potential impacts to the bedrock resulting from the activity.

Construction methods are anticipated to include minor surface excavations to a depth of less than 5 feet below the ground surface, impacting only surface Holocene alluvium. Surface mapped deposits of Holocene age younger alluvium are considered to be too young to produce scientifically significant paleontological resources, and thus have been assigned Potential Fossil Yield Classification rating of Class 2, or low potential, in this region (BLM, 2016). Class 2 is defined as unlikely to contain paleontological resources (BLM 2016).

Figure 14: P-13-017218 site map



6 ANALYSIS

The current study identified one unevaluated archaeological resource within the APE that will be impacted by proposed EHL Project activities: P-13-017218. This resource underwent archaeological testing and all collected materials were transported to Dudek's archaeological laboratory. Cataloging (see Appendix G, Artifact Catalog) and laboratory analysis of the excavated materials was conducted to aid in the determination of the site's eligibility for listing on the NRHP and CRHR. All artifacts collected during excavation will be curated at the Lower Colorado Regional Office of the Bureau of Reclamation (see Section 4.6, Curation).

6.1 P-13-017218; A-IMP-12805

Ceramics

A total of 16 different ceramic sherds (counting sherds that refit as one) were recovered from the evaluation excavations. A basic macroscopic visual analysis was performed to differentiate buffware and brownware types using a 10-times magnification hand lens. When necessary, a fresh break was made on a sherd to view the unweathered fabric. Tizon Brown and Salton Brown were predominantly differentiated using the presence (Tizon) or absence (Salton) of amphibole (hornblende) as the distinguishing characteristic (Gallucci 2004; Hildebrand et al. 2002). Differentiating between brownwares macroscopically is difficult at best, and low-powered magnification has been shown to be much less accurate than microscopic analysis (Gallucci 2004; Hildebrand et al. 2002). Buffware classifications were based on the descriptive characteristics defined by Waters (1982).

Of the 16 sherds, seven are Salton Brown, seven are Colorado Buff, one is Salton Buff, and one is Tumco Buff. No amphibole inclusions were identifiable in any of the specimens; however, since only a 10-times magnification hand lens was available for analysis at the time, it is not possible to definitely state that all of the specimens labeled as Salton Brown were indeed absent of amphibole. Of the seven Colorado Buff sherds, there are at least two different vessels based on different fabric characteristics (e.g., color, inclusions).

None of the sherds have been burned or have charcoal/soot on them, suggesting none were used for cooking, although such residues may have been lost through post-depositional processes. Rim diameters for each rim sherd measure 8, 10, and 11 centimeters, indicating all are likely from large jars or cooking pots (Cook 1986; Hale and Comeau 2009). One Salton Brown sherd (Cat. No. 4 in Appendix G) varies in thickness substantially. The thicker portion is consistent with typical base fragments of cooking vessels. Analysis of the three rim sherds following Cook's (1986) typology indicates that each represents a different rim type and curvature combination (see Table 4). Four sherds show remnant coils (or the curved void associated with coils) from production, and seven sherds, representing each type of ware, were burnished during production.

Table 4
Analysis of Three Rim Sherds

Rim Sherd Type	Type	Quantity
Direct Rim, Squared Lip	Colorado Buff	1
Recurved Rim, Projecting Asymmetrical Rounded Lip	Salton Brown	1
Direct Rim, Mushroomed Lip	Salton Buff	1
	Minimum Number of Vessels	**3**

Three specimens exhibit additional modifications. One Colorado Buff sherd and the Tumco Buff sherd have a scum coat on their exterior surfaces. The Salton Buff rim sherd has short incisions on the rim, oriented perpendicular to the rim.

7 MANAGEMENT CONSIDERATIONS

7.1 Cultural Resource Impact Evaluation

As stated in 36 CFR 800.5(a)(1) Criteria of adverse effect:

> An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the NRHP in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Consideration shall be given to all qualifying characteristics of a historic property, including those that may have been identified subsequent to the original evaluation of the property's eligibility for the NRHP. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance or be cumulative.

Archival review identified six previously recorded cultural resources within the proposed EHL Project APE while pedestrian survey identified 12 new cultural resources. These 18 cultural resources include 3 archaeological sites and 15 built environment resources. Previously, the AAC (P-13-007130) was evaluated and determined to be historically significant. Because of their association with the AAC, the East Highline Canal (P-13-008333) and the All-American Drain 2/2A (P-13-008668), were previously recommended eligible for listing on the NRHP. The remaining resources have not been previously evaluated for significance (see Table 5).

Table 5
Impact and Significance Evaluation of Cultural Resources Located within the Area of Potential Effect

Site Number	Trinomial	Era	Description	NRHP/CRHR Eligibility	Management
P-13-000305	CA-IMP-305	Prehistoric	Temporary Campsite	Not Evaluated	Monitor excavation
P-13-000316	CA-IMP-316	Prehistoric	Midden soil	Not Evaluated	Monitor excavation
P-13-007130	CA-IMP-7130H	Historic	All-American Canal	Determined Eligible	No adverse effect
P-13-008333	CA-IMP-7835H	Historic	East Highline Canal	Recommended Eligible	No adverse effect
P-13-008668	—	Historic	All-American Drain 2 and 2A	Recommended Eligible	Avoidable
P-13-014631	CA-IMP-12237	Historic	California State Route 98	Recommended Not Eligible	Avoidable
P-13-017218	—	Prehistoric	Ceramic Scatter	Recommended Not Eligible	Monitor excavation

Table 5
Impact and Significance Evaluation of Cultural Resources Located within the Area of Potential Effect

Site Number	Trinomial	Era	Description	NRHP/CRHR Eligibility	Management
P-13-017219	—	Historic	Irrigation Ditch	Recommended Not Eligible	None—Not Eligible
P-13-017220	—	Historic	Irrigation Ditch	Recommended Not Eligible	None—Not Eligible
P-13-017221	—	Historic	Irrigation Ditch	Recommended Not Eligible	None—Not Eligible
P-13-017222	—	Historic	Irrigation Ditch	Recommended Not Eligible	None—Not Eligible
P-13-017223	—	Historic	Irrigation Ditch	Recommended Not Eligible	None—Not Eligible
P-13-017224	—	Historic	Irrigation Ditch	Recommended Not Eligible	None—Not Eligible
P-13-017225	—	Historic	Irrigation Ditch	Recommended Not Eligible	None—Not Eligible
P-13-017226	—	Historic	Irrigation Ditch	Recommended Not Eligible	None—Not Eligible
P-13-017227	—	Historic	Irrigation Ditch	Recommended Not Eligible	None—Not Eligible
P-13-017228	—	Historic	Irrigation Ditch	Recommended Not Eligible	None—Not Eligible
P-13-017229	—	Historic	Irrigation Ditch	Recommended Not Eligible	None—Not Eligible

— = no data; CRHR = California Register of Historical Resources; NRHP = National Register of Historic Places.

Of the 18 cultural resources located within the APE, the proposed EHL Project can avoid 2 resources, P-13-008668 and P-13-014631. P-13-008668 consists of a single feature that splits into two components, the All American Drain 2 and the All American Drain 2A. P-13-014631 consists of segments of a SR-98. The proposed intake channel crosses the path of SR-98 and both segments of P-13-008668. The proposed EHL Project will avoid impacting these two resources by using box culverts to route the intake channel underneath P-13-014631 and P-13-008668.

Of the remaining 16 sites, 2 appear to no longer be extant within the proposed EHL Project APE. P-13-000305 and P-13-000316 both consist of poorly documented prehistoric resources recorded in the 1970s. P-13-000305 was described as a "temporary campsite," 90% of which is located within the path of the proposed EHL Project intake channel. P-13-000316 was described as "midden soil" and was located entirely within the path of the proposed EHL Project intake channel. The current pedestrian survey could not relocate these resources. An active agricultural field, concrete irrigation ditch, and dirt road now dominate the recorded boundaries of these resources. It appears that the resources were destroyed during the development of the agricultural field. However, there is still the possibility of uncovering subsurface archaeological deposits near the boundaries of these previously identified resources. Impacts to any such inadvertent discoveries would be considered potentially significant. Monitoring during construction to appropriately treat inadvertent discoveries would reduce that impact to a level below significance.

The proposed EHL Project cannot avoid impacts to the remaining 14 cultural resources identified within the APE. An impact and significance evaluation for each of these resources is described in this section.

P-13-007130; CA-IMP-7130H

The AAC (P-13-007130; CA-IMP-7130H) is an NRHP-eligible resource that will be altered by the proposed EHL Project, which proposes the construction of an open-air intake channel that will transfer water from the AAC and deposit it into the proposed reservoir. Alterations to the AAC include the cutting of approximately 250 feet of the northern bank of the AAC. This 250-foot cut will allow a direct connection to the open intake channel that will traverse north to the proposed reservoir. The direct connection will be open with no gate or other flow-altering apparatus. The connection between the AAC and the proposed intake canal will have a concrete sill to protect the connection from erosion. This concrete sill will extend to the top of the existing earthen embankment of the AAC and will be visible above the waterline.

Applying the Criteria of significance, the proposed undertaking will have no adverse effects or significant impacts to the AAC. No alterations are proposed to any major historic features of the AAC, such as bridges, checks, drops, gauging stations, existing inlets, overchutes, syphons, or turnouts. The direct connection of the AAC to the proposed intake canal is similar in structure to the existing connection of the AAC to the East Highline Canal, located approximately 1.1 miles west. The concrete sill located at the connection of the intake canal will disrupt the earthen embankment of the AAC; however, there are similar concrete structures located along the AAC where water is diverted into lateral irrigation canals. Finally, the 250-foot connection is only a small alteration to the approximately 80-mile-long AAC. The alterations proposed to the AAC are similar to other existing water-diverting features along the AAC, and will not impact the integrity or feel of the resource. None of the major features that qualify the AAC for inclusion in the NRHP will be impacted by the proposed EHL Project. Therefore, it is Dudek's recommendation that the proposed EHL Project will have no adverse effect on this historic property under Section 106 of the NHPA. From a CEQA perspective, Dudek finds that the proposed EHL Project will not have a significant impact on this historical resource.

P-13-008333; CA-IMP-7835H

The East Highline Canal (P-13-008333; CA-IMP-7835H) is an NRHP-eligible resource that will be directly impacted by the proposed EHL Project, which proposes the construction of seven pipes and seven gates that will transfer water from the proposed reservoir into the East Highline Canal. A concrete structure will be constructed along the bank of the earthen East Highline Canal near the northwest corner of the proposed reservoir. The concrete structure will span less than 150 feet along the eastern bank of East Highline Canal. This concrete structure will hold the seven discharge pipes in place and prevent erosion around the pipes. The discharge pipes will enter the East Highline Canal below the waterline. Upon completion, only the concrete structure will be visible above the water line. The discharge pipes will proceed approximately due north of the reservoir, entering the existing canal nearly following the direction of its flow.

Applying the Criteria of adverse effect, the proposed undertaking will have no affect or significant impact to any major historic features of the East Highline Canal, such as bridges, checks, or existing turnouts. Of the approximately 45-mile-long East Highline Canal, only a very small portion, less than 150 feet, will be altered by the proposed EHL Project. The proposed structure that will hold the seven discharge pipes will be constructed from concrete and will be visible along the eastern bank of the East Highline Canal. Though this will disrupt the continued earthen bank of the East Highline Canal, other concrete structures are located further along the canal. These other concrete structures deliver water from the East Highline Canal into the adjacent agricultural fields, which is the original function of the canal. The addition of another concrete structure along the East Highline Canal will not impact the integrity of the resource. The proposed connection will support the canal's purpose of reliably delivering water to agricultural fields. The concrete structure will support seven discharge pipes that will protrude from the wall of the East Highline Canal. These pipes will enter the canal below the water line and will not visually impact the canal.

The East Highline Canal was previously recommended eligible for the NRHP due to its association with the AAC, a NRHP-eligible resource. None of the major features that associate the East Highline Canal with the AAC for inclusion in the NRHP will be impacted by the proposed EHL Project. Therefore, it is Dudek's recommendation that the proposed EHL Project will have no adverse effect on this historic property under Section 106 of the NHPA. From a CEQA perspective, Dudek finds that the proposed EHL Project will not have a significant impact on this historical resource.

P-13-017218; CA-IMP-12805

This newly identified resource consists of a prehistoric ceramic scatter. As described in Section 5, Results, and Section 6, Analysis, P-13-017218 was evaluated through additional close-interval survey and excavation of three STPs and two SSUs. The excavated units produced only 10 subsurface ceramic sherds and all were located within the upper 20 centimeters. Laboratory analysis of the ceramics found them to be of types common to the area. Further excavations at P-13-017218 are unlikely to yield information important to prehistory and the current efforts to record, excavate, and analyze the site have exhausted its research potential. Dudek recommends P-13-017218 not eligible for listing on the NRHP or the CRHR under Criterion D/4. Moreover, no information was obtained about this site indicating its significance under NRHP criteria A through C or CRHR criteria 1 through 3. The site was not found to be associated with significant events (Criterion A/1), or persons (Criterion B/2), and no evidence suggests that it qualifies as the distinctive characteristics of a type, period, or method of construction, or that it represents the work of a master, or that possess high artistic values, or that it represents a significant and distinguishable entity whose components may lack individual distinction (Criterion C/3). As such, Dudek recommends P-13-017218 not eligible for listing on the NRHP or the CRHR under any criteria.

P-13-017219

This irrigation drain was identified within the boundaries of the proposed EHL Project APE and will be removed during the proposed excavation of the reservoir. Evaluation of P-13-017219 under NRHP/CRHR criteria included archival research. Archival research was unable to locate the date of construction for the earthen irrigation drain. Review of historic aerial photographs indicates that the drain was present in 1953 (NETRonline 2018). Though the drain is labelled “Mesa Lateral 7” on the 1976 Bonds Corner U.S. Geological Survey quadrangle, no previous recordings or evaluations of this canal segment were found during the course of archival research. Despite the association with irrigation history and the history of agricultural development in Imperial County, the lack of clear association with larger canals in the area suggests that this was a canal used by a single property owner for agricultural purposes and not part of a larger, more complex infrastructure. Therefore, P-13-017219 does not rise to the level of significance required for either the NRHP or the CRHR under Criterion A/1. Archival research also failed to establish any associations with significant persons important on the local, state, or national level, thus making it not eligible under Criterion B/2. The subject property does not embody the distinctive characteristics of a type, period, region, or method of construction. The earthen drain is not representative of a specific and significant infrastructure or architectural style. There is no evidence to suggest that it was constructed or conceived by an important creative individual, and it represents an ubiquitous piece of infrastructure seen throughout Imperial Valley. Therefore, P-13-017219 does not appear eligible under NRHP/CRHR Criterion

C/3. There is no evidence to suggest that this property has the potential to yield information important to state or local history, nor is it associated with a known archaeological resource. Therefore, P-13-017219 is recommended not eligible under NRHP/CRHP Criterion D/4. Although the earthen drain retains the requisite integrity of location, design, setting, materials, workmanship, feeling, and association, it has no important historical associations and lacks architectural merit. As such, P-13-017219 is recommended not eligible under all NRHP and CRHR designation criteria.

P-13-017220 through P-13-017229

Ten irrigation ditches were identified within the proposed boundaries of the proposed EHL Project APE: P-13-017220, P-13-017221, P-13-017222, P-13-017223, P-13-017224, P-13-017225, P-13-017226, P-13-017227, P-13-017228, and P-13-017229. These resources are concrete-lined, V- or U-shaped irrigation ditches, and of a similar size, shape, and design. Irrigation ditches P-13-017220, P-13-017221, P-13-017222, P-13-017223, P-13-017225, P-13-017226, P-13-017227, P-13-017228, and P-13-017229 will be removed during the proposed excavation of the reservoir, while P-13-017224 will only be partially removed and rebuilt outside of the proposed intake channel. Evaluation of the 10 irrigation ditches under NRHP/CRHR criteria included archival research. The concrete at the edge of P-13-017222 was inscribed "1/31/1953." Archival research was unable to locate the date of construction for all other irrigation structures. Though the picture quality makes it difficult to recognize such narrow features, review of historic aerial photographs indicates that some of the irrigation ditches were present in 1953 (NETRonline 2018). No previous recordings or evaluations of these irrigation ditches were found during the course of archival research. Despite the association with irrigation history and the history of agricultural development in Imperial County, the lack of clear association with larger canals in the area suggests that these irrigation features were used by a single property owner for agricultural purposes, and are not part of a larger, more complex infrastructure. Therefore, these irrigation ditches do not rise to the level of significance required for either the NRHP or the CRHR under Criterion A/1. Archival research also failed to establish any associations to significant persons important on the local, state, or national level, thus making the resources not eligible under Criterion B/2. The subject properties do not embody the distinctive characteristics of a type, period, region, or method of construction. The irrigation ditches are not representative of a specific and significant infrastructure or architectural style. There is no evidence to suggest that they were constructed or conceived by an important creative individual, and they represent ubiquitous infrastructure seen throughout Imperial Valley. Therefore, P-13-017220 through P-13-017229 do not appear eligible under NRHP/CRHR Criterion C/3. There is no evidence to suggest that these resources have the potential to yield information important to state or local history, nor are they associated with a known archaeological resource. Therefore, P-13-017220 through P-13-017229 are recommended not eligible under NRHP/CRHP Criterion D/4. Except for P-13-017226, whose integrity has been lost due to partial demolition, the other irrigation ditches retain the requisite integrity of location, design, setting, materials, workmanship, feeling, and association; however, they have no important historical associations and lack architectural merit. As such, P-13-017220, P-13-017221, P-13-017222, P-13-017223, P-13-017224, P-13-017225, P-13-017226, P-13-017227, P-13-017228, and P-13-017229 are recommended not eligible under all NRHP and CRHR designation criteria.

Tile Drains

The IID provided Dudek with tile drain construction maps which detail the installation of tile drains throughout the proposed reservoir portion of the EHL APE. This subsurface lattice of ceramic, concrete, metal, and plastic pipes were installed in stages between 1951 and 1989. Because these features exist between 4.5 and 9.2 feet below surface, the current cultural resources investigation was unable to verify their presence, extent, or materials. As such, Dudek is unable to confirm that these resources are located within the APE and is unable to make statements regarding the resource's integrity or eligibility for historical significance. While tile drains are associated with the history of irrigation and agricultural development in Imperial County, the tile drains within the APE were used by individual property owners for agricultural purposes, and are not part of a larger, more complex system of infrastructure. Tile drains have been commonly used all over the United States since the 1800s. The drains within the APE represent ubiquitous infrastructure seen throughout Imperial Valley. Further, the mix of different material types and dates illustrated on the construction maps provided by IID indicate that these drains are unlikely to retain integrity to their original construction. Given that these drains were developed to serve individual properties (and not intended to operate as part of a larger complex drainage system) they are also unlikely to be eligible for their associations with important events, people, or patterns of development. However, it is recommended that monitoring occur in areas where tile drainages are historically mapped in order to assess and document their condition. Should the archaeologist identify unique material types, methods of construction, or connections to a broader network of infrastructure that warrants recordation and evaluation of the resource, the archaeologist will document the resource in the field with detailed notes. Treatment of the tile drains will be detailed in the Cultural and Paleontological Resources Monitoring and Treatment Plan (MM-CR-1).

7.2 Paleontological Resource Impact Evaluation

A paleontological records search performed by the Natural History Museum of Los Angeles County did not identify any known fossil localities in the proposed EHL Project APE or within a

1-mile radius if the APE. However, geological records indicate that the proposed EHL Project site is situated on Pleistocene-age alluvial sediments that have produced numerous scientifically significant fossils in the region. However, construction impacts are anticipated to be minimal, including minor ground disturbance to a depth of less than 5 feet below the ground surface.

The management concern for paleontological resources is considered to be low due to the construction activities anticipated. A mitigation program for paleontological resources is not recommended at this time. If the constraints of the conventional trenching goes deeper than 5 feet below the ground surface, a paleontologist shall be retained to determine the potential at depth for impacts to high-sensitivity deposits, such as the Lake Cahuilla beds. If unanticipated fossils are discovered during the course of construction, implementation of mitigation measure MM-PAL-1 would reduce adverse effects on paleontological resources. Additionally, standard discovery requirements under Reclamation Guidelines require the applicant implement field procedures to protect paleontological resources in addition to mitigation. Reclamation also requires compliance with the Paleontological Resource Preservation Act of 2009. With compliance with the applicable regulations and implementation of MM-PAL-1, impacts to paleontological resources would be reduced to an acceptable level.

7.3 Mitigation Measures

The majority of the resources identified within the proposed EHL Project APE are built environment structures, while the three archaeological resources identified within the APE appear to have been destroyed during agricultural development (P-13-000305 and P-13-000316) or tested and recommended not eligible (P-13-017218). However, there is the possibility of impacting inadvertent discoveries of buried archaeological deposits during construction, which would have potentially significant impacts. Mitigation measures have been provided to reduce potential impacts to less than significant. Mitigation has been designed to fulfill the requirements of Section 106 of the NHPA and CEQA guidelines. The IID will be the lead agency implementing cultural resource mitigation measures and will provide information to Reclamation for their ongoing Section 106 oversight and consultation obligations.

Implementation of the following mitigation measures will reduce potential adverse effects/significant impacts to cultural resources to a level below significance:

MM-CR-1: Cultural and Paleontological Resources Monitoring and Treatment Plan

I. Prior to Start of Construction

A. Preparation of Cultural and Paleontological Resources Monitoring and Treatment Plan

1. Prior to the start of construction, the Principal Investigator (PI) archaeologist shall prepare a Cultural and Paleontological Resources Monitoring and Treatment Plan that specifies and describes:

- the cultural resources Area of Potential Effect (APE)
- roles and responsibilities
- construction monitoring methods
- monitoring locations
- reporting protocol
- avoidance and protective measures for cultural resources
- procedures for evaluating resource significance and/or data recovery for significant unanticipated discoveries that cannot be avoided
- curation protocol
- post-construction requirements

MM-CR-2: Avoidance

The following shall be implemented to protect known cultural resources that have not been evaluated for significance or that have been evaluated as significant under Section 106 of National Historic Preservation Act (NHPA) and the California Environmental Quality Act (CEQA):

I. Prior to Start of Construction

A. Identified cultural resources that have not been evaluated for significance or that have been evaluated as significant under Section 106 of the NHPA and CEQA, will be avoided through project design.

1. Prior to the start of construction, the Principal Investigator (PI) archaeologist shall ensure that resource-specific avoidance measures are implemented to prevent unanticipated impacts. These measures may include exclusionary fencing, Environmentally Sensitive Area signage, or other measures deemed appropriate and as specified in the Cultural and Paleontological Resources Monitoring and Treatment Plan.

MM-CR-3: Construction Monitoring

The following shall be implemented to protect unknown archaeological resources and/or grave sites that may be identified during construction phases of the proposed EHL Project.

I. During Construction

A. Monitoring of Grading/Excavation/Trenching

1. The Archaeological Monitor shall be present full time during all soil disturbing and grading/excavation/trenching activities within 200 feet of previously identified and unevaluated cultural resources.
2. If cultural resources are encountered during the absence of an Archaeological Monitor, work shall stop within 200 feet of discovery until the Principal Investigator (PI) can determine the significance of the discovery.
3. The Native American consultant/monitor shall determine the extent of their presence during soil disturbing and grading/excavation/trenching activities in consultation with the PI. If prehistoric resources are encountered during the Native American consultant/monitor's absence, work shall stop until the PI can consult with the Native American consultant/monitor and determine the significance of the discovery.
4. The PI may suggest a modification to the monitoring program to Imperial Irrigation District (IID) when a field condition such as modern disturbance post-dating the previous grading/trenching activities, presence of fossil formations, or when native soils are encountered that may reduce or increase the potential for resources to be present.
5. The Archaeological Monitor shall document field activity via the Daily Log.

B. Discovery Notification Process

1. In the event of a discovery, the Archaeological Monitor shall direct the contractor to temporarily divert all soil disturbing activities, including but not limited to digging, trenching, excavating or grading activities within 200 feet of the discovery and immediately notify the PI.
2. If the PI determines that the resource is significant or requires further evaluation, the PI shall immediately notify IID by phone of the discovery, and shall also submit written documentation to IID within 24 hours by fax or email, including photos of the resource in context, if possible.
3. If the resource is determined significant or requires further evaluation, the IID will notify the United States Bureau of Reclamation (Reclamation).

4. No soil shall be exported off site until a determination can be made regarding the significance of the resource.

C. Determination of Significance

1. The PI and Native American consultant/monitor, where Native American resources are discovered, shall evaluate the significance of the resource. If Human Remains are involved, the protocol outlined in Section II shall be followed.

   a. The PI shall immediately notify IID by phone to discuss significance determination and whether additional mitigation is required.

   b. If the resource is significant, the PI shall submit an Archaeological Data Recovery Program to IID and Reclamation. The Archaeological Data Recovery Program and any mitigation must be approved by IID and Reclamation before ground-disturbing activities in the area of discovery will be allowed to resume.

   c. If the resource is not significant, the PI shall submit a letter or email to IID indicating that artifacts will be collected, curated, and documented in the Final Monitoring Report. The letter shall also indicate that that no further work is required.

II. Discovery of Human Remains

If human remains are discovered, work shall halt in that area and no soil shall be exported off site until a determination can be made regarding the provenance of the human remains; and the following procedures as set forth in CEQA Section 15064.5(e), the California Public Resources Code, Section 5097.98, and State Health and Safety Code, Section 7050.5 shall be undertaken:

A. Notification

1. The Archaeological Monitor shall notify the PI immediately.
2. The PI will notify IID and Reclamation immediately by phone.
3. The PI shall notify the Medical Examiner after consultation with the IID.

B. Isolate Discovery

1. Work shall be directed away from the location of the discovery and any nearby area reasonably suspected to overlay adjacent human remains until a determination can be made by the Medical Examiner in consultation with the PI concerning the provenience of the remains.
2. The Medical Examiner, in consultation with the PI, shall determine the need for a field examination to determine the provenience.

3. If a field examination is not warranted, the Medical Examiner shall determine with input from the PI, if the remains are or are most likely to be of Native American origin.

C. If Human Remains **ARE** determined to be of Native American Origin

1. The Medical Examiner shall notify the Native American Heritage Commission (NAHC) within 24 hours. By law, **ONLY** the Medical Examiner can make this call.
2. NAHC shall immediately identify the person or persons determined to be the Most Likely Descendent (MLD) and provide contact information.
3. The MLD shall contact the PI within 24 hours after the Medical Examiner has completed coordination, to begin the consultation process in accordance with CEQA Section 15064.5(e), the California Public Resources Code, and Health and Safety Code.
4. The MLD shall have 48 hours to make recommendations to IID and Reclamation, for the treatment or disposition with proper dignity, of the human remains and associated grave goods.
5. Disposition of Native American Human Remains shall be determined between the MLD and the PI, and, if:
    a. The NAHC is unable to identify the MLD, OR the MLD failed to make a recommendation within 48 hours after being notified by the Commission, OR;
    b. The landowner or authorized representative rejects the recommendation of the MLD and mediation in accordance with California Public Resources Code, Section 5097.94(k) by the NAHC fails to provide measures acceptable to the landowner, THEN
    c. To protect these sites, the landowner shall do one or more of the following:
        (1) Record the site with the NAHC;
        (2) Record an open space or conservation easement; or
        (3) Record a document with the county.
    d. Upon the discovery of multiple Native American human remains during a ground disturbing land development activity, the landowner may agree that additional conferral with descendants is necessary to consider culturally appropriate treatment of multiple Native American human remains. Culturally appropriate treatment of such a discovery may be ascertained from review of the site utilizing cultural and archaeological standards. Where the parties are unable to agree on the appropriate treatment measures the human remains and items associated and buried with Native American human remains shall be reinterred with appropriate dignity.

D. If Human Remains are **NOT** Native American

1. The PI shall contact the Medical Examiner and notify them of the historic era context of the burial.
2. The Medical Examiner shall determine the appropriate course of action with the PI and IID staff (PRC 5097.98).
3. If the remains are of historic origin, they shall be appropriately removed and conveyed to the San Diego Archaeological Center for analysis. The decision for internment of the human remains shall be made in consultation with IID, Reclamation, any known descendant group, and the San Diego Archaeological Center.

III. Post Construction

A. Submittal of Draft Monitoring Report

1. The PI shall submit a Draft Monitoring Report that describes the results, analysis, and conclusions of all phases of the Archaeological Monitoring Program to IID and Reclamation for review and approval following the completion of monitoring.

B. Recording sites with State of California Department of Parks and Recreation

The PI shall be responsible for recording (on the appropriate State of California Department of Park and Recreation forms, DPR 523 A/B) any significant or potentially significant resources encountered during the Archaeological Monitoring Program, and for submittal of such forms to the South Coastal Information Center (SCIC) with the Final Monitoring Report(s).

C. Final Monitoring Report(s)

1. The PI shall submit the approved Final Monitoring Report(s) to IID and Reclamation.

MM-PAL-1

A literature review and paleontological field survey (as needed) shall be conducted as part of site-specific California Environmental Quality Act (CEQA) review to identify potential impacts to rock units that may contain significant fossil remains (*this report*). The following measures shall be implemented to protect paleontological resources.

- Modify construction design, when feasible, to avoid impacts to all significant paleontological resources.

- Construction monitoring by a qualified paleontologist may be recommended for locations within paleontologically sensitive sediments. If so, a Paleontological Monitoring Plan shall be prepared prior to ground disturbance in sensitive areas.
- In the event of an unanticipated discovery during construction, all ground disturbance within 200 feet of the discovery shall be halted or redirected to other areas until the discovery has been recovered by a qualified paleontologist.
- All paleontological resources recovered shall be appropriately described, processed, and curated in a scientific institution such as a museum or university.

8 REFERENCES

Begole, R. 1974. "Archaeological Phenomena in the California Desert." *Pacific Coast Archaeological Society Quarterly* 10(2):41–70.

BLM (Bureau of Land Management). 2016. "Potential Fossil Yield Classification (PFYC) System for Paleontological Resources on Public Lands." Instruction Memorandum No. 2016-124 from N. Huag (Acting Assistant Director of Resources Planning) to all field office officials. July 8, 2016. Downloaded December 2017. https://www.blm.gov/policy/im-2016-124.

Bolton, H. 1930. *Anza's California Expeditions: Font's Complete Diary*. Berkeley: University of California Press, Berkeley.

Cassetter, E., and W. Bell. 1951. *Yuman Indian Agriculture.* Albuquerque: University of New Mexico, Albuquerque.

Childers, W. 1980. "Evidence of Early Man Exposed at Yuma Pinto Wash." *American Antiquity.* 45(2):297–307.

Cook, J.R. 1986. "If Tizon Could Talk." *Casual Papers Cultural Resource Management* 2(2): 85–97. San Diego: San Diego State University Cultural Resources Management Center, Department of Anthropology.

Dowd, M.J. 1954. *IID: The First 40 Years.* Imperial Irrigation District. Unpublished manuscript on file at IID. Accessed September 2017. https://www.iid.com/home/showdocument?id=6000.

Ehrenberg, R. 2011. "Humans: A New Glimpse of Early Americans: Artifacts Show Texas Site was Occupied 15,000 Years Ago." *Science News* 179(9):12.

Erlandson, J. and T. Braje. 2007. "Early Maritime Technology on California's San Miguel Island: Arena Points from CA-SMI-575-NE." *Current Research in the Pleistocene* 24: 85–86.

Erlandson, J. and R. Colten. 1991. "An Archaeological Context for Early Holocene Studies on the California Coast." Chapter 1 in *Hunter-Gatherers of Early Holocene Coastal California*, edited by J.M. Erlandson and R.H. Colten, 1–10. Los Angeles: Institute of Archaeology, University of California, Los Angeles.

Forbes, J. 1965. *Warriors of the Colorado*. Oklahoma: University of Oklahoma Press.

Forde, C.D. 1931. "Ethnology of the Yuman Indians." *University of California Publications in American Archaeology and Ethnology* 28(4):83–278.

Gallucci, K. 2004. "Ceramic Analysis at Wikalokal, San Diego County, (CA-SDI-4787)." *Proceedings of the Society for California Archaeology* 14:119-123.

Gifford, E. 1931. *The Kamia of Imperial Valley*. Washington, DC: U.S. Government Printing Office.

Guerrero, V. 2006. *The Anza Trail and the Settling of California*. Berkeley: Heyday Books.

Hale, M.J. and B. Comeau. 2009. *Data Recovery Excavations at CA-SDI-18472 for the Proposed Padre Dam Municipal Water District Secondary Connection Project*. Prepared by ASM Affiliates Inc. San Diego County, California: Ridge Hill Facilities.

Hayden, J. 1976. "Pre-altithermal Archaeology in the Sierra Pinacate, Sonora, Mexico." *American Antiquity* 41(3):274–289.

Hildebrand, J.A., G.T. Gross, J. Schaefer, and H. Neff. 2002. "Patayan Ceramic Variability: Using Trace Elements and Petrographic Analysis to Study Brown and Buff Wares in Southern California." Chapter 10 in *Ceramic Production and Circulation in the Greater Southwest: Source Determination by INAA and Complementary Mineralogical Investigations*, edited by D. M. Glowacki and H. Neff, 121–139. Monograph No. 44. Los Angeles: Cotsen Institute of Archaeology, University of California, Los Angeles.

Johnson, J. 1999. "The Chumash Sociopolitical Groups on the Channel Islands." In *Cultural Affiliation and Lineal Descent of Chumash Peoples in the Channel Islands and Santa Monica Mountains*, edited by S. McLendon and J. Johnson, 51–66. Washington D.C.: National Park Service.

Justice, N. 2002. *Stone Age Spear and Arrow Points of California and the Great Basin*. Bloomington: Indiana University Press.

Kelly, W. 1977. "Cocopa Ethnography." *Anthropological Papers of the University of Arizona* 29. Tucson: University of Arizona Press.

Kroeber, A.L. 1925. *Handbook of the Indians of California*. New York: Dover Publications Inc.

Lake, S. 1957. "Birch's Overland Mail in San Diego County." *The Journal of San Diego History* 3(2). Accessed September 2018. http://www.sandiegohistory.org/journal/1957/april/birch.

McDonald, A. 1992. "Indian Hill Rockshelter and Aboriginal Cultural Adaptation in Anza-Borrego Desert State Park, Southeastern California." Unpublished PhD dissertation; University of California, Riverside.

NETRonline. 2018. Historic Aerials. Accessed September 2018. https://www.historicaerials.com.

Office of Historic Preservation. 1995. *Instructions for Recording Historical Resources*. Sacramento: California State Parks, Office of Historic Preservation. Accessed September 2018. http://ohp.parks.ca.gov/pages/1054/files/manual95.pdf

Reclamation (Bureau of Reclamation). 2016. "Cultural Resources Management." LND PO1 in the *Reclamation Manual*. Accessed September 2018. https://www.usbr.gov/recman/lnd/lnd-p01.pdf.

Rogers, M. 1966. *The San Dieguito Type Site: M.J. Rogers' 1938 Excavation on the San Dieguito River*. San Diego: San Diego Museum of Man.

Schaefer, J. 1994. "The Challenge of Archaeological Research in the Colorado Desert: Recent Approaches and Discoveries." *Journal of California and Great Basin Anthropology*16 (1):60–80.

Schaefer, J. and D. Laylander. 2007. "The Colorado Desert: Ancient Adaptations to Wetlands and Wastelands." In *California Prehistory: Colonization, Culture, and Complexity*, edited by T. Jones and K. Klar, 247–315. Lanham, Maryland: AltaMira Press.

Schaefer, J. and C. O'Neill. 2001. *The All-American Canal: An Historic Properties Inventory and Evaluation.* On file at the South Coastal Information Center, San Diego State University.

Shipek, F. 1982. "Kumeyaay Socio-Political Structure." *Journal of California and Great Basin Anthropology* 4(2):296–303.

Starr, K. 2007. *California: A History*. New York: Random House Inc.

Strand, R.G. 1962. "Geologic Map of California: San Diego El Centro Sheet." Scale 1:250,000. California Division of Mines and Geology.

Warren, C. and R. Crabtree. 1986. *The Prehistory of the Southwestern Great Basin.* Riverside, California: Bureau of Land Management.

Waters, M.R. 1982. "The Lowland Patayan Ceramic Typology." *Hohokam and Patayan: Prehistory of the Southwest*, edited by R.M. McGuire and M.B. Schiffer, 537–570. New York: Academic Press, Inc..

Willey, G. and P. Phillips. *Method and Theory in American Archeology*. Chicago: University of Chicago Press.

INTENTIONALLY LEFT BLANK

9 CERTIFICATION

Preparer: Micah Hale, PhD, RPA	**Title:** Archaeologist
Signature: Micah J. Hale	**Date:** October 5, 2018

INTENTIONALLY LEFT BLANK

APPENDIX A

Project Personnel Qualification

Brad Comeau

Archaeologist

Brad Comeau is an archaeologist with over 9 years' experience as a field director, archaeological monitor, and laboratory technician. He has conducted numerous surveys, evaluation excavations, and data recoveries, primarily in Southern California. He has extensive experience in San Diego County, with additional experience in Riverside County, the Mojave Desert, San Joaquin Valley, and Imperial County, as well as Massachusetts, Arizona, and England. His research interests include the role of experimentation in archaeology, copper production techniques, and lithic production.

EDUCATION

University of Sheffield

MS, Experimental Archaeology, 2012

University of Massachusetts, Amherst
BA, Anthropology, 2004

BA, Italian Studies, 2004

CERTIFICATIONS

Occupational Health and Safety Administration Hazardous Waste Operations and Emergency Response 40-hour Course, 2011

City of San Diego, Certified Archaeological Monitor, 2009

PROFESSIONAL AFFILIATIONS

Society for American Archaeology, 2012

Bath and Camerton Archaeological Society, 2012

Society for California Archaeology, 2008

Project Experience

Development

St. John Garabed Church Project, San Diego County, California. As field director, conducted site examinations and limited shovel test pit excavation for an Extended Phase 1 survey; directed a crew of two people; prepared a letter report of findings.

