SOUTH SAN JOAQUIN IRRIGATION DISTRICT

CANYON TUNNEL PROJECT

FINAL INITIAL STUDY/MITIGATED NEGATIVE DECLARATION

MARCH 2023

SCH NO. 2023010504

PREPARED FOR:

South San Joaquin Irrigation District
11011 E. Highway 120
Manteca, CA 95336

PREPARED BY:

Provost & Pritchard Consulting Group

NOTE (10.29.24):

On March 14, 2023, SSJID approved the Initial Study/Mitigated Negative Declaration (IS/MND) pursuant to the California Environmental Quality Act (CEQA) for the Canyon Tunnel Project. The Project documents as submitted to the State Clearinghouse can be found at this link: https://ceqanet.opr.ca.gov/Project/2023010504. Following CEQA approval by SSJID and during the Project final design and regulatory permitting processes, minor changes were made to the Project Description, including improvements to design features and water quality protective measures at the proposed upstream tunnel portal, containment of tunnel excavation spoils onsite, and development of a habitat mitigation and monitoring plan. Prior to implementing these changes, SSJID intends to prepare an addendum to the adopted IS/MND pursuant to CEQA Guidelines Sections 15162 and 15164. This addendum will assess the revised Project as compared to the approved Project to ascertain whether the original IS/MND remains sufficient in its consideration and assessment of the environmental impacts of the Project in light of the proposed changes, and will include a determination as to whether substantial evidence exists to support a fair argument that the proposed changes to the Project would have impacts on the environment beyond those evaluated in the adopted IS/MND. We anticipate that no new significant environmental impacts will be identified, nor a substantial increase in the severity of previously identified potential significant impacts.

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ACRONYMS & ABBREVIATIONS

AB .... Assembly Bill
AMSL........ Above Mean Sea Level
APE .... Area of Potential Effect
APN .... Assessor's Parcel Number
BAAQMD .... Bay Area Air Quality Management District
BMP .... best management practices
CAAQS........ California Ambient Air Quality Standards
CAL FIRE........ California Department of Forestry and Fire Protection
Cal/OSHA .... California Occupational Safety and Health Administration
CalEEMod .... California Emissions Estimator Modeling (software)
CARB .... California Air Resources Board
CCAA .... California Clean Air Act
CCIC .... Central California Information Center
CDFW........ California Fish and Wildlife
CEQA........ California Environmental Quality Act
Cfs .... cubic feet per second
CHRIS .... California Historical Resources Information System
CH_4 .... Methane
CNDDB .... California Natural Diversity Database
CNPS .... California Native Plant Society
CO .... Carbon Monoxide
CO_2 .... Carbon dioxide
CSC .... California Species of Special Concern
CY .... Cubic Yards
dBA .... A-weighted decibels
District .... South San Joaquin Irrigation District
DOC .... Department of Conservation
DTSC .... Department of Toxic Substances Control
ECOS .... Environmental Conservation Online System
EIR .... Environmental Impact Report
EPA .... Environmental Protection Agency

FEMA	Federal Emergency Management Agency
FMMP	Farmland Mapping and Monitoring Program
FTA	Federal Transit Administration
GAMAQI	Guidelines for Assessing and Mitigating Air Quality Impacts
GHG	Greenhouse Gas
GIS	Geographic Information System
HUC	Hydrologic Unit Code
IS	Initial Study
IS/MND	Initial Study/Mitigated Negative Declaration
ITP	Incidental Take Permit
JSC	Joint Supply Canal
km	kilometers
lf	lineal feet
MBTA	(Federal) Migratory Bird Treaty Act
MMRP	Mitigation Monitoring and Reporting Program
MND	Mitigated Negative Declaration
MRZ	Mineral Resource Zone
$MTCO2_e$	Metric tons of carbon dioxide equivalent
NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission
ND	Negative Declaration
NEPA	National Environmental Policy Act
N_2O	Nitrous oxide
NO_x	Nitrogen oxides
NPDES	National Pollution Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
O_3	Ozone
OID	Oakdale Irrigation District
PG&E	Pacific Gas and Electric
PM_{10}	particulate matter 10 microns in size
$PM_{2.5}$	particulate matter 2.5 microns in size
ppb	parts per billion

ppm	parts per million
PPV	peak particle velocity
Project	Canyon Tunnel Project
ROG	Recactive Organic Gas
RWQCB	Regional Water Quality Control Board
sf	square feet
SJVAPCD	San Joaquin Valley Air Pollution Control District
SO_x	sulfur oxides
SO_2	Sulfur Dioxide
SR	State Route
SSJID	South San Joaquin Irrigation District
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TAC	Toxic Air Contaminants
TPY	tons per year
USACE	United States Army Corps of Engineers
USC	United States Code
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
µg/m3	micrograms per cubic meter
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compound
WDR	Waste Discharge Requirements
WEAP	Worker Environmental Awareness Program

CHAPTER 1 INTRODUCTION

Provost & Pritchard Consulting Group (Provost & Pritchard) has prepared this Initial Study/Mitigated Negative Declaration (IS/MND) on behalf of South San Joaquin Irrigation District (District) to address the potential environmental effects of the proposed Canyon Tunnel Project (Project). This document has been prepared in accordance with the California Environmental Quality Act (CEQA), Public Resources Code Section 21000 et seq. The District is the CEQA lead agency for this Project.

The site and the Project are described in detail in Chapter 2.

1.1 REGULATORY INFORMATION

An Initial Study (IS) is a document prepared by a lead agency to determine whether a project may have a significant effect on the environment. In accordance with California Code of Regulations Title 14 (Chapter 3, Section 15000, *et seq.*)-- also known as the CEQA Guidelines--Section 15064 (a)(1) states that an environmental impact report (EIR) must be prepared if there is substantial evidence in light of the whole record that the Project under review may have a significant effect on the environment and should be further analyzed to determine mitigation measures or project alternatives that might avoid or reduce project impacts to less than significant levels. A negative declaration (ND) may be prepared instead if the lead agency finds that there is no substantial evidence in light of the whole record that the project may have a significant effect on the environment. An ND is a written statement describing the reasons why a proposed Project, not otherwise exempt from CEQA, would not have a significant effect on the environment and, therefore, why it would not require the preparation of an EIR (CEQA Guidelines Section 15371). According to CEQA Guidelines Section 15070, a ND or *mitigated* ND shall be prepared for a project subject to CEQA when either:

a. The IS shows there is no substantial evidence, in light of the whole record before the agency, that the proposed Project may have a significant effect on the environment, or
b. The IS identified potentially significant effects, but:
    1. Revisions in the project plans or proposals made by or agreed to by the applicant before the proposed MND and IS is released for public review would avoid the effects or mitigate the effects to a point where clearly no significant effects would occur is prepared, and
    2. There is no substantial evidence, in light of the whole record before the agency, that the proposed Project as *revised* may have a significant effect on the environment.

1.2 DOCUMENT FORMAT

This IS/MND contains six chapters. Chapter 1, provides an overview of the Project and the CEQA process. Chapter 2, provides a detailed description of proposed Project components and objectives. Chapter 3, the Lead Agency's determination based upon this initial evaluation. Chapter 4 presents the CEQA checklist and environmental analysis for all impact areas, mandatory findings of significance, and feasible mitigation measures. If the Project does not have the potential to significantly impact a given issue area, the relevant section provides a brief discussion of the reasons why no impacts are expected. If the Project could have a potentially significant impact on a resource, the issue area discussion provides a description of potential impacts, and appropriate mitigation measures and/or permit requirements that would reduce those impacts to a less than significant level. Chapter 5 Mitigation Monitoring Reporting Program (MMRP), provides the proposed mitigation measures, implementation timelines, and the entity/agency responsible for ensuring implementation. Chapter 6 details the documents and reports this document relies upon to provide its analysis.

The Air Quality and Greenhouse Gas Emissions Model, Biological Evaluation, Focused Bat Survey, Class III Cultural Resources Inventory/Phase I Survey, and Project-related Vehicle Miles Traveled Analysis, Responsible Agency Correspondence, and Canyon Tunnel Diversion Memo are provided as technical Appendix A, Appendix B, Appendix C, Appendix E, Appendix E, Appendix F and Appendix G respectively, at the end of this document.