Rhodes Crossing Update, Rhodes Properties, San Diego, California. As field director, led a crew of two people for a Class III pedestrian survey of 88 acres; coordinated Native American monitor participation; assisted with preparation of Archaeological Resource Management Report (ARMR).

Gregory Canyon Landfill Environmental Impact Statement PHI Assessments, PCR Services Corporation, Pala, San Diego, California. As field director, conducted pedestrian survey of proposed landfill; relocated and verified previously recorded sites; led a crew of four people; coordinated with Native American monitors; prepared site forms and site descriptions for ARMR report.

Robertson Ranch East Excavation, The Corky McMillin Companies, Carlsbad, San Diego County, California. As field director, conducted controlled grading of two prehistoric sites that required directing excavation activities of multiple types of heavy machinery; led excavation of numerous roasting pit features by a crew of up to 20 people; instructed crew in carbon-14, thermoluminescence, and soil floatation sampling techniques.

Sky Ranch Monitoring, Lennar, Santee, San Diego County, California. As archaeological monitor, monitored mass grading activities for construction of a subdivision.

Sky Ranch Data Recovery, Lennar, Santee, San Diego County, California. As crew chief, conducted data recovery excavation of two prehistoric sites; led a crew of up to eight staff; drew site maps and unit profiles; collected carbon-14 and soil floatation samples.

4S Ranch Data Recovery, 4S Ranch Company, Rancho Bernardo, San Diego County, California. As field technician and crew chief, conducted Phase III data recovery of a large Late Prehistoric site; excavated numerous hearth features; drew site maps and unit profiles; created a site grid for unit placement; collected carbon-14 and soil floatation samples.

Atlas Monitoring and Excavation, D. R. Horton, San Diego County, California. As archaeological monitor, monitored building/subterranean parking structure excavation; excavated historic deposits.

The Rock Academy Monitoring, The Rock Church, San Diego, California. As archaeological monitor, monitored building foundation excavation, trenching, and building demolition.

Vantage Point, Point of View Monitoring LLC, San Diego County, California. As archaeological and paleontological monitor, monitored excavation, drilling, and other construction activities during the excavation of a subterranean parking garage and building footings. Recorded and collected artifacts and marine fossils.

Audie Murphy Ranch Monitoring, Woodside Homes, Sun City, Riverside County, California. As archaeological monitor, monitored controlled grading of five sites in collaboration with Native American monitors; excavated hearth features; monitored construction grading.

Roberston Ranch Data Recovery, The Corky McMillin Companies, Carlsbad, San Diego County, California. As field technician, excavated four prehistoric sites as part of a data recovery program, including test unit excavation, wet screening, drawing and photographing profiles, excavating hearth and pit features, and artifact sorting.

LaPozz No. 5 Lode Evaluation, Enviroscientists, Indian Wells Valley, Kern County, California. As field director, led a crew of four people for an evaluation testing program of three prehistoric sites; prepared site form updates and site testing results for the ARMR technical report.

Faraday Data Recovery, Carlsbad, San Diego County, California. As field technician, excavated five prehistoric sites as part of a data-recovery program, including test unit excavation, drawing profiles, wet screening, and sorting artifacts.

Education

Palomar College 7 Building Historic Evaluation, Palomar Community College District, San Marcos, San Diego County, California. As Global Positioning System (GPS) technician and photographer, assisted architectural historians in recording potentially historic buildings; photographed and recorded buildings with Ricoh digital camera, range finder, and Trimble GeoXH GPS.

University House Excavation, University of California, San Diego, San Diego County, California. As crew chief, conducted Phase II test excavation using wet screening; led a crew of five people.

San Marcos Unified School District Monitoring, San Marcos Unified School District, San Diego County, California. As archaeological monitor, monitored transplanting of endangered species by biologists prior to construction grading of site.

Maranatha Excavation, Maranatha Christian School, Rancho Bernardo, San Diego County, California. As field technician, excavated test units for a Phase III data recovery of an archaic period site; drew unit profiles; sorted artifacts.

Energy

Jacumba Solar Extended Phase 1, NextEra, Jacumba, San Diego County, California. As principal investigator, conducted site examinations and limited shovel test pit excavation; directed a crew of two people; prepared a letter report of findings.

San Jacinto Solar Project, NextEra, Riverside County, California. As principal investigator, performed site visit and record search review of project area; prepared constraints analysis assessing the potential for sensitive cultural materials.

Tule Wind Cultural Resources Testing, HDR Inc., McCain Valley, San Diego County, California. As field director, conducted eligibility testing for one prehistoric site, led a crew of four people, and assisted in producing an ARMR report of findings.

Occidental of Elk Hills Block Survey II, Occidental Petroleum, Taft, Kern County, California. As field director, conducted pedestrian survey of 2,560 acres in the Elk Hills Oil Field; led a crew of six people; prepared site forms and site descriptions for technical report.

Class III Cultural Resources Inventory, Occidental Petroleum, Taft, Kern County, California. As field director, conducted pedestrian survey of 2,560 acres in the Elk Hills Oil Field; led a crew of six people; performed records search at the Southern San Joaquin Valley Information Center and Bureau of Land Management (BLM) Bakersfield office; prepared site forms and site descriptions for technical report.

Five Well Pads Cultural Resources Survey, Occidental Petroleum, Kern County, California. As field director, led a crew of two people for a Class III pedestrian survey of 60 acres near McKittrick, California; performed the record searches at the Southern San Joaquin Valley Information Center and BLM Bakersfield office.

Vintage Kern Front Inventory, Vintage Production California LLC, Oildale, Kern County, California. As field director, led a crew of five people for a Class III pedestrian survey of 184 acres in the Kern Front Oil Field; prepared primary record.

Gildred Solar Cultural Resources Survey, Gildred Building Company, Ocotillo Wells, San Diego County, California. As field director, led a crew of four for a Class III pedestrian survey of 440 acres; coordinated Native American monitor participation: assisted with preparation of ARMR technical report.

Silurian Valley West Cultural Resources Study, Iberdrola Renewables, Baker, San Bernardino County, California. As crew chief, led a crew of four people for a Class II pedestrian survey of 4,500 acres within the project right-of-way; assisted the field director in organizing and scheduling two field crews; trained crew members in operation of Bluetooth-enabled laser range finder.

TL 637 Survey Santa Ysabel to Creelman, San Diego Gas & Electric, San Diego County, California. As archaeological monitor, performed pre-construction fielding study with engineers, biologists, and construction managers for an electrical transmission line pole replacement; located previously recorded sites; helped direct new pole locations to avoid site impacts.

East County Substation Survey, Insignia Environmental, Jacumba, San Diego County, California. As crew chief, conducted survey of linear electric transmission line; directed a crew of three people; recorded multiple prehistoric and multicomponent sites; prepared site forms and site descriptions for technical report of findings.

Sunrise Powerlink Evaluations, San Diego Gas & Electric, San Diego and Imperial Counties, California. As field director, conducted subsurface testing of 17 sites; directed a crew ranging from three to six people; helped organize laboratory artifact processing.

Devers–Palo Verde 2 Survey, Southern California Edison, Riverside County, California. As field director, conducted Class III intensive survey of selected portions of a transmission line area of potential effect (APE); relocated and updated previously recorded sites; identified and recorded new sites.

Colorado River Staging Yard Survey, Southern California Edison, Riverside County, California. As crew chief, conducted Class III pedestrian survey of the Colorado River Staging Yard for the Devers–Palo Verde 2 electric transmission line near Blythe; identified and recorded numerous World War II–era sites relating to the Desert Training Center; led a crew of two people.

Tule Wind Project Surveys, HDR Inc., McCain Valley, San Diego County, California. As field director, conducted Class II and Class III intensive pedestrian surveys over 4,900 acres; coordinated multiple survey crews; scheduled and coordinated with Native American monitors; prepared site forms; assisted in producing an ARMR report of findings.

Sunrise Powerlink Survey and Monitoring, San Diego Gas & Electric, San Diego and Imperial Counties, California. As crew chief, led survey crew of four people and two Native American monitors for Class III survey of project APE; coordinated with Native American monitors; created survey schedules in conjunction with the field director and right-of-way agents.

Federal

Bunker Hill Survey, GSR Corporation, Imperial Beach, San Diego County, California. As field director, conducted Class III pedestrian survey of a road improvement and fence construction covering 7.6 acres for the border fence; directed a crew of two people; recorded a previously identified site for a future nomination to the National Register of Historic Places; prepared site form update; prepared ARMR technical report of findings.

Imperial County Drill Sites Survey, United States Geological Survey, Imperial County, California. As field director, conducted survey of two water well drilling sites; coordinated U.S. Border Patrol escort; prepared ARMR technical report of findings.

BLM Western Expansion Survey, TEC Environmental, Johnson Valley, San Bernardino County, California. As crew chief, surveyed various locations throughout the BLM Johnson Valley off-highway vehicle area; identified and recorded new sites; coordinated survey schedule with the field director.

Border Fence Project Survey and Monitoring, U.S. Army Corps of Engineers, San Diego County, California, and Pima, Santa Cruz and Cochise Counties, Arizona. As archaeological monitor, monitored construction of the U.S./Mexico border fence; surveyed locations of proposed construction activity; mapped new archaeological sites; directed construction activities away from archaeological resources.

Military

Fort Irwin Solar Project, Soitec LLC, Fort Irwin, San Bernardino County, California. As principal investigator, directed pedestrian survey of 12 acres for a proposed solar generation facility; also prepared the technical report.

Level 3 Powerline Road Fiber-Optic Project, HP Communications Inc., Fort Irwin, San Bernardino County, California. As principal investigator, conducted intensive pedestrian survey of approximately 10 acres; also prepared the ARMR technical report of findings.

Naval Air Weapons Station (NAWS) Road Survey, Naval Facilities Engineering Command (NAVFAC) Southwest, Ridgecrest, Inyo, San Bernardino, and Kern Counties, California. As field director, conducted Class III pedestrian survey of approximately 129 miles of existing roads; led a crew of four people; scheduled and coordinated with Explosive Ordnance Disposal escorts; prepared ARMR technical report of findings.

NAWS Fiber-Optic Survey, Epsilon Systems Solutions, Ridgecrest, San Bernardino County California. As crew chief, conducted Class III pedestrian survey for a proposed fiber-optic line; led a crew of two people; assisted the field director with scheduling.

Delivery Order (DO) 30 Survey, NAVFAC Southwest, Marine Corps Air Ground Combat Center (MCAGCC) Twentynine Palms, San Bernardino County, California. As crew chief, surveyed numerous proposed landing zones throughout MCAGCC; coordinated scheduling/training area access with the field director; prepared site forms and site descriptions for ARMR report.

53 Aerial Maneuver Zone (AMZ) Survey, NAVFAC Southwest, MCAGCC Twentynine Palms, San Bernardino County, California. As crew chief, surveyed numerous proposed landing zones throughout MCAGCC Twentynine Palms; coordinated scheduling/training area access with the field director; prepared site forms and site descriptions for ARMR report.

Southwest Division (SWDIV)-04/DO 27 Survey, NAWS China Lake, NAVFAC Southwest, Ridgecrest, Inyo County, California. As field technician, participated in a Class III intensive survey under Section 106 of National Historic Preservation Act; operated a Trimble GeoXH for navigation and site recording.

Resource Management

St Algar's Farm Geochemical Testing, English Heritage, Frome, Somerset, United Kingdom. As student volunteer, helped perform a pXRF field survey of a Roman-era glass and metalworking site; excavated a 5-by-5-meter trench.

Transportation

Palomar Station Project Survey, Integral Communities Inc., San Marcos, San Diego County, California. As field director, conducted Class III pedestrian survey of 14.5-acre parcel and prepared ARMR technical report of findings.

Water/Wastewater

Temescal Canyon and Dawson Canyon Pipelines and Non-Potable Water Tank Project, Lee Lake Water District, Riverside County, California. As principal investigator, performed Phase I intensive pedestrian survey of the project APE; also prepared letter report of findings.

Padre Dam Data Recovery, Padre Dam Municipal Water District, Lakeside, San Diego County, California. As field director, conducted a data recovery project of a late prehistoric site using wet screening; led a crew of six; coordinated with Native American monitors; performed shell and ceramic lab analysis studies.

Publications

Professional Presentations

Finding the Smith in Hammerscale Palais: Investigations at an Experimental Iron Production Site. Poster presented at the 39th International Symposium on Archaeometry 2012. Co-author.

Archaeological Investigations at Site CA-SDI-10,611: A Functional and Temporal Analysis of Subterranean Pit Features In Northern San Diego County. Presented at Society for California Archaeology Annual Meeting 2008. Co-author.

The Burghardts of Great Barrington: The View from the W.E.B. Du Bois Boyhood Homesite. Presented at the Society for Historical Archaeology Conference 2005. Co-author.

Technical Reports

2013 *Draft Archaeological Survey Report for the Fort Irwin Solar Project, Fort Irwin, San Bernardino County, California*. Brad Comeau, MSc, and Micah Hale, PhD, RPA.

2012 *Results of Extended Phase 1 Shovel Probing at Potentially Sensitive Archaeological Sites for the Jacumba Solar Project, San Diego County, California*. Brad Comeau, MSc, and Micah Hale, PhD, RPA.

2012 *Cultural Resources Report for the Extended Phase I Survey for the St. John Garabed Church Project, San Diego County, California*. Brad Comeau, MSc, and Micah Hale, PhD, RPA.

2012 *Cultural Resources Survey Report for the Lee Lake Water District Dawson Canyon Non-potable Water Storage Tank and Pipeline Design Project, Riverside County, California*. Brad Comeau, BA, and Micah Hale, PhD, RPA.

2011 *Class III Archaeological Inventory of 2,560 Acres Comprised of the Entire Sections of 10Z, 14D, 20B, 28B, 32G, Elk Hills, Kern County, California*. David Whitley, PhD, RPA; and Brad Comeau, BA; and Michelle Dalope, BA.

2011 *An Archaeological Evaluation of KER-7290, KER-7293 and KER-7294 for the LaPozz No. 5 Lode Claim (CAMC286149), Indian Wells Valley, Kern County, California*. Mark S. Becker, PhD, RPA; Brad Comeau, BA; and Tony Quach, BA.

2011 *Cultural Resources Inventory for the Gildred Solar Project, San Diego County, California.* Chad Willis, MA, RPA; Micah Hale, PhD, RPA; and Brad Comeau, BA.

2011 *Cultural Resources Inventory Report for the Rhodes Crossing Project, San Diego County, California.* Chad Willis, MA, RPA; Micah Hale, PhD, RPA; and Brad Comeau, BA.

2011 *Class II Cultural Resources Inventory for the Silurian Wind Project, Silurian Valley, San Bernardino County, California*. Diane Winslow, MA, RPA; Micah Hale, PhD, RPA; Sherri Andrews, MA, RPA; and Brad Comeau, BA.

2011 *An Archaeological Inventory of Historic and Contemporary Roads at Naval Air Weapons Station China Lake, Inyo, Kern, and San Bernardino Counties, California*. Brad Comeau, BA; Mark A. Giambastiani, PhD, RPA; and Oliver Patsch, BA.

2011 *Cultural Resources Survey Report for the Palomar Station Project, San Marcos, San Diego County, California*. Brad Comeau, BA, and Micah Hale, PhD, RPA.

2011 *An Archaeological Survey of Bunker Hill in Border Field State Park, San Diego County, California*. Brad Comeau, BA, Scott Wolf, BA, and Micah Hale, PhD, RPA.

2010 *Archaeological Survey Report for the Imperial County Drill Sites Project, Imperial County, California*. Brad Comeau, BA, and Jerry Schafer, PhD, RPA.

2010 *Class II and Class III Cultural Resources Inventory Report for the Tule Wind Project, McCain Valley, San Diego County, California*. Micah Hale, PhD, RPA; Brad Comeau, BA; and Chad Willis, MA.

2010 *Draft Study Plan for Cultural Resources: Gregory Canyon Landfill, San Diego County, California*. Don Laylander and Brad Comeau.

2009 *Data Recovery Excavations at CA-SDI-18472 for the Proposed Padre Dam Municipal Water District Secondary Connection Project (Ridge Hill Facilities), Johnstown, San Diego County, California*. Micah Hale, PhD, RPA, with contributions by Brad Comeau and Aaron Sasson.

Master's Dissertation

2012 *Investigating Metallurgical Practice: An Experimental Study of the Sintashta Well-Tunnel-Furnace (WTF) from the Middle Bronze Age, Siberia, Russia*. University of Sheffield.

Volunteer History

2012 Student Placement, English Heritage, Portsmouth, United Kingdom.

Awards/Commendations

1999–2003 Francis Ouimet Scholar

Relevant Previous Experience

- **2012–present Archaeologist, Dudek, Encinitas, California**
- **2009–2011 Associate Archaeologist, ASM Affiliates Inc., Carlsbad, California**
- **2008–2009 Archaeological Monitor, E²m, Denver, Colorado**
- **2008 Archaeological Monitor/Field Technician, URS Corporation, San Diego, California**
- **2005–2008 Field Supervisor, Brian F. Smith and Associates, Poway, California**
- **2003–2004 Field/Lab Technician, University of Massachusetts Archaeological Services, Amherst, Massachusetts**
- **2003 Field School in Archaeology, University of Massachusetts Amherst/Great Barrington, Massachusetts.** As student, participated in site surveying and mapping using theodolite; instructed in and participated in excavation and laboratory methodology; participated in geophysical surveying.

Matthew DeCarlo

Archaeologist

Matthew DeCarlo is an archaeologist with more than 11 years' professional experience leading archaeological surveys and excavations, performing lithic and faunal analyses, constructing and analyzing geographic information system (GIS) data, producing cultural resource management reports, and consulting with clients, agencies, contractors, and Native American representatives.

EDUCATION

California State University, Bakersfield
M.A., Anthropology, pending
University of California, Irvine
B.A., Anthropology, 2006

PROFESSIONAL AFFILIATIONS

San Diego Archaeological Society
Society for American Archaeology
Society for California Archaeology

As acting district archaeologist for the U.S. Forest Service (USFS), Mr. DeCarlo worked intensively with federal regulations and Native American tribal representatives and from this experience, has developed the ability to work collaboratively with consulting groups on multi-phase projects. Within the private sector, Mr. DeCarlo has managed the cultural resource requirements for large-scale utility projects which required extensive cooperation with utility managers, construction efforts, and Native American tribal representatives.

Project Experience

Municipal Waterways Maintenance Plan, City of San Diego, San Diego County, California. Served as cultural resources project lead for the proposed Municipal Waterways Maintenance Plan for the City of San Diego. Responsibilities included analysis of archived records, aerial photographs, and Native American outreach. Conducted site visits of project facilities while coordinating with a Native American representatives. Produced a report summarizing the finding of the cultural resources inventory including a cultural resources impact analysis, projected resource sensitivities, resource management recommendations, and mitigation measures. Developed a matrix indicating maintenance activities and facility locations that are exempt from further cultural review. (2017 to ongoing)

City of San Diego Underground Utility Program, City of San Diego, San Diego County, California. Served as manager for the cultural resource monitoring of a citywide utility underground program in the City of San Diego. Responsibilities included consultation with program representatives, scheduling and management of field technicians, oversite of daily field logs, recordation of identified cultural resources, and constructing a summary document at the completion of each project phase. (2017 to ongoing)

All-American Canal Surface Waters Seepage Recovery Project, City of El Centro, Imperial County, California. Served as cultural resources project lead for a proposed water recovery project outside the City of El Centro. Responsibilities included analysis of archived records, aerial photographs, and Native American outreach. Also conducted a pedestrian survey of the project area. Produced a report summarizing the finding of the cultural resources inventory including a cultural resources impact analysis comparing alternate project routes, resource management recommendations, and mitigation measures. (2017 to ongoing)

East Highline Reservoir Project, City of El Centro, Imperial County, California. Served as cultural resources project lead for a proposed main canal offline storage reservoir project outside the City of El Centro. Responsibilities included analysis of archived records, aerial photographs, and Native American outreach. Also conducted a pedestrian survey of the project area. Produced a report summarizing the finding of the cultural resources inventory including an impact analysis of a National Register of Historic Places listed resource, resource management recommendations, and mitigation measures. (2017 to ongoing)

Oceanside Campus Facilities Master Plan Project, City of Oceanside, San Diego County, California. Served as archaeological resources project lead for a proposed renovation and redevelopment of the Oceanside Campus within the MiraCosta Community College District. Responsibilities included analysis of archived records, aerial photographs, and Native American outreach. Conducted a pedestrian survey of the project area and coordination with a Native American monitor. Aided the District with AB 52 consultation including hosting project site visits with Native American representatives. Produced a report summarizing the finding of the cultural resources inventory and resource management recommendations including mitigation measures. (2017 to 2018)

North City Project, City of San Diego, San Diego County, California. Served as cultural resources project lead for the proposed construction of a water purification program in the City of San Diego. Responsibilities included analysis of archived records, aerial photographs, and Native American outreach. Aided the City with AB-52 tribal consultation and conducted a pedestrian survey of the project area while coordinating with a Native American monitors. Produced a report summarizing the finding of the cultural resources inventory including a cultural resources impact analysis comparing alternate project routes, resource management recommendations, and mitigation measures. (2016 to 2018)

Morena Pipelines Project, City of San Diego, San Diego County, California. Served as cultural resources project lead for a proposed utility pipeline installation project in the City of San Diego. Responsibilities included analysis of archived records, aerial photographs, and Native American outreach. Also conducted a pedestrian survey of the project area in coordination with a Native American monitor. Produced a report summarizing the finding of the cultural resources inventory and resource management recommendations including mitigation measures. (2018)

1237 West 7th Street Project, City of Los Angeles, Los Angeles County, California. Served as lead analyst and report author for a tribal cultural resources assessment for a proposed urban development project in the City of Los Angeles. Responsibilities included analysis of archived records, aerial photographs, and Native American outreach. Produced a report indicating the presence and the probability of encountering subsurface tribal cultural resources during construction. (2018)

1375 North Saint Andrews Place Project, City of Los Angeles, Los Angeles County, California. Served as lead analyst and report author for a tribal cultural resources assessment for a proposed urban development project in the City of Los Angeles. Responsibilities included analysis of archived records, aerial photographs, and Native American outreach. Produced a report indicating the presence and the probability of encountering subsurface tribal cultural resources during construction. (2018)

Fig Project, City of Los Angeles, Los Angeles County, California. Served as lead analyst and report author for a tribal cultural resources assessment for a proposed urban development project in the City of Los Angeles. Responsibilities included analysis of archived records, aerial photographs, and Native American outreach. Produced a report indicating the presence and the probability of encountering subsurface tribal cultural resources during construction. (2018)

Adams Solar Farm Project, City of Lind, Adams County, Washington. Developed an inadvertent discovery plan for utilization during the development of a solar farm. (2018)

Kaiser Permanente Irwindale Medical Office Building Project, City of Irwindale, Los Angeles County, California. Managed the cultural resource monitoring of the construction of a Kaiser Permanente medical building in the City of Irwindale. Responsibilities included consultation with program representatives, scheduling and management of field technicians, consultation with Native American representatives, oversite of daily field logs, recordation of identified cultural resources, and submitting a summary document at the completion of the project. (2017)

Fairway Business Park Project, Lake Elsinore, Riverside County, California. Managed the cultural resource monitoring of the construction of a business park in the City of Lake Elsinore. Responsibilities included consultation with program representatives, scheduling and management of field technicians, consultation with Native American representatives, oversite of daily field logs, recordation of identified cultural resources, and constructing a summary document at the completion of the project. (2017)

21st Street Ditch Project, City of Del Mar, San Diego County, California. Aided the City of Del Mar with AB-52 compliance for a proposed wastewater improvement project in the City of Del Mar. Drafted Responsibilities included drafting an AB-52 letter on the City's behalf requesting Native American representatives consultation. (2017)

MedVic/MccVic Tower Repair Project, near the City of Yermo, San Bernardino County, California. Served as cultural resources project lead for a proposed electrical transmission tower repair project outside the City of Yermo. Responsibilities included analysis of archived records, aerial photographs, and Native American outreach. Also conducted a pedestrian survey of the project area. Produced a report summarizing the finding of the cultural resources inventory including an impact analysis of a National Register of Historic Places listed resource, resource management recommendations, and avoidance measures. (2017)

Kaiser Permanente Murrieta Valley Medical Center Project, City of Murrieta, Riverside County, California. Managed the cultural resource monitoring of the construction of a Kaiser Permanente medical center in the City of Murrieta. Responsibilities included consultation with program representatives, scheduling and management of field technicians, consultation with Native American representatives, oversite of daily field logs, recordation of identified cultural resources, and submission of a summary document at the completion of the project. (2016 to 2017)

Kettner Lofts Project, City of San Diego, San Diego County, California. Managed the preliminary cultural resources testing and the construction monitoring of the Kettner Lofts housing development in the City of San Diego. Responsibilities included directing construction personnel in the excavation of testing trenches, documentation of subsurface findings, and consulting with program representatives to establish an appropriate monitoring plan. Management of construction monitoring included scheduling and management of field technicians, consultation with Native American representatives, oversite of daily field logs, recordation of identified cultural resources, and submission of a summary document at the completion of the project. (2016 to 2017)

Rincon Del Diablo Sewer Master Plan Project, San Diego County, California. Served as cultural resources project lead for the proposed sewer master plan near the City of Escondido. Responsibilities included analysis of archived records, aerial photographs, and Native American outreach. Conducted a pedestrian survey of the project area. Produced a report summarizing the finding of the cultural resources inventory including a cultural resources impact analysis comparing alternate project routes and resource management recommendations. (2016)

Terra Vista Development Project, Victorville, San Bernardino County, California. Served as cultural resources project lead for a proposed residential development in Rancho Cucamonga. Responsibilities included analysis of archived records, aerial photographs, and Native American outreach. Also conducted a pedestrian survey of the project area. Produced a report summarizing the finding of the cultural resources inventory including resource management recommendations. (2016)

Commercial Development Project, Morongo Valley, San Bernardino County, California. Served as cultural resources project lead for a proposed commercial development on Twenty-nine Palms Highway, Morongo Valley. Responsibilities included analysis of archived records, aerial photographs, and Native American outreach. Also conducted a pedestrian survey of the project area. Produced a report summarizing the finding of the cultural resources inventory including resource management recommendations. (2016)

South Amargosa Plaza Project, Victorville, San Bernardino County, California. Served as cultural resources project lead for a proposed commercial development in Victorville. Responsibilities included analysis of archived records, aerial photographs, and Native American outreach. Also conducted a pedestrian survey of the project area. Produced a report summarizing the finding of the cultural resources inventory including resource management recommendations. (2016)

RCP Walker Trails Project, City of Santee, San Diego County, California. Served as cultural resources project lead for the proposed construction of a residential community in the City of Santee. Responsibilities included analysis of archived records, aerial photographs, and Native American outreach. Conducted a pedestrian survey of the project area in coordination with a Native American Monitor. Produced a report summarizing the finding of the cultural resources inventory including a cultural resource impact analysis and management recommendations. (2016)

1836 Columbia Street Project, City of San Diego, San Diego County, California. Served as cultural resources project lead for a proposed urban development project in the City of San Diego. Responsibilities included analysis of archived records, aerial photographs, and Native American outreach. Also conducted a pedestrian survey of the project area and coordination with a Native American monitor. Produced a report summarizing the finding of the cultural resources inventory and mitigation recommendations. (2016)

West of Devers Upgrade Project (WODUP), Southern California Edison (SCE), Riverside and San Bernardino Counties, California. Served as project manager for a cultural resource impact assessment for a dual transmission line upgrade spanning from North Palm Springs to San Bernardino, California. Tasks included implementing archaeological surveys and excavations, producing a cultural resource evaluation report, and participation in construction site visits with SCE staff and construction specialists to resolve construction/resource conflicts. (2014 to 2016)

Devers to Palo Verde 2 (DPV2) Transmission Line Project, SCE, Riverside County, California. Served as field director for the construction of a 500 kV transmission line spanning from Blythe to Romoland, California. Tasks included conducting archaeological surveys and excavations; managing construction monitoring teams; producing cultural resource records and reports; and consulting with SCE, construction, and Native American representatives. The final cultural resource report has been submitted and is awaiting approval. (2010 to 2015)

Mountain Top Healthy Trees Project, USFS, Mount Pinos Ranger District, Santa Barbara County, California. Served as the acting district archaeologist for a proposed tree thinning project. To ensure that no previously recorded resources were impacted during the tree mastication, Mr. DeCarlo conducted a records search, delineated mastication boundaries, and monitored the mastication activities.

ARRA Wilderness Trails Restoration Project, USFS, Mount Pinos Ranger District, Santa Barbara and Ventura Counties, California. Served as the acting district archaeologist. Fulfilled cultural resource requirements for National Environmental Policy Act (NEPA) compliance to ensure the Mount Pinos Ranger District of the Los Padres Forest received American Recovery and Reinvestment Act (ARRA) federal funds to conduct trail work within wilderness areas. This required consultation with USFS supervisors to construct a viable timetable, completion of a records search, intensive survey of trails, and collaboration with trail maintenance crew chiefs to protect threatened cultural resources.

Cultural Resources Management for the Day Fire Reforestation Project, USFS, Mount Pinos Ranger District, Ventura County, California. Served as the acting district archaeologist for the reforestation of areas burned during the 2007 Day Wildfire. Prior to the planting of pine tree saplings, Mr. DeCarlo performed a records search, conducted an archaeological inventory, and evaluated the post-fire condition of previously identified archaeological sites. A survey report and archaeological site records were submitted to the Los Padres National Forest Headquarters and tree saplings were planted in the spring of 2010.

Sierra Madre Ridge Archaeological Survey and Rock Art Recordation Project, USFS, Mount Pinos Ranger District, Santa Barbara County, California. Served as the field chief for the Sierra Madre Ridge Project, a Section 110 of the National Historic Preservation Act (NHPA) project consisting of three one-week expeditions to update site records and survey previously unrecorded portions of a known archaeological district. Tasks included leading and training volunteer teams in survey and site recordation methods, updating previously recorded archaeological sites, identification of new sites, surveying previously unrecorded land, and managing fuels near significant sites to prevent possible fire damage. A survey report, site records, and GIS mapping were completed and submitted to the Los Padres National Forest Headquarters.

NEPA Compliance for the New Chuchupate Ranger Station, USFS, Mount Pinos Ranger District, Ventura County, California. Served as the acting district archaeologist. To ensure NEPA compliance and ensure acquisition of ARRA federal funds, conducted a records search, collaborated with the Forest Tribal Liaison, updated previously recorded sites, mapped the existing Chuchupate Ranger Station, conducted an intensive survey, contracted an architectural historian, and submitted a report to the Los Padres National Forest Headquarters.

Sapaski (Painted Rock) Tribal Protection Meeting, USFS, Mount Pinos Ranger District, Ventura County, California. Served as the acting district archaeologist for the Sapaski Tribal Protection Meeting, a collaborative effort with tribal representatives and USFS supervisors to protect a significant rock art resource. Conducted a records search and suggested possible protection strategies to tribal representatives.

Archaeological Investigation for the Yellow Jacket Fire Project, USFS, Mount Pinos Ranger District, Ventura County, California. Served as the acting district archaeologist for the archaeological investigation after the Yellow Jacket Fire. Conducted a records search to identify any previously identified cultural resource within burned or staging areas, appraised sites impacted by both fire and fire-fighting measures, consulted with fire personnel to determine possible impacts, and submitted a report to the Los Padres National Forest Headquarters.

Micah Hale, PhD, RPA

Senior Archaeologist

Micah Hale is Dudek's cultural resources practice manager and lead principal investigator, with technical expertise as a lithic and groundstone analyst, invertebrate analyst, and in ground penetrating radar. Over the course of his 18 year career, Dr. Hale has served as a principal investigator in the public and private sector for all levels of archaeological investigation, as a public outreach coordinator and as an assistant professor at the University of California, Davis (U.C. Davis). As Dudek's cultural resources practice manager, he currently functions as a principal investigator in project oversight including proposals, research designs, fieldwork, artifact analysis, and report authorship.

EDUCATION

University of California, Davis
PhD, Anthropology, 2009

California State University, Sacramento
MA, Anthropology, 2001

University of California, Davis
BS, Anthropology, 1996

CERTIFICATIONS

Register of Professional Archaeologists (RPA), 2001

PROFESSIONAL AFFILIATIONS

Society for American Archaeology
Society for California Archaeology
Antelope Valley Archaeological Society
San Diego Archaeological Society

Dr. Hale's experience is both academic and professional spanning California, Arizona, Nevada, and Oregon, including work for Naval Facilities Engineering Command (NAVFAC) Southwest, California Department of Transportation (Caltrans), Western Area Power Administration, Bureau of Land Management (BLM), U.S. Army Corps of Engineers (ACOE), U.S. Fish and Wildlife Service (USFWS), California State Parks, various city and county agencies, and directly for Native American groups. Dr. Hale has supervised numerous large-scale surveys, test excavations, data recovery programs, and geoarchaeological investigations, served as a third party review consultant, and an expert witness in legal proceedings. He has authored research designs, management and treatment plans, proposals, preliminary and final reports, and technical analyses. Dr. Hale has integrated his personal research interests into projects and participated in professional symposia at local and national venues, including the Society for American Archaeology and the Society for California Archaeology. Additionally, he has conducted academic research in the Polar Arctic, Greenland. Dr. Hale's current focus is on hunter-gatherer archaeology of California and the Great Basin, applying theoretical premises of cultural evolution and human behavioral ecology.

Project Experience

Development

Phase II Archaeological Data Recovery for the Newland Homes Sierra Project, San Diego County, California, 2013-present. As project manager and principal investigator, supervising data recovery investigations at two significant prehistoric archaeological sites and historic archival research of a homestead in support of the Newland Sierra Environmental Impact Report (EIR).

Phase I Archaeological Inventory and Phase II Archaeological Evaluation for the Yokohl Ranch Project, Tulare County, California, 2012-2013. As project manager and principal investigator, supervised completion of 12,000 acre survey and archaeological evaluation of 85 prehistoric and historical archaeological sites in support of the Yokohl Ranch EIR.

Phase I Inventory and Phase II Cultural Resources Evaluation for the Star Ranch Project, RBF Consulting, San Diego County, California, 2011. As project manager and principal investigator, supervised CEQA inventory and evaluation for private development.

Phase II Archaeological Evaluation of Two Prehistoric Sites, Torrey Pines Glider Port, San Diego County, California, 2012. As project manager and principal investigator, supervised CEQA evaluation of two prehistoric archaeological sites for the Torrey Pines City Park General Development Plan.

Data Recovery of One Prehistoric Site for the Rhodes Property, Sea Breeze Properties, San Diego County, California. As project manager and principal investigator, supervised CEQA compliant data recovery of a large prehistoric site for a residential development.

Archaeological Survey of the Paramount Mine Exploratory Drilling Project, Essex Environmental, Mono County, Nevada, 2006. As principal investigator and field director, conducted archaeological survey for mining exploration and prepared the technical report.

Phase I Inventory of 1,544 Acres and Phase II Evaluation of Archaeological Sites along the Western and Northwestern Boundaries, Edwards Air Force Base, Kern County, California, 2005. As field director, supervised a Phase I inventory of 1,544 acres. Recorded 30 new archaeological sites, more than a dozen "sub-modern" refuse dumps, and a variety of isolate finds. Notable sites include several early Holocene lithic scatters (Lake Mojave-, Silver Lake-, and Pinto-age deposits), a rhyolite lithic quarry, and a complex of historic dumps associated with homesteading activities around Lone Butte.

Pankey Ranch Testing, Pardee Homes, Northern San Diego County, California, 2004. As field director, supervised excavation of shovel test pits to delineate the boundaries of site CA-SDI-682, the prehistoric village of Tom-Kav. Managed field personnel, conducted excavation, and wrote portions of technical report.

Oceanside Hilton EIR, Dudek Associates, Oceanside, San Diego County, California, 2004. As principal investigator and field director, conducted a survey of the proposed Hilton Hotel at the eastern end of Buena Vista Lagoon in Carlsbad and prepared portions of technical report for an EIR.

Archaeological Survey of the La Mesa Meadows Residential Development Project, Helix Environmental, San Diego County, California, 2005. As principal investigator, conducted a survey of a proposed residential development in San Diego County.

Data Recovery of Locus O, Star Canyon Development, Agua Caliente Band of Cahuilla Indians, Palm Springs, Riverside County, California, 2004. As field director, supervised field crews for data recovery mitigation of an archaeological deposit and human remains near Tahquitz Canyon. Coordinated with Native American representatives and prepared portions of the technical report.

Linda Vista Survey, City of San Marcos Planning Department, San Diego County, California, 2003. As field director, conducted a Phase I cultural resource inventory of the proposed road realignment in San Marcos. Prepared technical reports and made recommendations for additional work to be done within the project area.

Archaeological Monitoring for Williams Communications Fiber-Optic Line, Jones and Stokes Associates, San Luis Obispo and Bakersfield, Kern and San Luis Obispo Counties, California, 2001. As resource monitor/Native American coordinator, conducted archaeological monitoring for a fiber-optic cable installation project that spanned 180 miles from San Luis Obispo to Bakersfield. Identified and protected archaeological resources in the project area in compliance with state and federal regulations. Managed Native American monitors and coordinated daily work with construction and environmental staff to facilitate project completion.

AT&T Cable Removal Project, Jones and Stokes Associates, Taft to Los Angeles, Kern and Los Angeles Counties, California, 1998. As field archaeologist, conducted a survey to determine archaeological impact by the removal of a lead-lined subsurface cable.

Subsurface Survey of a Proposed Bicycle Path Along the Columbia River Slough in Northwest Portland, City of Portland, Multnomah County, Oregon, 2000. As field archaeologist, conducted auger testing in a variable north-to-south transect at 30-meter intervals, and unit mapping.