CHAPTER 2 PROJECT DESCRIPTION

2.1 PROJECT BACKGROUND

2.1.1 Project Title

Canyon Tunnel Project

2.1.2 Lead Agency Name and Address

South San Joaquin Irrigation District
11011 E. Highway 120
Manteca, CA 95336

2.1.3 Contact Person and Phone Number

Lead Agency Contact

Forrest Killingsworth
Engineering Department Manager
(209) 249-4600

CEQA Consultant

Provost & Pritchard Consulting Group
Briza Sholars, Environmental Project Manager
Dena Giacomini, Environmental Project Manager
(559) 449-2700

2.1.4 Project Location

The Project is located in a portion of Calaveras County, Stanislaus County, and Tuolumne County, California, approximately 17 miles northeast of Modesto and 30 miles southeast of Stockton (see Figure 2-1, Figure 2-2, and Figure 2-3). The Project site is located on multiple Assessor's Parcel Numbers (APN) and are listed in Table 2-1. They can also be seen in Figure 2-6.

Table 2-1: Assessor's Parcel Numbers

Calaveras APNs	Stanislaus APNs	Tuolumne APNs
053-021-003	002-073-001	063-120-24
053-021-011	002-073-003	063-120-27
053-021-WOW	002-063-017	

The centroid of the Project site is 37° 50' 54.53" [N], 120° 38' 51.39" [W].

2.1.5 General Plan Designation and Zoning

The General Plan serves as a blueprint for the future, prescribing policy goals and objectives to shape and guide the physical development of a City or County. A zoning ordinance is a rule that defines how property in specific geographic zones can be used. Zoning ordinances may also regulate lot size, placement, density, and the height of structures. Zoning ordinances are one of the mechanisms how a General Plan can be implemented. The Project is primarily located in Calaveras County, but it is also located in Stanislaus and Tuolumne County. Table 2-2 below depicts the general plan and zoning district designations onsite and adjacent to the Project area.

Table 2-2: General Plan and Zoning Designations

Project Area	General Plan Designation	Zoning District
ONSITE (CALAVERAS COUNTY)	Resource Production[1]	General Agriculture, Agriculture Preserve, Water Right-of-Way[2]
ONSITE (STANISLAUS COUNTY)	Agriculture[3]	General Agriculture (40-acre minimum parcel size)[4]
ONSITE (TUOLUMNE COUNTY)	Agricultural, Estate Residential, Public, Rural Residential[5]	General Agriculture (10-acre minimum parcel size), Residential Estate (2-acre minimum parcel size), Open Space[6]
Source information is directly from Calaveras, Stanislaus, and Tuolumne Counties General Plans (2019, 2015, and 2018 respectively) and Zoning Ordinances.		

Table 2-3: Existing Uses, General Plan Designation, & Zone Districts of Surrounding Properties

Direction from Project Site	Existing Use	General Plan Designation	Zone District
NORTH	Open Space	Resource Production	Agriculture
EAST	Open Space/Agricultural/Public	Resource Production, Water Right-of-Way, Agriculture	Agriculture, Open Space
SOUTH	Open Space/Agricultural/Public	Resource Production, Water Right-of-Way, Agriculture	Agriculture, Open Space
WEST	Open Space	Resource Production	Agriculture, Agricultural Preserve,

2.1.6 Description of Project

Project Background and Purpose

The Project consists of a new water conveyance tunnel (approximately 12,000 lineal feet, 1,000 feet hard rock and 11,000 feet soft rock) to bypass approximately 12,250 lineal feet of existing canal, referred to as the Joint Supply Canal (JSC). The purpose of the Project is to improve long-term reliability of this critical water supply system because existing canal segments along this bypass reach are extremely vulnerable to catastrophic failure, primarily due to unstable rock slopes that are present along the canyon wall above the JSC.

[1] (Calaveras County 2019)
[2] (Municode 2022)
[3] (Stanislaus County 2015)
[4] (Stanislaus County 2022)
[5] (Tuolumne County Community Resources Agency 2018)
[6] (Tuolumne County 2022)

The JSC provides water supply for both South San Joaquin Irrigation District (SSJID) and Oakdale Irrigation District (OID). SSJID provides JSC maintenance and is the lead agency for this project. The JSC is located along the north bank of the Stanislaus River in Calaveras and Stanislaus Counties, California, near the town of Knights Ferry. Water is diverted into the JSC at Goodwin Dam; Goodwin Dam was constructed circa 1913 and was raised in 1958. Goodwin Dam is operated by the Tri-Dam Project, an agency owned jointly by SSJID and OID. The maximum design flow capacity of the existing JSC is approximately 1,250 cubic feet per second (cfs); the existing flows and annual diversion limits would not be modified as a part of this Project but would increase the reliability of supplies. Based on subsurface conditions data and evaluation of potential tunneling methods, a recommended tunnel route was selected. The Project evaluated is a tunnel intake located upstream of the dam; with a submerged intake from the existing forebay pool approximately 20 feet from the dam.

Project objectives would be as follows:

- <u>Increase water supply reliability</u>: The Project would increase reliability of supplies available for both SSJID and OID.
- <u>Reduce rockfall hazard</u>: The Project would provide rockfall protection, thus limiting/minimizing/preventing rocks, sand, gravel, trees, and other material cleanup within the canal, by redirecting flows through the tunnel thus minimizing rockfall issues/concerns.
- <u>Increase Safety</u>: Provide much safer working conditions for facilities maintenance personnel.

Project Description

The work would include temporary construction access, laydown, and staging areas; permanent downstream tunnel portal and tie-in to the existing canal; approximately 12,000 lineal feet of new tunnel; permanent upstream tunnel portal and tie-in to either the existing Goodwin Reservoir; and permanent access improvements leading to the existing Goodwin Dam right abutment:

The Project specifically includes the following components:

- Construction of approximately 12,000 feet tunnel; approximately 16-feet-wide by 13.8-feet-high;
- Use of existing roads paved and dirt roads to be rehabilitated where necessary;
- Rehabilitation of an existing barge landing and new barge platform:
    - Sectional barge would consist of eight pre-cast concrete segments (each 10 feet by 15 feet) with a combined 30-foot by 40-foot area, measuring 7 feet in depth, which is required for 65,000 pound of live load weight during construction;
    - Rehabilitation of the existing landing would be constructed at the same location and same footprint at the south shore of Goodwin Dam Reservoir at the current parking lot location;
    - Protective cofferdam would be used to dewater around the existing barge landing;
    - Tensioned guide cable would be secured for barge movement alignment:
        - South end would be attached below the reconstructed concrete landing with rock bolts;
        - North end would be attached to the existing concrete trash rack wall; and
        - Electric winches would be used to move the barge platform back and forth.
- Improve and re-align existing livestock fences including barbed wire fencing and panel gates;
- Tunnel inlet would start on the north side of the reservoir, upstream of the dam, above the existing diversion canal and on the dry side of the forebay and trash rack;
- Installation of new control gates at the tunnel inlet;
    - The tunnel size would be approximately 16 feet in diameter

- Temporary installation of stop logs at the existing trash rack for forebay dewatering;
- Installation of a concrete cover cap over the existing forebay to provide rockfall protection;
- Existing ram pump to be abandoned;
    - Proposed vertical conduit to be drilled vertically to tunnel for upland property owner (well with steel casing, removable screen and sump at tunnel sidewall, submersible solar power pump);
- Existing canal gates at dam to remain for side-spill
- Existing canal inlet gates to be abandoned
- Tunnel Outlet would be located at the south end of the Project area at the downstream portal.
- The proposed Canyon Tunnel would bypass the existing canal for approximately 12,000 feet and tie back into the existing canal through a downstream tunnel portal.

Construction Phases are as follows and are referenced throughout the document:

1. Excavate Portal Work Area
2. Shotcrete Portal Face
3. Excavate First 916 LF D + S
4. Tunnel Excavation, Stage 1 Shotcrete
5. Stage 2 Shotcrete
6. Place Concrete Slab D+S and Invert Concrete
7. Tunnel Cleanup

Cultural Area of Potential Effect

The cultural Area of Potential Effect (APE) for ground disturbing activities is approximately 8.5 acres outlined below:

Tuolumne County
Existing Staging Area (barge landing and related improvements) = 16,560 sf = ~0.4 acres
Existing Access Road (may need to be widened) = 780 lf @ 16’w = 12,480 sf = ~0.3 acres

Stanislaus County
Existing Access Road (From Diversion Works – improvements to restore conditions following construction) = 5,481 lf @ 16’w = 87,696 sf = ~2.2 acres
Temporary Contractor Laydown Area (improve then reclaim) = ~3 acres

Calaveras County
New Barge Landing/Cap over Upstream Portal = 12,093 sf = ~0.3 acres
Existing Access Road (To Downstream Tunnel Portal and Staging Area - improvements to restore conditions following construction) = 1,508 lf @ 16’w = 24,128 sf = ~ 0.6 acres
New Downstream Tunnel Portal and Staging Area = 19,446 sf = ~ 0.5 acres
Temporary Construction Staging, Spoils Pile/Staging Area with connecting Road (improve then reclaim) = 49,285 sf = ~ 1.2 acres

Construction Schedule

Construction will occur over two to three years and consist of several phases including clearing, grading, and excavation. Equipment maintenance visits are anticipated to occur weekly.

Equipment

Construction equipment would include air compressors, all-terrain vehicles, concrete mixers, concrete pumps, concrete vibrators, electric generators, excavators, light plants, loaders, water pumps, dump/haul trucks, road header tunneling machine, various hand tools, forklift, drill rig, grout pump, concrete transit trucks, and a temporary barge to transport equipment. Temporary construction staging area would be located within the Project boundary and used for storage of materials and equipment.

Operation and Maintenance

Operation and maintenance of the facility would be consistent with current activities to maintain infrastructure. The new water conveyance tunnel and associated infrastructure would have the same intent and operational needs as the existing JSC. SSJID would be responsible for operation and maintenance of the Project. Current maintenance equipment access to the north abutment is provided through the JSC during the non-irrigation season (annually November through February). Because the bypassed segment of JSC will be abandoned and no longer available for access, future permanent access to the north abutment will be provided by the new barge.

2.1.7 Setting and Surrounding Land Uses

The Project is located within Calaveras, Stanislaus, and Tuolumne Counties, north of the unincorporated community of Knights Ferry, California. This area lies within the foothills of the Sierra Nevada Mountain Range adjacent to the San Joaquin Valley. The topography is made up of rolling hills with elevations ranging from approximately 300 to 700 feet, with underlying rock formations of older metamorphic rock and younger volcanic flows and sandstone. The hills are made up of large oak woodland and grassland habitat. Outside of the community of Knights Ferry are residential homes and ranches on larger lot sizes.

Like most of California, the Sierra foothills experience a Mediterranean climate. Warm, dry summers are followed by cool, moist winters. Summer temperatures range between 70- and 90-degrees Fahrenheit (°F), but often exceeds 100 °F. Winter minimum temperatures are near 40 °F. The average annual precipitation is approximately 13 inches, falling mainly from October to April.

The Goodwin Dam Reservoir and Stanislaus River are the main waters located in the area and located below Tulloch Reservoir. Goodwin Dam was the first part of the SSJID system construction in 1909 creating Goodwin Dam Reservoir. There are trails and canyon bluffs surrounding the reservoir. Recreational activities include fishing and wildlife viewing. There is white-water rafting on portions of the Stanislaus River downstream of the dam.

2.1.8 Other Public Agencies Whose Approval May Be Required

- Division of Safety of Dams
- California Division of Occupational Safety and Health
- Regional Water Quality Control Board, Central Valley Division
- United States Army Corps of Engineers
- California Department of Fish and Wildlife

2.1.9 Consultation with California Native American Tribes

Public Resources Code Section 21080.3.1, *et seq. (codification of AB 52, 2013-14)* requires that a lead agency, within 14 days of determining that it will undertake a project, must notify in writing any California

Native American Tribe traditionally and culturally affiliated with the geographic area of the project if that Tribe has previously requested notification about projects in that geographic area. The notice must briefly describe the project and inquire whether the Tribe wishes to request formal consultation. Tribes have 30 days from receipt of notification to request formal consultation. The lead agency then has 30 days to initiate the consultation, which then continues until the parties come to an agreement regarding necessary mitigation or agree that no mitigation is needed, or one or both parties determine that negotiation occurred in good faith, but no agreement will be made.

The District has not received any written correspondence from a Tribe pursuant to Public Resources Code Section 21080.3.1 requesting notification of proposed project.