Phase II Test Excavations, AT&T, Portland, Multnomah County, Oregon, and Vancouver, Clark County, Washington, 1999. This project determined the presence and condition of any cultural resources in the project areas that were situated on the northern and southern sides of the Columbia River in Washington and Oregon.

Education

Data Recovery for the Palomar North and Meadowood Projects, Palomar College, San Diego County, California, 2012. As principal investigator, supervised Section 106 and CEQA-compliant data recovery of the ethnohistoric village of Tom-Kav. Expert witness for litigation of archaeological work for the client.

Data Recovery Excavations in Advance of Geotechnical Coring at W-12, University of California San Diego (UCSD), San Diego County, California, 2009. As project manager and principal investigator, supervised data recovery excavations in a midden dated as early as 9,600 years before present.

Archaeological Test Excavations at Selected Sites on Vandenberg Air Force Base, University of California, Davis, Lompoc, Santa Barbara County, California, 2008. As principal investigator and field director, supervised and instructed 21 students for the 2008 U.C. Davis Field School.

Archaeological Survey and Excavations in the Polar Arctic, University of California Davis, Northwest Greenland, 2006. As researcher, conducted a project for the National Science Foundation, National Geographic, and the Inglefieldland Polar Archaeology Expedition; U.C. Davis.

Energy

Phase II Evaluation of 19 Archaeological Sites for Soitec's Tierra Del Sol Solar Project, San Diego County, California, 2012-2013. As principal investigator, oversaw and implemented significance evaluations, including fieldwork and documentation, under CEQA and San Diego County guidelines within the development footprint.

Phase II Evaluation of 42 Archaeological Sites for Soitec's Rugged Solar Project, San Diego County, California, 2012-2013. As principal investigator, oversaw and implemented significance evaluations, including fieldwork and documentation, under CEQA and San Diego County guidelines within the development footprint.

Class III Cultural Resources Inventory for the Level 3 Fiber Optic Installation Project, Fort Irwin Army Reserve and BLM, San Bernardino County, California, 2012-2013. As Project manager and co-principal investigator, oversaw and implemented cultural resource inventory of fiber optic corridor and recordation and evaluation of contributing elements to the NRHP-eligible LADWP transmission line corridor.

Class III Cultural Resources Inventory for Soitec's Fort Irwin Solar Project, San Bernardino County, California, 2013. As project manager and co-principal investigator, oversaw and implemented cultural resources inventory.

Third Party Compliance Monitoring for the Ocotillo Wind Energy Farm, Ocotillo, Imperial County, California, 2012-2013. As principal investigator, oversaw and implemented compliance assistance to the BLM to ensure adherence to mitigation measures and proper treatment of cultural resources.

Third Party Compliance Monitoring for the Tule Wind Project, San Diego County, California, 2012-2013. As principal investigator, oversaw and implemented compliance assistance to the Bureau of Land Management to ensure adherence to mitigation measures and proper treatment of cultural resources.

Third Party Compliance Monitoring for the East County Substation Project, San Diego County, California, 2012-2013. As principal investigator, oversaw and implemented compliance assistance to the BLM and California Public Utilities Commission (CPUC) to ensure adherence to mitigation measures and proper treatment of cultural resources.

Third Party Compliance Monitoring for the Rio Mesa Solar Project, Riverside County, California, 2012-2013. As principal investigator, oversaw and implemented compliance assistance to the BLM to ensure adherence to mitigation measures and proper treatment of cultural resources.

Phase II Archaeological Testing of One Historic Site for the Cool Valley Solar Project, RBF Consulting, San Diego County, California. As project manager, supervised implementation of archaeological testing of a historic airfield near Campo.

Phase II Archaeological Testing of Four Prehistoric Sites for the Gildred Solar Project, RBF Consulting, San Diego County, California. As project manager, supervised implementation of archaeological testing of four small prehistoric sites along the ancient Lake Cahuilla shoreline.

Phase II Archaeological Testing of One Prehistoric Site for the Borrego A and B Solar Projects, RBF Consulting, San Diego County, California. As project manager, supervised implementation of archaeological testing of a large prehistoric habitation site in the Imperial Valley.

Phase I Cultural Resources Inventories for the Sol Orchard and Sol Focus Solar Projects, RBF Consulting, San Diego County, California. As project manager, supervised implementation of Phase I CEQA inventories for more than 22 solar projects.

Class II Survey of 4,700 Acres for the Silurian Wind Project, Iberdrola Renewables, San Bernardino County, California, 2011. As project manager and principal investigator, supervised Section 106 inventory of proposed renewable energy project.

Class III and Class II Cultural Resources Inventory for the Tule Wind Alternative Energy Project, HDR Engineering for Iberdrola Renewables, San Diego County, California, 2010. As project manager and principal investigator, supervised inventory of 6,000 acres and recordation of nearly 200 archaeological sites, and assisted the BLM in preparation of a programmatic agreement between Iberdrola and the California State Historic Preservation Office (SHPO).

Monitoring of the Installation of Meteorological (MET) Towers for the Tule Wind Project, HDR Engineering, San Diego County, California, 2010. As project manager and principal investigator, supervised archaeological and Native American monitors during MET tower installation in the Tule Wind project area.

Jamul Substation 6, San Diego Gas & Electric Company (SDG&E), Jamul, San Diego County, California, 2004. As field director, conducted an intensive pedestrian survey of 18 acres in Jamul for a proposed substation construction project. Identified and recorded two archaeological sites within the project area. Prepared the technical report. Coordinated with paleontology subcontractor and incorporated paleontology report into ASM's archaeology technical report.

Path 15 Transmission Line Corridor, Steigers Corporation, San Joaquin Valley, Fresno and Merced Counties, California, 2004. As field director, supervised survey of over 87 miles of 400-foot transmission line corridor and over 46 miles of access roads in Merced and Fresno Counties. Supervised field crew, documented sites, coordinated with Native American representatives, coordinated access to survey areas, and prepared portions of technical report.

Carmel Valley Substation Survey, SDG&E, Carmel Valley, San Diego County, California, 2003. As field director, conducted a Phase I cultural resource inventory of a proposed power substation.

Federal

Ground-Penetrating Radar Survey and Class III Inventory for the Friendship Circle Project, Department of Homeland Security, Gulf South Research Corporation, San Diego County, California. As project manager and principal investigator, supervised and implemented a ground-penetrating radar survey and surface survey for the Friendship Circle project at Border Fields State Park, San Diego.

Military

Phase II Evaluation of 31 High Complexity Sites on Edwards Air Force Base, CH2MHill/JT3, Kern and Los Angeles Counties, California, 2010. As project manager, oversaw Section 106 test excavations at 31 prehistoric archaeological sites.

Phase II Evaluation of 85 Archaeological Sites on Edwards Air Force Base, CH2MHill/JT3, Kern and Los Angeles Counties, California, 2010. As project manager and principal investigator, supervised Section 106 test excavations at 42 prehistoric and 43 historic archaeological sites.

Western Acquisition Survey, Marine Corps Air Ground Combat Center (MCAGCC) Twentynine Palms, San Bernardino County, California, 2010. As principal investigator, managed the survey of 10,000 acres on land administered by the BLM in Johnson Valley, west of the base. Duties included project management, coordination with BLM Barstow field office and MCAGCC 29 Palms personnel, coordinating and supervising field crews, as well as document preparation.

Management Plan for the Coso Rock Art National Historic Landmark (NHL), Naval Air Weapons Station (NAWS) China Lake, Inyo County, California, 2010. As project manager, supervised and co-authored a management plan for the Coso Rock Art NHL, including arranging and implementing stakeholder meetings and field testing the implementation plan.

Section 110 Intensive Archaeological Survey of the Cole Flat Training Area, NAWS China Lake, Inyo County, California, 2009. As project manager and principal investigator, supervised the survey of 5,400 acres near the Coso Rock Art NHL.

Phase I Survey of Selected Parcels in Five Training Areas, MCAGCC Twentynine Palms, San Bernardino County, California, 2009. As project manager and principal investigator, supervised survey of 4,500 acres in the Blacktop, Lava, Lavic Lake, Sunshine Peak, and Quackenbush training areas.

Phase I Survey of Aerial Maneuver Zones for the 53 AMZ Project, MCAGCC Twentynine Palms, California, 2009. As project manager and principal investigator, supervised survey of 72 Aerial Maneuver Zones. Client Reference: Leslie Glover, MCAGCC 29 Palms, 760.830.5369.

Cultural Resources Inventory and Evaluation for the Skaggs Island BRAC Disposal Archaeological Survey, Naval Communications Station, Sonoma County, California, 2011-2012. As principal investigator, supervised survey of installation and recordation and evaluation of historic civilian and military resources.

Phase I Survey of 8,100 Acres on Edwards Air Force Base, ACOE, Kern County, California, 2008–2009. As principal investigator, supervised survey of 8,100 acres on Edward Air Force Base.

Phase I and II Survey of 2,500 Acres and Evaluation of 50 Sites on Edwards Air Force Base, ACOE, Kern County, California, 2008. As principal investigator, supervised survey of 2,500 acres and evaluation of 50 sites on Edward Air Force Base.

Cultural Resources Inventory and Evaluation for the Concord Inland BRAC Disposal Archaeological Survey, Naval Weapons Station, Seal Beach, Detachment Concord, Contra Costa County, California. As principal investigator, supervised survey of 5,200 acres and recordation and evaluation of historic civilian and military resources, and prehistoric archaeological sites.

Archaeological Evaluation of Eight Prehistoric Sites in the Emerson and Quackenbush Training Areas, ACOE, MCAGCC Twentynine Palms, San Bernardino County, California, 2005. As field director, supervised excavation of eight prehistoric sites on the Marine Corps base in Twentynine Palms, California.

Archaeological Evaluation of 22 Sites on Edwards Air Force Base, ACOE, San Bernardino County, California, 2005. As field director, supervised the National Register evaluation of 22 sites at Edwards Air Force Base.

Naval Base Point Loma Site Recordation, NAVFAC Southwest (SW), Point Loma, San Diego County, California, 2004. As principal investigator and field director, supervised relocation of 33 sites located on Naval Base Point Loma. Reviewed site documentation and re-recorded sites that were improperly documented by past surveys.

Archaeological Testing of 23 Sites in the Las Pulgas Corridor, MCB Camp Pendleton Environmental Security, MCB Camp Pendleton, San Diego County, California, 2004. As field director, supervised field crews for Phase II testing and mechanical coring of 23 sites on Camp Pendleton. Coordinated with coring contractor and base personnel. Documented sites in the field. Supervised field crews and prepared portions of technical report.

Rose-Arizone, Clay, and Photo Drainage, and Road Improvement Surveys, NAVFAC SW, NALF San Clemente Island, Los Angeles County, California, 2004. As field director, supervised archaeological surveys and the placement of protective signing on 750 sites. Coordinated access to the island and supervised one crew member.

Remote Sensing, NAVFAC SW, NALF San Clemente Island, Los Angeles County, California, 2004. As Global Positioning System (GPS) specialist, conducted data collection and image rectification for a remote sensing project in the detection of archaeological sites on the base. Supervised one crew member.

MCB Camp Pendleton Burn Survey, MCB Camp Pendleton Environmental Security, MCB Camp Pendleton, San Diego County, California, 2002. As field director, supervised an archaeological survey of 1,500 acres in the De Luz and Case Springs areas of Camp Pendleton. Managed field crews, documented archaeological sites, prepared site forms and portions of technical report.

Survey of Yuma Stormwater Basin, NAVFAC SW, MCAS Yuma, Yuma County, Arizona, 2002. As field director, supervised survey of stormwater basin along the Marine Corps airfield at MCAS Yuma. Managed field crew and prepared technical report. Client

Archaeological Coring of SDI-811, MCB Camp Pendleton Environmental Security, MCB Camp Pendleton, San Diego County, California, 2002. As field director, supervised first phase of a geologic coring project for a shell midden site along the coast of MCB Camp Pendleton, San Diego County. Coordinated with coring contractor and base personnel. Managed field monitors and field crew.

Archaeological Testing and Survey of the Lemon Tank Area, NAVFAC SW, NALF San Clemente Island, Los Angeles County, California, 2002. Conducted excavations, survey, and site recording.

Evaluation of Four Prehistoric Sites, Jones and Stokes Associates, Camp Roberts National Guard, San Luis Obispo County, California, 1998. As field technician, conducted excavation in order to determine the boundaries of the site for further mitigation.

Evaluation of Nine Prehistoric Sites, Edwards Air Force Base, San Bernardino County, California, 1999. As field archaeologist, evaluated nine sites through excavation to determine overall sensitivity and value of the archaeological remains that characterize the region.

Archaeological Survey and Excavation, ACOE, MCAGCC Twentynine Palms, San Bernardino County, California, 1998. As field archaeologist, participated in nine field rotations averaging 10 days each. Conducted survey of portions of the Marine Corps base to determine the distribution of cultural materials, and subsequently excavate sites based on priority. This area is characterized as high desert with the typically associated flora and fauna and archaeological sites that range in age from Early to Late Holocene.

Resource Management

Archaeological Data Recovery Excavations at Border Fields State Park, California State Parks, Imperial Beach, San Diego County, California, 2005. As field director, supervised excavation of prehistoric sites located within the APE of a fence along the U.S.–Mexico Border in San Diego County. Prepared technical report.

Archaeological Salvage Excavations of Two Ollas in Hellhole Canyon, BLM, San Diego County, California, 2005. As principal investigator, relocated a cache of prehistoric ceramic artifacts uncovered during wildfires in San Diego County. Documented cache and collected artifacts for subsequent reconstruction in the ASM laboratory. Prepared technical report detailing project.

Archaeological Data Recovery Excavations at CA-SDI-16691, Jackson Pendo Development Company, Escondido, San Diego County, California, 2005. As principal investigator, supervised data recovery excavation at a Late Prehistoric site in Escondido, California.

El Cuervo Wetlands Mitigation, City of San Diego Land Development Review Department and Mitigation Monitoring Coordination, Carmel Valley, San Diego County, California, 2004. As co-principal investigator, supervised an archaeological monitoring project in central San Diego County, conducted test excavation of one site identified during monitoring. The site was evaluated as not significant. Prepared portions of technical report and supervised on-site monitor.

Milk Vetch Emergency, Imperial Irrigation District, Imperial County, California, 2002. As archaeological monitor, conducted emergency monitoring along transmission line corridor in Imperial County. Coordinated with IID and construction personnel. Prepared technical report.

Burial Salvage Excavations at the Carp Site, CA-MER-295, California Department of Parks and Recreation, Los Banos, Merced County, California, 1999. As field supervisor, directed excavations at CA-MER-295 in the central San Joaquin Valley in order to salvage cultural remains (including burials) from further destruction by the San Joaquin River.

Archaeological Survey of the Silver Lake Recreation Area, El Dorado Irrigation District, El Dorado County, California, 2006. As principal investigator and field director, supervised an archaeological survey of the Silver Lake Recreation area.

Transportation

Ortega Highway Monitoring, City of San Juan Capistrano, Orange County, California, 2013. As project manager, supervised Dudek's principal investigator to coordinate archaeological, tribal, and paleontological mitigation monitoring associated with the construction of water conveyance facilities and road repairs.

Archaeological Testing and Ground Penetrating Radar Study of the Forester Creek Biological Mitigation Area, Caltrans District 11, Santee, San Diego County, California, 2005. As principal investigator and field director, supervised archaeological testing of a private parcel.

Bridge 230.6 Replacement, North County Transit District, Agua Hedionda, Carlsbad, San Diego County, California, 2004. As principal investigator and field director, managed an archaeological survey of an APE associated with the replacement of and historic railroad bridge. Recorded archaeological sites within APE and prepared portions of technical report.

Little Lake Phase II Testing, Caltrans District 5, Little Lake, Inyo County, California, 2004. As field director, supervised Phase II testing of four sites including the ethnohistoric village of *Pagunda* near the town of Little Lake. Supervised field crews, coordinated fieldwork with Caltrans and subcontractors, and prepared portions of technical report.

Extended Phase I Testing, Caltrans District 05, Little Lake, Inyo County, California, 2003. As field director, supervised fieldwork for extended Phase I testing of one prehistoric site along U.S. Highway 395 in Inyo County. Prepared portions of technical report.

Cartago and Olancha Four-Lane Project Test Excavations, Caltrans District 05, Inyo County, California, 2002. As field director, supervised test excavations of 15 sites for the proposed widening of U.S. Highway 395 near Cartago and Olancha. Supervised all fieldwork and managed a team of 12 field archaeologists. Coordinated selected specialized studies, conducted ground stone analysis, and prepared large portions of the resulting 800+-page report.

Survey of Amtrak Second Mainline Right-of-Way, North County Transit District, Oceanside, San Diego County, California, 2002. As co-field director, managed an archaeological survey of 6.2 miles of North County Transportation District railroad right-of-way near San Onofre, California.

State Route 905 Survey, Caltrans District 11, San Diego County, California, 2002. As co-field director, conducted survey and recording of sites along the State Route 905 right-of-way in southern San Diego County. Documented three prehistoric sites within the proposed right-of-way. Created site maps and prepared site forms.

Evaluation of 11 Sites along U.S. 395, Caltrans District 05, Blackrock, Inyo County, California, 2000. As crew chief, managed 6-18 personnel, prepared paperwork and report. Made decisions surrounding site excavations in Owens Valley. Project included Phase II test excavation of numerous sites ranging in age from early to late Holocene.

Phase I Survey, Caltrans District 10, Stockton, San Joaquin County, California, 1997. As field archaeologist, conducted various survey and excavation projects for Caltrans throughout central California. Conducted survey and excavation, operated as a graduate student assistant to the District 10 archaeologist dealing with compliance issues, prepared site mapping and technical reports including Archaeological Survey Reports (ASR), Historic Properties Survey Reports (HPSR), and Negative Declarations.

Phase I Survey/TEA, Caltrans, Inyo and Mono Counties, California, 1996–1997. As field archaeologist, conducted survey of most major highways in Mono and Inyo Counties, California. Documented the distribution of all cultural material within the Caltrans right-of-way in order to determine impacts by road widening.

Tribal

Section 106 Mitigation Development and Tribal Consultation Assistance, BLM, San Diego County, California, 2011–2012. As project manager, assisted the BLM in development of Historic Properties Treatment Plan, Tribal Participation Plan, and other mitigation measures for the Tule Wind project, McCain Valley California.

Mitigative Screening, Agua Caliente Band of Cahuilla Indians, Palm Springs, Riverside County, California, 2003. As field director, supervised archaeological mitigation of an impacted burial site on the Agua Caliente Reservation. Prepared mapping of the project, coordinated field efforts with Tribal representatives, oversaw monitoring of the project, and prepared portions of the technical report.

Water/Wastewater

San Clemente Water Recycling Monitoring, City of San Clemente, Orange County, California, 2013. As project manager, supervised Dudek's principal investigator to coordinate archaeological, tribal, and paleontological mitigation monitoring associated with the construction of a new water conveyance pipeline. Duties include preparation of a discovery and treatment plan.

Poseidon Resources Desalination Plant and Pipeline Monitoring, City of Carlsbad, San Diego County, California, 2013. As project manager, supervised Dudek's principal investigator to coordinate archaeological, tribal, and paleontological mitigation monitoring associated with the construction of the desalination plant and a new water conveyance pipeline. Duties include preparation of a discovery and treatment plan and evaluation of archaeological discoveries.

Poseidon Resources Desalination Plant and Pipeline Wetland Mitigation Archaeological Evaluation, City of San Diego, San Diego County, California, 2013. As project manager and principal investigator, developed methods and strategies to evaluate archaeological deposits most likely related to the 1782 ethnohistoric Kumeyaay village of La Punta located within the wetland mitigation area. Project included geotechnical coring and backhoe exploration to locate and evaluate buried archaeological deposits Duties included assistance provided to the USFWS for NAGPRA consultation and implementation.

Lee Lake Cultural Resources Inventory, Lee Lake Water District, Riverside County, California, 2013. As project manager, supervised Dudek's principal investigator to coordinate and implement cultural resources inventory for the construction of a new pipeline and water storage facility.

Cultural Resources Monitoring for the City of Napa Levee Improvement Project, ACOE, Sacramento District, Sacramento, California, 2010-2011. As principal investigator, supervised archaeological monitoring requiring HAZWOPER certified archaeologists to treat historical archaeological discoveries for a levee and stormwater improvement project.

Data Recovery Excavations at the Ridge Hill Facilities Site (SDI-18472), Padre Dam Municipal Water District (PDMWD), San Diego County, California, 2009. As principal investigator, supervised data recovery of a complex late prehistoric habitation site.

San Clemente Canyon Survey, City of San Diego Metropolitan Wastewater Department, City of San Diego, San Diego County, California, 2004. As principal investigator and field director, supervised and conducted an intensive pedestrian survey of proposed access road maintenance for the San Clemente Canyon sewer line. Two cultural resources were identified. Conducted site documentation, prepared sites forms and technical report. Managed survey crew member.

Lake Murray Survey, City of San Diego Metropolitan Wastewater Department, La Mesa, San Diego County, California, 2003. As field director, conducted survey of proposed trunk sewer replacement in La Mesa. Prepared portions of the technical report.

Imperial Irrigation District's Phase II Testing, Imperial Irrigation District, Imperial County, California, 2003. As field director, supervised Phase II testing of eight sites in the Colorado Desert. Managed field crews, conducted test excavations, and prepared site documentation and portions of the technical report.

Carmel Valley Archaeological Monitoring, City of San Diego Metropolitan Wastewater Department, Carmel Valley, San Diego County, California, 2002. As field monitor for pre-trenching for placement of sewer line, conducted monitoring and wrote portions of technical report.

EIR/EIS Preparation

Dr. Hale currently assists in the preparation of technical descriptions and analyses for environmental impact statements and reports at the state and federal levels for Dudek projects. Examples of completed environmental sections include those prepared for the Yokohl Ranch, Rio Mesa Solar, Soitec Rugged and Tierra Del Sol Solar, SDG&E's Wood to Steel project, and various others. More details are available upon request.

Other Relevant Experience

Training

≠ 2012 - Accounting and Finance for Non-Financial Managers, UCSD Rady School of Business Management

≠ 2010 - ESOP Planning and Management, UCSD Rady School of Business Management

≠ 2004 - Ground Penetrating Radar Field Methods and Interpretation Certificate

≠ 2002, 2010 - GPS Field Methods Training, ASC Scientific

Teaching

≠ 2008 - Assistant Professor, Archaeology, U.C. Davis

≠ 2008 - Instructor/ Principal Investigator, 2008 UC Davis Archaeology Field School, Vandenberg Air Force Base, California.

≠ 2005–2008 – Level III Teaching Assistant, U.C. Davis; taught discussion sections/ lectures for Human Evolution, Archaeology, and Human Ecology

≠ 1998–1999 – Acted as Public Education Coordinator for the Museum of Anthropology at UC Davis; included instructing a course teaching archaeology students how to inform the public about the value of anthropology through in-class presentations, exhibits, and the building of 'teaching trunks' for people in grades 1–12 of primary and secondary education

≠ 1997–1998 - Substitute teacher with an Emergency Credential in the Woodland and Davis Joint Unified School Districts for grades K–12, all subjects excluding foreign languages

≠ 1997–present – Regularly perform presentations about the value of archaeology in classrooms at the level of the grades 1–12

≠ 1996 – Teaching assistant at the U.C. Davis archaeological field school; job duties included student management and instruction in the methods of excavation and survey.

Publications

Selected Technical Reports

Hale, Micah J. 2010. "Limited Archaeological Excavations at SDI-4669 (SDM-W-12A)." In Advance of Geotechnical Coring, University House Rehabilitation Project, University of California at San Diego, La Jolla, California. Submitted to Ione Stiegler Architecture, La Jolla, California. Report on file at South Coastal Information Center, SDSU.

Hale, Micah J. 2010. Results of Archaeological Monitoring for Meteorological Masts in McCain Valley, San Diego County, California. Prepared for HDR Engineering Inc.

Hale, Micah J. 2007. Archaeological Survey of the Silver Lake Recreation Area, El Dorado Irrigation District, El Dorado County, California. Prepared for Trish Fernandez, El Dorado Irrigation District, El Dorado County, California.

Hale, Micah J. 2005. "Ground Stone Analysis." In From the Coast to the Inland: Prehistoric Settlement Systems Along the Las Pulgas Corridor, Camp Pendleton, California, by Micah J. Hale and Mark S. Becker. Report submitted to Southwest Division of Naval Facilities.

Hale, Micah J. 2005. Cultural Resources Inventory for the Proposed San Diego Model Schools Development Project. ASM Affiliates Inc., Carlsbad, California. Prepared for the City of San Diego, California.

Hale, Micah J. 2004. Cultural Resources Inventory for the Replacement of Bridge 230.6 over Agua Hedionda Lagoon, San Diego County, California. Submitted to North County Transit District, San Diego County, California.

Hale, Micah J. 2004. Cultural Resources Inventory for the Gawle Property, San Diego County, California. Submitted to Helix Environmental for the City of San Diego.

Hale, Micah J. 2004. Cultural Resources Inventory for the Hines Nursery, San Diego County, California. Submitted to Hines Nurseries, Rainbow Valley, California.

Hale, Micah J. 2004. Cultural Resources Inventory for the San Clemente Canyon Trunk Sewer Maintenance and Access Routes, San Diego County, California. Submitted to Metropolitan Wastewater Department, City of San Diego, California.

Hale, Micah J. 2004. Cultural Resources Inventory for the Montezuma Trunk Sewer Replacement, San Diego County, California. Submitted to Metropolitan Wastewater Department, City of San Diego, California.

Hale, Micah J. 2004. Cultural Resources Inventory for the Oceanside Hotel EIR, San Diego County, California. Submitted to Dudek for the City of Oceanside, California.

Hale, Micah J. 2004. Historic Resources Mitigation Monitoring of the El Cuervo Norte Project, San Diego County, California. Submitted to the City of San Diego.

Hale, Micah J. 2004. Emergency Test Excavations of an Exposed Olla, Riverside County, California. Submitted to BLM, Riverside County, California.

Hale, Micah J. 2004. Cultural Resources Monitoring for Geotechnical Coring Related to the All-American Canal Lining Project, Imperial County, California. Submitted to Imperial Irrigation District, Imperial County, California.

Hale, Micah J. 2004. Cultural Resources Monitoring of Geotechnical Coring Related to the Coachella Canal Lining Project, Riverside County, California. Submitted to Imperial Irrigation District, Riverside County, California.

Hale, Micah J. 2004. "Ground and Battered Stone Analysis." In Data Recovery Investigations at the Eucalyptus Site, CA-SDI-6954, San Diego County, California. Prepared by Don Laylander, ASM Affiliates Inc., Carlsbad, California. Submitted to EDAW, Inc.

Hale, Micah J. 2003. Cultural Resources Inventory for the Linda Vista Drive Re-Alignment Alternatives, City of San Marcos, California. Submitted to Nolte for the City of San Marcos.

Hale, Micah J. 2003. Cultural Resources Inventory for the Lake Murray Trunk Sewer Replacement, San Diego County, California. Submitted to the Metropolitan Wastewater Department, City of San Diego, California.

Hale, Micah J. 2000. Cultural Resource Monitoring Report. Jones and Stokes Associates Inc. Prepared for AT&T Corp., Atlanta, Georgia, for the AT&T cable removal project from Lucin, Utah, to Red Bluff, California.

Hale, Micah J. 2000. "Ground and Battered Stone Analysis." In Report on Excavations at Four Locations in the Lead Mountain Vicinity of the 29-Palms Marine Base, edited by Mark Basgall. Sacramento Archaeological Research Center.

Hale, Micah J. 2000. "Ground and Battered Stone Analysis." In Report on Excavations at CA-MER-295, edited by Mark Basgall and R. Bethard. Sacramento Archaeological Research Center.

Hale, Micah J. 2000. "Invertebrate Analysis." In Report on Excavations at CA-MER-295, edited by Mark Basgall and Mark Giambastiani. Sacramento Archaeological Research Center.

Hale, Micah J. 2000. "Site Reports for Sites SBR-9415 and SBR-9420." In Report on Excavations at Lead Mountain in Twentynine Palms Marine Corps Air Ground Combat Training Center, edited by Mark Basgall. Sacramento Archaeological Research Center.

Hale, Micah J. 1999. "Ground and Battered Stone Analysis." In Muddle in the Middle: Phase II Excavations of Five Sites in Kern County, California, edited by Mark Basgall. Prepared for V. Levulett, Environmental Management, Caltrans District 5, San Luis Obispo. Sacramento Archaeological Research Center.

Hale, Micah J., and Brad Comeau. 2009. Data Recovery Excavations at CA-SDI-18472 for the Proposed Padre Dam Municipal Water District Secondary Connection Project (Ridge Hill Facilities) Johnstown, San Diego County, California. Prepared for Mr. Albert Lau, Engineering Manager, Padre Dam Municipal Water District.

Hale, Micah, Brad Comeau, and Chad Willis. 2010. Class II and Class III Cultural Resources Inventory Report for the Tule Wind Project, McCain Valley, San Diego County, California. Prepared for HDR Engineering Inc. Report on file at the South Coastal Information Center, SDSU.

Hale, Micah J., and John R. Cook. 2005. Results of Ground Penetrating Radar Investigations at CA-SDI-10148 in the Forester Creek Biological Mitigation Site, San Diego County, California. With contributions by Jeffrey S. Patterson. Prepared for Chris White, Caltrans District 11.

Hale, Micah J., and Mark S. Becker. 2006. From the Coast to the Inland: Prehistoric Settlement Systems Along the Las Pulgas Corridor, Camp Pendleton, California. ASM Affiliates, Carlsbad, California. Submitted to Southwest Division of Naval Facilities.

Hale, Micah J., and Mark A. Giambastiani. 2010. A Cultural Resources Inventory for Sample Surveys in Selected Training Areas, Marine Corps Air Ground Combat Center (MCAGCC), Twentynine Palms, San Bernardino County, California. Prepared for Marine Air Ground Task Force Training Command, Natural Resources and Environmental Affairs, Twentynine Palms, California.

Hale, Micah, and Mark Giambastiani. 2010. Archaeological Resources Survey Report Aerial Maneuver Zone (AMZ) Project at the Marine Air Ground Task Force Training Command, Marine Corps Air Ground Combat Center, Twentynine Palms, California, San Bernardino County, California. Prepared for Marine Air Ground Task Force Training Command, Natural Resources and Environmental Affairs, Twentynine Palms, California.

Hale, Micah, and Mark Giambastiani. 2010. An Archaeological Survey of 3,650 Acres at Cole Flat, Naval Air Weapons Station (NAWS), China Lake, California. Prepared for Mike Baskerville, Base Archaeologist, NAWS China Lake, California.

Hale, Micah J., Mark Giambastiani, Michael Richards, and David Iversen. 2009. Phase II Cultural Resource Evaluations at 51 Archaeological Sites in Management Regions 1A, 1B, 2B, 2C, and 3E, Bissell Hills and Paiute Ponds, Edwards Air Force Base, Kern and Los Angeles Counties, California. Prepared for U.S. Army Corps of Engineers under contract numbers W91238-07-F-0051 and W91238-07-F-0052.

Basgall, Mark, Lynn Johnson, and Micah Hale. 2002. An Evaluation of Four Archaeological Sites in the Lead Mountain Training Area, Marine Air Ground Task Force Training Command, Marine Corps Air Ground Combat Center, Twentynine Palms, California. Prepared for United States Marine Corps Air Ground Combat Center, Twentynine Palms, California. Prepared by Archaeological Research Center, Institute of Archaeology and Cultural Studies, Department of Anthropology, California State University, Sacramento.

Becker, Mark S., and Micah J. Hale. 2004. "Flaked Stone and Ground Stone Artifact Analysis." In Phase II Archaeological Testing and Evaluation of CA-INY-3647, CA-INY-3650/H, CA-INY-3826, and P-14-7356, Little Lake Rehabilitation, U.S. 395, Inyo County, California, edited by Brian Byrd and Seetha Reddy, ASM Affiliates. Prepared for Caltrans District 6, Fresno.

Byrd, Brian F., and Micah J. Hale. 2005. Testing and Evaluation of CA-SDI-13,930 on Camp Pendleton Marine Corps Base, San Diego County, California: A Paleoenvironmental Approach. ASM Affiliates, Carlsbad, California. Prepared for Southwest Division Naval Facilities Engineering Command.

Byrd, Brian F., and Micah J. Hale. 2004. Final Report on the Rose-Arizone Site Survey and Documentation, San Clemente Island. Prepared for Dr. Andrew Yatsko, NAVFAC SW, South Bay Area Focus Team.

Byrd, Brian F., and Micah J. Hale. 2004. Final Report on the San Clemente Island Protective Signing and Maintenance Project. Prepared for Dr. Andrew Yatsko, NAVFAC SW, South Bay Area Focus Team.

Byrd, Brian F., and Micah J. Hale. 2004. Final Report on the San Clemente Island Road Improvement Survey. Prepared for Dr. Andrew Yatsko, NAVFAC SW, South Bay Area Focus Team.

Byrd, Brian F., Micah J. Hale, and Sinéad Ní Ghabhláin. 2004. "Archaeological Testing at INY-3647." In Phase II Archaeological Testing and Evaluation of CA-INY-3647, CA-INY-3650/H, CA-INY-3826, and P-14-7356, Little Lake Rehabilitation, U.S. 395, Inyo County, California, edited by Brian Byrd and Seetha Reddy, ASM Affiliates. Prepared for Caltrans District 6, Fresno.

Byrd, Brian F., Micah J. Hale, and Sinéad Ní Ghabhláin. 2004. "Archaeological Testing at INY-3650/H." In Phase II Archaeological Testing and Evaluation of CA-INY-3647, CA-INY-3650/H, CA-INY-3826, and P-14-7356, Little Lake Rehabilitation, U.S. 395, Inyo County, California, edited by Brian Byrd and Seetha Reddy, ASM Affiliates. Prepared for Caltrans District 6, Fresno.

Byrd, Brian F., Micah J. Hale, and Sinéad Ní Ghabhláin. 2004. Archaeological Testing at INY-3826. In Phase II Archaeological Testing and Evaluation of CA-INY-3647, CA-INY-3650/H, CA-INY-3826, and P-14-7356, Little Lake Rehabilitation, U.S. 395, Inyo County, California, edited by Brian Byrd and Seetha Reddy, ASM Affiliates. Prepared for Caltrans District 6, Fresno.

Byrd, Brian F., and Micah J. Hale. 2003. Final Report on Extended Phase I Excavation at CA-INY-2207/2758, Little Lake Rehab Project, Inyo County, California. ASM Affiliates, Encinitas. Prepared for Lynn Faraone, Chief, Central California Cultural Resource Branch, California Department of Transportation.

Byrd, Brian F., and Micah J. Hale. 2002. Phase II Investigations of 15 Prehistoric Sites for the Cartago-Olancha Four-Lane Project, U.S. 395, Owens Valley, California. ASM Affiliates Inc. Prepared for Caltrans District 6, Fresno.

Byrd, Brian F., and Micah J. Hale. 2001. Research Design for Phase II Investigations of 14 Prehistoric Sites for the Cartago-Olancha Four-Lane Project, U.S. 395, Owens Valley, California. ASM Affiliates Inc. Prepared for Caltrans District 6, Fresno.

Cook, John R., Collin O'Neill, and Micah J. Hale. 2001. Archaeological Survey for the Amtrak Second Main Line, San Onofre Segment, MP 210.1 to 214.7, San Diego County. ASM Affiliates Inc. Draft report prepared for North County Transit District.

Giambastiani, M., M. Hale, M. Richards, and S. Shelley. 2008. Draft Report Phase II Cultural Resource Evaluations at 47 Archaeological Sites on the East and Northeast Shores of Rogers Lake, Management Region 3, Edwards Air Force Base, Kern and Los Angeles Counties, California. Report submitted to Edward Air Force Base, Base Historic Preservation Officer.

Giambastiani, G., M. Hale, S. Ni Ghabhláin, and D. Iversen. 2006. Phase II Cultural Resource Evaluation of 21 Archaeological Sites along the Western and Northwestern Boundary Fence, Edwards AFB, Kern and Los Angeles Counties, California. Submitted to Earth Tech Inc., Colton, California.

Hector, Susan, Micah J. Hale, and Catherine Wright. 2003. Cultural Resource Inventory of the Path 15 Los Banos-Gates Transmission Line Construction Project, Merced and Fresno Counties, California. Contract No. 03-186-01-01-ASM. Prepared for Steigers Corporation, Littleton, Colorado.

Laylander, Don, and Micah J. Hale. 2004. Data Recovery Excavations at Locus O, CA-RIV-45. ASM Affiliates Inc., Carlsbad, California. Submitted to Agua Caliente Band of Cahuilla Indians.

Reddy, Seetha N., and Micah J. Hale. 2003. Archaeological Survey of Portions of the De Luz Housing Area, O'Neill Lake, and the Case Spring Highlands, Marine Corps Base Camp Pendleton, California. ASM Affiliates, Encinitas, California. Prepared for NAVFAC SW, San Diego, California.

Whitley, David, and Micah Hale. 2010. Management Plan for the Coso Rock Art District National Historic Landmark. Prepared for NAVFAC SW, San Diego County, California.

Other Publications

Hale, Micah J. 2012. "Malcolm Rogers' Archaeology in Coastal San Diego." Book chapter in preparation; edited by Don Laylander.

Hale, Micah J. 2011. "Modeling Socioeconomic Discontinuity in Southern Alta California." In, California Archaeology 2:2: December 2010, pp. 203-250.

Hale, Micah J. 2010. "A Comment on Hildebrandt et al. (2009) Shellfish Transport, Caloric Return Rates, and Prehistoric Feasting." In California Archaeology 3:111-113.

Hale, Micah J. 2009. Santa Barbara and San Diego: Contrasting Adaptive Strategies in Southern California. PhD dissertation; University of California, Davis.