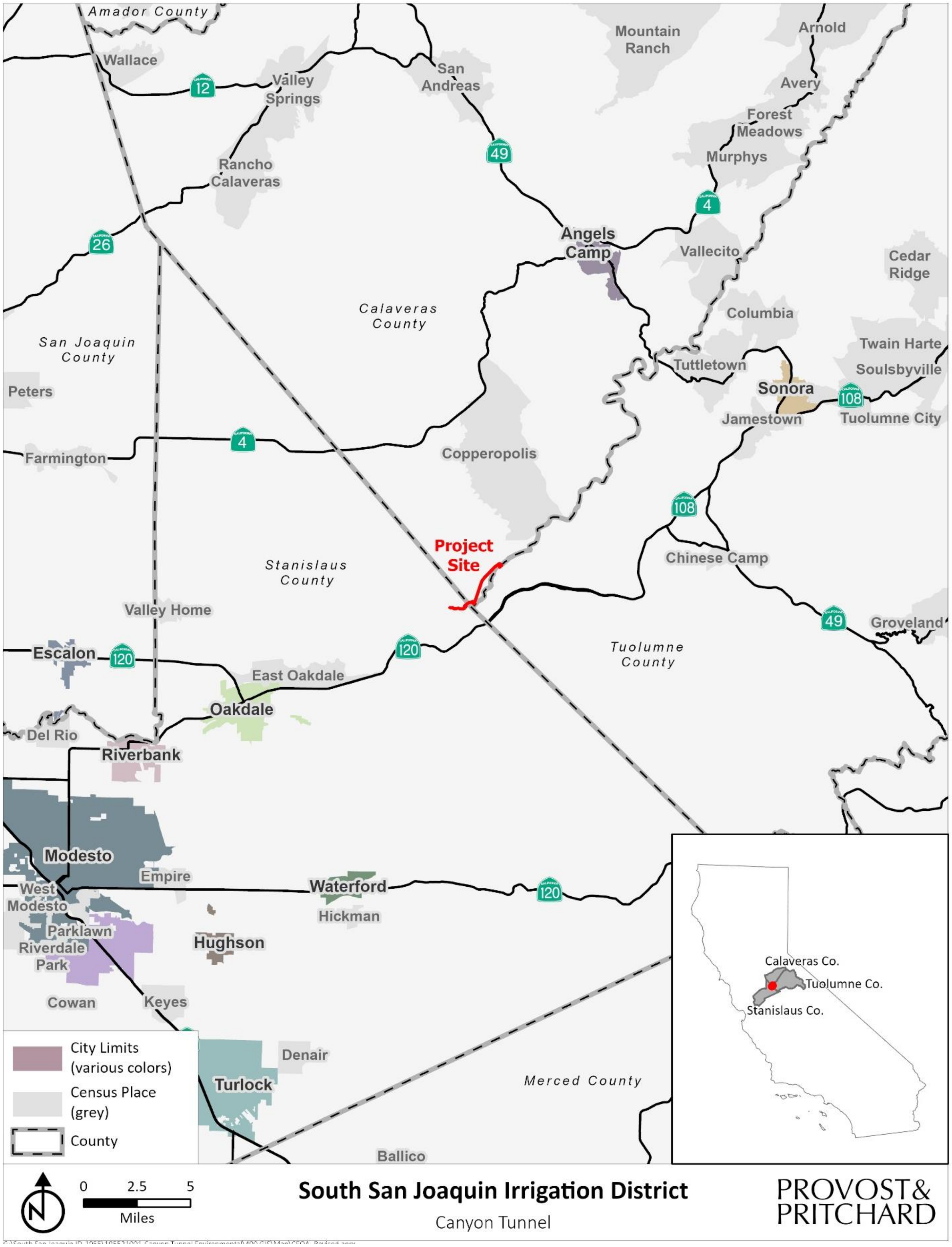

Figure 2-1: Regional Location Map

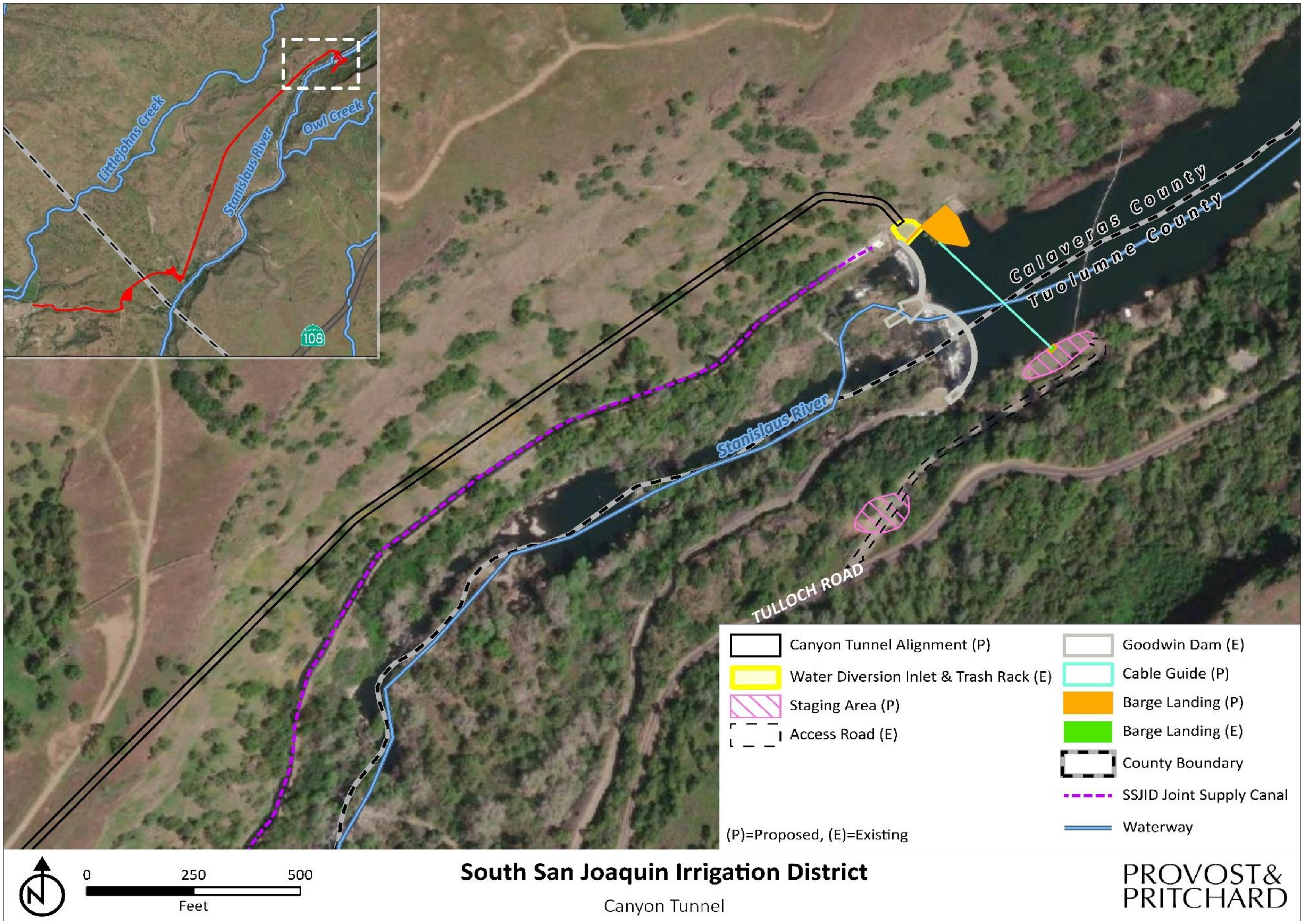

Figure 2-2: Project Area (Northeast Portion)

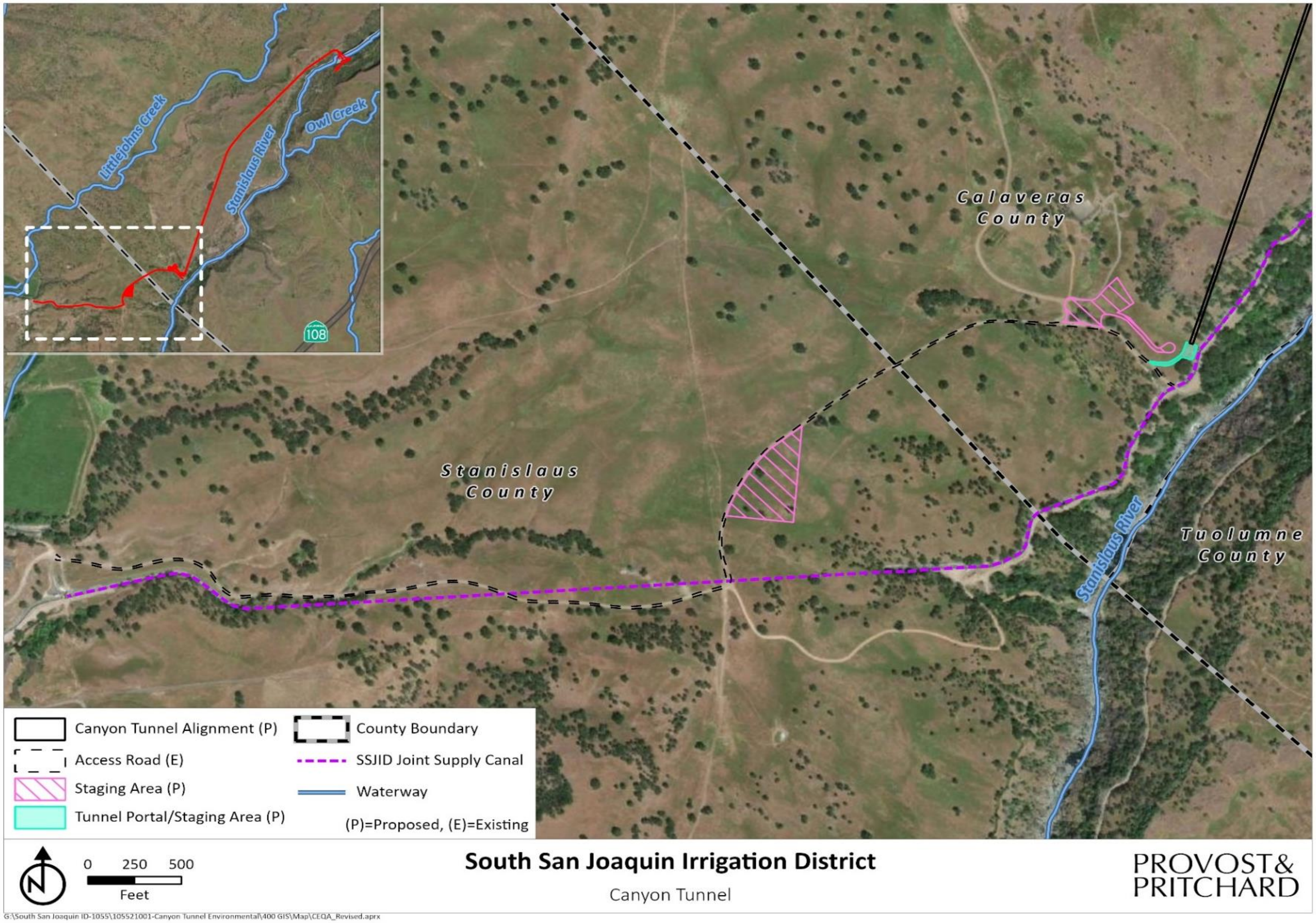

Figure 2-3: Project Area (Southwest Portion)