Hale, Micah J. n.d. Preserving Cultural Heritage Through Public Outreach: A Curriculum for Jr. High and High School.

Hale, Micah J. 2005. Processing Economies, Coastal Settlement, and Intensification in Northern San Diego County. In Proceedings of the Society for California Archaeology, Volume 18.

Hale, Micah J. 2001. Technological and Social Organization of the Millingstone Horizon in Southern California. Master's thesis; California State University, Sacramento.

Hale, Micah J. 2000. Consumer Anthropology: Theory and Method of Recognizing and Interpreting Consumption Patterns for Product Development and Marketing Strategies. Developed for Richard Knight, Director of Intelligent Products, Addidas, USA.

Hale, Micah J., Richard McElreath, and Robert Bettinger. 2012. (in prep.) Modeling Time Minimizing and Energy Maximizing Adaptive Strategies.

Hale, Micah J., and Peter Richerson. 2012. (in prep.) Investigating the Rate-Limiting Factors of Cultural Evolution: Archaeological Evidence from Southern California.

Hale, Micah J., and Bruce Winterhalder. 2012. (in prep.) Discontinuous Sociocultural Evolution

Editorial Reviewer

Hale, Micah J. 2011. Editorial Reviewer, *Journal of California Archaeology*, Left Coast Press, California.

Hale, Micah J. 2011. Editorial reviewer, *Journal of California and Great Basin Anthropology*, Malki Museum Press, California.

Hale, Micah J. 2010. Editorial reviewer, *Pacific Coast Archaeology Society*, California.

Presentations

Hale, Micah J. 2012. *The Data Matter: Contributions of the Sacramento State Archaeological Research Center*. Presented at the 2012 Society for California Archaeology Meetings, San Diego, California.

Hale, Micah J. 2012. *Andy Yatsko, the Human Transit: Celebrating His Lifetime Contributions*. Presented at the 2012 Society for California Archaeology Meetings, San Diego, California.

Hale, Micah J. 2012. *Malcolm Rogers' Work Along the San Diego Coast*. Presented at the 2012 Society for California Archaeology Meetings, San Diego, California.

Hale, Micah J. 2011. *Tracing the Origins of Processing Economies in the Far West: A View from Coastal Southern California*. Presented at the Yucca Valley Archaeopalooza Conference, 29 Palms, California.

Hale, Micah J. 2011. *Adaptive Divergence Among Southern California Hunter Gatherers*. Presented at the 2011 Society for California Archaeology Meetings, Rohnert Park, California.

Hale, Micah J. 2011. *A 10,000 Year Old Habitation at the University House, La Jolla: Implications for Trans-Holocene Socioeconomic Stability in San Diego*. Presented at the 2011 Society for American Archaeology Meetings, Sacramento, California.

Hale, Micah J. 2010. *Using the Ideal Free Distribution to Model Socioeconomic Discontinuity Among Hunter-Gatherers*. Paper presented at the 2009 Society for American Archaeology Meetings, St. Louis, Missouri. Micah Hale, Symposium Chair.

Hale, Micah J. 2005. *Investigating the Role of Acorns in Southern California Hunter-Gatherer Economies.* Guest Speaker at the Antelope Valley Archaeological Society Meeting.

Hale, Micah J. 2005. *Processing Economies, Coastal Settlement, and Intensification in Northern San Diego County.* Presented at the Society for California Archaeology, Sacramento.

Hale, Micah J. 2004. *Cultural Resource Management in Practice: An Overview of Methodological Approaches.* Presented at the Imperial Valley Desert Museum Annual Meetings.

Hale, Micah J. 2003. *The Adaptive Significance of Technological Organization during the Holocene in Southern California.* Discussant in a symposium entitled, *Change and Cultural Adaptations Along the California Coast.* Organized by Seetha Reddy for the 68th Annual Meetings of the Society for American Archaeology, Milwaukee, Wisconsin. David Yesner and Roger Colten, Chairs.

Hale, Micah J. 2003. *The Organization of Subsistence Technology in Southern California During the Holocene.* Guest Speaker for the San Diego County Archaeological Society, January 28, 2003, San Diego.

Hale, Micah J. 2002. *Prehistory Along the Southwestern Shore of Owens Lake: Preliminary Results from the Cartago-Olancha Project.* Presented at the 2002 Northern California Data Sharing Meetings, Society for California Archaeology, Santa Cruz, California.

Hale, Micah J. 2002. *Ground and Battered Stone Along the Western Shores of Owens Lake.* Presented at the 2002 Northern California Data Sharing Meetings, Society for California Archaeology, Santa Cruz, California.

Hale, Micah J. 2001. *Technological and Social Organization during the Millingstone Horizon of Southern California*. Presented at the Society for California Archaeology Annual Meeting, Modesto.

Hale, Micah J. 1999. *The Analysis Method of Formatting Presentations and Lesson Plans in Archaeology*. Presented at the Society for American Archaeology 64th Annual Meeting, Chicago, Illinois.

Hale, Micah J. 1998. *A Practical and Effective Method for Teaching Archaeology to the Public*. Presented at the Society for California Archaeology Annual Meeting, San Diego, California.

Awards/Commendations

≠ 2010 – NAVFAC SW, Camp Pendleton, Research Grant, $59,000
≠ 2008 – U.S. Air Force, Vandenberg AFB, Radiocarbon Grant, $25,000
≠ 2008 – Fieldwork Fellowship, Graduate Studies, UC Davis, $2,010
≠ 2007 – Fieldwork Fellowship, Graduate Studies, UC Davis, $1,800
≠ 2006 – Fieldwork Fellowship, Graduate Studies, UC Davis, $5,650
≠ 2005–2009 – Graduate Fee Fellowship/Stipend, UC Davis, $74,500

Clearances

≠ Department of Defense (DoD) High-Security Clearance for SPAWAR, Naval Base Point Loma, NALF San Clemente Island, Vandenberg Air Force Base, MCAGCC 29 Palms, Edwards Air Force Base, NAWS China Lake, Yuma Proving Grounds, and MCB Camp Pendleton

Samantha Murray, MA

Historic Built Environment Lead / Senior Architectural Historian

Samantha Murray is a senior architectural historian with 12 years' professional experience in in all elements of cultural resources management, including project management, intensive-level field investigations, architectural history studies, and historical significance evaluations in consideration of the California Register of Historical Resources (CRHR), the National Register of Historic Places (NRHP), and local-level evaluation criteria. Ms. Murray has conducted hundreds of historical resource evaluations and developed detailed historic context statements for a multitude of property types and architectural styles, including private residential, commercial, industrial, educational, medical, ranching, mining, airport, and cemetery properties, as well as a variety of engineering structures and objects. She has also provided expertise on numerous projects requiring conformance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties*.

EDUCATION

California State University, Los Angeles
MA, Anthropology, 2013

California State University, Northridge
BA, Anthropology, 2003

PROFESSIONAL AFFILIATIONS

California Preservation Foundation

Society of Architectural Historians

National Trust for Historic Preservation

Registered Professional Archaeologist

Ms. Murray meets the Secretary of the Interior's Professional Qualification Standards for both Architectural History and Archaeology. She is experienced managing multidisciplinary projects in the lines of transportation, transmission and generation, federal land management, land development, state and local government, and the private sector. She has experience preparing environmental compliance documentation in support of projects that fall under the California Environmental Quality Act (CEQA)/National Environmental Policy Act (NEPA), and Sections 106 and 110 of the National Historic Preservation Act (NHPA). She also prepared numerous Historic Resources Evaluation Reports (HRERs) and Historic Property Survey Reports (HPSRs) for the California Department of Transportation (Caltrans).

Dudek Project Experience (2014-2017)

Development

Birch Specific Plan 32-Unit Condo Project, City of Carson, Los Angeles County, California (in progress). Dudek was retained by the City of Carson to prepare a cultural resources report for a project that proposes to demolish approximately 6,200 square feet of existing residential buildings and roughly 5,850 square feet of pavement on the project site, and construct a 32-unit residential condominium community with on-grade parking, landscaping, and other associated improvements. The historical significance evaluation included three residential properties proposed for demolition. All properties were found not eligible under all designation criteria and integrity requirements. Ms. Murray provided QA/QC of the final cultural resources report.

The 1431 El Camino Real Project, City of Burlingame, San Mateo County, California (in progress). The City of Burlingame proposes to demolish an existing four-unit (two-story) apartment building along with the detached five-car garage structure at the rear and construct a new six-unit (three-story) townhouse complex, totaling 3,858 square feet and a proposed height of 35 feet. The property at 1431-1433 El Camino Real was constructed in 1947 and required evaluation for historical significance. Further, because the property requires a Caltrans encroachment permit, a Caltrans-compliant Historical Resources Compliance Report (HRCR) was prepared. In addition to evaluating the building at 1431 El Camino, Dudek also had to address impacts to an NRHP-listed tree row within the project area. Ms. Murray co-authored the HRCR, provided QA/QC of the final cultural resources report, and prepared the SOIS and ESA Action Plans required by Caltrans as mitigation for the NRHP-listed resource.

HABS Written Documentation for Camp Haan, Riverside County, California (2017). Dudek was retained by the County of Riverside Economic Development Agency (EDA) to prepare HABS documentation for approximately 28 building foundations associated with the Camp Haan property located on March Air Reserve Base. Ms. Murray provided project management and QA/QC of the final HABS documentation and submittal package.

Chino Annexation Area Project, City of Chino, San Bernardino County, California (2017). The Chino Annexation Area Project involves annexation of an approximately 40-acre site (project site or annexation area) into the City of Chino, as well as approval of General Plan Amendments and prezoning designations for this site. Seven previously unrecorded historic-age resources were identified within the project area and were recorded and evaluation for historical significance. All properties were found not eligible for designation. Ms. Murray prepared the evaluations and conducted QA/QC of the cultural resources MND section.

Santa Monica/Orange Grove Mixed-Use Development at 7811 Santa Monica Boulevard, City of West Hollywood, Los Angeles County, California (2017). Dudek was retained by the City of West Hollywood to prepare an Environmental Impact Report (EIR) for the Santa Monica/Orange Grove Mixed-Use Development Project. In support of the EIR, Dudek conducted a cultural resources inventory and evaluation of two commercial properties at 7811 Santa Monica Blvd. and 1125-1127 N. Ogden Drive. Both properties were found not eligible for designation under NRHP, CRHR and local designation criteria. Ms. Murray co-authored the technical report and provided QA/QC.

Duke Fontana Warehouse Project, City of Fontana, San Bernardino County, California (2017). Dudek was retained by the City of Fontana to conduct a cultural resources study for the proposed Duke Fontana Warehouse Project. The proposed project would include construction of a 288,215-square-foot (gross), one-story industrial/warehouse building on an approximately 13.45-acre site at the intersection of Santa Ana Avenue and Oleander Avenue. As part of the cultural resources study, Dudek evaluated 8 residential properties over 45 years old for historical significance. The resources were found not eligible under all designation criteria and integrity requirements. Ms. Murray assisted with background research, co-authored the report, and provided QA/QC of the final cultural resources report.

Pacific Freeway Center Project, City of Fontana, San Bernardino County, California (2017). Dudek was retained by the City of Fontana to conduct a cultural resources study for the proposed Pacific Freeway Center Project. The project would include construction and operation of two "high cube" warehouse/distribution/logistics buildings with associated office spaces, surface parking, and loading areas. As part of the cultural resources study, Dudek evaluated the former Union Carbide Site for historical significance. The resource was found not eligible under all designation criteria and integrity requirements. Ms. Murray assisted with background research, co-authored the report, and provided QA/QC of the final cultural resources report.

Transportation Vessels Manufacturing Facility Project at Berth 240, Port of Los Angeles, Los Angeles County, California (2017). Dudek was retained by the Los Angeles Harbor Department (LAHD) to provide a cultural resources assessment for a project that proposes to construct a facility to manufacture transportation vessels at Berth 240 off South Seaside Avenue on Terminal Island. The site is adjacent to the NRHP-eligible Bethlehem Shipyard Historic District. Ms. Murray provided an updated conditions assessment of the site and an updated evaluation of the historic district to address integrity issues. She also reviewed project design plans for new construction within the district for conformance with the Secretary of the Interior's Standards for Rehabilitation.

Berths 238-239 [PBF Energy] Marine Oil Terminal Wharf Improvements Project and Lease Renewal, Port of Los Angeles, Los Angeles County, California (2017). Dudek was retained by the Los Angeles Harbor Department (LAHD) to provide an updated cultural resources assessment for Berths 238-239 at the Port of Los Angeles (POLA), as part of the proposed Environmental Impact Report (EIR) for the Berths 238-239 [PBF Energy] Marine Oil Terminal Wharf Improvements Project and Lease Renewal. Ms. Murray updated a previous evaluation of the project area conducted in 2010. This included a pedestrian survey, archival research, and a cultural resources impact assessment. The wharf was found not eligible under all designation criteria.

Robertson Lane Hotel Commercial Redevelopment Project, City of West Hollywood, Los Angeles County, California (2017). Ms. Murray is currently serving as architectural historian and peer reviewer of the historical evaluation report. The project involved conducting a records search, archival research, consultation with local historical groups, preparation of a detailed historic context statement, evaluation of three buildings proposed for demolition in consideration of local, CRHR, and NRHP designation criteria, and assistance with the EIR alternatives analysis.

8777 Washington Boulevard Project, Culver City, Los Angeles County, California (2017). Dudek prepared a cultural resources assessment for a project that proposed to demolish the property located at 8777 Washington Blvd. Ms. Murray evaluated the building for NRHP, CRHR, and local level criteria and integrity requirements and co-authored the cultural resources report.

Yosemite Avenue-Gardner Avenue to Hatch Road Annexation Project, City of Merced, Merced County, California (2017). Ms. Murray managed and reviewed the historic resource significance evaluation of a single-family residence/agricultural property within the proposed project site. The evaluation found the property not eligible under all NRHP and CRHR designation criteria. The project proposes to annex 70 acres from Merced County to the City of Merced and to construct and operate the University Village Merced Student Housing and Commercial component on an approximately 30-acre portion of the project site. No development is proposed on the remaining 40 acres.

Historical Evaluation of 3877 El Camino Real, City of Palo Alto, Santa Clara County, California (2017). Ms. Murray served as architectural historian, originally providing a peer review of another consultant's evaluation. The City then asked Dudek to re-do the original evaluation report. As part of this work Ms. Murray conducted additional archival research on the property and evaluated the building for historical significance in consideration of local, state, and national designation criteria and integrity requirements. The project proposes to demolish the existing building and develop new housing.

North Montclair Downtown Specific Plan EIR, City of Montclair, San Bernardino County California (2016). The project proposes expansion of the Montclair Plaza (the Mall)— a regional shopping center— which would involve the demolition of portions of the existing Mall, construction of new retail/entertainment/restaurant space, renovation and refurbishment of portions of the existing mall, and the construction additional structured and surface parking. Ms. Murray prepared the cultural resources MND section.

Land Park Commercial Center EIR, City of Sacramento, Sacramento County, California (2016). Dudek was retained by Mo Capital to prepare a cultural resources study for the Land Park Commercial Center Project. Three resources over 45 years old within the project area required evaluation for historical significance. All properties were found ineligible for designation. Ms. Murray co-authored the cultural resources report.

Covina Transit-Oriented Mixed-Use Development Project, City of Covina, Los Angeles County, California (2016). The proposed project would involve a General Plan Amendment (GPA) to develop a mixed-use residential, transit-oriented development (TOD) project. The proposed project would consist of three primary components: 1) a Transit Center and Park & Ride facility; 2) the Covina Innovation, Technology, and Event Center (iTEC) - an event center and professional office incubator space; and 3) residential townhome units. Ms. Murray evaluated one residential and one commercial property over 45 years old for historical significance. Both were found not eligible. Ms. Murray also co-authored the cultural resources technical report.

Jack in the Box Drive Through Restaurant Project, City of Downey, Los Angeles County, California (2015). Ms. Murray served as architectural historian and lead author of the cultural resources study which included evaluation of two historic resources in consideration of national, state, and local criteria and integrity requirements. The study also included a records search, survey, and Native American Coordination.

635 S. Citrus Avenue Proposed Car Dealership MND, City of Covina, Los Angeles County, California (2015). Ms. Murray served as architectural historian and archaeologist, and author of the cultural resources MND section. The project proposes to convert an existing Enterprise Rent-a-Car facility into a car dealership. As part of the MND section, Ms. Murray conducted a records search, Native American coordination, background research, building permit research, and a historical significance evaluation of the property. The study resulted in a finding of less-than-significant impacts to cultural resources.

8228 Sunset Boulevard Tall Wall Project, City of West Hollywood, Los Angeles County California (2014). Ms. Murray prepared DPR forms and conducted building development and archival research to evaluate a historic-age office building. The project proposes to install a tall wall sign on the east side of the building.

Historic Resource Evaluation of 8572 Cherokee Drive, City of Downey, Los Angeles County, California (2014). Ms. Murray served as architectural historian and project manager. She prepared a historical resource evaluation report and a set of DPR forms to evaluate a partially demolished residence that was previously determined eligible for inclusion in the NRHP (known as the Al Ball House). The current owner is proposing to subdivide the lot and develop four new homes.

Montclair Plaza Expansion Project, City of Montclair, San Bernardino County, California (2014). Ms. Murray prepared the cultural resources MND section, which included an evaluation of several department store buildings proposed for demolition. All buildings were found ineligible for listing. The project proposes to expand the existing Montclair Plaza Shopping Center.

Foothill 533 IS/MND, City Ventures, City of Glendora, Los Angeles County, California (2014). Ms. Murray served as architectural historian, archaeologist, and author of the cultural resources IS/MND section. As part of the cultural study, Ms. Murray recorded and evaluated five historic-age commercial/industrial properties proposed for demolition as part of the project. The project proposes to develop a series of new townhomes.

Normal Street Project, City of San Diego, San Diego County, California (2014). Ms. Murray served as architectural historian and co-author of the Historical Resources Technical Report for properties located at 3921-3923; 3925-3927; 3935 Normal Street for the City of San Diego's Development Services Department Ms. Murray assisted with the final round of comments from the City and wrote the historical significance evaluations for all properties included in the project.

Education

Castilleja School Project, City of Palo Alto, Santa Clara County, California (in progress). Dudek was retained by the City of Palo Alto to conduct a cultural resources study for the Castilleja Master Plan and Conditional Use Permit project. The study included a historical significance evaluation of the campus and related buildings and structures. Ms. Murray co-authored the cultural resources report and provided QA/QC.

Fullerton College Facilities Master Plan Program EIR, North Orange County Community College District, City of Fullerton, Orange County, California (in progress). The North Orange County Community College District (NOCCCD) is undertaking a comprehensive improvement and building program to make upgrades and repairs to existing buildings, as well as to construct new facilities to improve the safety and education experience of those attending Fullerton College. The College proposed to implement the Facilities Master Plan to more effectively meet the space needs of the projected on-campus enrollment through the next decade and beyond, while constructing and renovating facilities to meet the District's instructional needs. Ms. Murray co-authored and oversaw the cultural resources study. All buildings and structures on campus over 45 years old and/or or proposed for demolition/substantial alteration as part of the proposed project were photographed, researched, and evaluated in consideration of NRHP, CRHR, and local designation criteria and integrity requirements, and in consideration of potential impacts to historical resources under CEQA. As a result of the significance evaluation, three historic districts and one individually eligible building were identified within the project area. The study also entailed conducting extensive archival and building development research, a records search, Native American coordination, detailed impacts assessment, and development of mitigation measures for project conformance with the Secretary of the Interior's Standards for Rehabilitation.

MiraCosta Community College District Oceanside Campus, San Diego County, California (2017). Dudek was retained by the MiraCosta Community College District (MCCCD) to conduct a cultural resources study for the proposed Oceanside Campus Facilities Master Plan. Of the original 11 buildings constructed in the early 1960s, nine are still extant and required evaluation for historical significance. The campus was ultimately found ineligible for designation due to a lack of important historical associations and integrity issues. Ms. Murray provided QA/QC of the final cultural report.

CSU Chico College Park Demolition Project, Butte County, California (2017). Dudek was retained by California State University (CSU), Chico to complete a cultural resources study for a project that proposes demolition of 10 single-family residences near the CSU Chico campus in the City of Chico, Butte County, California. The study involved completion of a California Historical Information System (CHRIS) records search, outreach with the Native American Heritage Commission (NAHC) and local tribes/groups, a pedestrian survey of the project area for built-environment resources, and recordation and evaluation of 10 properties for historical significance. The significance evaluations included conducting archival and building development research for each property; outreach with local libraries, historical societies, and advocacy groups; and completion of a historic context. This study was conducted in accordance with Section 15064.5(a)(2)-(3) of the CEQA Guidelines, and the project site was evaluated in consideration of CRHR and City of Chico Historic Resources Inventory eligibility and integrity requirements. Furthermore, as required under California Public Resources Code (PRC) Sections 5024 and 5024.5, CSU Chico is required to provide notification and submit documentation to the State Historic Preservation Officer (SHPO) for any project having the potential to affect state-owned historical resources on or eligible for inclusion in the Master List. In accordance with PRC Section 5024(a), all properties were also evaluated in consideration of the NRHP and California Historical Landmark (CHL) criteria and integrity requirements. All 10 properties evaluated for historical significance appear to be not eligible for inclusion in the NRHP, CRHR, CHL, or local register (6Z) due to a lack of significant historical associations and compromised integrity.

SDSU Tula Pavilion and Tenochca Hall Renewal/Refresh, San Diego, California (2017). Dudek was retained by the San Diego State University (SDSU) to evaluate potential impacts to historical resources associated with the proposed Tula Pavilion and Tenochca Hall Renewal/Refresh project located in San Diego, California. The historic resources technical memorandum provides the results of that evaluation. Ms. Murray provided quality assurance/quality control of the final work product and provided input on impacts to historical resources.

Kings Beach Elementary School Modernization Project, Tahoe Truckee Unified School District, Tahoe City, Placer County, California (2016). Ms. Murray served as architectural historian and co-author of the cultural resources study. The study involved evaluation of the existing school for NRHP, CRHR and local eligibility, conducting archival and building development research, a records search, and Native American coordination.

Truckee High School Trach and Field Improvements Project, Tahoe Truckee Unified School District, Town of Truckee, Nevada County, California (2016). Dudek was retained by the Tahoe Truckee Unified School District (the District) to prepare a cultural resources study for the Truckee High School Track and Field Improvements. Ms. Murray provided QA/QC of the evaluation of several buildings within the high school and co-authored the cultural resources report.

Cypress College Facilities Master Plan Program EIR, City of Cypress, Orange County, California (2016). The North Orange County Community College District (NOCCCD) is undertaking a comprehensive improvement and building program to make upgrades and repairs to existing buildings, as well as to construct new facilities to improve the safety and education experience of those attending Cypress College. The College proposed to implement the Facilities Master Plan to more effectively meet the space needs of the projected on-campus enrollment through the next decade and beyond, while constructing and renovating facilities to meet the District's instructional needs. Ms. Murray authored the cultural resources study for the project, which included a significance evaluation of all 1960s and 1970s buildings on campus proposed for demolition or renovation. As a result of the significance evaluation, including consideration of CRHR evaluation criteria and integrity requirements, the original 1960s–1970s campus appears to be eligible as a historic district under CRHR Criterion 3 for conveying a concentration of planned buildings, structures, and associated elements united aesthetically by their embodiment of the Brutalist style. The study also entailed conducting extensive archival and building development research, a records search, Native American coordination, detailed impacts assessment, and development of mitigation measures for project conformance with the Secretary of the Interior's Standards for Rehabilitation.

Schouten House Property Evaluation, California State University, Chico Research Foundation, Butte County, California (2016). Ms. Murray prepared a historic resource evaluation report and DPR form for a former single-family residence located at 2979 Hegan Lane in Butte County, California, in consideration of CRHR and local level eligibility criteria and integrity requirements. The University Research Foundation was proposing demolition of the property.

Tahoe Lake Elementary School Facilities Master Plan Project, Tahoe Truckee Unified School District, Tahoe City, Placer County, California (2015). Ms. Murray served as architectural historian and lead author of the cultural resources study. She recorded and evaluated the Tahoe Lake Elementary School Building for NRHP, CRHR, and local level criteria and integrity considerations. The study also entailed conducting archival and building development research, a records search, and Native American coordination.

San Diego State University (SDSU) Open Air Theater Renovation Project, SDSU and Gatzke Dillon & Balance, LLP, San Diego, California (2015). Ms. Murray served as architectural historian and prepared a technical memorandum that analyzed the project's potential to impact the OAT theater (a contributing property to the San Diego State College NRHP Historic District). This included conducting a site visit, reviewing proposed site and design plans, and preparing a memorandum analyzing the project's conformance with the Secretary of the Interior's Standards for the Treatment of Historic Properties.

Mt. San Jacinto College (MSJC) Master Plan Project, City of San Jacinto, Riverside County, California (2015). Ms. Murray served as architectural historian, archaeologist, and lead author of the cultural resources study. As part of the study she evaluated 11 buildings for NRHP, CRHR, and local level criteria and integrity requirements. The buildings were constructed prior to 1970 and proposed for demolition as part of the project. The study also entailed conducting extensive archival and building development research at District offices, a records search, and Native American coordination.

San Diego State University (SDSU) Engineering and Sciences Facilities Project, SDSU and Gatzke Dillon & Balance, LLP, San Diego, California (2014). Ms. Murray served architectural historian, archaeologist, and lead author of the Cultural Resources Technical Report for the SDSU Engineering and Interdisciplinary Sciences Building Project. The project required evaluation of 5 historic-age buildings in consideration of NRHP, CRHR, and local designation criteria and integrity requirements, an intensive level survey, Native American coordination, and a records search. The project proposes to demolish four buildings and alter a fifth as part of the university's plan to update its engineering and science facilities.

Big Chico Creek Ecological Reserve (BCCER) Henning Property Historical Evaluation, California State University, Chico, Butte County, California (2014). Ms. Murray authored the historical significance evaluation report for a property located at 3521 14 Mile House Road as requested by the California State University Chico Research Foundation. The property is historically known as the Henning Property and has served as the BCCER conference center in recent years. The Foundation is considering demolition of the existing property due to numerous safety concerns and the high cost associated with bringing the building up to current code requirements.

The Cove: 5th Avenue Chula Vista Project, E2 ManageTech Inc., City of Chula Vista, San Diego County, California (2014). Ms. Murray served as architectural historian and co-author of the CEQA report. The project involved recordation and evaluation of several properties functioning as part of the Sweetwater Union High School District administration facility, proposed for redevelopment, as well as an archaeological survey of the project area.

Energy

J-135I Electrical Distribution and Substation Improvements and J-600 San Dieguito Pump Station Replacement Project, Santa Fe Irrigation, San Diego County, California (2014). Ms. Murray served as architectural historian and prepared the Department of Parks and Recreation (DPR) forms and associated memo concerning replacement of the original 1964 San Dieguito Pump Station. Ms. Murray recorded and evaluated the pump house for state and local significance and integrity considerations. As part of this effort she conducted background research, prepared a brief historic context, and a significance evaluation.

Expert Witness

Robert Salamone vs. The City of Whittier (2016). Ms. Murray was retained by the City of Whittier to serve as an expert witness for the defense. She peer reviewed a historic resource evaluation prepared by another consultant and provided expert testimony regarding the contents and findings of that report as well as historic resource requirements on a local and state level in consideration of the City of Whittier's Municipal Code Section 18.84 and CEQA. Judgement was awarded in favor of the City on all counts.

Healthcare

Hamilton Hospital Residential Care Facility Project, City of Novato, Marin County, California (2015). Ms. Murray served as architectural historian, prepared a cultural resources study, and assessed the proposed project's design plans for conformance with the Secretary of the Interior's Standards for the Treatment of Historic Properties. The project proposed to construct an addition and make alterations to an NRHP-listed district contributing property. With review from Ms. Murray, the project was able to demonstrate conformance with the Standards for Rehabilitation.

Culver Place Assisted Living Project, DJB Architects, Culver City, Los Angeles County, California (2014). Ms. Murray served as architectural historian, archaeologist, and author of the Letter Report for a Cultural and Paleontological Resources Study. Ms. Murray conducted the intensive-level cultural resources survey of the project area, conducted background research, and coordinated with local Native American groups. The project proposes to construct an assisted living facility on a large private property in Culver City.

Municipal

The Santa Monica City Yards Master Plan Project, City of Santa Monica, Los Angeles County, California (2017). The City of Santa Monica retained Dudek to complete a cultural resources study for the proposed City Yards Master Plan project site located at 2500 Michigan Avenue in the City of Santa Monica. The study involved evaluation of the entire City Yards site, including two murals and a set of concrete carvings for historical significance and integrity. As a result, the City Yards and its associated public art work was found ineligible under all designation criteria. Ms. Murray conducted the intensive level survey, building permit research, co-authored the technical report, and provided QA/QC of the final cultural resources report.

148 North Huntington Street, City of Pomona, Los Angeles County, California (2017). Dudek was retained by the City of Pomona to conduct a cultural resources study for the remediation of the project site located at 148 North Huntington Street. The proposed project involves the excavation, removal, and off-site treatment of approximately 10,000 Cubic Yards (CYs) of contaminated soil due to the former presence of a manufactured gas plant (MGP) at the project site (currently the City of Pomona Water and Wastewater Yards). All buildings over 45 years of age within the project site were evaluated for the CRHR and local landmark eligibility as part of the Pomona Gas Plant site. The site was found not eligible with concurrence from the historic resources commission. Ms. Murray conducted the survey, prepared the evaluation, and authored the cultural resources report.

Tequesquite Creek Maintenance Project, City of Riverside, Riverside County, California (2017). Dudek was retained by the City of Riverside to conduct a cultural resources study for the proposed Tequesquite Creek Maintenance Project. The Tequesquite Creek Channel was constructed circa 1962-1966 and required evaluation for historical significance. The resource was found ineligible under all designation criteria and integrity requirements. Ms. Murray co-authored the significance evaluation and provided QA/QC of the cultural resources report.

Northside Specific Plan, Cities of Riverside and Colton, San Bernardino and Riverside Counties, California (2017). Dudek prepared cultural resources constraints analysis in support of the proposed Northside Specific Plan Project located in the City of Riverside in Riverside County and the City of Colton in San Bernardino County, California. The report presents the results of a cultural resources records search and literature review and preliminary Native American coordination, including an inventory of identified historical resources within the plan area. Ms. Murray provided QA/QC of the final cultural resources report.

LADWP West Los Angeles District Yard Project, City of Los Angeles, Los Angeles County, California (2017). Dudek was retained by Los Angeles Department of Water and Power (LADWP) to complete a cultural resources study for a project that proposes demolition of five LADWP-owned administrative buildings and warehouses at the West Los Angeles District Headquarters located at 12300 West Nebraska Avenue. Dudek evaluated the yard for historical significance in consideration of NRHP, CRHR, and City of Los Angeles HCM criteria and integrity requirements. Ms. Murray co-authored the significance evaluation and provided QA/QC of the cultural resources report.

LADWP Haynes Generating Station Units 3 through 6 Demolition Project, City of Long Beach, Los Angeles County, California (2017). Dudek was retained by Los Angeles Department of Water and Power (LADWP) to complete a cultural resources study for a project that proposes demolition of Units 3-6 at the LADWP Haynes Generating Station. Ms. Murray evaluated the entire steam plant for historical significance in consideration of NRHP, CRHR, and City of Long Beach designation criteria and integrity requirements, and co-authored the cultural resources report.

LADWP Green Verdugo Reservoir Improvement Project, City of Los Angeles, Los Angeles County, California (2017). Dudek was retained by Los Angeles Department of Water and Power (LADWP) to complete a cultural resources study for a project that proposes facility updates at the reservoir site in order to ensure safe water quality. Ms. Murray evaluated the reservoir for historical significance in consideration of NRHP, CRHR, and City of Los Angeles HCM designation criteria and integrity requirements, and co-authored the cultural resources report.

LADWP Upper Stone Canyon Reservoir Water Quality Improvement Project, City of Los Angeles, Los Angeles County, California (2016). Dudek was retained by Los Angeles Department of Water and Power (LADWP) to complete a cultural resources study for a project that proposes to maintain and improve the quality, reliability, and stability of the Stone Canyon Reservoir Complex (SCRC) service area drinking water supply in order to continue to meet customer demand. Dudek prepared an updated evaluation of the reservoir in consideration of NRHP, CRHR, and City of Los Angeles HCM criteria and integrity requirements. Ms. Murray conducted the built environment survey, archival research, and co-authored the cultural resources report.

LADWP North Hollywood West Well Field Water Treatment Project, City of Los Angeles, Los Angeles County, California (2016). Dudek was retained by Los Angeles Department of Water and Power (LADWP) to complete a cultural resources study for a project that proposes to implement a response action to address releases of 1,4 dioxane in groundwater that are migrating to the NHW Well Field. This response action would be achieved by installing treatment equipment at the well field capable of removing 1,4-dioxane to below the identified cleanup levels. Ms. Murray provided QA/QC of the cultural resources technical report.

LADWP Power Plant 1 Long-Term Maintenance Program Project, City of Los Angeles, Los Angeles County, California (2016). Dudek was retained by Los Angeles Department of Water and Power (LADWP) to complete a cultural resources study for the proposed long-term maintenance of the flood control infrastructure in the vicinity of Power Plant 1. Ms. Murray prepared the cultural resources impacts assessment, co-authored the cultural resources report, and provided QA/QC of the cultural resources technical report.

LADWP Bishop Creek Bridge Replacement Project, City of Bishop, Inyo County, California (2016). Dudek was retained by Los Angeles Department of Water and Power (LADWP) to complete a cultural resources study for a project that proposed to replace two bridges and their associated infrastructure: the bridge across South Fork Bishop Creek at the Bishop Creek Canal, and the bridge across Bishop Creek at the A-1 Drain. Ms. Murray evaluated both bridges for historical significance and found them not eligible due to a lack of important historical associations and integrity. Ms. Murray also prepared the cultural resources technical report.

Rocketship Senter Road Public Elementary School Project, City of San Jose, Santa Clara County, California (2015). Ms. Murray served as architectural historian and prepared a historic resource evaluation report in compliance with the City of San Jose's historic preservation ordinance. Ms. Murray evaluated a 1960s church building in consideration of NRHP, CRHR, and local designation criteria and integrity requirements.

Orange County Central Utility Facility Upgrade, County of Orange Public Works, City of Santa Ana, Orange County, California (2014). To further the County's long-term goals of operational safety, improved efficiency, cost effectiveness, and supporting future campus development plans, the proposed Central Utility Facility Upgrade project consisted of improvements and equipment replacements recommended by the Strategic Development Plan for the CUF's original utility systems. Ms. Murray served as architectural historian and archaeologist, and prepared the cultural resources MND section. As part of this effort Ms. Murray conducted a detailed review of historic resource issues within and around the proposed project area to assess potential impacts to historic buildings and structures. The proposed project involved improvements to 16 buildings located within the Civic Center Campus. As a result of the cultural resources analysis, it was determined that the proposed project would not result in a substantial adverse change to any of the historic-age buildings or the associated Civic Center Plaza walkways/landscaping.

San Carlos Library Historical Resource Technical Report, City of San Diego, California (2014). Ms. Murray served as architectural historian and author of the Historical Resource Technical Report for the San Carlos Library. Preparation of the report involved conducting extensive building development and archival research on the library building, development of a historic context, and a historical significance evaluation in consideration of local, state, and national designation criteria and integrity requirements. The project proposes to build a new, larger library building.

Peer Review

Peer Review of 1106 North Branciforte Avenue, City of Santa Cruz, Santa Cruz County, California (2017). Dudek was retained by the City of Santa Cruz to peer review the revised Department of Parks and Recreation Series 523 forms (DPR forms) for the property located at 1106 North Branciforte Avenue in the City of Santa Cruz. Ms. Murray conducted two rounds of peer review on the original and revised evaluation.

Peer Review of Avenidas Expansion Project, City of Palo Alto, Santa Clara County, California (2016). Ms. Murray peer reviewed a historical resource evaluation report for the property at 450 Bryant Street. The peer review assessed the report's adequacy as an evaluation in consideration of state and local eligibility criteria and assessed the project's conformance with the Secretary of the Interior's Standards for Rehabilitation.

Peer Review of 429 University Avenue Historic Resources Evaluation Report, City of Palo Alto, Santa Clara County California (2014). Ms. Murray conducted a peer review of a study prepared by another consultant, and provided a memorandum summarizing the review, comments, and recommendations, and is currently working on additional building studies for the City of Palo Alto.

Peer Review of 1050 Page Mill Road Historic Resources Evaluation Report, City of Palo Alto, Santa Clara County, California (2014). Ms. Murray conducted a peer review of a study prepared by another consultant, and provided a memorandum summarizing the review, comments, and recommendations.

State of California

Judicial Council of California Historical Resource Evaluation Report for the Santa Monica Courthouse, City of Santa Monica, Los Angeles County, California (2017). Dudek was retained by the Judicial Council of California (JCC) to prepare an evaluation of the Santa Monica Courthouse building, located at 1725 Main Street in the City of Santa Monica, California. To comply with Public Resources Code Section 5024(b), the JCC must submit to the State Historic Preservation Officer (SHPO) an inventory of all structures over 50 years of age under the JCC's jurisdiction that are listed in or that may be eligible for inclusion in the National Register of Historic Places (NRHP), or registered or that may be eligible for registration as a California Historical Landmark (CHL). The Santa Monica Courthouse was found not eligible for designation under all applicable criteria. Ms. Murray co-authored the report and provided QA/QC of the final cultural resources report.

Judicial Council of California Historical Resource Evaluation Report for the Figueroa Division Courthouse, City of Santa Barbara, Santa Barbara County, California (2017). Dudek was retained by the Judicial Council of California (JCC) to prepare an evaluation of the Santa Monica Courthouse building, located at 118 E. Figueroa Street in the City of Santa Barbara, California. To comply with Public Resources Code Section 5024(b), the JCC must submit to the State Historic Preservation Officer (SHPO) an inventory of all structures over 50 years of age under the JCC's jurisdiction that are listed in or that may be eligible for inclusion in the National Register of Historic Places (NRHP), or registered or that may be eligible for registration as a California Historical Landmark (CHL). The Figueroa Division Courthouse was found not eligible for designation under all applicable criteria. Ms. Murray co-authored the report and provided QA/QC of the final cultural resources report.

Department of General Services Historical Resource Evaluation for the Pomona Armory at 600 South Park Avenue, City of Pomona, Los Angeles County, California (2017). Dudek was retained by the State of California Department of General Services to mitigate potential adverse effects to the Pomona Armory (600 South Park Avenue), a state-owned historical resource proposed to be transferred from State-ownership to a local agency or private owner. Ms. Murray prepared a detailed significance evaluation for the Pomona Park Armory in the consideration NRHP, CRHR, CHL, and City of Pomona designation criteria and integrity requirements, and prepared a single historic landmark application for the property. The Pomona Park Armory was locally designated after unanimous approval by the Historic Resources Commission and City Council. SHPO concurred with the evaluation findings and agreed that adverse effects had been adequately mitigated with no comments.

Department of General Services Historical Resource Evaluation for the Santa Barbara Armory Complex, City of Santa Barbara, California (2017). Dudek was retained by the State of California Department of General Services to mitigate potential adverse effects to the Santa Barbara Armory (700 East Canon Perdido Street), a state-owned historical resource proposed to be transferred from State-ownership to a local agency or private owner. Ms. Murray assisted with preparation of a detailed significance evaluation for the Santa Barbara Armory in the consideration NRHP, CRHR, CHL, and City of Santa Barbara designation criteria and integrity requirements. SHPO concurred with the evaluation findings and had no comments.

Department of General Services Historical Resource Evaluation for the Normal Street Department of Motor Vehicles Site at 3960 Normal Street, San Diego, California (2017). Dudek was retained by the State of California Department of General Services to complete a Historical Resources Technical Report for a project that proposes demolition and replacement of the Department of Motor Vehicles (DMV) building located at 3960 Normal Street in the City of San Diego. To comply with Public Resources Code Section 5024(b), DGS must submit to the State Historic Preservation Officer (SHPO) an inventory of all structures over 50 years of age under DGS's jurisdiction that are listed in or that may be eligible for inclusion in the National Register of Historic Places (NRHP), or that may be eligible for registration as a California Historical Landmark (CHL). The DMV was found not eligible. Ms. Murray provided QA/QC of the historical resource technical report.

Transportation

Princeton Avenue Road Widening Project, City of Moorpark, Ventura County, California (in progress). Dudek was retained by Stantec and the City of Moorpark to prepare Caltrans-compliant cultural resource documentation for the Princeton Avenue Road Widening Project. The project includes approximately 0.75-miles of roadway widening and improvements, including sidewalks and bicycle lanes.

Dudek prepared an ASR, HRER, and HPSR in support of this effort. Ms. Murray prepared the HRER and HPSR, which included evaluation of two industrial properties on Princeton Avenue. Both properties were found ineligible under all designation criteria and integrity requirements. As a Principal Architectural historian, Ms. Murray was also able to exempt several properties from evaluation that were less than 50 years old or heavily altered. The reports are currently pending Caltrans District 7 approval.

Silverado Canyon Road Over Ladd Creek Bridge Replacement Project, Orange County Public Works, Caltrans District 12, California (in progress). Orange County Public Works (OCPW) proposes to remove and replace the existing Silverado Canyon Road as it passes over Ladd Creek on the proposed project at a location slightly east of the intersection of Ladd Canyon Road and Silverado Canyon Road. Caltrans District 12 required preparation of an ASR and HPSR. Ms. Murray developed the project's area of potential effects map, reviewed the project area for historical resources, and assisted with finalizing the HPSR.

Historical Resources Assessment for the SFO Residential Sound Insulation Program, Cities of San Bruno and Millbrae, San Mateo County, California (2017). Dudek was retained by San Francisco International Airport (SFO) to evaluate 28 residential properties constructed 50 years ago or more within the cities of San Bruno and Millbrae, in San Mateo County, California. These properties are proposed to receive installation of sound insulation materials as part of SFO's Residential Sound Insulation Program. All 28 properties were recorded and evaluated on State of California Department of Parks and Recreation Series 523 Forms for historical significance in consideration of National Register of Historic Places (NRHP) designation criteria and integrity requirements. Ms. Murray co-authored the technical report and provided QA/QC.

California Boulevard Roundabout Project, OmniMeans, Caltrans District 4, City of Napa, California (2016). The California Department of Transportation (Caltrans) and the City of Napa worked together to deliver a cooperative project encompassing three intersections: First Street/California Boulevard, Second Street/California Boulevard, and State Route 29 (SR-29) northbound off-ramp/First Street. The City of Napa (City) proposed improvements at the First Street/California Boulevard and Second Street/California Boulevard intersections within the County of Napa. It was proposed to reconfigure these two intersections to improve traffic operations and accommodate the reversal in travel direction on First and Second Streets between California Boulevard and Jefferson Street. The project also proposes to modify the SR-29 northbound off-ramp and First Street intersection with a modern roundabout. Ms. Murray served as Principal Architectural Historian and archaeologist, preparing of the Area of Potential Effects (APE) map and subsequent preparation of Caltrans documentation, including an Archaeological Survey Report (ASR), Historical Resources Evaluation Report (HRER), Finding of No Adverse Effect Report (FNAE), and Historic Property Survey Report (HPSR). This included an evaluation of seven previously unevaluated properties for the NRHP and CRHR, and consideration of impacts to the West Napa Historic District.

SR-86 and Neckel Road Intersection Improvements and New Traffic Signal Light Project, Caltrans District 11, City of Imperial, California (2015). Ms. Murray served as Principal Architectural Historian, and author of the HPSR and Finding of No Adverse Effect document. The project involved an intensive field survey, Native American and historic group coordination, a records search, and recordation and NRHP and CRHR evaluation of two historic drainage canals proposed for improvement as part of Caltrans intersection improvement project. All documents were signed and approved by Caltrans District 11 and the Caltrans Cultural Studies Office.

Water/Wastewater

Morena Reservoir Outlet Tower Replacement Project, City of San Diego, California (2016). Ms. Murray evaluated the 1912 Morena Dam and Outlet Tower for NRHP, CRHR, and local level eligibility and integrity requirements. The project entailed conducting extensive archival research and development research at City archives, libraries, and historical societies, and preparation of a detailed historic context statement on the history of water development in San Diego County.

69th and Mohawk Pump Station Project, City of San Diego, California (2015). Ms. Murray served as architectural historian and lead author of the Historical Resource Technical Report for the pump station building on 69th and Mohawk Street. Preparation of the report involves conducting extensive building development and archival research on the pump station building, development of a historic context, and a historical significance evaluation in consideration of local, state, and national designation criteria and integrity requirements.

Pump Station No. 2 Power Reliability and Surge Protection Project, City of San Diego, California (2015). Ms. Murray served as architectural historian and prepared an addendum to the existing cultural resources report in order to evaluate the Pump Station No. 2 property for NRHP, CRHR, and local level eligibility and integrity requirements. This entailed conducting additional background research, building development research, a supplemental survey, and preparation of a historic context statement.

Bear River Restoration at Rollins Reservoir Project, Nevada Irrigation District, Nevada and Placer Counties, California (2014). Ms. Murray served as architectural historian and co-author of the Cultural Resources Inventory Report. Ms. Murray conducted background research on the 1963 Chicago Park Powerhouse Bridge and prepared a historic context for the Little York Township and Secret Town Mine.

Otay River Estuary Restoration Project (ORERP), Poseidon Resources, South San Diego Bay, California (2014). Ms. Murray served as architectural historian for the documentation of Pond 15 and its associated levees. The project proposes to create new estuarine, salt marsh, and upland transition habitat from the existing salt ponds currently being used by the South Bay Salt Works salt mining facility. Because the facility was determined eligible for listing in the NRHP, the potential impacts caused by breeching the levees, a contributing feature of the property, had to be assessed.

Other Project Experience (2008-2014)

LADPW BOE Gaffey Pool and Bathhouse Project, Los Angeles County, California (2014). Ms. Murray served as project manager, field director for the intensive-level cultural resources survey, and primary author of the cultural resources technical report. Ms. Murray reviewed proposed design plans for new construction within an NRHP-listed historic district for conformance with the Secretary of the Interior's Standards. The LADPW BOE proposed to conduct various improvements to the Gaffey Street Pool and surrounding area, located in Upper Reservation of Fort McArthur in San Pedro, California.

Metro Green Line to LAX Project (2013-2014). Ms. Murray served as project manager for a multi-disciplinary project that includes cultural resources, biology, and paleontology. The Los Angeles County Metropolitan Transportation Authority (Metro), Federal Transit Administration (FTA), Federal Aviation Administration (FAA) and Los Angeles World Airports (LAWA) have initiated an Alternatives Analysis (AA)/Draft EIS/Draft EIR for the Metro Green Line to Los Angeles International Airport (LAX) project. The AA/DEIS/DEIR is being prepared to comply with NEPA and CEQA. This study will examine potential connections between the planned Metro Crenshaw /LAX Transit Corridor Project's Aviation/Century

Station and the LAX Central Terminal Area (CTA) located approximately one mile to the west. Client: Terry Hayes Associates.

LADPW BOE Downtown Cesar Chavez Median Project, Los Angeles County, California (2013). Ms. Murray served as field director for the intensive-level cultural resources survey, and co-author of the Caltrans ASR and HRER. The City of Los Angeles Department of Public Works (LAPDW), Bureau of Engineering (BOE), proposes to provide for transportation enhancements along West Cesar Chavez Boulevard in the downtown area of Los Angeles. Client: LADPW BOE, Lead Agency: Caltrans, District 7.

Edwards Air Force Base Historic Context and Survey, Multiple Counties, California (2013). Ms. Murray served as lead architectural historian and project manager for survey and evaluation of 17 buildings and structures located throughout the base, and preparation of a Cold War historic context statement, an analysis of property types, and registration requirements for all built environment resources on base. Client: JT3/CH2M Hill.

San Gabriel Trench Grade Separation Project (Phases I, II, and III); Cities of San Gabriel, Alhambra, and Rosemead, Los Angeles County, California (2008–2010, 2011-2014). Ms. Murray served as Archaeologist, Architectural Historian, and Osteologist throughout various stages of the project. The project consisted of conducting a cultural resources assessment for a proposed grade separation located within the cities of San Gabriel, Alhambra, and Rosemead. The proposed project would lower a 2.2 mile section of Union Pacific Railroad tracks in the immediate vicinity of the historic Mission San Gabriel Arcángel. Ms. Murray was involved in both the archaeological and architectural history components of this project. This includes the archaeological and architectural history field surveys, archaeological testing of the site and completion of over 100 DPR forms for the evaluation of built environment resources. She also served as the on-site human osteologist. Client: Terry A. Hayes Associates, LLC. Agency: Caltrans.

Azusa Intermodal Parking Facility Project, Azusa, Los Angeles County, California (2012). Ms. Murray served as field director, assistant project manager, and primary report author for the intensive-level cultural resources survey and cultural resources technical report, which included evaluation of several built environment resources adjacent to an existing NRHP district. The City of Azusa proposed to construct an approximately 39-foot high, four-story parking structure, bus bays for passenger loading/unloading for layovers, and electric charging stations for patrons of the future Gold Line Foothill Extension Azusa Station. Client: Terry Hayes Associates.

Terminal Island Historic Building Evaluations, Los Angeles County, California (2011). Ms. Murray served as project manager, field director for the architectural history survey, and primary author of the technical report. She formally evaluated 16 Port of Los Angeles-owned properties on Terminal Island for NRHP and CRHR eligibility, as well as local level eligibility. Client: CDM; Port of Los Angeles.

LOSSAN San Luis Rey River and Second Track Project, Oceanside, San Diego County, California (2011). Ms. Murray served as primary author for the technical report and conducted the intensive-level cultural resources field survey. The project proposes to construct a new 0.6-mile section of double-track to connect two existing passing tracks, and replace the existing San Luis Rey River Bridge. She prepared the cultural resources technical report and evaluated the bridge for NRHP, CRHR, and local level criteria and integrity requirements. Client: HNTB Corporation.

LADPW BOE San Pedro Plaza Park Project, Los Angeles County, California (2011). Ms. Murray served as project manager, field director for the intensive-level cultural resources survey, and primary author of the cultural resources technical report. She evaluated the entire park for local, CRHR, and NRHP eligibility and integrity requirements. The LADPW BOE proposed to conduct various outdoor improvements to the San Pedro Plaza Park. Client: LADPW BOE.

Crenshaw /LAX Transit Corridor Project, Los Angeles County, California (2011). Ms. Murray supervised architectural history survey and participated in the evaluation of over 100 built environment resources that may be affected by the Los Angeles County Metropolitan Transportation Authority's (Metro's) proposed Crenshaw/LAX Transit Corridor Project. The project is approximately 8.5 miles in length and is located within the cities of Los Angeles and Inglewood, Los Angeles County, California. The project was subsequently approved by SHPO with no comments. Client: Terry Hayes Associates, LLC; Agency: Metro.

LOSSAN Control Point San Onofre to Control Point Pulgas Double Track Project, San Diego County, California (2011). Ms. Murray served as field director for the archaeological and architectural history survey and co-authored the technical report. She conducted a survey and evaluation of cultural resources in support of the Los Angeles to San Diego, California (LOSSAN) Control Point (CP) San Onofre to CP Pulgas Double Track Upgrade Project. The project is located within the boundaries of the Marine Corps Base (MCB) Camp Pendleton in Northern San Diego County, on federal land that is part of a long-term lease to the rail operator. Client: HNTB Corporation.

Half Moon Bay Airport Taxiway and Access Road Improvement Project, San Mateo County, California (2010). Ms. Murray served as field director for the archaeological and architectural history survey and co-authored the technical report. She conducted a cultural resources survey of 21.65 acres situated on three areas within the 313-acre airport property, and evaluated airport properties for the CRHR and NRHP. Half Moon Bay Airport is located approximately 5 miles north of the City of Half Moon Bay in unincorporated San Mateo County, California. Client: Coffman Associates.

Sunset Avenue Grade Separation Project, Riverside County, California (2010). Ms. Murray served as field director for the archaeological and architectural history survey and co-authored the ASR, HRER, and HPSR reports. The project involved a proposed grade separation of Sunset Avenue, which crosses the UPRR in the City of Banning, Riverside County. She conducted a 43.6-acre survey for cultural resources, and prepared environmental compliance documentation in accordance with Caltrans. Client: Kimley-Horn and Associates, Inc.; Agency: Caltrans District 8.

Hollister Avenue Bridge Seismic Retrofit Project, Santa Barbara County, California (2010). Ms. Murray supervised the architectural history survey of surrounding properties. The project proposed the seismic retrofit of Union Pacific Railroad (UPRR) Bridge 51C-0018 on Hollister Avenue in an unincorporated area of Santa Barbara County, located between UPRR mile posts 362.08 and 362.41. Client: Santa Barbara County Public Works Department; Agency: Caltrans District 5.

Nogales Grade Separation/Gale Avenue Widening/Evaluation of 938 Nogales Street; City of Industry, Los Angeles County, California (2009). Ms. Murray participated in the architectural history field survey of several properties and co-authored the report. The project consisted of conducting a cultural resources assessment for a proposed grade separation project that would lower Nogales Street beneath the Union Pacific Railroad tracks and widen a 0.83 mile section of Walnut Drive/Gale Avenue located in the City of Industry. Client: Terry A. Hayes Associates, LLC. Agency: Caltrans.

Integrated Cultural Resources Management Plan Update for MCLB Barstow, San Bernardino County, California (2011-2014). Served as project manager for the 2014 ICRMP update of the 2011 ICRMP that she authored. The update includes survey and evaluation of two historic road segments, recordation and preparation of a conditions assessment of the Rattlesnake Rock Art site, and revision of the NRHP nomination for the site. Client: NAVFAC Southwest.

Integrated Cultural Resources Management Plan, Naval Air Station, Lemoore, Kings County, California (2009-2012). Served as project manager and primary author of the Final ICRMP document. The project consists of preparing a management plan for the protection and management of cultural resources located within Naval Air Station, Lemoore. The management plan inventories known cultural resources, summarizes relevant laws and regulations, and establishes management priorities for the installation. Client: NAVFAC SW (U.S. Navy).

Integrated Cultural Resources Management Plan, Naval Weapons Station, Seal Beach, Detachment Corona, Riverside County, California (2009-2011). Served as project manager and primary author of the Advance Draft document. The project consists of preparing a management plan for the protection and management of cultural resources located within Naval Weapons Station, Seal Beach, Detachment Corona. The management plan inventories known cultural resources, summarizes relevant laws and regulations, and establishes management priorities for the installation. Client: NAVFAC SW (U.S. Navy).

Integrated Cultural Resources Management Plan, Naval Weapons Station, Seal Beach, Orange County, California (2009-2011). Served as project manager and primary author of the Advance Draft document. The project consists of preparing a management plan for the protection and management of cultural resources located within Naval Weapons Station, Seal Beach. The management plan inventories known cultural resources, summarizes relevant laws and regulations, and establishes management priorities for the installation. Client: NAVFAC SW (U.S. Navy).

Integrated Cultural Resources Management Plan, Naval Air Weapons Station China Lake; Inyo, Kern, and San Bernardino Counties, California (2009-2011). Served as co-author of the final document. The project consists of preparing a management plan for the protection and management of cultural resources located within Naval Air Weapons Station China Lake. The management plan inventories known cultural resources, summarizes relevant laws and regulations, and establishes management priorities for the installation. Client: NAVFAC SW (U.S. Navy).

Publications

Gross, C., Melmed, A., Murray, S., Dietler, S., and Gibson, H. 2012. *Osteological Analysis In Not Dead but Gone Before:* The Archaeology of Los Angeles City Cemetery, edited by H. Gibson and S. Dietler, AECOM Cultural Heritage Publication Number 4, San Diego.

Murray, S. 2013. *The People of Plaza Church Cemetery (1822-1844):* An Osteological Analysis of Los Angeles' First Cemetery. UMI Dissertation Publishing, ProQuest, LLC., Michigan.

Presentations

***Historical Resources under CEQA*. Prepared for the Orange County Historic Preservation Planner Working Group. Presented by Samantha Murray, Dudek. December 1, 2016.** Ms. Murray delivered a one-hour PowerPoint presentation to the Orange County Historic Preservation Planner Working Group, which included planners from different municipalities in Orange County, regarding the treatment of historical resources under CEQA. Topics of discussion included identification of historical resources, assessing impacts, avoiding or mitigating impacts, overcoming the challenges associated with impacts to historical resources, and developing effective preservation alternatives.

***Knowing What You're Asking For: Evaluation of Historic Resources*. Prepared for Lorman Education Services. Presented by Samantha Murray and Stephanie Standerfer, Dudek. September 19, 2014.** Ms. Murray and Ms. Standerfer delivered a one-hour PowerPoint presentation to paying workshop attendees from various cities and counties in Southern California. The workshop focused on outlining the basics of historical resources under CEQA, and delved into issues/challenges frequently encountered on preservation projects.

Relevant Training

- CEQA and Historic Preservation: A 360 Degree View, CPF, 2015
- Historic Designation and Documentation Workshop, CPF, 2012
- Historic Context Writing Workshop, CPF, 2011
- Section 106 Compliance Training, SWCA, 2010
- CEQA Basics Workshop, SWCA, 2009
- NEPA Basics Workshop, SWCA, 2008
- CEQA, NEPA, and Other Legislative Mandates Workshop, UCLA, 2008

Sarah Siren

Senior Paleontologist

Sarah Siren is a senior paleontologist with 18 years' experience as a paleontological resources consultant. Ms. Siren has served as paleontologist for numerous projects throughout California, with extensive experience in Imperial, Orange, Riverside, Los Angeles, San Bernardino, and San Diego Counties. These projects involved multiple agencies, public and private sector clients, a variety of resources, and multidisciplinary staff supervision. She specializes in California Environmental Quality Act (CEQA) and Bureau of Land Management (BLM) compliance standards. She taught at Saddleback Community College in Mission Viejo, California as an associate geology professor, and worked as a curatorial assistant with the Natural History Museum of Los Angeles County and, more recently, as a field manager with the San Diego Natural History Museum.

While in college pursuing her degrees, she conducted studies at both the Smithsonian Institution and Badlands National Park, and supervised as lead research scientist for various field activities, curation projects, and laboratory preparations. Her diverse experience includes recovering, identifying, mapping, and preparing fossils. Ms. Siren is able to effectively manage projects and complete deliverables from assessments to final technical reports in a timely manner.

EDUCATION

South Dakota School of Mines and Technology
MS, Paleontology, 2002

George Washington University
BS, Geology, 1999
BA, French Language and Literature, 1999

CERTIFICATIONS

Geologist-in-Training, No. 167 California, 2007

Certified GIS Professional (GISP), 2013

40-hour HAZWOPER Training, 2008

Qualified Paleontologist, City of San Diego and Counties of Kern, Los Angeles, Orange, Riverside, San Diego, and San Luis Obispo

AFFILIATIONS

San Diego Natural History Museum, Departmental Associate

Natural History Museum of Los Angeles County, Museum Associate

Society of Vertebrate Paleontology

Geological Society of America

South Coast Geological Society

Project Experience

Development

Sea Summit (Marblehead Coastal), Taylor Morrison, City of San Clemente, California. Served as paleontologist responsible for a paleontological assessment of the 266-acre property and oversight of paleontological resource monitoring during rough grading. Designed and implemented an archaeological survey in consultation with the California Coastal Commission (CCC) and local Native Americans. Survey methods were tailored in response to specific CCC concerns regarding ground surface visibility, historical land use, previously recorded archaeological traces, and diverse development impacts. Successfully developed a detailed archaeological, Native American, and paleontological monitoring and discoveries treatment plan to address CCC, Native American, and City of San Clemente concerns. Prepared final technical report for submittal to the City of San Clemente as a condition of occupancy.

Patton State Hospital Project, California Department of General Services, County of San Bernardino, California. As project manager and principal investigator, supervised the cultural and paleontological resources mitigation program during construction improvements to the facility in accordance with the mitigation measures and treatment plan for the project.

Tejon Mountain Village, Tejon Mountain Village LLC, County of Kern, California. Responsible for paleontological resources monitoring during geotechnical drilling within a portion of this 28,000-acre master planned community.

Kettner Lofts Project, Citymark Development, City of San Diego, California. As project manager and principal investigator, responsible for cultural resources construction monitoring during construction of this residential complex located in Little Italy.

Heather Lane Corti Residence, City of Del Mar, California. As project manager and principal investigator, responsible for cultural and paleontological resources construction monitoring for residential development located in the City of Del Mar.

1902 Grandview Street, City of Oceanside, California. Provided a paleontological resources review for the tentative tract map location, including management considerations and recommendations.

Winchester 1800 Project, City of Temecula, California. Project manager and principal investigator responsible for a paleontological resources survey and report prepared for this development located in the City of Temecula. Also provided editorial comments on the cultural resources report for the same project.

Mira Loma Commerce Center, County of Riverside, California. Project manager and principal investigator, responsible for cultural and paleontological resources monitoring during the construction of two commercial buildings on 31 acres and completion of a final technical report.

Palm Avenue Distribution Center, IDS Real Estate Group, City of San Bernardino, California. Project manager and principal investigator, responsible for preparation of a field survey report, cultural and paleontological resources monitoring program, and final report for this warehouse/distribution center construction.

Otay Ranch, Parcels B (Village 8 West) and C (Village 9), Otay Land Company, City of Chula Vista, California. As field manager and co-principal investigator, conducted the pedestrian field survey of an approximately 600 acre site in the City of Chula Vista. Ms. Siren also co-authored the paleontological assessment for the project.

Olympic Pointe (East and West) Project, Alta Geotechnical Inc., City of Chula Vista, California. As field manager and co-principal investigator, responsible for oversight of field studies conducted as part of the paleontological mitigation program for the project. The findings of this paleontological mitigation program were included in a final technical report co-authored by Ms. Siren.

Beaumont Four Seasons, K. Hovnanian, Beaumont, California. As project manager and principal investigator, responsible for paleontological resources mitigation program on this approximately 600-acre residential community.

Terranea, Lowe Destination Development, City of Rancho Palos Verdes, California. As project manager, provided comprehensive archaeological and paleontological consultation services for this planned resort property located on the Palos Verdes Peninsula. This project site was known to be both archaeologically and paleontologically sensitive and yielded fossils and artifacts. Responsible for overseeing the cultural and paleontological resource management, and co-authored the final report.

Portola Springs (Planning Area 6), The Irvine Company, City of Irvine, California. As project manager, provided comprehensive paleontological consultation services for a large-scale development. This project yielded fossils that dated from the Cretaceous age (over 65 million years ago) deposits through the Pleistocene age (until 11,000 years ago). Responsible for overseeing the paleontological resource management, including large fossil salvages and monitoring during rough grading. Evaluation studies are in progress and large-scale mitigation efforts are ongoing.

Orchard Hills (Planning Area 1), The Irvine Company, City of Irvine, California. As project manager, responsible for archaeological and paleontological services provided during rough grading at Fire St. #55 for Irvine Community Development Company (ICDC).

607 Kings Road, City of Newport Beach, California. Served as paleontologist for fossil salvage of a Pleistocene baleen whale skull from a private residence for the City of Newport Beach. Was instrumental in coordinating with the City, the property owner, and the Los Angeles Times journalists who covered the breaking news story.

Pelican Hill, The Irvine Company, City of Newport Beach, California. Managed the on-site paleontological mitigation program operated by Stantec for the Pelican Hill Project in Newport Beach, Orange County, California. In accordance with local and state guidelines, supervised the recovery of over 200 fish fossils from the middle to late Miocene marine Monterey Formation, and both terrestrial and marine specimens from the overlying Pleistocene age terrace deposits.

The Preserve at Mystic Ridge, City of Moreno Valley, California. This project consists of approximately 700 lots ranging from condos to large single-family estates within the existing Quail Ranch Golf Club. Project entitlements will include an EIR, Change of Zone, and Tentative Tract Map through the City of Moreno Valley concurrently with an annexation application including a Plan of Services through LAFCO and a land exchange with California Department of Fish and Wildlife. Mrs. Siren was responsible for a paleontological assessment of the 200-acre property, and oversight during paleontological resource monitoring of geotechnical bore hole drilling and trenching.

Shady Canyon, The Irvine Company, City of Irvine, California. Assumed supervisory role of a 4-year monitoring project during mass grading for the Shady Canyon residential community. During that time, the majority of the fossils salvaged by paleontological monitors were from the Vaqueros Formation. These marine sediments yielded a relatively complete skull of a new species of primitive baleen whale, in addition to mollusks, echinoderms, sharks, fishes, a marine bird, and mammals that lived in the early Miocene ocean, approximately 20 to 23 million years ago. The collection has been reported on and placed in the Natural History Museum of Los Angeles County at Exposition Park.

Turtle Ridge, The Irvine Company, City of Irvine, California. Supervised paleontological monitoring during rough grading for this large residential community. Monitoring personnel collected a variety of marine fossils during the course of the project. Most notable was the complete skull of a primitive tusked sea cow (*Dioplotherium)* from the Topanga Formation; this skull was prepared in the Stantec paleontological laboratory, reported on, and placed at the Smithsonian Institution, Washington, DC, for further research.

Vellano Project, Chino Hills Land West LLC, City of Chino Hills, California. Supervised paleontological monitoring services for this 570-acre property during mass grading. Over 2,000 fossil fish specimens were collected, which expanded the known species recorded from the Puente Formation. This residential community project afforded the rare opportunity to monitor Miocene sediments for the presence of marine fossils. Also collected on this project were Ice Age mega fauna remains, most notably the best-preserved Shasta ground sloth skull outside Rancho La Brea and a large bison femur. The most complete dolphin skeleton ever recovered from the Pacific region was collected during the course of this project and is described as a newly discovered species of kentriodontid dolphin by Dr. Barnes of the Natural History Museum of Los Angeles County. A replica of this animal is currently on display at the City of Chino Hills City Hall. The collection was placed at the Natural History Museum of Los Angeles County.

Planning Areas 18 and 39 (Verizon Amphitheater and Wild Rivers) City of Irvine, California. Stantec performed historical, archaeological, and paleontological technical studies for the EIRs prepared in accordance with CEQA Guidelines. Records research, Native American consultation, archaeological surveys, and paleontological assessments were conducted to identify and evaluate cultural and paleontological resources within and near two adjacent project sites. Three 20th century historical resource sites, four prehistoric Native American archaeological sites, and three paleontologically sensitive geologic formations were identified and evaluated. The technical reports analyzed proposed project impacts and provided mitigation measures.

Planning Area 9A – Woodbury, The Irvine Company, City of Irvine, California. Planning Area 9A – Woodbury, Irvine, California (Project Paleontologist) Responsible for providing services including monitoring and collection of any archaeological or paleontological material found at Planning Area 9A – Phase I and Phase II (Woodbury). Fossils collected were discovered within Ice Age deposits, and included specimens of bison, camel, tapir, horse, sloth, and mammoth. All work was designed to comply with the California Environmental Quality Act, County Guidelines, and City Mitigation Measures.

Aliso Creek, County of Orange, California. Responsible for field survey and analysis of surface fossils exposed in the creek noted in a newspaper article. The fossil whale skull pictured in the article was that of a right whale preserved within the Oso Sandstone Member of the Capistrano Formation. Other fossils included a jawbone from a small baleen whale (*Herpetocetinae*). These specimens were later jacketed and airlifted by helicopter for transport to the Orange County facility for storage.

Education

Fullerton College Master Plan Program EIR, North Orange County Community College District, Cypress, California. Paleontologist for the Facilities Master Plan Program EIR. Issues include historic building preservation, traffic, and parking, and adjacent neighbor concerns associated with noise, traffic, parking, and growth inducement.

Coast Community College District, County of Orange, California. As project manager and co-principal investigator, conducted the field surveys and prepared the paleontological resources assessments for Orange Coast College, Golden West College, and Coastline Community College for submittal to Dudek.

Thomas Jefferson School of Law Project, Thomas Jefferson School of Law, City of San Diego, California. As field manager, conducted multiple fossil salvages for this East Village project site. A mammoth skull, tusks, and partial skeleton were recovered and are currently awaiting preparation. In addition, a partial gray whale (*Eschrichtius robustus*) skeleton was discovered at the site and is housed at the museum's storage facility.

San Ysidro School District (SYSD) Vista Del Mar School, RBF, County of San Diego, California. As field manager and co-principal investigator, responsible for preconstruction WEAP training and supervision of paleontological monitoring program for the project. A series of fossil producing strata were discovered and collected from approximately 2–3 million year old San Diego Formation consisted of significant fossil remains of marine invertebrates.

Energy

California Flats Solar Project, First Solar/NextEra, Counties of Monterey and San Luis Obispo, California. As project manager and principal investigator, supervised the cultural and paleontological resources mitigation program in accordance with the mitigation measures and treatment plan for the project.

McCoy Solar Project, First Solar, County of Riverside, California. Managed cultural and paleontological resource staff during construction of this 250-megawatt (MW) solar photovoltaic facility located in easternmost Riverside County. As the BLM-permit holder, served as principal investigator for paleontology and paleontological resources compliance manager.

Imperial Solar Energy Center West Project, First Solar, County of Imperial, California. Managed cultural and paleontological resource staff during construction of this 250-MW solar photovoltaic facility located in Imperial County. Mitigation was conducted in accordance with the Conditional Use Permit (CUP) for the project, including screenwashing of sediment samples collected during excavation.

Jacumba Solar, County of San Diego, California. As senior paleontologist, provided paleontological resources recommendations and guidelines during the design phase of this project, and oversite during mitigation monitoring.

San Joaquin Cross Valley Loop Project, Southern California Edison (SCE), City of Visalia, California. As project manager, co-authored the final technical report on paleontological resources for the San Joaquin Cross Valley Loop Project in Tulare County, California. The final report was written in compliance with CEQA and Tulare County guidelines for approval by the California Public Utilities Commission (CPUC).

Valley South Subtransmission Line Project, SCE, County of Riverside, California. As project manager, conducted a field survey and co-authored the paleontological resources survey report in advance of proposed construction along the approximately 17.76 miles of subtransmission line in Riverside County, California. The final preliminary environmental assessment (PEA) was written in compliance with CEQA and Riverside County guidelines for approval by the CPUC.

Stateline Solar Farm Project, First Solar, County of San Bernardino, California. As project manager and co-principal investigator, prepared the paleontological resources plan and provided technical review and editorial comments on the field survey report for this project located on BLM-managed land.

Antelope Valley Solar Ranch Project, Sun Power, Counties of Los Angeles and Kern, California. As field manager and co-principal investigator, supervised the paleontological mitigation program in accordance with the paleontological monitoring and treatment plan for the project.

California Valley Solar Ranch Project, NRG/Sun Power, County of San Luis Obispo, California. As field manager and co-principal investigator, supervised the paleontological mitigation program in accordance with the paleontological monitoring and treatment plan for the project.

Sunrise Powerlink, San Diego Gas and Electric (SDG&E), Counties of San Diego and Imperial, California. As field manager and co-principal investigator, responsible for implementation of the field mitigation program for the project. Additionally, aided in the preparation of the SDG&E Sunrise Powerlink

Paleontological Records Search, Monitoring and Treatment Plan, and co-authored Final Technical Report on paleontological resources for submittal to the BLM.

Paleontological Services On-Call Contract, SDG&E, Counties of San Diego and Imperial, California. As field manager investigator, responsible for oversight of paleontological monitoring being conducted as part of several work orders for SDG&E. Over thirty work orders ongoing or completed under the on-call contract. Also responsible for co-authoring final project reports (both mitigation and assessment).

Ocotillo Express Wind Project, Insignia Environmental, County of Imperial, California. As field manager and co-principal investigator, responsible for obtaining the BLM permit and assisting the Project Manager in preparation of a Paleontological Monitoring and Treatment Plan for the project. Additionally responsible for oversight of paleontological monitoring by another consultant during construction related activities on the project.

SDG&E East County (ECO) Substation Project, Insignia Environmental, County of San Diego, California. As field manager and co-principal investigator, co-authored the paleontological resources mitigation plan which was accepted by the BLM. She was also responsible for supervising the paleontological monitoring on this project located in eastern San Diego County, California.

Tehachapi Renewable Transmission Project (TRTP), Pacific Legacy, Counties of Kern, Los Angeles, and San Bernardino County, California. As project manager and principal investigator, evaluated paleontological resource discoveries during construction for this multiyear SCE project. Excavation activities within the Miocene-age Puente Formation in Los Angeles and San Bernardino counties had the potential to yield scientifically significant fossils during construction on this large-scale project.

CSE Centinela Solar Farm, kp environmental, County of Imperial, California. As field manager and co-principal investigator, responsible for obtaining the BLM permit and assisting in review of the assessment and paleontological monitoring and treatment plan for the project. A series of fossil producing strata were discovered and collected from ~14,000 to 7,000 year old lacustrine sedimentary rocks ancient Lake Cahuilla. Recovered fossils consisted of significant fossil remains of late Pleistocene- to early Holocene-age marine invertebrates.

Simbol Calipatria Plant I Project, Ecology and Environment, County of Imperial, California. As field manager and co-principal investigator, responsible for oversight of field studies conducted on Energy Source LLC's property within the Salton Sea Known Geothermal Resource Area. She also co-authored the paleontological assessment for the project.

Hudson Ranch II Geothermal Project, Ecology and Environment, County of Imperial, California. As field manager and co-principal investigator, responsible for oversight of field studies conducted as part of the paleontological assessment of the project. The paleontological assessment program included completion of a paleontological records search and literature review, completion of a field survey, and preparation of a final report summarizing findings and proposing appropriate mitigation measures to reduce potential adverse impacts to a level below significance. The findings of this paleontological assessment report indicated that the potential adverse impacts to a variety of marine and non-marine sedimentary rocks could be avoided.

Imperial Irrigation District (IID) Imperial to Dixieland 230 kilovolt Transmission Line and Expansion of Dixieland Substation, AECOM, County of Imperial County, California. As field manager and co-principal investigator, responsible for field studies oversight and preparation of the paleontological assessment report. The paleontological assessment program included completion of a paleontological records search and literature review, completion of a field survey, and preparation of a final report summarizing findings and proposing appropriate mitigation measures to reduce potential adverse impacts to a level below significance. The findings of this paleontological assessment report indicated that the potential adverse impacts to a variety of marine and non-marine sedimentary rocks could be avoided.

SCG Imperial Valley Loop, Insignia Environmental, City of Brawley, California. As field manager, responsible for oversight of monitoring and fossil salvage being conducted on site by another consultant. Mitigation efforts consisted of monitoring during mass grading activities, recovery of fossils discovered, laboratory preparation and curation of fossils, and preparation of the final report. A series of fossil producing strata were discovered and collected from ~14,000 to 7,000 year old lacustrine sedimentary rocks ancient Lake Cahuilla. Recovered fossils consisted of significant fossil remains of late Pleistocene- to early Holocene-age marine invertebrates.

Municipal

Block 4N (North Encanto) Project, City of San Diego, California. As project manager and principal investigator, responsible for archaeological and paleontological monitoring for underground conduit system installation by SDG&E for the City of San Diego in the neighborhood of Encanto. A marine mollusk and vertebrate assemblage was recovered from the San Diego Formation. Ms. Siren served as the primary author of the report. Specimens were prepared and curated according to the City of San Diego and the San Diego Natural History Museum's guidelines for paleontology.

Transportation

Mid-Coast Corridor Transit Project, City of San Diego, California. As project manager and principal investigator, responsible for cultural and paleontological resources construction monitoring during excavation for this San Diego Association of Governments (SANDAG) project.