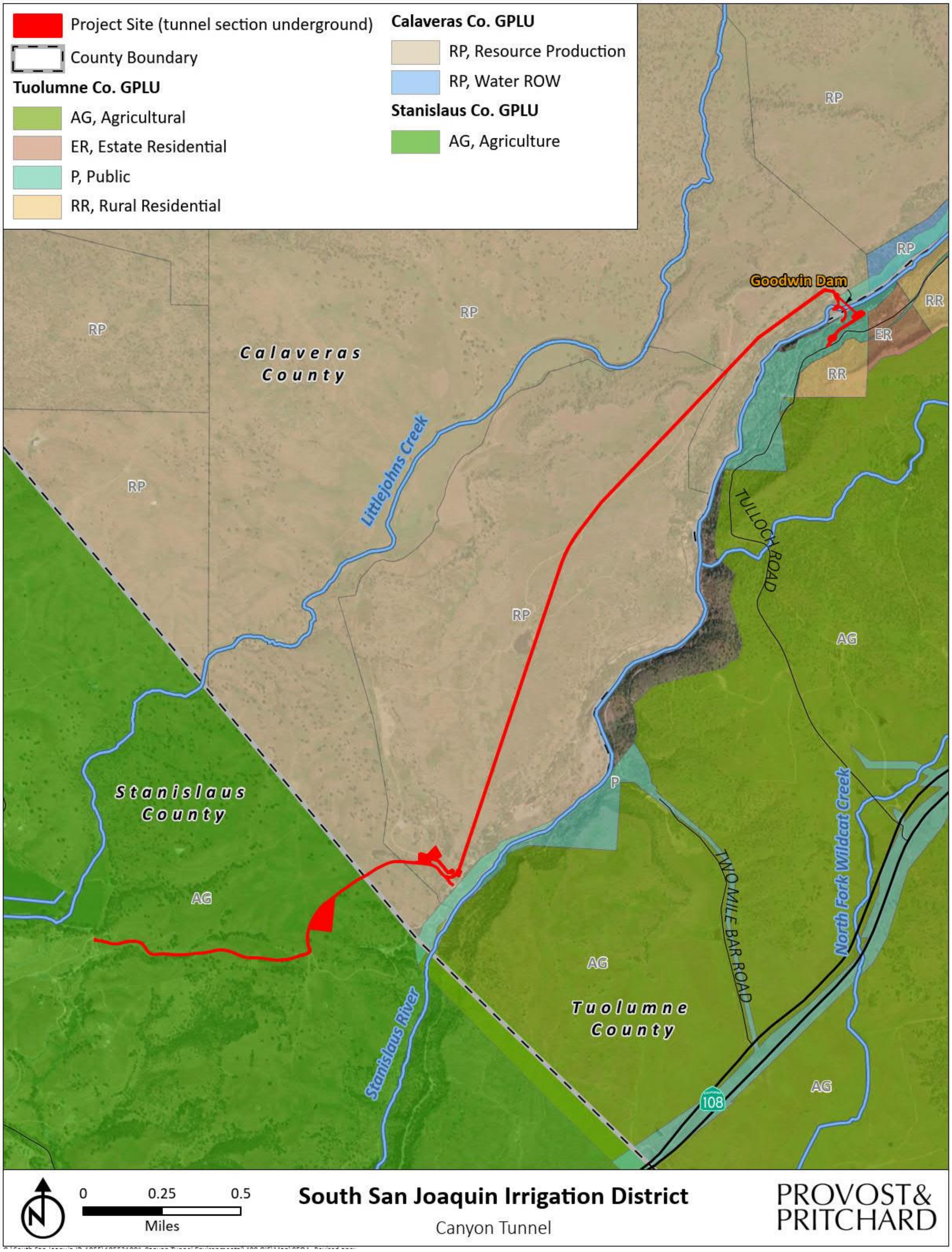

Figure 2-4: General Plan Land Use Designation Map

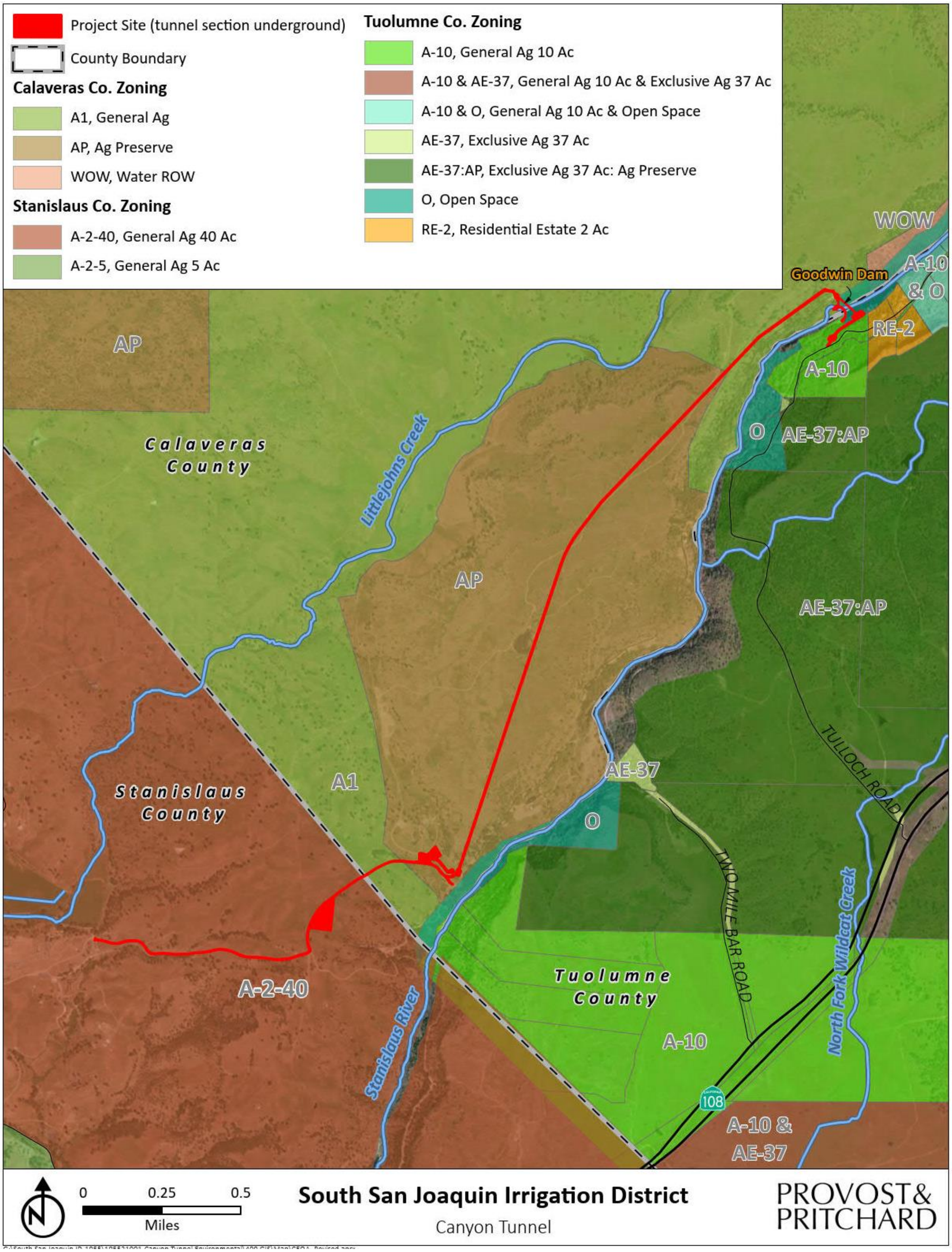

Figure 2-5: Zone District Map

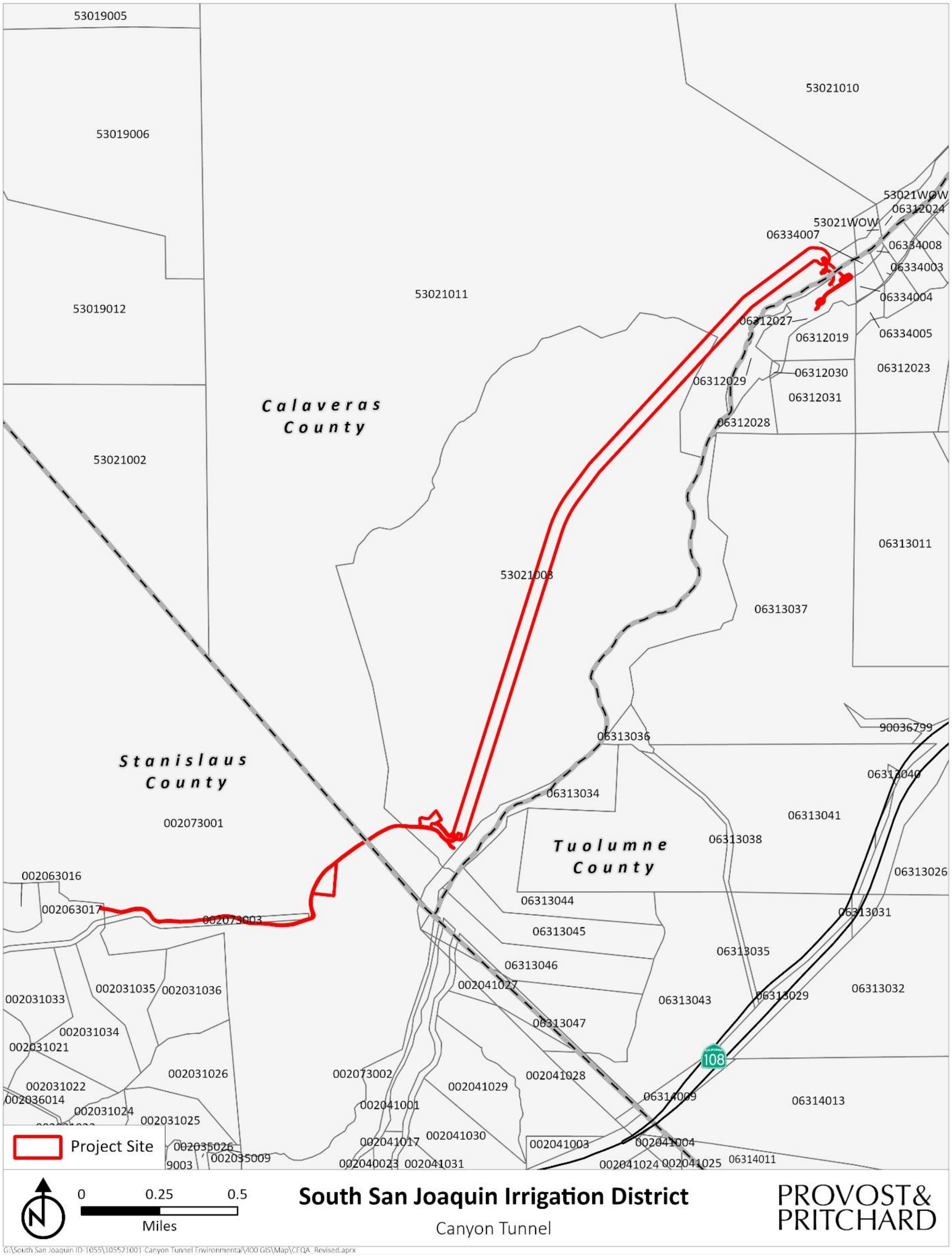

Figure 2-6: Assessor's Parcels Numbers

CHAPTER 3 DETERMINATION

3.1 POTENTIAL ENVIRONMENTAL IMPACTS

As indicated by the discussions of existing and baseline conditions, and impact analyses that follow in this Chapter, environmental factors not checked below would have no impacts or less than significant impacts resulting from the project. Environmental factors that are checked below would have potentially significant impacts resulting from the project. Mitigation measures are recommended for each of the potentially significant impacts that would reduce the impact to less than significant.

☒ Aesthetics	☐ Agriculture and Forestry Resources	☒ Air Quality
☒ Biological Resources	☒ Cultural Resources	☐ Energy
☒ Geology/Soils	☐ Greenhouse Gas Emissions	☐ Hazards and Hazardous Materials
☒ Hydrology / Water Quality	☐ Land Use/Planning	☐ Mineral Resources
☒ Noise	☐ Population/Housing	☐ Public Services
☐ Recreation	☐ Transportation	☒ Tribal Cultural Resources
☐ Utilities and Service Systems	☒ Wildfire	☒ Mandatory Findings of Significance

The analyses of environmental impacts in Chapter 4 Impact Analysis result in an impact statement, which shall have the following meanings.

Potentially Significant Impact. This category is applicable if there is substantial evidence that an effect may be significant, and no feasible mitigation measures can be identified to reduce impacts to a less than significant level. If there are one or more "Potentially Significant Impact" entries when the determination is made, an EIR is required.

Less than Significant with Mitigation Incorporated. This category applies where the incorporation of mitigation measures would reduce an effect from a "Potentially Significant Impact" to a "Less than Significant Impact." The lead agency must describe the mitigation measure(s), and briefly explain how they would reduce the effect to a less than significant level (mitigation measures from earlier analyses may be cross-referenced).

Less than Significant Impact. This category is identified when the proposed Project would result in impacts below the threshold of significance, and no mitigation measures are required.

No Impact. This category applies when a project would not create an impact in the specific environmental issue area. "No Impact" answers do not require a detailed explanation if they are adequately supported by the information sources cited by the lead agency, which show that the impact does not apply to the specific project (e.g., the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards (e.g., the project would not expose sensitive receptors to pollutants, based on a project-specific screening analysis).

3.2 DETERMINATION

On the basis of this initial evaluation (to be completed by the Lead Agency):

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☒ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

______________________________ ______________________

Signature Date

____

Printed Name/Position

CHAPTER 4 ENVIRONMENTAL IMPACT ANALYSIS

4.1 AESTHETICS

Table 4-1: Aesthetics Impacts

Except as provided in Public Resources Code Section 21099, would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a) Have substantial adverse effect on a scenic vista?	☐	☐	☒	☐
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☒	☐
c) In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?	☐	☐	☒	☐
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☒	☐	☐

4.1.1 Baseline Conditions

The Project is located in portions of Calaveras, Stanislaus, and Tuolumne Counties. The topography around the Project is characterized as rural with rolling hills with the Stanislaus River flowing through a steep-sided canyon. The Stanislaus River is obstructed by the Goodwin Dam, which has created a reservoir often used for recreation. The visual character of the area includes hills scattered with oak trees and grasslands. Figure 4-1 illustrates the overall landscape surrounding the Project. Tuolumne County has an oak tree ordinance that protects oak trees by preventing the premature removal of these native trees.

The existing homes and recreational users within the Project area enjoy the rural landscape and visual character of the region. Although the existing setting is considered to be rural and scenic, the Goodwin Dam, the JSC, the OID South Main Canal, and supporting hydrologic infrastructure exists within the Project area.

Artificial lighting is attached to various locations along the Goodwin Dam and the supporting infrastructure such as the existing turnout facilities operated by SSJID and OID. When the lights are on, they are visible by neighboring residences, recreational users, and others who may be out during the nighttime. The dam itself, along with other existing hydrological structures such the JSC and South Main Canal, are in view of nearby occupants and play a large part in the existing setting.

According to the California State Scenic Highway System Map, the three counties jointly contain eligible state scenic highways, an officially designated State Scenic Highway, and a Federal Byway. In Calaveras County, a portion of State Route (SR) 49 is eligible but not officially designated as a State Scenic Highway. A portion of SR 4 is an eligible highway and another portion of SR 4 in a different location is officially designated as a State Scenic Highway. In Stanislaus County, Interstate 5, which runs through the western portion of the County, is officially designated. In Tuolumne County, portions of Highway 108, SR 49, and SR 120 are eligible to be designated as State Scenic Highways but are not officially designated. Another portion of SR 120, which runs through the southern portion of Tuolumne County before crossing over into Mariposa County, is designated as a Federal Byway. The nearest officially designated State Scenic Highway to the Project site is a portion of SR 4, located approximately 30 miles northeast.

4.1.2 Impact Analysis

a) Have substantial adverse effect on a scenic vista?