San Elijo Lagoon Double Track Project, AECOM, City of Encinitas, California. As project manager and principal investigator, responsible for cultural and paleontological resources construction monitoring during excavation on this SANDAG project.

Keller Road and I-215 Interchange Project, Jacobs Engineering and California Department of Transportation (Caltrans), City of Murrieta, California. As project manager and principal investigator for cultural and paleontological resources on this interchange project for the City of Murrieta, conducted the field survey and drafted a report in accordance with the Caltrans Standard Environmental Reference.

California High-Speed Rail Project Construction Package 2–3, Fresno to Bakersfield, Dragados/Flatiron Joint Venture, Fresno to Bakersfield, California. Managed cultural and paleontological resource staff on the Fresno to Bakersfield Section of the project. Responsible for Worker Environmental Awareness Program (WEAP) training and Paleontological Resources Mitigation and Monitoring Plan (PRMMP) consistent with the Final Environmental Impact Report (EIR)/Environmental Impact Statement (EIS) created for the project.

Old Otay Mesa Road Improvement Project, City of San Diego, California. As project manager and principal investigator, responsible for cultural and paleontological resources construction monitoring during excavation on this City of San Diego project.

Mid-City Bus Rapid Transit Project, City of San Diego, California. Co-authored the paleontological evaluation report for the Caltrans District 11. Completed the field survey for the study, and made recommendations for future mitigation monitoring in accordance with the Standard Environmental Reference for Paleontology. Responsible for WEAP training preconstruction and paleontological resources monitoring during excavation by Granite Construction on this SANDAG project.

Paleontological Services On-Call Contract, Caltrans, Counties of San Diego and Imperial, California. As field manager investigator, responsible for oversight of paleontological monitoring being conducted as part of Caltrans road improvement projects along the SR-52, SR-76, SR-78, SR-94, SR-805, SR-905, and I-15 freeways. Numerous concurrent work orders were issued and completed under the on-call contract. Also responsible for co-authoring final project reports (both mitigation and assessment).

SR-210 Mixed Flow Lane Addition from Highland Avenue to San Bernardino Avenue, County of San Bernardino, California. Conducted field survey and co-authored the Paleontological Identification and Evaluation Report for submittal to Caltrans District 8.

I-15/Limonite Avenue Interchange Improvements Project, County of Riverside, California. Conducted field survey and co-authored the Paleontological Identification and Evaluation Report for submittal to the California Department of Transportation (Caltrans) District 8.

SR-76/I-15 Interchange Improvement Project, Caltrans, City of San Diego, California. During grading by Flatiron Construction for the Caltrans District 11 roadway improvements to the SR-76/I-15 interchange, field manager responsible for recovery of a nearly complete skull and postcrania of a long-horned bison (*Bison latifrons*).

Water/Wastewater

North City Pure Water Conveyance Project, City of San Diego, California. Served as project manager and principal investigator on this public works project. Responsible for managing cultural and paleontological resources studies for a new underground pipeline with improvements to existing infrastructure.

Cultural Resources Support for Master Stormwater System Maintenance Program (MSWSMP), County of San Bernardino, California. As project manager and principal investigator for paleontology, responsible for the review and edit of the paleontological resources assessment of approximately 500 flood control facilities within San Bernardino County. The scope of services included providing a mitigation monitoring plan should monitoring and collection of paleontological resources be necessary.

Little Lake Line B Town Drain System Construction Project, Riverside County Flood Control and Water Conservation District, California. Served as project manager and principal investigator on this public works project. Responsible for managing cultural and paleontological resources monitoring for a new underground pipeline.

North Broadway Pipeline, City of Escondido, California. Served as principal investigator and paleontologist on this project. Managed mitigation monitoring project for this water pipeline project traversing Quaternary older alluvial deposits within the City of Escondido.

Los Angeles Department of Power and Water (LADWP) Path 46 Transmission Line Project, Environmental Science Associates (ESA), County of San Bernardino County, California, and Clark

County, Nevada. As project manager and principal investigator, reviewed the final survey report for submittal to the client. Co-authored annual report for submittal to the BLM.

San Vicente Dam Raise Project, San Diego County Water Authority (SDCWA), County of San Diego, California. As field manager and co-principal investigator, Ms. Siren conducted the field survey and co-authored the paleontological resources assessment report.

South Orange County Water Authority (SOCWA) Coastal Treatment Plant, County of Orange, California. As field manager and co-principal investigator, Ms. Siren conducted the field survey and co-authored the paleontological resources assessment report.

Otay Water Treatment Plant, ICF International Inc., County of San Diego, California. As field manager and co-principal investigator, Ms. Siren co-authored the paleontological resources final technical report which was accepted by the Otay Water District. She was also responsible for supervising the paleontological monitoring on this project located in eastern San Diego County, California.

Holly Hills Storm Drain Project, Los Angeles Department of Public Works, Los Angeles County, California. As project manager and paleontologist, responsible for providing on-call paleontological monitoring. The scope of services included providing on-site monitoring and collection of archaeological or paleontological resources found. Evaluated and prepared salvaged fossils in compliance with CEQA guidelines. Wrote quarterly reports on the findings.

Relevant Previous Experience

Paleo Solutions Inc., City of Monrovia, California. Served as project manager/principal investigator of paleontology responsible for managing projects and report preparation for private and public sector projects located throughout California. (2013–2014)

San Diego Natural History Museum, City of San Diego, California. Served as paleontological field manager responsible for managing field operations and preparing reports for the Department of PaleoServices projects in Central and Southern California. (2008–2013)

Natural History Museum of Los Angeles County, City of Los Angeles, California. Served as curatorial assistant responsible for assisting collections manager with curation; is well versed in the latest preparation and casting and molding techniques. (2007–2008)

Saddleback College, City of Mission Viejo, California. Served as associate professor responsible for teaching fossil preparation techniques in addition to leading lecture classes for the Department of Geology. (2004–2008)

Stantec Consulting Inc., City of Irvine, California. Served as project manager/paleontologist responsible for managing field operations for multiple projects throughout Southern California. (2003–2008)

South Dakota School of Mines and Technology, Rapid City, South Dakota.

- Served as research scientist I. Assisted the collections manager/preparatory in several field activities, curation projects, and laboratory preparation. (Summer 2002)
- Served as graduate research assistant. Prepared, identified, mapped, and curated fossils from new bone beds located during the 2000 and 2001 summer field seasons of the Natural Resources Preservation Program (NRPP) Project. (Fall 2001 and Spring 2002; Fall 2000 and Spring 2001)

- ≠ Served as fossil resource monitor. Monitored potentially fossiliferous areas in the Badlands National Park for construction crews. (May 2001 and 2002)
- ≠ Served as co-principal investigator. Assisted with the NRPP 2001 project in the Badlands National Park by filling administrative duties, mapping using aerial photos and GPS unit, and collecting and preparing fossils for transport to the Museum of Geology in Rapid City, South Dakota. (Summer 2001)
- ≠ Served as paleontological supervisor. Interpreted fossil remains for tourists visiting an ongoing excavation site in the Badlands National Park, filled administrative duties, and collected and prepared fossils for transport to the Museum of Geology (Summer 2001).
- ≠ Served as research assistant at the Badlands National Park for Museum of Geology Bone Bed Project.. (Summer 2000)
- ≠ Served as fossil interpreter/paleontologist at the Pig Dig, Badlands National Park. (Summer 1999 and 2000)
- ≠ Served as graduate research assistant at the Museum of Geology/Department of Geology and Geological Engineering. (Fall 1999 and Spring 2001)
- ≠ Attended field paleontology course. (2000)

National Museum of Natural History, Smithsonian Institution, Invertebrate Paleobiology Department, Washington, DC. Served as a contract employee. Identified microfossil species for stable isotope analysis and sorted microfossils based on morphology for population studies. (1998–1999)

Disability Services, George Washington University, Washington, DC. Served as a tutor to students in Physical and Historical Geology. (1998–1999)

Field Paleontology in the Bahamas. *Cerion* snail fossil collection and documentation on various islands such as Cat Island and Long Island, for Stephen J. Gould. (1998)

National Science Foundation Research Experience for Undergraduates, Green River, Wyoming. Served as field participant. Prospected and collected fossils for the Natural Science Museum, Michigan. Prepared a report on the results of activities and presented it to her peers. (1997)

Vertebrate Paleontology Laboratory, National Museum of Natural History, Smithsonian Institution, Washington, DC. Served as a volunteer in the department and prepared fossil samples of vertebrates for study. (1997)

Specialized Training

- ≠ Geology field course, Lehigh University, 1999.

Publications

Black, S.A., C.L. Herbel, and R.C. Benton. 2001. "Bone Beds in the Lower Scenic Member, Brule Formation (*Oligocene*), Badlands National Park, South Dakota." Abstract. Poster presentation at the Sixty-First Annual Society of Vertebrate Paleontology Meeting, Bozeman, Montana.

Deering, M.R., L.G. Barnes, S.A. Siren, S.A. McLeod, M.O. Walsh, and K.R. Rice. 2007. "A Fossil Ziphiid Whale (*Cetacea*: *Odontoceti*) from the Latest Miocene Capistrano Formation in Southern Orange County, California." Los Angeles, California: Southern California Academy of Sciences.

Deering, M.R., M.L. Kearin, S.A. Black, and L.G. Barnes. 2004. "An Archaic Baleen-Bearing Mysticete Whale Resembling *Eomysticetus* from the Lower Miocene Vaqueros Formation in Southern California." Abstract. Western Association of Vertebrate Paleontologists, Annual Meeting, Occidental College. February 14, 2004.

Deméré, T.A., K.A. Randall, B.O. Riney, and S.A. Siren.[1] 2013. Forthcoming. "Discovery of remains of an extinct giant bison (*Bison latifrons*) in Upper Pleistocene (*Rancholabrean*) fluvial strata in the San Luis Rey River Valley, San Diego County, California, USA." In *Alternative Rocks: The Geology and Natural Resources Above and Below the San Luis Rey River Valley, Northern Dan Diego County, California*, edited by B. Olson. San Diego, California: San Diego Association of Geologists Field Trip Guide.

Herbel, C.L., R.C. Benton, and S.A. Black. 2002. "Bone Bed Surveys: Making Use of the Data." Abstract. Geological Society of America Annual Meeting, Abstracts with Programs 34, no. 6, paper no. 237–5.

Santos, Comer, K. S. Siren, A. Nouri, T. Deméré, and Randall, K. 2010. "Paleontological Sensitivity Map for San Diego County: A Categorical Risk Analysis." ESRI Users Conference, Map Gallery Poster.

Siren, S.A. 2006. "Site Analysis of the Buffalo Alley Bone Bed Located in the Lower Scenic Member of the Brule Formation (*Oligocene*), Badlands National Park, South Dakota." Abstract. Poster presentation at the Sixty-Sixth Annual Society of Vertebrate Paleontology Meeting, Ottawa, Ontario, Canada.

Awards

SDNHM Staff Appreciation Award, 2012.

SDSM&T Award for Outstanding Contributions to Campus Leadership, April 2001 and 2002.

1 Née S.A. Black.

APPENDIX B (CONFIDENTIAL)

SCIC Records Search Results

APPENDIX C

NAHC Sacred Lands File Search Results and Tribal Correspondence

DUDEK

MAIN OFFICE
605 THIRD STREET
ENCINITAS, CALIFORNIA 92024
T 760.942.5147 T 800.450.1818 F 760.632.0164

April 6, 2017

Gayle Totton
Associate Government Program Analyst
Native American Heritage Commission

Subject: NAHC Sacred Lands Records Search Request for the East Highline Reservoir Project in El Centro, Imperial County, California

Dear Ms. Totton,

Dudek is conducting a cultural resources inventory for the East Highline Reservoir Project. The approximately 515-acre project site consists largely of lot previously used for agriculture located roughly 15 miles east of El Centro, California (Figure 1, 2, 3). The project is located in Section 25 and 26 of Township 16S, Range 16E and Section 31 of Township 16S, Range 17E on the U.S. Geological Survey (USGS) Midway Well NW and Bonds Corner 7.5' quadrangles.

Dudek is requesting a NAHC search for any sacred sites, traditional cultural properties, or other Native American cultural resources that may fall within a 1-mile buffer of the proposed project location (Figure 1, 2, 3). Please provide contact information for all Native American tribal representatives that should be consulted regarding these project activities. This information can be emailed or faxed to 760-632-0164.

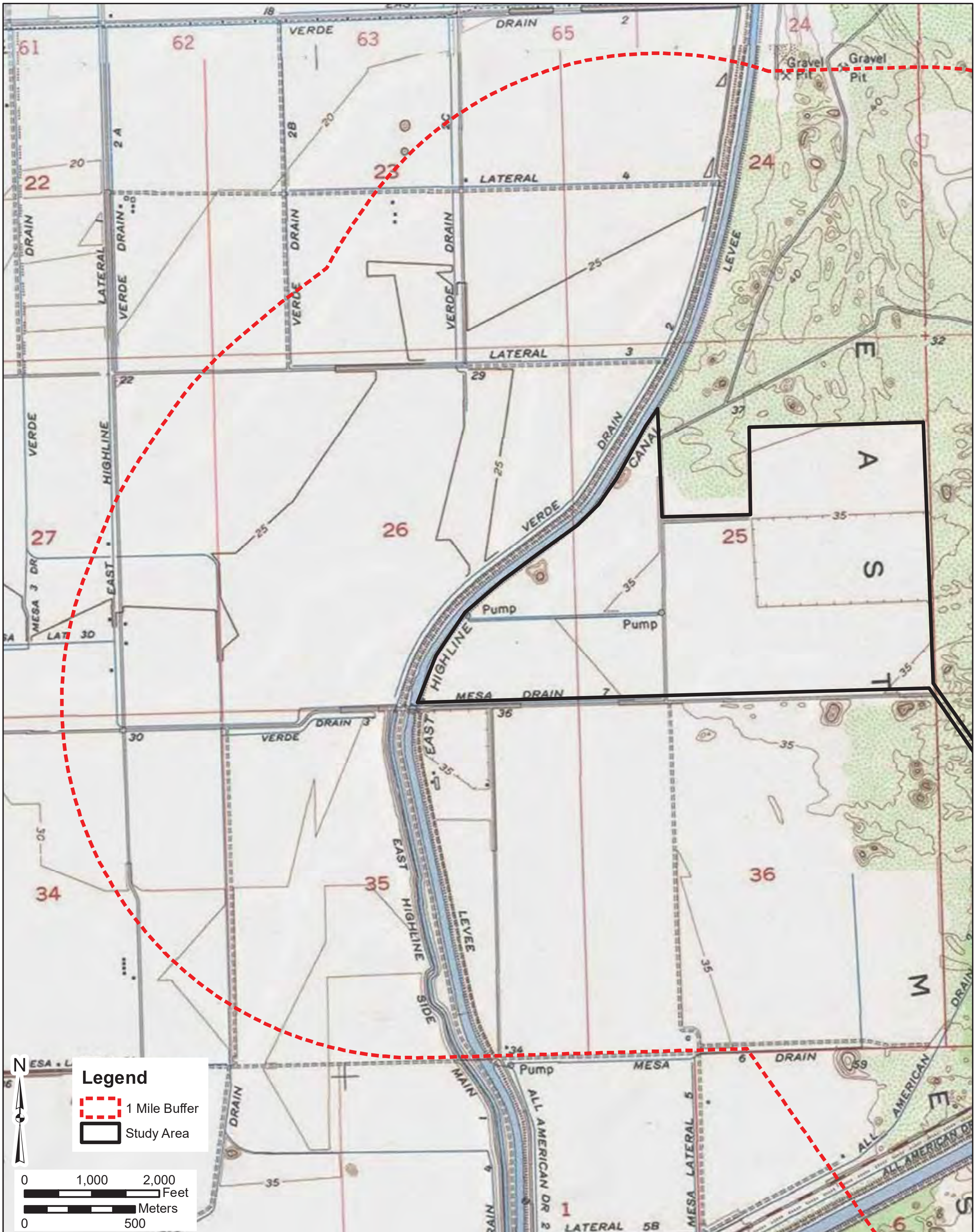
If you have any questions about this investigation, please contact me directly by email or phone.

Regards,

Matthew M. DeCarlo

Matthew DeCarlo
Archaeologist
DUDEK
Phone: (760) 632-0164
Email: mdecarlo@dudek.com

Attachments:
Figure 1. Project Location Map 1.
Figure 2. Project Location Map 2.
Figure 3. Project Location Map 3.

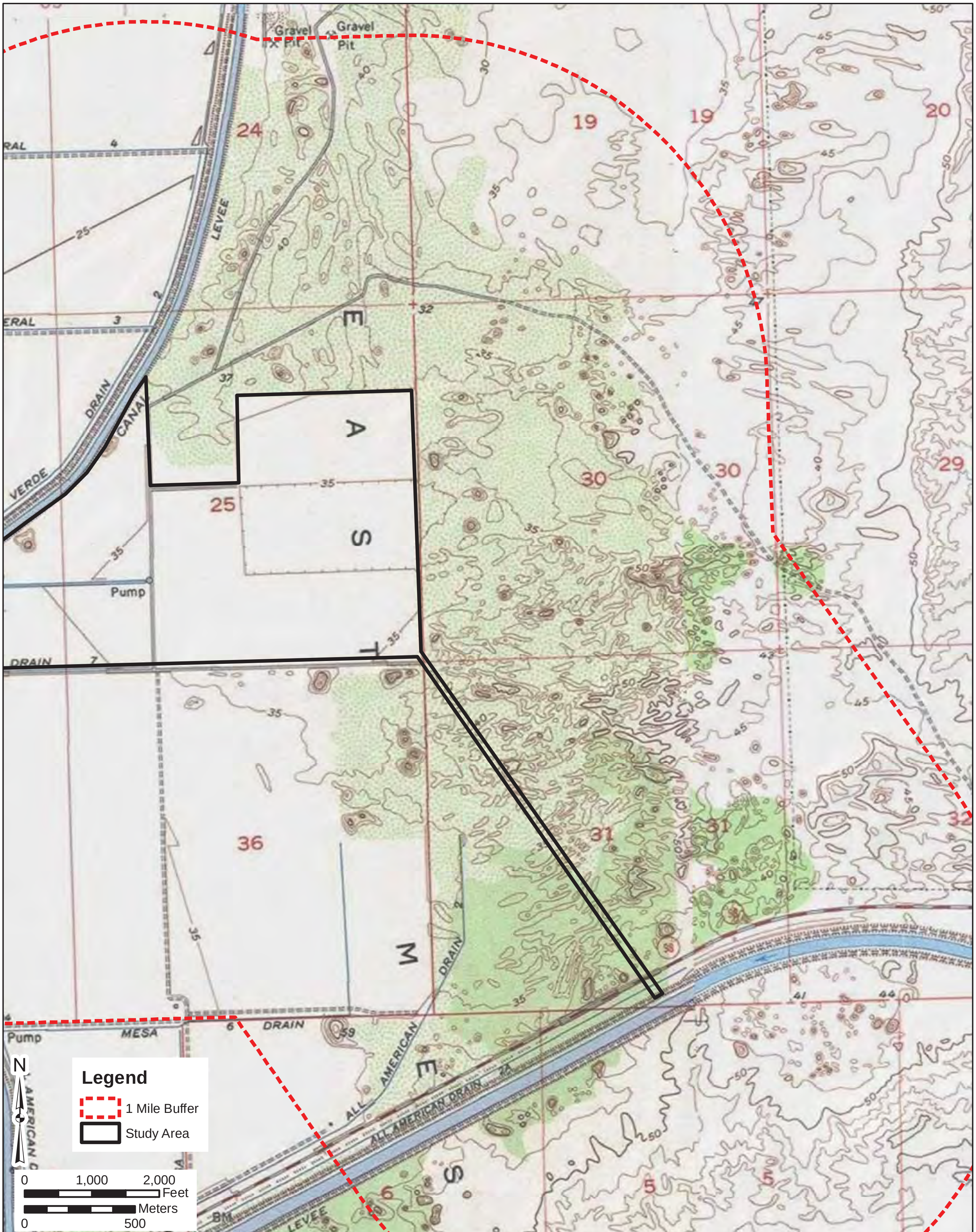


SOURCE: USGS 7.5-Minute Series Midway Well NW & Bonds Corner Quadrangles
Township 16S; Range 16E; Sections 25,26

1015401

Records Search Map

East Highline Reservoir Project

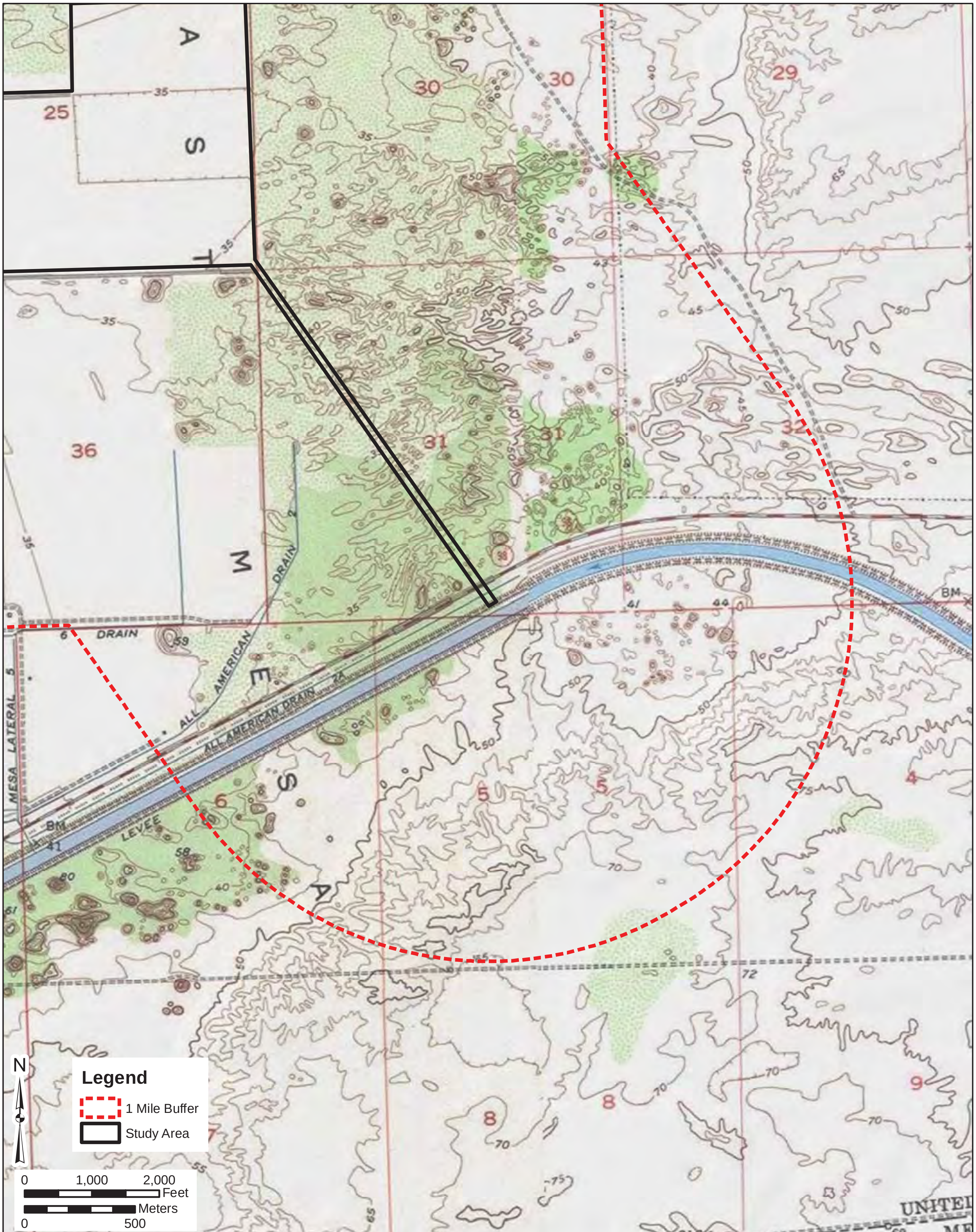


SOURCE: USGS 7.5-Minute Series Midway Well NW & Bonds Corner Quadrangles
Township 16S; Range 16E; Sections 25,26

1015401

Records Search Map

East Highline Reservoir Project



SOURCE: USGS 7.5-Minute Series Midway Well NW & Bonds Corner Quadrangles
Township 16S; Range 16E; Sections 25,26

1015401

Records Search Map

East Highline Reservoir Project

STATE OF CALIFORNIA | Edmund G. Brown, Jr., *Governor*

NATIVE AMERICAN HERITAGE COMMISSION
1550 Harbor Blvd., Suite 100
West Sacramento, CA 95691
(916) 373-3710
Fax (916) 373-5471

April 10, 2017

Matthew DeCarlo
Dudek

Sent by E-mail: mdecarlo@dudek.com

RE: Proposed East Highline Reservoir Project - Dudek No. 10154, near the City of El Centro; Midway Well NW and Bonds Corner USGS Quadrangles, Imperial County, California

Dear Mr. DeCarlo:

A record search of the Native American Heritage Commission (NAHC) *Sacred Lands File* was completed for the area of potential project effect (APE) referenced above with negative results. Please note that the absence of specific site information in the *Sacred Lands File* does not indicate the absence of Native American cultural resources in any APE.

Attached is a list of tribes culturally affiliated to the project area. I suggest you contact all of the listed Tribes. If they cannot supply information, they might recommend others with specific knowledge. The list should provide a starting place to locate areas of potential adverse impact within the APE. By contacting all those on the list, your organization will be better able to respond to claims of failure to consult. If a response has not been received within two weeks of notification, the NAHC requests that you follow-up with a telephone call to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from any of these individuals or groups, please notify me. With your assistance we are able to assure that our lists contain current information. If you have any questions or need additional information, please contact via email: gayle.totton@nahc.ca.gov.

Sincerely,

Gayle Totton

Gayle Totton, M.A., PhD.
Associate Governmental Program Analyst

Native American Heritage Commission
Native American Contact List
Imperial County
4/10/2017

Barona Group of the Capitan Grande
Clifford LaChappa, Chairperson
1095 Barona Road — Kumeyaay
Lakeside, CA, 92040
Phone: (619) 443 - 6612
Fax: (619) 443-0681
cloyd@barona-nsn.gov

Campo Kumeyaay Nation
Ralph Goff, Chairperson
36190 Church Road, Suite 1 — Kumeyaay
Campo, CA, 91906
Phone: (619)478-9046
Fax: (619)478-5818
rgoff@campo-nsn.gov

Cocopah Indian Reservation
H. McCormick, Tribal Archaeologist
County 15th & Avenue G — Cocopah
Sommerton, AZ, 85350
Phone: (928) 530 - 2291
culturalres@cocopah.com

Ewiiaapaayp Band of Kumeyaay Indians
Robert Pinto, Chairperson
4054 Willows Road — Kumeyaay
Alpine, CA, 91901
Phone: (619)445-6315
Fax: (619)445-9126

Ewiiaapaayp Band of Kumeyaay Indians
Michael Garcia, Vice Chairperson
4054 Willows Road — Kumeyaay
Alpine, CA, 91901
Phone: (619) 445 - 6315
Fax: (619) 445-9126
michaelg@leaningrock.net

Iipay Nation of Santa Ysabel
Virgil Perez, Chairperson
P.O. Box 130 — Kumeyaay
Santa Ysabel, CA, 92070
Phone: (760)765-0845
Fax: (760)765-0320

Iipay Nation of Santa Ysabel
Clint Linton, Director of Cultural Resources
P.O. Box 507 — Kumeyaay
Santa Ysabel, CA, 92070
Phone: (760) 803 - 5694
cjlinton73@aol.com

Inaja Band of Mission Indians
Rebecca Osuna, Chairperson
2005 S. Escondido Blvd. — Kumeyaay
Escondido, CA, 92025
Phone: (760)737-7628
Fax: (760)747-8568

Jamul Indian Village of California
Erica Pinto, Chairperson
P.O. Box 612 — Kumeyaay
Jamul, CA, 91935
Phone: (619)669-4785
Fax: (619)669-4817

Kwaaymii Laguna Band of Mission Indians
Carmen Lucas,
P.O. Box 775 — Kumeyaay
Pine Valley, CA, 91962
Phone: (619)709-4207

La Posta Band of Diegueno Mission Indians
Gwendolyn Parada, Chairperson
8 Crestwood Road — Kumeyaay
Boulevard, CA, 91905
Phone: (619)478-2113
Fax: (619)478-2125
LP13boots@aol.com

La Posta Band of Diegueno Mission Indians
Javaughn Miller, Tribal Administrator
8 Crestwood Road — Kumeyaay
Boulevard, CA, 91905
Phone: (619) 478 - 2113
Fax: (619) 478-2125
jmiller@LPtribe.net

This list is current only as of the date of this document. Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed East Highline Reservoir Project, Imperial County.

Native American Heritage Commission
Native American Contact List
Imperial County
4/10/2017

Manzanita Band of the Kumeyaay Nation
Angela Elliott Santos, Chairperson
P.O. Box 1302 Kumeyaay
Boulevard, CA, 91905
Phone: (619) 766 - 4930
Fax: (619) 766-4957

Manzanita Band of the Kumeyaay Nation
Nick Elliott, Cultural Resources Coordinator
P. O. Box 1302 Kumeyaay
Boulevard, CA, 91905
Phone: (619) 766 - 4930
Fax: (619) 766-4957
nickmepa@yahoo.com

Mesa Grande Band of Mission Indians
Virgil Oyos, Chairperson
P.O Box 270 Kumeyaay
Santa Ysabel, CA, 92070
Phone: (760)782-3818
Fax: (760)782-9092
mesagrandeband@msn.com

San Pasqual Band of Mission Indians
Allen E. Lawson, Chairperson
P.O. Box 365 Kumeyaay
Valley Center, CA, 92082
Phone: (760)749-3200
Fax: (760)749-3876
allenl@sanpasqualtribe.org

San Pasqual Band of Mission Indians
John Flores, Environmental Coordinator
P. O. Box 365 Kumeyaay
Valley Center, CA, 92082
Phone: (760) 749 - 3200
Fax: (760) 749-3876
johnf@sanpasqualtribe.org

Sycuan Band of the Kumeyaay Nation
Cody J. Martinez, Chairperson
1 Kwaaypaay Court Kumeyaay
El Cajon, CA, 92019
Phone: (619)445-2613
Fax: (619)445-1927
ssilva@sycuan-nsn.gov

Sycuan Band of the Kumeyaay Nation
Lisa Haws, Cultural Resources Manager
1 Kwaaypaay Court Kumeyaay
El Cajon, CA, 92019
Phone: (619) 312 - 1935

Viejas Band of Kumeyaay Indians
Robert J. Welch, Chairperson
1 Viejas Grade Road Kumeyaay
Alpine, CA, 91901
Phone: (619)445-3810
Fax: (619)445-5337
jhagen@viejas-nsn.gov

Viejas Band of Kumeyaay Indians
Julie Hagen,
1 Viejas Grade Road Kumeyaay
Alpine, CA, 91901
Phone: (619) 445 - 3810
Fax: (619) 445-5337
jhagen@viejas-nsn.gov

This list is current only as of the date of this document. Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed East Highline Reservoir Project, Imperial County.

DUDEK

MAIN OFFICE
605 THIRD STREET
ENCINITAS, CALIFORNIA 92024
T 760.942.5147 T 800.450.1818 F 760.632.0164

August 21, 2017

Mr. Nick Elliott, Cultural Resources Coordinator
Manzanita Band of Kumeyaay Nation
P.O. Box 1302
Boulevard, CA 91905

Subject: ***Information Request for the East Highline Reservoir Project in Imperial County, California***

Dear Mr. Elliott,

The Imperial Irrigation District has proposed the construction of a reservoir, intake structure, and canal connected to the All American Canal (AAC) southeast of the City of El Centro, Imperial County, California. The project area consists of a 515-acre reservoir and approximately 1.5 mile canal in largely agricultural land (Figure 1 & 2). The project area falls within Section 25 and 26 of Township 16S, Range 16E and Section 31 of Township 16S, Range 17E on the U.S. Geological Survey (USGS) Midway Well NW and Bonds Corner 7.5' quadrangles.

The Native American Heritage Commission conducted a Sacred Lands file search and identified no Tribal cultural resources within the study area. I am writing as part of the cultural inventory process in order find out if you, or your tribal community, have any knowledge of cultural resources or places that may be impacted by the proposed project.

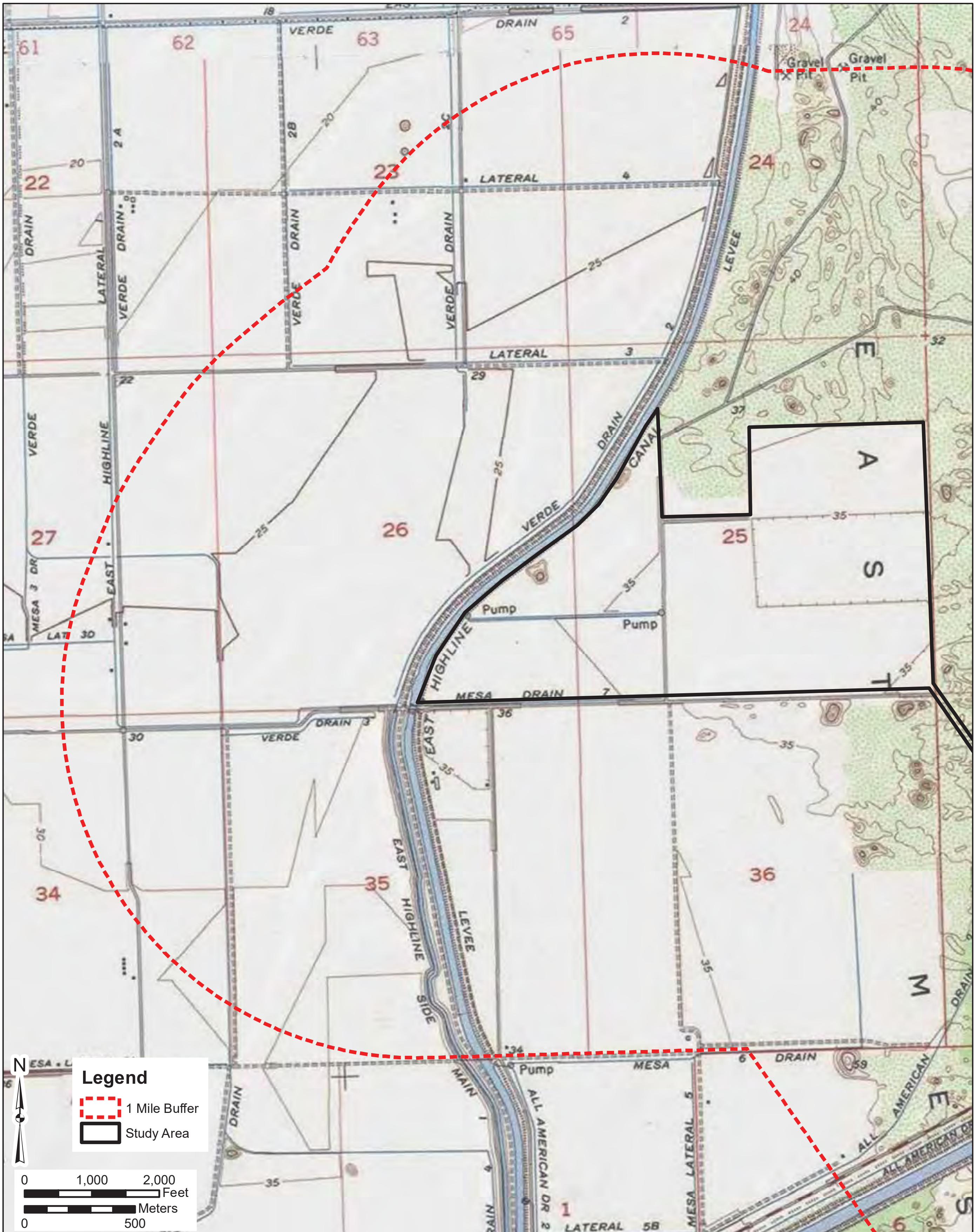
If you have any information or concerns pertaining to such information, please contact me.