Less than Significant Impact. The Project area landscape is considered scenic with its rolling hills and the reservoir created by Goodwin Dam's which modified the flow of the Stanislaus River. Although, not identified as an official scenic resource, the setting in itself is scenic. In addition to the natural landscape, the Goodwin Dam, the JSC, the South Main Canal, and other existing hydrological infrastructure, currently obstructs portions of the natural landscape. During construction, vehicles and associated construction equipment would be visible and would have the potential to obstruct the full scope of the scenery; however, once complete, the Project would be nearly unidentifiable. Construction would be temporary and associated equipment would be removed from the area and return to normal operations. The implementation of the tunnel and associated infrastructure would be similar to the existing infrastructure. Impacts would be less than significant.

b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

Less than Significant Impact. The Project area contains existing water conveyance facilities such as tunnels and canals. The addition of the Project would not substantially damage scenic resources including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway. The Project area contains oak trees, but no oak trees would be removed as part of Project activities. The nearest official State Scenic Highway is located approximately 30 miles away; therefore, the Project would have no impact in relation to designated State Scenic Highways. The majority of the Project would be underground, avoiding any additional aesthetic impacts to what current conditions exist. The tunnel would be drilled low into the existing cliffside to facilitate water diversion. Above-ground infrastructure that is instrumental to the operations of the tunnel facility would remain similar to the existing infrastructure and would not change the overall appearance of the area. The existing barge landing would be rehabilitated and the remaining work at the inlet tunnel would be performed within the dry area of the existing forebay. Additionally, historical structures would not be altered. Impacts would be less than significant.

c) In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?

Less than Significant Impact. The Project would not substantially degrade the existing visual character or quality of public views of the site and its surroundings. The Project site and the immediate vicinity of the Project area presently contains similar infrastructure such as water conveyance tunnels and canals.

During construction, construction equipment and materials may be visible, but it would be temporary. As mentioned in impact "a", during construction, vehicles and associated construction equipment would be visible and would have the potential to obstruct portions of the reservoir and existing parking area; however, construction would be temporary and there are other areas close by that the public can temporarily use for recreational purposes such as Knights Ferry Recreation Area, Stanislaus River Parks, Horseshoe Road Recreation Area, and Honolulu Bar Recreation Area (see Section 4.16 Recreation for details of nearby recreational areas).Therefore, impacts from construction activities would be temporary and would be less than significant.

d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

Less than Significant Impact with Mitigation Incorporated. The area surrounding the Project site is primarily open space. There is existing lighting that is used along the dam and existing facilities such as the pedestrian bridge along the dam. Construction would occur during the day and nighttime. New nighttime light sources have the potential to increase ambient nighttime illumination levels and result in spillover of light onto adjacent properties. These effects have the potential to interfere with certain functions including vision, sleep, privacy, and general enjoyment of the natural nighttime condition. The significance of the impact depends on the type of use affected, proximity to the affected use, the intensity of the light source, and the existing ambient light environment. The majority of construction would take place within the tunnel and would continue to go further as it is excavated; therefore, most of the lighting would be shielded underground or obscured during the bulk of the construction timeline. The remaining light sources associated with construction activities near the lake and at the downstream end of the tunnel would also generate similar effects with the potential to interfere with certain functions including vision, sleep, privacy, and general enjoyment of the natural nighttime condition. Vehicles coming and going during a shift change also have the potential to generate unwanted lighting and glare. The landscape, which contains steep slopes, rocky outcroppings, and oak trees, would help reduce the potential effects. In addition, construction is temporary; therefore, impacts from construction lighting sources would not be permanent. Light from vehicles at night, the existing parking lot near the barge landing, and the barge landing area itself, would temporarily increase in light sources and could be significant. In order to reduce substantial light or glare from the Project, mitigation measure **AES-1**, **AES-2**, **AES-3, and AES-4** would be implemented to ensure that any outdoor lighting would reduce potential impacts on adjacent properties and nearby sensitive receptors to less than significant.

4.1.3 Mitigation

AES-1 All new permanent outdoor lighting shall be hooded or have protective shielding to direct and minimize light downward so as not to shine on adjacent properties or nearby sensitive receptors.

AES-2 At a minimum, the construction contractor shall minimize project-related light and resulting glare to the maximum extent feasible, given safety considerations when used. Color-corrected halide lights will be used. Portable lights will be operated at the lowest allowable wattage and height and will be raised to a height no greater than 20 feet. All lights will be screened and directed downward toward work activities and away from the night sky and nearby residents and sensitive visual resource areas to the maximum extent possible. The number of nighttime lights used will be minimized to the greatest extent possible.

AES-3 Material and equipment shall be brought to staging areas during daytime hours, to the extent possible, to minimize nighttime traffic lights going to and from the site.

AES-4 The contractor shall install visual barriers as needed to obstruct nighttime lighting and glare from sensitive receptors, namely near residential or sensitive visual resource areas to contain and focus necessary nighttime lighting.

Figure 4-1: Project Setting – Proposed Downstream Portal Area

4.2 AGRICULTURE AND FORESTRY RESOURCES

Table 4-2: Agriculture and Forest Impacts

Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☒	☐
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	☐	☐	☐	☒
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☒	☐

4.2.1 Baseline Conditions

The Farmland Mapping and Monitoring Program (FMMP) produces maps and statistical data used for analyzing impacts to California's agricultural resources. Agricultural land is rated according to soil quality and irrigation status; the best quality land is called Prime Farmland. The maps are updated every two years with the use of a computer mapping system, aerial imagery, public review, and field reconnaissance. The California Department of Conservation (DOC)'s 2018 FMMP is a non-regulatory program that produces "Important Farmland" maps and statistical data used for analyzing impacts on California's agricultural resources. According to the California Important Farmland Finder, the Project site is designated grazing land and farmland of local importance.[7] There are no lands designated as prime farmland, unique farmland, or farmland of statewide importance. A number of Project parcels are currently under Williamson Act contracts. The principal objectives of the Williamson Act program include protection of agricultural resources, preservation of open space land, and promotion of efficient urban growth patterns.

[7] (California Department of Conservation 2018)

4.2.2 Impact Analysis

a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?

No Impact. The Project site is designated Grazing Land and Farmland of Local Importance. There are no lands within the Project area determined to be Prime Farmland, Unique Farmland, or Farmland of Statewide Importance; therefore, there would be no impact.

b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?

Less than Significant Impact. A water conveyance tunnel is not listed as a permitted use in the zoning ordinances of either of the affected Counties. However, pursuant to Government Code Section 53091(e), location or construction of facilities for the production, generation, storage, treatment, or transmission of water by a special district are not subject to the zoning ordinance of the county in which the Project would be located. Although the Project is not required to comply with the Calaveras, Stanislaus, or Tuolumne County Zoning Ordinances, it is the Project's intent to continue to transport water to SSJID's and OID's agricultural users, maintaining current agricultural practices.

The implementation of a water conveyance tunnel and would result in less than significant impacts due to the tunnel being constructed underground. The Project's goal is to transport water effectively to agricultural users inherently protecting agricultural resources. The Project would facilitate greater security of irrigation water supply for District growers, inherently promoting the agricultural zoning and Williamson Act intentions; therefore, impacts would be less than significant.

c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?

No Impact. Calaveras County designates portions of the Project area as Resource Production. Resource Production includes agricultural resources, timber resources, mineral resources, and geothermal resources.[8] In this case, the area designated Resource Production is zoned for agricultural uses and not timber resources. There are no lands zoned for forest or timberland use in the Project area and agricultural uses would not be altered as a result of Project activities. Therefore, the Project would not conflict with existing zoning for, or cause rezoning of, forest land, timberland, or timberland zoned - timberland production. There would be no impact.

d) Result in the loss of forest land or conversion of forest land to non-forest use?

No Impact. There are no forests or timberland in the Project area or its vicinity; therefore, the Project would not result in the loss of forest land or convert forest land to non-forest use. There would be no impact.

e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?

Less than Significant Impact. The downstream portal area would be located in a small section of an area that is currently used as agricultural grazing land for cattle. Project improvements would involve

[8] (Calaveras County 2019)

removing approximately 0.5 acres of said grazing land. Although the 0.5 acres of grazing land would be lost from Project implementation, the amount of land to be improved upon for the downstream portal area is miniscule compared to the amount of remaining grazing land in the vicinity. In addition, implementation of the Project would allow for an overall more reliable water source for the continued support for ongoing farmland and agricultural land purposes. Impacts would be less than significant.