Respectfully,

Matthew M DeCarlo

Matthew DeCarlo, B.A.
Archaeologist
DUDEK
Phone: (760) 479-4831
Email: mdecarlo@dudek.com

Attachments: *Figure 1. Project Map.*

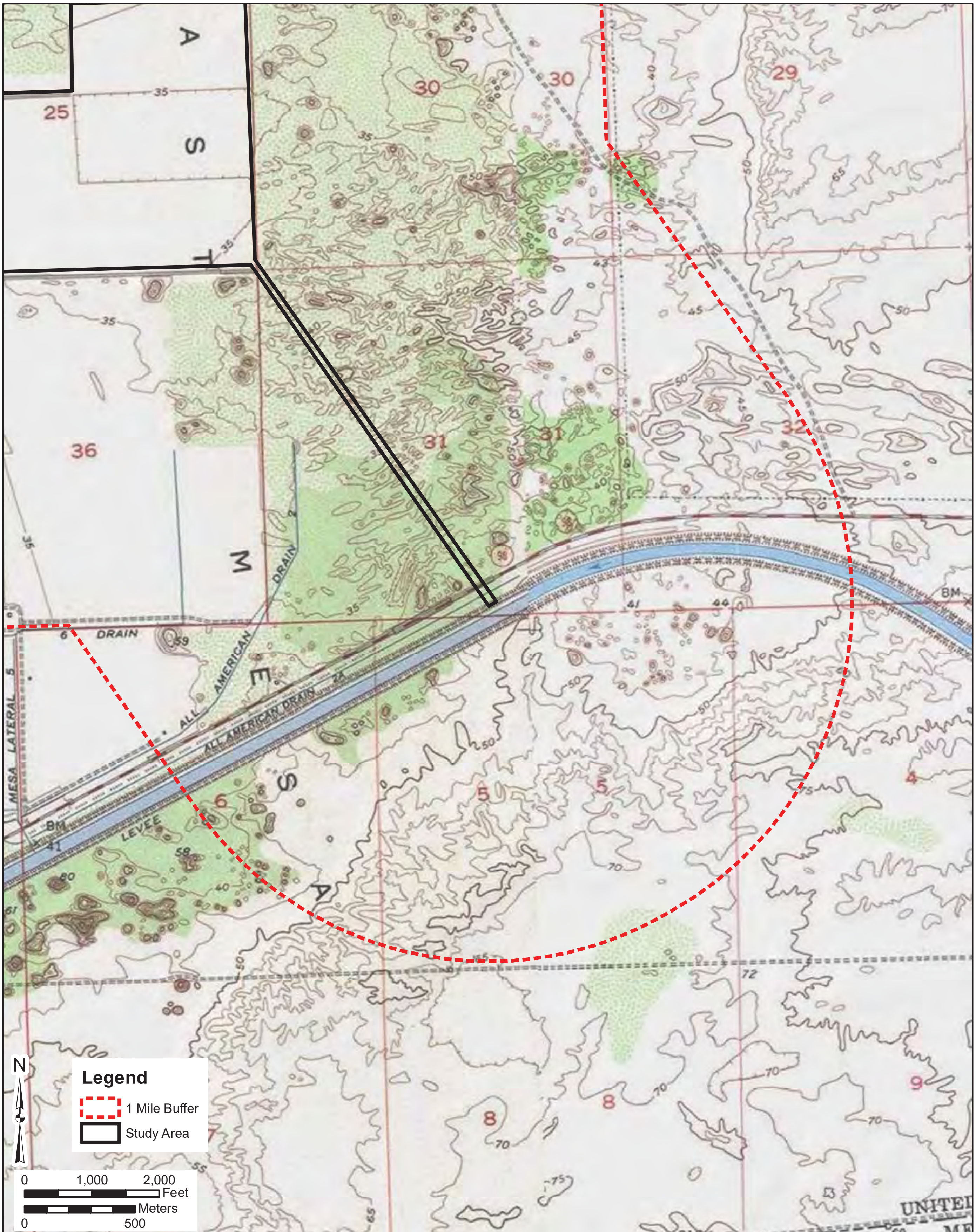


SOURCE: USGS 7.5-Minute Series Midway Well NW & Bonds Corner Quadrangles
Township 16S; Range 16E; Sections 25,26

1015401

Records Search Map

East Highline Reservoir Project



SOURCE: USGS 7.5-Minute Series Midway Well NW & Bonds Corner Quadrangles
Township 16S; Range 16E; Sections 25,26

1015401

Records Search Map

East Highline Reservoir Project

DUDEK

MAIN OFFICE
605 THIRD STREET
ENCINITAS, CALIFORNIA 92024
T 760.942.5147 T 800.450.1818 F 760.632.0164

August 21, 2017

Mr. John Flores, Environmental Coordinator
San Pasqual Band of Indians
P.O. Box 365
Valley Center, CA 92082

Subject: ***Information Request for the East Highline Reservoir Project in Imperial County, California***

Dear Mr. Flores,

The Imperial Irrigation District has proposed the construction of a reservoir, intake structure, and canal connected to the All American Canal (AAC) southeast of the City of El Centro, Imperial County, California. The project area consists of a 515-acre reservoir and approximately 1.5 mile canal in largely agricultural land (Figure 1 & 2). The project area falls within Section 25 and 26 of Township 16S, Range 16E and Section 31 of Township 16S, Range 17E on the U.S. Geological Survey (USGS) Midway Well NW and Bonds Corner 7.5' quadrangles.

The Native American Heritage Commission conducted a Sacred Lands file search and identified no Tribal cultural resources within the study area. I am writing as part of the cultural inventory process in order find out if you, or your tribal community, have any knowledge of cultural resources or places that may be impacted by the proposed project.

If you have any information or concerns pertaining to such information, please contact me.

Respectfully,

Matthew M DeCarlo

Matthew DeCarlo, B.A.
Archaeologist
DUDEK
Phone: (760) 479-4831
Email: mdecarlo@dudek.com

Attachments: *Figure 1. Project Map.*

DUDEK

MAIN OFFICE
605 THIRD STREET
ENCINITAS, CALIFORNIA 92024
T 760.942.5147 T 800.450.1818 F 760.632.0164

August 21, 2017

Mr. Michael Garcia, Vice Chairperson
Ewiiaapaayp Tribal Office
4054 Willows Road
Alpine, CA 91901

Subject: ***Information Request for the East Highline Reservoir Project in Imperial County, California***

Dear Mr. Garcia,

The Imperial Irrigation District has proposed the construction of a reservoir, intake structure, and canal connected to the All American Canal (AAC) southeast of the City of El Centro, Imperial County, California. The project area consists of a 515-acre reservoir and approximately 1.5 mile canal in largely agricultural land (Figure 1 & 2). The project area falls within Section 25 and 26 of Township 16S, Range 16E and Section 31 of Township 16S, Range 17E on the U.S. Geological Survey (USGS) Midway Well NW and Bonds Corner 7.5' quadrangles.

The Native American Heritage Commission conducted a Sacred Lands file search and identified no Tribal cultural resources within the study area. I am writing as part of the cultural inventory process in order find out if you, or your tribal community, have any knowledge of cultural resources or places that may be impacted by the proposed project.

If you have any information or concerns pertaining to such information, please contact me.

Respectfully,

Matthew H DeCarlo

Matthew DeCarlo, B.A.
Archaeologist
DUDEK
Phone: (760) 479-4831
Email: mdecarlo@dudek.com

Attachments: *Figure 1. Project Map.*

DUDEK

MAIN OFFICE
605 THIRD STREET
ENCINITAS, CALIFORNIA 92024
T 760.942.5147 T 800.450.1818 F 760.632.0164

August 21, 2017

Mr. Ralph Goff, Chairperson
Campo Band of Mission Indians
36190 Church Road, Suite 1
Campo, CA 91906

Subject: ***Information Request for the East Highline Reservoir Project in Imperial County, California***

Dear Mr. Goff,

The Imperial Irrigation District has proposed the construction of a reservoir, intake structure, and canal connected to the All American Canal (AAC) southeast of the City of El Centro, Imperial County, California. The project area consists of a 515-acre reservoir and approximately 1.5 mile canal in largely agricultural land (Figure 1 & 2). The project area falls within Section 25 and 26 of Township 16S, Range 16E and Section 31 of Township 16S, Range 17E on the U.S. Geological Survey (USGS) Midway Well NW and Bonds Corner 7.5' quadrangles.

The Native American Heritage Commission conducted a Sacred Lands file search and identified no Tribal cultural resources within the study area. I am writing as part of the cultural inventory process in order find out if you, or your tribal community, have any knowledge of cultural resources or places that may be impacted by the proposed project.

If you have any information or concerns pertaining to such information, please contact me.

Respectfully,

Matthew M DeCarlo

Matthew DeCarlo, B.A.
Archaeologist
DUDEK
Phone: (760) 479-4831
Email: mdecarlo@dudek.com

Attachments: *Figure 1. Project Map.*

DUDEK

MAIN OFFICE
605 THIRD STREET
ENCINITAS, CALIFORNIA 92024
T 760.942.5147 T 800.450.1818 F 760.632.0164

August 21, 2017

Ms. Julie Hagen, Cultural Resources
Viejas Band of Kumeyaay Indians
P.O. Box 908
Alpine, CA 91903

Subject: ***Information Request for the East Highline Reservoir Project in Imperial County, California***

Dear Ms. Hagen,

The Imperial Irrigation District has proposed the construction of a reservoir, intake structure, and canal connected to the All American Canal (AAC) southeast of the City of El Centro, Imperial County, California. The project area consists of a 515-acre reservoir and approximately 1.5 mile canal in largely agricultural land (Figure 1 & 2). The project area falls within Section 25 and 26 of Township 16S, Range 16E and Section 31 of Township 16S, Range 17E on the U.S. Geological Survey (USGS) Midway Well NW and Bonds Corner 7.5' quadrangles.

The Native American Heritage Commission conducted a Sacred Lands file search and identified no Tribal cultural resources within the study area. I am writing as part of the cultural inventory process in order find out if you, or your tribal community, have any knowledge of cultural resources or places that may be impacted by the proposed project.

If you have any information or concerns pertaining to such information, please contact me.

Respectfully,

Matthew M DeCarlo

Matthew DeCarlo, B.A.
Archaeologist
DUDEK
Phone: (760) 479-4831
Email: mdecarlo@dudek.com

Attachments: *Figure 1. Project Map.*

DUDEK

MAIN OFFICE
605 THIRD STREET
ENCINITAS, CALIFORNIA 92024
T 760.942.5147 T 800.450.1818 F 760.632.0164

August 21, 2017

Ms. Lisa Haws, Cultural Resource Manager
Sycuan Band of the Kumeyaay Nation
1 Kwaaypaay Court
El Cajon, CA 92019

Subject: ***Information Request for the East Highline Reservoir Project in Imperial County, California***

Dear Ms. Haws,

The Imperial Irrigation District has proposed the construction of a reservoir, intake structure, and canal connected to the All American Canal (AAC) southeast of the City of El Centro, Imperial County, California. The project area consists of a 515-acre reservoir and approximately 1.5 mile canal in largely agricultural land (Figure 1 & 2). The project area falls within Section 25 and 26 of Township 16S, Range 16E and Section 31 of Township 16S, Range 17E on the U.S. Geological Survey (USGS) Midway Well NW and Bonds Corner 7.5' quadrangles.

The Native American Heritage Commission conducted a Sacred Lands file search and identified no Tribal cultural resources within the study area. I am writing as part of the cultural inventory process in order find out if you, or your tribal community, have any knowledge of cultural resources or places that may be impacted by the proposed project.

If you have any information or concerns pertaining to such information, please contact me.

Respectfully,

Matthew M DeCarlo

Matthew DeCarlo, B.A.
Archaeologist
DUDEK
Phone: (760) 479-4831
Email: mdecarlo@dudek.com

Attachments: *Figure 1. Project Map.*

DUDEK

MAIN OFFICE
605 THIRD STREET
ENCINITAS, CALIFORNIA 92024
T 760.942.5147 T 800.450.1818 F 760.632.0164

August 21, 2017

Mr. Clifford LaChappa, Chairperson
Barona Group of the Capitan Grande
1095 Barona Road
Lakeside, CA 92040

Subject: ***Information Request for the East Highline Reservoir Project in Imperial County, California***

Dear Mr. LaChappa,

The Imperial Irrigation District has proposed the construction of a reservoir, intake structure, and canal connected to the All American Canal (AAC) southeast of the City of El Centro, Imperial County, California. The project area consists of a 515-acre reservoir and approximately 1.5 mile canal in largely agricultural land (Figure 1 & 2). The project area falls within Section 25 and 26 of Township 16S, Range 16E and Section 31 of Township 16S, Range 17E on the U.S. Geological Survey (USGS) Midway Well NW and Bonds Corner 7.5' quadrangles.

The Native American Heritage Commission conducted a Sacred Lands file search and identified no Tribal cultural resources within the study area. I am writing as part of the cultural inventory process in order find out if you, or your tribal community, have any knowledge of cultural resources or places that may be impacted by the proposed project.

If you have any information or concerns pertaining to such information, please contact me.

Respectfully,

Matthew M DeCarlo

Matthew DeCarlo, B.A.
Archaeologist
DUDEK
Phone: (760) 479-4831
Email: mdecarlo@dudek.com

Attachments: *Figure 1. Project Map.*

DUDEK

MAIN OFFICE
605 THIRD STREET
ENCINITAS, CALIFORNIA 92024
T 760.942.5147 T 800.450.1818 F 760.632.0164

August 21, 2017

Mr. Allen E. Lawson, Chairperson
San Pasqual Band of Mission Indians
P.O. Box 365
Valley Center, CA 92082

Subject: Information Request for the East Highline Reservoir Project in Imperial County, California

Dear Mr. Lawson,

The Imperial Irrigation District has proposed the construction of a reservoir, intake structure, and canal connected to the All American Canal (AAC) southeast of the City of El Centro, Imperial County, California. The project area consists of a 515-acre reservoir and approximately 1.5 mile canal in largely agricultural land (Figure 1 & 2). The project area falls within Section 25 and 26 of Township 16S, Range 16E and Section 31 of Township 16S, Range 17E on the U.S. Geological Survey (USGS) Midway Well NW and Bonds Corner 7.5' quadrangles.

The Native American Heritage Commission conducted a Sacred Lands file search and identified no Tribal cultural resources within the study area. I am writing as part of the cultural inventory process in order find out if you, or your tribal community, have any knowledge of cultural resources or places that may be impacted by the proposed project.

If you have any information or concerns pertaining to such information, please contact me.

Respectfully,

Matthew M DeCarlo

Matthew DeCarlo, B.A.
Archaeologist
DUDEK
Phone: (760) 479-4831
Email: mdecarlo@dudek.com

Attachments: *Figure 1. Project Map.*

DUDEK

MAIN OFFICE
605 THIRD STREET
ENCINITAS, CALIFORNIA 92024
T 760.942.5147 T 800.450.1818 F 760.632.0164

August 21, 2017

Mr. Clint Linton, Director of Cultural Resources
Ipay Nation of Santa Ysabel
P.O. Box 507
Santa Ysabel, CA 92070

Subject: ***Information Request for the East Highline Reservoir Project in Imperial County, California***

Dear Mr. Linton,

The Imperial Irrigation District has proposed the construction of a reservoir, intake structure, and canal connected to the All American Canal (AAC) southeast of the City of El Centro, Imperial County, California. The project area consists of a 515-acre reservoir and approximately 1.5 mile canal in largely agricultural land (Figure 1 & 2). The project area falls within Section 25 and 26 of Township 16S, Range 16E and Section 31 of Township 16S, Range 17E on the U.S. Geological Survey (USGS) Midway Well NW and Bonds Corner 7.5' quadrangles.

The Native American Heritage Commission conducted a Sacred Lands file search and identified no Tribal cultural resources within the study area. I am writing as part of the cultural inventory process in order find out if you, or your tribal community, have any knowledge of cultural resources or places that may be impacted by the proposed project.

If you have any information or concerns pertaining to such information, please contact me.

Respectfully,

Matthew M DeCarlo

Matthew DeCarlo, B.A.
Archaeologist
DUDEK
Phone: (760) 479-4831
Email: mdecarlo@dudek.com

Attachments: *Figure 1. Project Map.*

DUDEK

MAIN OFFICE
605 THIRD STREET
ENCINITAS, CALIFORNIA 92024
T 760.942.5147 T 800.450.1818 F 760.632.0164

August 21, 2017

Ms. Carmen Lucas,
Kwaaymii Laguna Band of Mission Indians
P.O. Box 775
Pine Valley, CA 91962

Subject: ***Information Request for the East Highline Reservoir Project in Imperial County, California***

Dear Ms. Lucas,

The Imperial Irrigation District has proposed the construction of a reservoir, intake structure, and canal connected to the All American Canal (AAC) southeast of the City of El Centro, Imperial County, California. The project area consists of a 515-acre reservoir and approximately 1.5 mile canal in largely agricultural land (Figure 1 & 2). The project area falls within Section 25 and 26 of Township 16S, Range 16E and Section 31 of Township 16S, Range 17E on the U.S. Geological Survey (USGS) Midway Well NW and Bonds Corner 7.5' quadrangles.

The Native American Heritage Commission conducted a Sacred Lands file search and identified no Tribal cultural resources within the study area. I am writing as part of the cultural inventory process in order find out if you, or your tribal community, have any knowledge of cultural resources or places that may be impacted by the proposed project.

If you have any information or concerns pertaining to such information, please contact me.

Respectfully,

Matthew M DeCarlo

Matthew DeCarlo, B.A.
Archaeologist
DUDEK
Phone: (760) 479-4831
Email: mdecarlo@dudek.com

Attachments: *Figure 1. Project Map.*

DUDEK

MAIN OFFICE
605 THIRD STREET
ENCINITAS, CALIFORNIA 92024
T 760.942.5147 T 800.450.1818 F 760.632.0164

August 21, 2017

Mr. Cody Martinez, Chairperson
Sycuan Band of the Kumeyaay Nation
1 Kwaaypaay Court
El Cajon, CA 92019

Subject: ***Information Request for the East Highline Reservoir Project in Imperial County, California***

Dear Mr. Martinez,

The Imperial Irrigation District has proposed the construction of a reservoir, intake structure, and canal connected to the All American Canal (AAC) southeast of the City of El Centro, Imperial County, California. The project area consists of a 515-acre reservoir and approximately 1.5 mile canal in largely agricultural land (Figure 1 & 2). The project area falls within Section 25 and 26 of Township 16S, Range 16E and Section 31 of Township 16S, Range 17E on the U.S. Geological Survey (USGS) Midway Well NW and Bonds Corner 7.5' quadrangles.

The Native American Heritage Commission conducted a Sacred Lands file search and identified no Tribal cultural resources within the study area. I am writing as part of the cultural inventory process in order find out if you, or your tribal community, have any knowledge of cultural resources or places that may be impacted by the proposed project.

If you have any information or concerns pertaining to such information, please contact me.

Respectfully,

Matthew H DeCarlo

Matthew DeCarlo, B.A.
Archaeologist
DUDEK
Phone: (760) 479-4831
Email: mdecarlo@dudek.com

Attachments: *Figure 1. Project Map.*

DUDEK

MAIN OFFICE
605 THIRD STREET
ENCINITAS, CALIFORNIA 92024
T 760.942.5147 T 800.450.1818 F 760.632.0164

August 21, 2017

Mr. H. McCormick, Tribal Archaeologist
Cocopah Indian Reservation
County 15th & Avenue G
Sommerton, AZ 85350

Subject: Information Request for the East Highline Reservoir Project in Imperial County, California

Dear Mr. McCormick,

The Imperial Irrigation District has proposed the construction of a reservoir, intake structure, and canal connected to the All American Canal (AAC) southeast of the City of El Centro, Imperial County, California. The project area consists of a 515-acre reservoir and approximately 1.5 mile canal in largely agricultural land (Figure 1 & 2). The project area falls within Section 25 and 26 of Township 16S, Range 16E and Section 31 of Township 16S, Range 17E on the U.S. Geological Survey (USGS) Midway Well NW and Bonds Corner 7.5' quadrangles.

The Native American Heritage Commission conducted a Sacred Lands file search and identified no Tribal cultural resources within the study area. I am writing as part of the cultural inventory process in order find out if you, or your tribal community, have any knowledge of cultural resources or places that may be impacted by the proposed project.

If you have any information or concerns pertaining to such information, please contact me.

Respectfully,

Matthew H DeCarlo

Matthew DeCarlo, B.A.
Archaeologist
DUDEK
Phone: (760) 479-4831
Email: mdecarlo@dudek.com

Attachments: *Figure 1. Project Map.*

DUDEK

MAIN OFFICE
605 THIRD STREET
ENCINITAS, CALIFORNIA 92024
T 760.942.5147 T 800.450.1818 F 760.632.0164

August 21, 2017

Ms. Javaughn Miller,
La Posta Band of Mission Indians
8 Crestwood Rd.
Boulevard, CA 91905

Subject: ***Information Request for the East Highline Reservoir Project in Imperial County, California***

Dear Ms. Miller,

The Imperial Irrigation District has proposed the construction of a reservoir, intake structure, and canal connected to the All American Canal (AAC) southeast of the City of El Centro, Imperial County, California. The project area consists of a 515-acre reservoir and approximately 1.5 mile canal in largely agricultural land (Figure 1 & 2). The project area falls within Section 25 and 26 of Township 16S, Range 16E and Section 31 of Township 16S, Range 17E on the U.S. Geological Survey (USGS) Midway Well NW and Bonds Corner 7.5' quadrangles.

The Native American Heritage Commission conducted a Sacred Lands file search and identified no Tribal cultural resources within the study area. I am writing as part of the cultural inventory process in order find out if you, or your tribal community, have any knowledge of cultural resources or places that may be impacted by the proposed project.

If you have any information or concerns pertaining to such information, please contact me.

Respectfully,

Matthew M DeCarlo

Matthew DeCarlo, B.A.
Archaeologist
DUDEK
Phone: (760) 479-4831
Email: mdecarlo@dudek.com

Attachments: *Figure 1. Project Map.*

DUDEK

MAIN OFFICE
605 THIRD STREET
ENCINITAS, CALIFORNIA 92024
T 760.942.5147 T 800.450.1818 F 760.632.0164

August 21, 2017

Ms. Rebecca Osuna, Chairman
Inaja Band of Mission Indians
2005 S. Escondido Blvd.
Escondido, CA 92025

Subject: ***Information Request for the East Highline Reservoir Project in Imperial County, California***

Dear Ms. Osuna,

The Imperial Irrigation District has proposed the construction of a reservoir, intake structure, and canal connected to the All American Canal (AAC) southeast of the City of El Centro, Imperial County, California. The project area consists of a 515-acre reservoir and approximately 1.5 mile canal in largely agricultural land (Figure 1 & 2). The project area falls within Section 25 and 26 of Township 16S, Range 16E and Section 31 of Township 16S, Range 17E on the U.S. Geological Survey (USGS) Midway Well NW and Bonds Corner 7.5' quadrangles.

The Native American Heritage Commission conducted a Sacred Lands file search and identified no Tribal cultural resources within the study area. I am writing as part of the cultural inventory process in order find out if you, or your tribal community, have any knowledge of cultural resources or places that may be impacted by the proposed project.

If you have any information or concerns pertaining to such information, please contact me.

Respectfully,

Matthew M DeCarlo

Matthew DeCarlo, B.A.
Archaeologist
DUDEK
Phone: (760) 479-4831
Email: mdecarlo@dudek.com

Attachments: *Figure 1. Project Map.*

DUDEK

MAIN OFFICE
605 THIRD STREET
ENCINITAS, CALIFORNIA 92024
T 760.942.5147 T 800.450.1818 F 760.632.0164

August 21, 2017

Mr. Virgil Oyos, Chairperson
Mesa Grande Band of Mission Indians
P.O. Box 270
Santa Ysabel, CA 92070

Subject: ***Information Request for the East Highline Reservoir Project in Imperial County, California***

Dear Mr. Oyos,

The Imperial Irrigation District has proposed the construction of a reservoir, intake structure, and canal connected to the All American Canal (AAC) southeast of the City of El Centro, Imperial County, California. The project area consists of a 515-acre reservoir and approximately 1.5 mile canal in largely agricultural land (Figure 1 & 2). The project area falls within Section 25 and 26 of Township 16S, Range 16E and Section 31 of Township 16S, Range 17E on the U.S. Geological Survey (USGS) Midway Well NW and Bonds Corner 7.5' quadrangles.

The Native American Heritage Commission conducted a Sacred Lands file search and identified no Tribal cultural resources within the study area. I am writing as part of the cultural inventory process in order find out if you, or your tribal community, have any knowledge of cultural resources or places that may be impacted by the proposed project.

If you have any information or concerns pertaining to such information, please contact me.

Respectfully,

Matthew M DeCarlo

Matthew DeCarlo, B.A.
Archaeologist
DUDEK
Phone: (760) 479-4831
Email: mdecarlo@dudek.com

Attachments: *Figure 1. Project Map.*

DUDEK

MAIN OFFICE
605 THIRD STREET
ENCINITAS, CALIFORNIA 92024
T 760.942.5147 T 800.450.1818 F 760.632.0164

August 21, 2017

Ms. Gwendolyn Parada, Chairperson
La Posta Band of Mission Indians
8 Crestwood Rd.
Boulevard, CA 91905

Subject: Information Request for the East Highline Reservoir Project in Imperial County, California

Dear Ms. Parada,

The Imperial Irrigation District has proposed the construction of a reservoir, intake structure, and canal connected to the All American Canal (AAC) southeast of the City of El Centro, Imperial County, California. The project area consists of a 515-acre reservoir and approximately 1.5 mile canal in largely agricultural land (Figure 1 & 2). The project area falls within Section 25 and 26 of Township 16S, Range 16E and Section 31 of Township 16S, Range 17E on the U.S. Geological Survey (USGS) Midway Well NW and Bonds Corner 7.5' quadrangles.

The Native American Heritage Commission conducted a Sacred Lands file search and identified no Tribal cultural resources within the study area. I am writing as part of the cultural inventory process in order find out if you, or your tribal community, have any knowledge of cultural resources or places that may be impacted by the proposed project.

If you have any information or concerns pertaining to such information, please contact me.

Respectfully,

Matthew M DeCarlo

Matthew DeCarlo, B.A.
Archaeologist
DUDEK
Phone: (760) 479-4831
Email: mdecarlo@dudek.com

Attachments: *Figure 1. Project Map.*

DUDEK

MAIN OFFICE
605 THIRD STREET
ENCINITAS, CALIFORNIA 92024
T 760.942.5147 T 800.450.1818 F 760.632.0164

August 21, 2017

Mr. Virgil Perez, Chairperson
Iipay Nation of Santa Ysabel
P.O. Box 130
Santa Ysabel, CA 92070

Subject: ***Information Request for the East Highline Reservoir Project in Imperial County, California***

Dear Mr. Perez,

The Imperial Irrigation District has proposed the construction of a reservoir, intake structure, and canal connected to the All American Canal (AAC) southeast of the City of El Centro, Imperial County, California. The project area consists of a 515-acre reservoir and approximately 1.5 mile canal in largely agricultural land (Figure 1 & 2). The project area falls within Section 25 and 26 of Township 16S, Range 16E and Section 31 of Township 16S, Range 17E on the U.S. Geological Survey (USGS) Midway Well NW and Bonds Corner 7.5' quadrangles.

The Native American Heritage Commission conducted a Sacred Lands file search and identified no Tribal cultural resources within the study area. I am writing as part of the cultural inventory process in order find out if you, or your tribal community, have any knowledge of cultural resources or places that may be impacted by the proposed project.

If you have any information or concerns pertaining to such information, please contact me.

Respectfully,

Matthew M DeCarlo

Matthew DeCarlo, B.A.
Archaeologist
DUDEK
Phone: (760) 479-4831
Email: mdecarlo@dudek.com

Attachments: *Figure 1. Project Map.*

DUDEK

MAIN OFFICE
605 THIRD STREET
ENCINITAS, CALIFORNIA 92024
T 760.942.5147 T 800.450.1818 F 760.632.0164

August 21, 2017

Ms. Erica Pinto, Chairperson
Jamul Indian Village
P.O. Box 612
Jamul, CA 91935

Subject: ***Information Request for the East Highline Reservoir Project in Imperial County, California***

Dear Ms. Pinto,

The Imperial Irrigation District has proposed the construction of a reservoir, intake structure, and canal connected to the All American Canal (AAC) southeast of the City of El Centro, Imperial County, California. The project area consists of a 515-acre reservoir and approximately 1.5 mile canal in largely agricultural land (Figure 1 & 2). The project area falls within Section 25 and 26 of Township 16S, Range 16E and Section 31 of Township 16S, Range 17E on the U.S. Geological Survey (USGS) Midway Well NW and Bonds Corner 7.5' quadrangles.

The Native American Heritage Commission conducted a Sacred Lands file search and identified no Tribal cultural resources within the study area. I am writing as part of the cultural inventory process in order find out if you, or your tribal community, have any knowledge of cultural resources or places that may be impacted by the proposed project.

If you have any information or concerns pertaining to such information, please contact me.

Respectfully,

Matthew M DeCarlo

Matthew DeCarlo, B.A.
Archaeologist
DUDEK
Phone: (760) 479-4831
Email: mdecarlo@dudek.com

Attachments: *Figure 1. Project Map.*

DUDEK

MAIN OFFICE
605 THIRD STREET
ENCINITAS, CALIFORNIA 92024
T 760.942.5147 T 800.450.1818 F 760.632.0164

August 21, 2017

Mr. Robert Pinto, Sr., Chairperson
Ewiaapaayp Tribal Office
4054 Willow Rd.
Alpine, CA 91901

Subject: ***Information Request for the East Highline Reservoir Project in Imperial County, California***

Dear Mr. Pinto, Sr.,

The Imperial Irrigation District has proposed the construction of a reservoir, intake structure, and canal connected to the All American Canal (AAC) southeast of the City of El Centro, Imperial County, California. The project area consists of a 515-acre reservoir and approximately 1.5 mile canal in largely agricultural land (Figure 1 & 2). The project area falls within Section 25 and 26 of Township 16S, Range 16E and Section 31 of Township 16S, Range 17E on the U.S. Geological Survey (USGS) Midway Well NW and Bonds Corner 7.5' quadrangles.

The Native American Heritage Commission conducted a Sacred Lands file search and identified no Tribal cultural resources within the study area. I am writing as part of the cultural inventory process in order find out if you, or your tribal community, have any knowledge of cultural resources or places that may be impacted by the proposed project.

If you have any information or concerns pertaining to such information, please contact me.

Respectfully,

Matthew H DeCarlo

Matthew DeCarlo, B.A.
Archaeologist
DUDEK
Phone: (760) 479-4831
Email: mdecarlo@dudek.com

Attachments: *Figure 1. Project Map.*

DUDEK

MAIN OFFICE
605 THIRD STREET
ENCINITAS, CALIFORNIA 92024
T 760.942.5147 T 800.450.1818 F 760.632.0164

August 21, 2017

Ms. Angela Elliott Santos, Chairperson
Manzanita Band of Kumeyaay Nation
P.O. Box 1302
Boulevard, CA 91905

Subject: Information Request for the East Highline Reservoir Project in Imperial County, California

Dear Ms. Santos,

The Imperial Irrigation District has proposed the construction of a reservoir, intake structure, and canal connected to the All American Canal (AAC) southeast of the City of El Centro, Imperial County, California. The project area consists of a 515-acre reservoir and approximately 1.5 mile canal in largely agricultural land (Figure 1 & 2). The project area falls within Section 25 and 26 of Township 16S, Range 16E and Section 31 of Township 16S, Range 17E on the U.S. Geological Survey (USGS) Midway Well NW and Bonds Corner 7.5' quadrangles.

The Native American Heritage Commission conducted a Sacred Lands file search and identified no Tribal cultural resources within the study area. I am writing as part of the cultural inventory process in order find out if you, or your tribal community, have any knowledge of cultural resources or places that may be impacted by the proposed project.

If you have any information or concerns pertaining to such information, please contact me.

Respectfully,

Matthew M DeCarlo

Matthew DeCarlo, B.A.
Archaeologist
DUDEK
Phone: (760) 479-4831
Email: mdecarlo@dudek.com

Attachments: *Figure 1. Project Map.*

DUDEK

MAIN OFFICE
605 THIRD STREET
ENCINITAS, CALIFORNIA 92024
T 760.942.5147 T 800.450.1818 F 760.632.0164

August 21, 2017

Mr. Robert J. Welch, Jr., Chairperson
Viejas Band of Kumeyaay Indians
1 Viejas Grade Rd.
Alpine, CA 91901

Subject: ***Information Request for the East Highline Reservoir Project in Imperial County, California***

Dear Mr. Welch, Jr.,

The Imperial Irrigation District has proposed the construction of a reservoir, intake structure, and canal connected to the All American Canal (AAC) southeast of the City of El Centro, Imperial County, California. The project area consists of a 515-acre reservoir and approximately 1.5 mile canal in largely agricultural land (Figure 1 & 2). The project area falls within Section 25 and 26 of Township 16S, Range 16E and Section 31 of Township 16S, Range 17E on the U.S. Geological Survey (USGS) Midway Well NW and Bonds Corner 7.5' quadrangles.

The Native American Heritage Commission conducted a Sacred Lands file search and identified no Tribal cultural resources within the study area. I am writing as part of the cultural inventory process in order find out if you, or your tribal community, have any knowledge of cultural resources or places that may be impacted by the proposed project.

If you have any information or concerns pertaining to such information, please contact me.

Respectfully,

Matthew M DeCarlo

Matthew DeCarlo, B.A.
Archaeologist
DUDEK
Phone: (760) 479-4831
Email: mdecarlo@dudek.com

Attachments: *Figure 1. Project Map.*

VIEJAS
TRIBAL GOVERNMENT

P.O Box 908
Alpine, CA 91903
#1 Viejas Grade Road
Alpine, CA 91901

Phone: 619.445.3810
Fax: 619.445.5337
viejas.com

August 31, 2017

Matthew DeCarlo
Archaeologist
Dudek
605 Third Street
Encinitas, CA 92024

RE: East Highline Reservoir Project

Dear Mr. DeCarlo,

The Viejas Band of Kumeyaay Indians ("Viejas") has reviewed the proposed project and at this time we have determined that the project site has cultural significance or ties to Viejas.

Viejas Band request that a Kumeyaay Cultural Monitor be on site for ground disturbing activities to inform us of any new developments such as inadvertent discovery of cultural artifacts, cremation sites, or human remains.

Please call me at 619-659-2312 or Ernest Pingleton at 619-659-2314 or email, rteran@viejas-nsn.gov or epingleton@viejas-nsn.gov , for scheduling. Thank you.

Sincerely,

Ray Teran, Resource Management
VIEJAS BAND OF KUMEYAAY INDIANS

APPENDIX D (CONFIDENTIAL)

New and Updated DPR Site Records

APPENDIX E (CONFIDENTIAL)

Resources in APE Maps

APPENDIX F

Paleontological Records Search

Natural History Museum
of Los Angeles County
900 Exposition Boulevard
Los Angeles, CA 90007

tel 213.763.DINO
www.nhm.org

NATURAL HISTORY MUSEUM
LOS ANGELES COUNTY

Vertebrate Paleontology Section
Telephone: (213) 763-3325

e-mail: smcleod@nhm.org

28 December 2017

Dudek
605 Third Street
Encinitas, CA 92024

Attn: Sarah Siren, Senior Paleontologist

re: Vertebrate Paleontology Records Check for paleontological resources for the proposed IID All American Canal Surface Water Seepage Recovery Project, Dudek Project # 10154, southeast of Holtville, Imperial County, project area

Dear Sarah:

I have conducted a thorough search of our paleontology collection records for the locality and specimen data for the proposed IID All American Canal Surface Water Seepage Recovery Project, Dudek Project # 10154, southeast of Holtville, Imperial County, project area as outlined on the portions of the Midway Well and Midway Well NW USGS topographic quadrangle maps that you sent to me via e- mail on 15 December 2017. We do not have any vertebrate fossil localities that lie directly within the proposed project area, but we do have a vertebrate fossil locality relatively nearby from sedimentary deposits similar to those that may occur at depth in the proposed project area.

Surface deposits in the entire proposed project area consist of younger Quaternary Alluvium, derived as alluvial fan deposits from the more elevated terrain of the East Mesa and the Algadones Dunes of the Sand Hills to the east. These younger Quaternary Alluvium deposits typically do not contain significant vertebrate fossils, at least in the uppermost layers, but they may be underlain by older Quaternary deposits in this vicinity that may well contain significant fossil vertebrate remains. Our closest vertebrate fossil locality from the older Quaternary deposits is LACM 1719, situated west-southwest of the proposed project area west of Calexico and Mount Signal near the border between the United States and Mexico, that produced a specimen of horse, Equidae.

Surface grading or very shallow excavations in the younger Quaternary Alluvium exposed in the proposed project area probably will not encounter any significant vertebrate fossil remains. Deeper excavations there that extend down into older Quaternary deposits, however, may well uncover significant fossil vertebrate remains. Any substantial excavations in the sedimentary deposits in the proposed project area, therefore, should be monitored closely to quickly and professionally recover any fossil remains discovered while not impeding development. Sediment samples should also be collected and processed to determine the small fossil potential in the proposed project area. Any fossils recovered during mitigation should be deposited in an accredited and permanent scientific institution for the benefit of current and future generations.

This records search covers only the vertebrate paleontology records of the Natural History Museum of Los Angeles County. It is not intended to be a thorough paleontological survey of the proposed project area covering other institutional records, a literature survey, or any potential on-site survey.

Sincerely,

Samuel A. McLeod, Ph.D.
Vertebrate Paleontology

enclosure: invoice

APPENDIX G

Artifact Catalog

Ceramic Analysis

Rim Type - 1: Rounded; 2: Squared; 3- Flattened; 4: Mushroomed; 5: Tapered; 6: Lap Lip; 7: Projecting Asymetrical Rounded; 8: Porjec

QTY- Quantity; WT- Weight; RIM D - Rim Diameter (cm); MOD- Modification: + Present, - Absent; FIRE AFF- Fire Affected: + Yes, - No

Cat No.	SITE	LOCUS	Object	R Type	UNIT	TOPLEV	BOTLEV	Lip Type	Rim Type	TYPE
1	EHL-1		18	2		0	0	4	Direct	Salton Buff
2a	EHL-1		17	6	1	0	20	-		Colorado Buff
2b	EHL-1		17	6	1	0	20	-		Colorado Buff
2c	EHL-1		17	6	1	0	20	-		Tumco Buff
3	EHL-1		18	6	1	0	0	7	Recurve	Salton Brownware
4a	EHL-1		17	6	1	0	0	-		Salton Brownware
4b	EHL-1		17	6	1	0	0	-		Colorado Buff
4c	EHL-1		17	6	1	0	0	-		Salton Brownware
5	EHL-1		17	6	2	0	0	-		Salton Brownware
6	EHL-1		17	7	2	0	10	-		Tizon Brownware
7a	EHL-1		17	7	1	0	10	-		Salton Brownware
7b	EHL-1		17	7	1	0	10	-		Colorado Buff
7c	EHL-1		17	7	1	0	10	-		Salton Brownware
7d	EHL-1		17	7	1	0	10	-		Colorado Buff
8	EHL-1		18	6	1	0	0	2	Direct	Colorado Buff

Cat No.	Inclusions	Color	Manuf. Technique	Amphibole?	QTY	WT	Rim D
1	subA-SubR Q and		likely paddle/hand anvil - finger impresions on interior surface	-	1	5.2	10
2a	subA-subR; no Q	grey; uniform	Coils stil viz.	-	1	2	-
2b	Ang-Round; red/orange includsions- possible hematite?	light grey-buff	unknown	-	1	2.2	-
2c	rare; fabric is uniform	Buff to pink			1	1.8	-
3				-	1	7.2	8
4a	Round-subrounded; rare	light brown to grey	probably coil remnant/void	-	1	9.9	-
4b	Round-subrounded; rare; mostly Q	Buff to pink	unkown	-	1	4.1	-
4c	rare; fabric is uniform; subrounded; minimal to no Q	Brown interior surface/grey exterior	unknown	-	1	3.2	-
5	rare; fabric is uniform; subrounded; minimal to no Q	grey	unknown	-	1	11.3	-
6	Subrounded mostly, with lesser amounts subangular		unknown	-	1	6.3	-
7a		grey	unknown	-	1	0.9	-
7b	round-subround	Tan to pink	coil	-	1	3.5	
7c	Subrounded-subangular; minimal	tan to grey; grey in middle	coil		1	3.6	
7d	round-subround	Tan to pink			2	1.2	
8	Round-subrounded; Q, others		unknown		1	3.2	11
					16	65.6	

Cat No.	Burnished	MOD 1	MOD 2	FIRE AFF	NOTES	Vessel Type (based on Rim d)
1		+		-	Deep incision, perpendicular to rim, on rim	Jar/Cooking Pot
2a	Exterior				Interior surface rough, not burnished/shoothed/wiped	
2b	both			-	2A,2B, 2C are all different vessels	
2c	both	+	-	-	Scum coat exterior; oxidixed exterior half under scum coat	
3		-	-	-	recurve rim	Jar/Cooking Pot
4a	Exterior				variable thicknes; thickest part indicated cooking vessel; possible piee of charcoal embeded in fabric - interior surface	
4b	interior				Scum coat exterior;	
4c	-	-	-	-	Oxidized interior; reduced exterior;	
5	-	-	-	-	4 pieces refit from 1 vessel; reducing atmo; possible shell inclusions; minimal quartz - all rock minerals are v. small	
6	-	-	-	-		
7a	-	-	-	-	very thin, small fragment	
7b						
7c	Exterior				Voids visible - plant matter	
7d						
8					Oxidized interior and exterior, middle reduced; rim not quite squared/not quite flattened; interior wiped	Jar/Cooking Pot

APPENDIX E

DUDEK
CREATOR OF KERATA TECHNOLOGY

FIELD DATA REPORT

Appendix E Field Noise Measurement Data

Record: 500	
Project Name	*East Highline*
Observer(s)	*Connor Burke*
Date	*2017-05-05*
autoemail	*cburke@dudek.com*

Meteorological Conditions	
Temp (F)	*100*
Humidity % (R.H.)	*11*
Wind	*Calm*
Wind Speed (MPH)	*2*
Wind Direction	*East*
Sky	*Sunny*

Instrument and Calibrator Information	
Instrument Name List	*(ENC) Rion NL-52*
Instrument Name	*(ENC) Rion NL-52*
Instrument Name Lookup Key	*(ENC) Rion NL-52*
Manufacturer	*Rion*
Model	*NL-52*
Serial Number	*553896*
Calibrator Name	*(ENC) LD CAL150*
Calibrator Name	*(ENC) LD CAL150*
Calibrator Name Lookup Key	*(ENC) LD CAL150*
Calibrator Manufacturer	*Larson Davis*
Calibrator Model	*LD CAL150*
Calibrator Serial #	*5152*
Pre-Test (dBA SPL)	*94*
Post-Test (dBA SPL)	*94*
Windscreen	*Yes*
Weighting?	*A-WTD*
Slow/Fast?	*Slow*
ANSI?	*Yes*

Recordings	
Record #	*1*
Site ID	*ST4*
Site Location	*Latitude:32.722673, Longitude:-115.335652, Altitude:-10.033813, Speed:0.000000, Horizontal Accuracy:5.000000, Vertical Accuracy:6.000000, Time:12:14:01 PM PDT*
Begin (Time)	*12:14:00*
End (Time)	*12:24:00*
Leq	*48.1*
Lmax	*69*
Lmin	*39.6*
Other Lx?	*L90, L50, L10*
L90	*41.7*
L50	*44.3*
L10	*46*
Other (Specify Metric)	
Primary Noise Source	*Other*

FIELD DATA REPORT

Primary Noise Source Other	*Birds*
Other Noise Sources (Background)	*Birds, Distant Traffic*
Other Noise Sources Additional Description	*Distant farming noises. One car passed by.*
Is the same instrument and calibrator being used as previously notated?	*Yes*
Are the meteorological conditions the same as previously notated?	*Yes*

Description / Photos

Site Photos

Photo	
Comments / Description	*Facing north.*

Recordings

Record #	*2*
Site ID	*ST1*
Site Location	*Latitude:32.723269, Longitude:-115.284960, Altitude:2.328304, Speed:0.000000, Horizontal Accuracy:5.000000, Vertical Accuracy:3.000000, Time:12:31:19 PM PDT*
Begin (Time)	*12:31:00*
End (Time)	*12:41:00*
Leq	*45.5*
Lmax	*70*
Lmin	*37.7*
Other Lx?	*L90, L50, L10*
L90	*39.1*
L50	*39.8*
L10	*43.5*
Other (Specify Metric)	
Primary Noise Source	*Other*
Primary Noise Source Other	*Sprinklers*

DUDEK
CREATOR OF KERATA TECHNOLOGY

FIELD DATA REPORT

Other Noise Sources (Background)	*Birds, Distant Aircraft, Distant Traffic*
Is the same instrument and calibrator being used as previously notated?	*Yes*
Are the meteorological conditions the same as previously notated?	*Yes*

Description / Photos

Site Photos

Photo	
Comments / Description	*Facing north towards Verde School Rd.*

Recordings

Record #	*3*
Site ID	*ST2*
Site Location	*Latitude:32.720450, Longitude:-115.285062, Altitude:1.843506, Speed:0.000000, Horizontal Accuracy:5.000000, Vertical Accuracy:3.000000, Time:12:44:07 PM PDT*
Begin (Time)	*12:44:00*
End (Time)	*12:54:00*
Leq	*44.6*
Lmax	*59.5*
Lmin	*28.7*
Other Lx?	*L90, L50, L10*
L90	*30.5*
L50	*37.9*
L10	*48.7*
Other (Specify Metric)	
Primary Noise Source	*Other*
Primary Noise Source Other	*Birds*
Other Noise Sources (Background)	*Birds, Distant Aircraft, Distant Traffic*
Other Noise Sources Additional Description	*Distant farming noise.*

Is the same instrument and calibrator being used as previously notated?	*Yes*
Are the meteorological conditions the same as previously notated?	*Yes*

Description / Photos

Site Photos

Photo	
Comments / Description	*Facing north.*

Recordings

Record #	*4*
Site ID	*ST3*
Site Location	*Latitude:32.706161, Longitude:-115.275333, Altitude:-4.908447, Speed:0.000000, Horizontal Accuracy:5.000000, Vertical Accuracy:6.000000, Time:1:01:45 PM PDT*
Begin (Time)	*13:01:00*
End (Time)	*13:11:00*
Leq	*38.4*
Lmax	*50.5*
Lmin	*32*
Other Lx?	*L90, L50, L10*
L90	*33.8*
L50	*37.5*
L10	*41*
Other (Specify Metric)	
Primary Noise Source	*Other*
Primary Noise Source Other	*Rustling leaves*
Other Noise Sources (Background)	*Birds, Distant Aircraft, Distant Traffic, Rustling Leaves*
Is the same instrument and calibrator being used as previously notated?	*Yes*

DUDEK
CREATOR OF KERATA TECHNOLOGY

FIELD DATA REPORT

Are the meteorological conditions the same as previously notated?	*Yes*

Description / Photos

Site Photos

Photo	
Comments / Description	*Facing north.*

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 2/21/2018
Case Description: East Highline Reservoir_Grading

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Nearest Receiver 150'	Residential	65	60	55

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Grader	No	40	85		150	0
Flat Bed Truck	No	40		74.3	150	0

				Results				
		Calculated (dBA)			Noise Limits (dBA)			
				Day		Evening		Night
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Grader		75.5	71.5	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck		64.7	60.7	N/A	N/A	N/A	N/A	N/A
	Total	75.5	71.8	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Typical Receiver 1000'	Residential	65	60	55

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Grader	No	40	85		1000	0
Flat Bed Truck	No	40		74.3	1000	0

				Results				
		Calculated (dBA)			Noise Limits (dBA)			
				Day		Evening		Night
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Grader		59	55	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck		48.2	44.3	N/A	N/A	N/A	N/A	N/A
	Total	59	55.4	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 2/21/2018
Case Description: East Highline Reservoir_Paving

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Nearest Receiver 150'	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Mixer Truck	No	40		78.8	150	0
Crane	No	16		80.6	150	0
Pumps	No	50		80.9	200	0
Pumps	No	50		80.9	200	0
Pumps	No	50		80.9	250	0
Pumps	No	50		80.9	250	0
Pumps	No	50		80.9	300	0

Results

Equipment		Calculated (dBA) *Lmax	Leq	Noise Limits (dBA) Day Lmax	Leq	Evening Lmax	Leq	Night Lmax
Concrete Mixer Truck		69.3	65.3	N/A	N/A	N/A	N/A	N/A
Crane		71	63	N/A	N/A	N/A	N/A	N/A
Pumps		68.9	65.9	N/A	N/A	N/A	N/A	N/A
Pumps		68.9	65.9	N/A	N/A	N/A	N/A	N/A
Pumps		67	64	N/A	N/A	N/A	N/A	N/A
Pumps		67	64	N/A	N/A	N/A	N/A	N/A
Pumps		65.4	62.4	N/A	N/A	N/A	N/A	N/A
	Total	71	73	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Typical Receiver 1000'	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Mixer Truck	No	40		78.8	1000	0

Crane	No	16		80.6	1000	0
Pumps	No	50		80.9	1000	0
Pumps	No	50		80.9	1000	0
Pumps	No	50		80.9	1000	0
Pumps	No	50		80.9	1000	0
Pumps	No	50		80.9	1000	0

				Results					
		Calculated (dBA)			Noise Limits (dBA)				
				Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	
Concrete Mixer Truck		52.8	48.8	N/A	N/A	N/A	N/A	N/A	
Crane		54.5	46.6	N/A	N/A	N/A	N/A	N/A	
Pumps		54.9	51.9	N/A	N/A	N/A	N/A	N/A	
Pumps		54.9	51.9	N/A	N/A	N/A	N/A	N/A	
Pumps		54.9	51.9	N/A	N/A	N/A	N/A	N/A	
Pumps		54.9	51.9	N/A	N/A	N/A	N/A	N/A	
Pumps		54.9	51.9	N/A	N/A	N/A	N/A	N/A	
	Total	54.9	59.5	N/A	N/A	N/A	N/A	N/A	

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 2/21/2018

Case Description: East Highline Reservoir_Site Preparation

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Nearest Receiver 150'	Residential	65	60	55

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Dump Truck	No	40		76.5	150	0
Dump Truck	No	40		76.5	150	0
Dump Truck	No	40		76.5	200	0
Dump Truck	No	40		76.5	200	0
Dump Truck	No	40		76.5	250	0
Dump Truck	No	40		76.5	250	0
Dump Truck	No	40		76.5	300	0
Dump Truck	No	40		76.5	300	0
Dump Truck	No	40		76.5	350	0
Dump Truck	No	40		76.5	350	0
Compactor (ground)	No	20		83.2	400	0
Dozer	No	40		81.7	400	0

Dozer		No	40		81.7	450	0	
Tractor		No	40	84		450	0	

				Results				
		Calculated (dBA)			Noise Limits (dBA)			
				Day		Evening		Night
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Dump Truck		66.9	62.9	N/A	N/A	N/A	N/A	N/A
Dump Truck		66.9	62.9	N/A	N/A	N/A	N/A	N/A
Dump Truck		64.4	60.4	N/A	N/A	N/A	N/A	N/A
Dump Truck		64.4	60.4	N/A	N/A	N/A	N/A	N/A
Dump Truck		62.5	58.5	N/A	N/A	N/A	N/A	N/A
Dump Truck		62.5	58.5	N/A	N/A	N/A	N/A	N/A
Dump Truck		60.9	56.9	N/A	N/A	N/A	N/A	N/A
Dump Truck		60.9	56.9	N/A	N/A	N/A	N/A	N/A
Dump Truck		59.5	55.6	N/A	N/A	N/A	N/A	N/A
Dump Truck		59.5	55.6	N/A	N/A	N/A	N/A	N/A
Compactor (ground)		65.2	58.2	N/A	N/A	N/A	N/A	N/A
Dozer		63.6	59.6	N/A	N/A	N/A	N/A	N/A
Dozer		62.6	58.6	N/A	N/A	N/A	N/A	N/A
Tractor		64.9	60.9	N/A	N/A	N/A	N/A	N/A
	Total	66.9	71.1	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Typical Receiver 1000'	Residential	65	60	55

	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dump Truck	No	40		76.5	1000	0
Dump Truck	No	40		76.5	1000	0
Dump Truck	No	40		76.5	1000	0
Dump Truck	No	40		76.5	1000	0
Dump Truck	No	40		76.5	1000	0
Dump Truck	No	40		76.5	1000	0
Dump Truck	No	40		76.5	1000	0
Dump Truck	No	40		76.5	1000	0
Dump Truck	No	40		76.5	1000	0
Dump Truck	No	40		76.5	1000	0
Compactor (ground)	No	20		83.2	1000	0
Dozer	No	40		81.7	1000	0
Dozer	No	40		81.7	1000	0
Tractor	No	40	84		1000	0

			Results				
	Calculated (dBA)		Noise Limits (dBA)				
			Day		Evening		Night
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Dump Truck	50.4	46.5	N/A	N/A	N/A	N/A	N/A
Dump Truck	50.4	46.5	N/A	N/A	N/A	N/A	N/A
Dump Truck	50.4	46.5	N/A	N/A	N/A	N/A	N/A
Dump Truck	50.4	46.5	N/A	N/A	N/A	N/A	N/A
Dump Truck	50.4	46.5	N/A	N/A	N/A	N/A	N/A
Dump Truck	50.4	46.5	N/A	N/A	N/A	N/A	N/A
Dump Truck	50.4	46.5	N/A	N/A	N/A	N/A	N/A
Dump Truck	50.4	46.5	N/A	N/A	N/A	N/A	N/A
Dump Truck	50.4	46.5	N/A	N/A	N/A	N/A	N/A
Dump Truck	50.4	46.5	N/A	N/A	N/A	N/A	N/A
Compactor (ground)	57.2	50.2	N/A	N/A	N/A	N/A	N/A
Dozer	55.6	51.7	N/A	N/A	N/A	N/A	N/A
Dozer	55.6	51.7	N/A	N/A	N/A	N/A	N/A
Tractor	58	54	N/A	N/A	N/A	N/A	N/A
Total	58	60.4	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 2/21/2018
Case Description: East Highline Canal and Measurement Flume_Building Construction

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Nearest Receiver 150'	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Generator	No	50		80.6	150	0
Generator	No	50		80.6	150	0
Grader	No	40	85		200	0
Flat Bed Truck	No	40		74.3	200	0
Pumps	No	50		80.9	250	0
Compactor (ground)	No	20		83.2	250	0

Results

Equipment		Calculated (dBA) *Lmax	Leq	Noise Limits (dBA) Day Lmax	Leq	Evening Lmax	Leq	Night Lmax
Generator		71.1	68.1	N/A	N/A	N/A	N/A	N/A
Generator		71.1	68.1	N/A	N/A	N/A	N/A	N/A
Grader		73	69	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck		62.2	58.2	N/A	N/A	N/A	N/A	N/A
Pumps		67	64	N/A	N/A	N/A	N/A	N/A
Compactor (ground)		69.3	62.3	N/A	N/A	N/A	N/A	N/A
	Total	73	74.1	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Typical Receiver 1000'	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Generator	No	50		80.6	1000	0
Generator	No	50		80.6	1000	0
Grader	No	40	85		1000	0
Flat Bed Truck	No	40		74.3	1000	0

Pumps	No	50		80.9	1000	0
Compactor (ground)	No	20		83.2	1000	0

				Results					
		Calculated (dBA)			Noise Limits (dBA)				
				Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	
Generator		54.6	51.6	N/A	N/A	N/A	N/A	N/A	
Generator		54.6	51.6	N/A	N/A	N/A	N/A	N/A	
Grader		59	55	N/A	N/A	N/A	N/A	N/A	
Flat Bed Truck		48.2	44.3	N/A	N/A	N/A	N/A	N/A	
Pumps		54.9	51.9	N/A	N/A	N/A	N/A	N/A	
Compactor (ground)		57.2	50.2	N/A	N/A	N/A	N/A	N/A	
	Total	59	59.5	N/A	N/A	N/A	N/A	N/A	

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 2/21/2018

Case Description: East Highline Canal and Measurement Flume_Grading

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Nearest Receiver 150'	Residential	65	60	55

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Crane	No	16		80.6	150	0
Excavator	No	40		80.7	150	0
Scraper	No	40		83.6	200	0
Scraper	No	40		83.6	200	0

				Results				
		Calculated (dBA)			Noise Limits (dBA)			
				Day		Evening		Night
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Crane		71	63	N/A	N/A	N/A	N/A	N/A
Excavator		71.2	67.2	N/A	N/A	N/A	N/A	N/A
Scraper		71.5	67.6	N/A	N/A	N/A	N/A	N/A
Scraper		71.5	67.6	N/A	N/A	N/A	N/A	N/A
	Total	71.5	72.7	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Typical Receiver 1000'	Residential	65	60	55

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Crane	No	16		80.6	1000	0
Excavator	No	40		80.7	1000	0
Scraper	No	40		83.6	1000	0
Scraper	No	40		83.6	1000	0

				Results				
		Calculated (dBA)			Noise Limits (dBA)			
				Day		Evening		Night
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Crane		54.5	46.6	N/A	N/A	N/A	N/A	N/A
Excavator		54.7	50.7	N/A	N/A	N/A	N/A	N/A
Scraper		57.6	53.6	N/A	N/A	N/A	N/A	N/A
Scraper		57.6	53.6	N/A	N/A	N/A	N/A	N/A
	Total	57.6	57.9	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 2/21/2018

Case Description: East Highline Canal and Measurement Flume_Paving

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Nearest Receiver 150'	Residential	65	60	55

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Concrete Mixer Truck	No	40		78.8	150	0
Pumps	No	50		80.9	150	0
Pumps	No	50		80.9	200	0

				Results				
		Calculated (dBA)			Noise Limits (dBA)			
				Day		Evening		Night
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Concrete Mixer Truck		69.3	65.3	N/A	N/A	N/A	N/A	N/A
Pumps		71.4	68.4	N/A	N/A	N/A	N/A	N/A

Pumps		68.9	65.9	N/A	N/A	N/A	N/A	N/A
	Total	71.4	71.5	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Typical Receiver 1000'	Residential	65	60	55

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Mixer Truck	No	40		78.8	1000	0
Pumps	No	50		80.9	1000	0
Pumps	No	50		80.9	1000	0

Results

		Calculated (dBA)		Noise Limits (dBA)				
				Day		Evening		Night
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Concrete Mixer Truck		52.8	48.8	N/A	N/A	N/A	N/A	N/A
Pumps		54.9	51.9	N/A	N/A	N/A	N/A	N/A
Pumps		54.9	51.9	N/A	N/A	N/A	N/A	N/A
	Total	54.9	55.9	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 2/21/2018
Case Description: East Highline Sedimentation Basin_Building Construction

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Nearest Receiver 150'	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Generator	No	50		80.6	150	0
Generator	No	50		80.6	150	0
Grader	No	40	85		200	0
Flat Bed Truck	No	40		74.3	200	0
Compactor (ground)	No	20		83.2	250	0
Pumps	No	50		80.9	250	0

Results

Equipment		Calculated (dBA) *Lmax	Leq	Noise Limits (dBA) Day Lmax	Leq	Evening Lmax	Leq	Night Lmax
Generator		71.1	68.1	N/A	N/A	N/A	N/A	N/A
Generator		71.1	68.1	N/A	N/A	N/A	N/A	N/A
Grader		73	69	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck		62.2	58.2	N/A	N/A	N/A	N/A	N/A
Compactor (ground)		69.3	62.3	N/A	N/A	N/A	N/A	N/A
Pumps		67	64	N/A	N/A	N/A	N/A	N/A
	Total	73	74.1	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Typical Receiver 1000'	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Generator	No	50		80.6	1000	0
Generator	No	50		80.6	1000	0
Grader	No	40	85		1000	0
Flat Bed Truck	No	40		74.3	1000	0

Compactor (ground)		No	20		83.2	1000	0	
Pumps		No	50		80.9	1000	0	

				Results				
		Calculated (dBA)			Noise Limits (dBA)			
				Day		Evening		Night
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Generator		54.6	51.6	N/A	N/A	N/A	N/A	N/A
Generator		54.6	51.6	N/A	N/A	N/A	N/A	N/A
Grader		59	55	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck		48.2	44.3	N/A	N/A	N/A	N/A	N/A
Compactor (ground)		57.2	50.2	N/A	N/A	N/A	N/A	N/A
Pumps		54.9	51.9	N/A	N/A	N/A	N/A	N/A
	Total	59	59.5	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 2/21/2018

Case Description: East Highline Sedimentation Basin_Grading

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Nearest Receiver 150'	Residential	65	60	55

				Equipment			
				Spec	Actual	Receptor	Estimated
		Impact		Lmax	Lmax	Distance	Shielding
Description		Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Excavator		No	40		80.7	150	0
Flat Bed Truck		No	40		74.3	150	0
Flat Bed Truck		No	40		74.3	200	0
Flat Bed Truck		No	40		74.3	200	0
Flat Bed Truck		No	40		74.3	250	0
Flat Bed Truck		No	40		74.3	250	0
Flat Bed Truck		No	40		74.3	300	0
Flat Bed Truck		No	40		74.3	300	0
Flat Bed Truck		No	40		74.3	350	0
Flat Bed Truck		No	40		74.3	350	0
Flat Bed Truck		No	40		74.3	400	0
Dozer		No	40		81.7	400	0
Tractor		No	40	84		450	0

Results

Calculated (dBA) Noise Limits (dBA)

				Day		Evening		Night
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Excavator		71.2	67.2	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck		64.7	60.7	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck		62.2	58.2	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck		62.2	58.2	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck		60.3	56.3	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck		60.3	56.3	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck		58.7	54.7	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck		58.7	54.7	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck		57.3	53.4	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck		57.3	53.4	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck		56.2	52.2	N/A	N/A	N/A	N/A	N/A
Dozer		63.6	59.6	N/A	N/A	N/A	N/A	N/A
Tractor		64.9	60.9	N/A	N/A	N/A	N/A	N/A
	Total	71.2	70.8	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Typical Receiver 1000'	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	1000	0
Flat Bed Truck	No	40		74.3	1000	0
Flat Bed Truck	No	40		74.3	1000	0
Flat Bed Truck	No	40		74.3	1000	0
Flat Bed Truck	No	40		74.3	1000	0
Flat Bed Truck	No	40		74.3	1000	0
Flat Bed Truck	No	40		74.3	1000	0
Flat Bed Truck	No	40		74.3	1000	0
Flat Bed Truck	No	40		74.3	1000	0
Flat Bed Truck	No	40		74.3	1000	0
Flat Bed Truck	No	40		74.3	1000	0
Dozer	No	40		81.7	1000	0
Tractor	No	40	84		1000	0

Results

	Calculated (dBA)		Noise Limits (dBA)				
			Day		Evening		Night
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Excavator	54.7	50.7	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck	48.2	44.3	N/A	N/A	N/A	N/A	N/A

Flat Bed Truck		48.2	44.3	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck		48.2	44.3	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck		48.2	44.3	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck		48.2	44.3	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck		48.2	44.3	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck		48.2	44.3	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck		48.2	44.3	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck		48.2	44.3	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck		48.2	44.3	N/A	N/A	N/A	N/A	N/A
Dozer		55.6	51.7	N/A	N/A	N/A	N/A	N/A
Tractor		58	54	N/A	N/A	N/A	N/A	N/A
	Total	58	58.9	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 2/21/2018
Case Description: East Highline Sedimentation Basin_Paving

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Nearest Receiver 150'	Residential	65	60	55

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Concrete Mixer Truck	No	40		78.8	150	0
Pumps	No	50		80.9	150	0
Pumps	No	50		80.9	200	0

Results

		Calculated (dBA)		Noise Limits (dBA)				
				Day		Evening		Night
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Concrete Mixer Truck		69.3	65.3	N/A	N/A	N/A	N/A	N/A
Pumps		71.4	68.4	N/A	N/A	N/A	N/A	N/A
Pumps		68.9	65.9	N/A	N/A	N/A	N/A	N/A
	Total	71.4	71.5	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Typical Receiver 1000'	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Mixer Truck	No	40		78.8	1000	0
Pumps	No	50		80.9	1000	0
Pumps	No	50		80.9	1000	0

Results

		Calculated (dBA)		Noise Limits (dBA)				
				Day		Evening		Night
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Concrete Mixer Truck		52.8	48.8	N/A	N/A	N/A	N/A	N/A
Pumps		54.9	51.9	N/A	N/A	N/A	N/A	N/A
Pumps		54.9	51.9	N/A	N/A	N/A	N/A	N/A
	Total	54.9	55.9	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 2/21/2018
Case Description: East Highline Structures_Building Constructrion

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Nearest Receiver 150'	Residential	65	60	55

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Generator	No	50		80.6	150	0
Generator	No	50		80.6	150	0
Grader	No	40	85		200	0
Flat Bed Truck	No	40		74.3	200	0
Compactor (ground)	No	20		83.2	250	0
Pumps	No	50		80.9	250	0

Results

Equipment		Calculated (dBA) *Lmax	Leq	Noise Limits (dBA) Day Lmax	Leq	Evening Lmax	Leq	Night Lmax
Generator		71.1	68.1	N/A	N/A	N/A	N/A	N/A
Generator		71.1	68.1	N/A	N/A	N/A	N/A	N/A
Grader		73	69	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck		62.2	58.2	N/A	N/A	N/A	N/A	N/A
Compactor (ground)		69.3	62.3	N/A	N/A	N/A	N/A	N/A
Pumps		67	64	N/A	N/A	N/A	N/A	N/A
	Total	73	74.1	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Typical Receiver 1000'	Residential	65	60	55

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Generator	No	50		80.6	1000	0
Generator	No	50		80.6	1000	0
Grader	No	40	85		1000	0
Flat Bed Truck	No	40		74.3	1000	0

Compactor (ground)		No	20		83.2	1000	0
Pumps		No	50		80.9	1000	0

Results

		Calculated (dBA)		Noise Limits (dBA)				
				Day		Evening		Night
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Generator		54.6	51.6	N/A	N/A	N/A	N/A	N/A
Generator		54.6	51.6	N/A	N/A	N/A	N/A	N/A
Grader		59	55	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck		48.2	44.3	N/A	N/A	N/A	N/A	N/A
Compactor (ground)		57.2	50.2	N/A	N/A	N/A	N/A	N/A
Pumps		54.9	51.9	N/A	N/A	N/A	N/A	N/A
	Total	59	59.5	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 2/21/2018
Case Description: East Highline Structures_Grading

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Nearest Receiver 150'	Residential	65	60	55

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Excavator	No	40		80.7	150	0
Flat Bed Truck	No	40		74.3	150	0
Flat Bed Truck	No	40		74.3	200	0
Flat Bed Truck	No	40		74.3	200	0
Flat Bed Truck	No	40		74.3	250	0
Flat Bed Truck	No	40		74.3	250	0
Flat Bed Truck	No	40		74.3	300	0
Flat Bed Truck	No	40		74.3	300	0
Flat Bed Truck	No	40		74.3	350	0
Flat Bed Truck	No	40		74.3	350	0
Flat Bed Truck	No	40		74.3	400	0
Dozer	No	40		81.7	400	0
Tractor	No	40	84		450	0

Results

		Calculated (dBA)		Noise Limits (dBA)				
				Day		Evening		Night

Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Excavator		71.2	67.2	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck		64.7	60.7	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck		62.2	58.2	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck		62.2	58.2	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck		60.3	56.3	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck		60.3	56.3	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck		58.7	54.7	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck		58.7	54.7	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck		57.3	53.4	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck		57.3	53.4	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck		56.2	52.2	N/A	N/A	N/A	N/A	N/A
Dozer		63.6	59.6	N/A	N/A	N/A	N/A	N/A
Tractor		64.9	60.9	N/A	N/A	N/A	N/A	N/A
	Total	71.2	70.8	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Typical Receiver 1000'	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	1000	0
Flat Bed Truck	No	40		74.3	1000	0
Flat Bed Truck	No	40		74.3	1000	0
Flat Bed Truck	No	40		74.3	1000	0
Flat Bed Truck	No	40		74.3	1000	0
Flat Bed Truck	No	40		74.3	1000	0
Flat Bed Truck	No	40		74.3	1000	0
Flat Bed Truck	No	40		74.3	1000	0
Flat Bed Truck	No	40		74.3	1000	0
Flat Bed Truck	No	40		74.3	1000	0
Flat Bed Truck	No	40		74.3	1000	0
Dozer	No	40		81.7	1000	0
Tractor	No	40	84		1000	0

Results

	Calculated (dBA)		Noise Limits (dBA)				
			Day		Evening		Night
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Excavator	54.7	50.7	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck	48.2	44.3	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck	48.2	44.3	N/A	N/A	N/A	N/A	N/A

Flat Bed Truck		48.2	44.3	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck		48.2	44.3	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck		48.2	44.3	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck		48.2	44.3	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck		48.2	44.3	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck		48.2	44.3	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck		48.2	44.3	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck		48.2	44.3	N/A	N/A	N/A	N/A	N/A
Dozer		55.6	51.7	N/A	N/A	N/A	N/A	N/A
Tractor		58	54	N/A	N/A	N/A	N/A	N/A
	Total	58	58.9	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 2/21/2018
Case Description: East Highline Structures_Paving

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Nearest Receiver 150'	Residential	65	60	55

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Compactor (ground)	No	20		83.2	150	0
Pumps	No	50		80.9	150	0
Pumps	No	50		80.9	200	0

Results

		Calculated (dBA)			Noise Limits (dBA)			
				Day		Evening		Night
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Compactor (ground)		73.7	66.7	N/A	N/A	N/A	N/A	N/A
Pumps		71.4	68.4	N/A	N/A	N/A	N/A	N/A
Pumps		68.9	65.9	N/A	N/A	N/A	N/A	N/A
	Total	73.7	71.9	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Typical Receiver 1000'	Residential	65	60	55

Equipment

Description		Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Compactor (ground)		No	20		83.2	1000	0
Pumps		No	50		80.9	1000	0
Pumps		No	50		80.9	1000	0

		Calculated (dBA)		Results	Noise Limits (dBA)			
				Day		Evening		Night
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Compactor (ground)		57.2	50.2	N/A	N/A	N/A	N/A	N/A
Pumps		54.9	51.9	N/A	N/A	N/A	N/A	N/A
Pumps		54.9	51.9	N/A	N/A	N/A	N/A	N/A
	Total	57.2	56.2	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 2/21/2018
Case Description: East Highline Canal Tie-Ins_Grading

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Nearest Receiver 150'	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Drill Rig Truck	No	20		79.1	150	0
Excavator	No	40		80.7	150	0
Generator	No	50		80.6	200	0
Pumps	No	50		80.9	250	0
Compactor (ground)	No	20		83.2	200	0

Results

		Calculated (dBA)		Noise Limits (dBA)				
				Day		Evening		Night
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Drill Rig Truck		69.6	62.6	N/A	N/A	N/A	N/A	N/A
Excavator		71.2	67.2	N/A	N/A	N/A	N/A	N/A
Generator		68.6	65.6	N/A	N/A	N/A	N/A	N/A
Pumps		67	64	N/A	N/A	N/A	N/A	N/A
Compactor (ground)		71.2	64.2	N/A	N/A	N/A	N/A	N/A
	Total	71.2	72	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Typical Receiver 1000'	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Drill Rig Truck	No	20		79.1	1000	0
Excavator	No	40		80.7	1000	0
Generator	No	50		80.6	1000	0
Pumps	No	50		80.9	1000	0
Compactor (ground)	No	20		83.2	1000	0

		Results						
		Calculated (dBA)			Noise Limits (dBA)			
				Day		Evening		Night
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Drill Rig Truck		53.1	46.1	N/A	N/A	N/A	N/A	N/A
Excavator		54.7	50.7	N/A	N/A	N/A	N/A	N/A
Generator		54.6	51.6	N/A	N/A	N/A	N/A	N/A
Pumps		54.9	51.9	N/A	N/A	N/A	N/A	N/A
Compactor (ground)		57.2	50.2	N/A	N/A	N/A	N/A	N/A
	Total	57.2	57.5	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 2/21/2018

Case Description: East Highline Canal Tie-Ins_Paving

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Nearest Receiver 150'	Residential	65	60	55

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Generator	No	50		80.6	150	0
Pumps	No	50		80.9	150	0
Pumps	No	50		80.9	200	0

		Results						
		Calculated (dBA)			Noise Limits (dBA)			
				Day		Evening		Night
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Generator		71.1	68.1	N/A	N/A	N/A	N/A	N/A
Pumps		71.4	68.4	N/A	N/A	N/A	N/A	N/A
Pumps		68.9	65.9	N/A	N/A	N/A	N/A	N/A
	Total	71.4	72.4	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Typical Receiver 1000'	Residential	65	60	55

			Equipment			
			Spec	Actual	Receptor	Estimated

Description		Impact Device	Usage(%)	Lmax (dBA)	Lmax (dBA)	Distance (feet)	Shielding (dBA)
Generator		No	50		80.6	1000	0
Pumps		No	50		80.9	1000	0
Pumps		No	50		80.9	1000	0

Results

		Calculated (dBA)			Noise Limits (dBA)			
				Day		Evening		Night
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Generator		54.6	51.6	N/A	N/A	N/A	N/A	N/A
Pumps		54.9	51.9	N/A	N/A	N/A	N/A	N/A
Pumps		54.9	51.9	N/A	N/A	N/A	N/A	N/A
	Total	54.9	56.6	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 2/21/2018
Case Description: East Highline Canal Tie-Ins_Site Preparation

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Nearest Receiver 150'	Residential	65	60	55

Equipment

Description		Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Flat Bed Truck		No	40		74.3	150	0
Tractor		No	40	84		150	0

Results

		Calculated (dBA)			Noise Limits (dBA)			
				Day		Evening		Night
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Flat Bed Truck		64.7	60.7	N/A	N/A	N/A	N/A	N/A
Tractor		74.5	70.5	N/A	N/A	N/A	N/A	N/A
	Total	74.5	70.9	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Typical Receiver 1000'	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Flat Bed Truck	No	40		74.3	1000	0
Tractor	No	40	84		1000	0

			Results				
	Calculated (dBA)			Noise Limits (dBA)			
			Day		Evening		Night
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Flat Bed Truck	48.2	44.3	N/A	N/A	N/A	N/A	N/A
Tractor	58	54	N/A	N/A	N/A	N/A	N/A
Total	58	54.4	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 2/21/2018
Case Description: East Highline Highway 98 Detour_Grading

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Nearest Receiver 150'	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Grader	No	40	85		150	0
Flat Bed Truck	No	40		74.3	150	0
Compactor (ground)	No	20		83.2	200	0
Scraper	No	40		83.6	200	0
Scraper	No	40		83.6	250	0

Results

Equipment		Calculated (dBA) *Lmax	Leq	Noise Limits (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax
Grader		75.5	71.5	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck		64.7	60.7	N/A	N/A	N/A	N/A	N/A
Compactor (ground)		71.2	64.2	N/A	N/A	N/A	N/A	N/A
Scraper		71.5	67.6	N/A	N/A	N/A	N/A	N/A
Scraper		69.6	65.6	N/A	N/A	N/A	N/A	N/A
	Total	75.5	74.3	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Typical Receiver 1000'	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Grader	No	40	85		1000	0
Flat Bed Truck	No	40		74.3	1000	0
Compactor (ground)	No	20		83.2	1000	0
Scraper	No	40		83.6	1000	0
Scraper	No	40		83.6	1000	0

		Results						
		Calculated (dBA)			Noise Limits (dBA)			
				Day		Evening		Night
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Grader		59	55	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck		48.2	44.3	N/A	N/A	N/A	N/A	N/A
Compactor (ground)		57.2	50.2	N/A	N/A	N/A	N/A	N/A
Scraper		57.6	53.6	N/A	N/A	N/A	N/A	N/A
Scraper		57.6	53.6	N/A	N/A	N/A	N/A	N/A
	Total	59	59.6	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 2/21/2018
Case Description: East Highline Highway 98 Detour_Paving

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Nearest Receiver 150'	Residential	65	60	55

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Paver	No	50		77.2	150	0
Roller	No	20		80	150	0

		Results						
		Calculated (dBA)			Noise Limits (dBA)			
				Day		Evening		Night
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Paver		67.7	64.7	N/A	N/A	N/A	N/A	N/A
Roller		70.5	63.5	N/A	N/A	N/A	N/A	N/A
	Total	70.5	67.1	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Typical Receiver 1000'	Residential	65	60	55

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)

Paver	No	50		77.2	1000	0
Roller	No	20		80	1000	0

Results

		Calculated (dBA)		Noise Limits (dBA)				
				Day		Evening		Night
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
Paver		51.2	48.2	N/A	N/A	N/A	N/A	N/A
Roller		54	47	N/A	N/A	N/A	N/A	N/A
	Total	54	50.6	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.