4.3 AIR QUALITY

Table 4-3: Air Quality Impacts

Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☒	☐	☐
b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?	☐	☒	☐	☐
c) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☒	☐
d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?	☐	☐	☐	☒

4.3.1 Baseline Conditions

California's ambient air monitoring network is one of the most extensive in the world, with more than 250 sites and 700 individual monitors measuring air pollutant levels across a diverse range of topography, meteorology, emissions, and air quality. Existing levels of ambient air quality and historical trends and projections in the Project are best documented by measurements made by these monitoring sites. The nearest monitoring site to the Project is located at the Modesto-14th Street Monitoring Station in Downtown Modesto, CA. The site measures O_3, PM_{10}, and $PM_{2.5}$. Data presented in Table 4-4 summarize monitoring data from the CARB's Aerometric Data Analysis and Management System for this monitoring station location published from 2018 to 2020.

Table 4-4: Ambient Air Quality Monitoring Summary

Air Pollutant	Averaging Time	Item	2018	2019	2020
Ozone	1-hour	Max 1 Hour (ppm)	.103	.102	.102
		Days > State Standard (0.09 ppm)	2	1	3
	8-hour	Max 8 Hour (ppm)	.091	.083	.083
		Days > State Standard (0.070 ppm)	13	8	13
		Days > National Standard (0.070 ppm)	14	9	13
Inhalable coarse particles (PM_{10})	Annual	State Annual Average (µg/m3)	[1]	[1]	39.2
	24-hour	National 24 Hour (µg/m3)	224.9	309.1	333.0
		Days > State Standard (50 µg/m3)	44	41	80
		Days > National Standard (150 µg/m3)	4	1	7
Fine particulate matter ($PM_{2.5}$)	Annual	National Annual Average (µg/m3)[1]	15.2	7.7	14.5
	24-hour	24 Hour (µg/m3)	189.8	34.4	114.9
		Days > National Standard (35 µg/m3)	21	0	25

[1] Insufficient data available to determine the value.

SSJID possesses and maintains several facilities in the vicinity of the Project. The Project site possesses no SSJID facilities. There are no sensitive receptors within 1-mile of the primary construction site. There are three (3) sensitive receptors within one half-mile of the proposed barge facility location.

4.3.2 Applicable Regulations

Regulatory Attainment Designations

Under the California Clean Air Act (CCAA), the California Air Resources Board (CARB) is required to designate areas of the State as attainment, nonattainment, or unclassified with respect to applicable standards. An "attainment" designation for an area signifies that pollutant concentrations did not violate the applicable standard in that area. A "nonattainment" designation indicates that a pollutant concentration violated the applicable standard at least once, excluding those occasions when a violation was caused by an exceptional event, as defined in the criteria. Depending on the frequency and severity of pollutants exceeding applicable standards, the nonattainment designation can be further classified as serious nonattainment, severe nonattainment, or extreme nonattainment, with extreme nonattainment being the most severe of the classifications. An "unclassified" designation signifies that the data does not support either an attainment or nonattainment designation. The CCAA divides districts into moderate, serious, and severe air pollution categories, with increasingly stringent control requirements mandated for each category.

The United States Environmental Protection Agency (USEPA) designates areas for ozone, carbon monoxide (CO), and nitrogen dioxide (NO_2) as "does not meet the primary standards," "cannot be classified," or "better than national standards." For sulfur dioxide (SO2), areas are designated as "does not meet the primary standards," "does not meet the secondary standards," "cannot be classified," or "better than national standards." However, the CARB terminology of attainment, nonattainment, and unclassified is more frequently used. The USEPA uses the same sub-categories for nonattainment status: serious, severe, and extreme. In 1991, USEPA assigned new nonattainment designations to areas that had previously been classified as Group I, II, or III for particulate matter in the air with a diameter of 10 micrometers (PM_{10}) based on the likelihood that they would violate national PM_{10} standards. All other areas are designated "unclassified."

The State and national attainment status designations pertaining to the San Joaquin Valley Air Basin (SJVAB) are summarized in Appendix A. The SJVAB is currently designated as a nonattainment area with respect to the State PM_{10} standard, ozone, and particulate matter in the air with a diameter of 2.5 micrometers ($PM_{2.5}$) standards. The SJVAB is designated nonattainment for the National Ambient Air Quality Standards (NAAQS) 8-hour ozone and $PM_{2.5}$ standards. On September 25, 2008, the EPA re-designated the San Joaquin Valley to attainment status for the PM_{10} National Ambient Air Quality Standards (NAAQS) and approved the PM_{10} Maintenance Plan.

4.3.3 Thresholds

To assist local jurisdictions in the evaluation of air quality impacts, the San Joaquin Valley Air Pollution Control District (SJVAPCD) has published the *Guide for Assessing and Mitigating Air Quality Impacts*. This guidance document includes recommended thresholds of significance to be used for the evaluation of short-term construction, long-term operational, odor, toxic air contaminant, and cumulative air quality impacts. Accordingly, the SJVAPCD-recommended thresholds of significance are used to determine whether implementation of the Project would result in a significant air quality impact. Projects that exceed these recommended thresholds would be considered to have a potentially significant impact to human health and welfare. The thresholds of significance are summarized, as follows:

Short-Term Emissions of Particulate Matter (PM_{10}): Construction impacts associated with the proposed Project would be considered significant if the feasible control measures for construction in compliance with Regulation VIII as listed in the SJVAPCD guidelines are not incorporated or implemented, or if project-generated emissions would exceed 15 tons per year (TPY).

Short-Term Emissions of Ozone Precursors [Reactive Organic Gas (ROG) and Nitrogen Oxide (NO_X)]: Construction impacts associated with the proposed Project would be considered significant if the project generates emissions of ROG or NO_X that exceeds 10 TPY.

Long-Term Emissions of Particulate Matter (PM_{10}): Operational impacts associated with the proposed Project would be considered significant if the project generates emissions of PM_{10} that exceed 15 TPY.

Long-Term Emissions of Ozone Precursors (ROG and NO_X): Operational impacts associated with the proposed Project would be considered significant if the project generates emissions of ROG or NO_x that exceeds 10 TPY.

Conflict with or Obstruct Implementation of Applicable Air Quality Plan: Due to the region's nonattainment status for ozone, $PM_{2.5}$, and PM_{10}, if the project-generated emissions of either of the ozone precursor pollutants (i.e., ROG and NO_x) or PM_{10} would exceed the SJVAPCD's significance thresholds, then the project would be considered to conflict with the attainment plans. In addition, if the project would result in a change in land use and corresponding increases in vehicle miles traveled, the project may result in an increase in vehicle miles traveled that is unaccounted for in regional emissions inventories contained in regional air quality control plans.

Local Mobile-Source CO Concentrations: Local mobile source impacts associated with the proposed Project would be considered significant if the project contributes to CO concentrations at receptor locations in excess of the California Ambient Air Quality Standards (CAAQS) (i.e., 9.0 parts per million (ppm) for 8 hours or 20 ppm for 1-hour).

Toxic Air Contaminants (TACs): Exposure to toxic air contaminants would be considered significant if the probability of contracting cancer for the Maximally Exposed Individual (i.e., maximum individual risk) would exceed 20 in 1-million or would result in a Hazard Index greater than 1.

Odors: Odor impacts associated with the Project would be considered significant if the project has the potential to frequently expose members of the public to objectionable odors.

Table 4-5: Summary of Ambient Air Quality Standards and Attainment Designation

Pollutant	Averaging Time	California Standards*		National Standards*	
		Concentration*	Attainment Status	Primary	Attainment Status
Ozone (O_3)	1-hour	0.09 ppm	Nonattainment/ Severe	–	No Federal Standard
	8-hour	0.070 ppm	Nonattainment	0.075 ppm	Nonattainment (Extreme)**
Particulate Matter (PM_{10})	AAM	20 µg/m^3	Nonattainment	–	Attainment
	24-hour	50 µg/m^3		150 µg/m^3	
Fine Particulate Matter ($PM_{2.5}$)	AAM	12 µg/m^3	Nonattainment	12 µg/m^3	Nonattainment
	24-hour	No Standard		35 µg/m^3	
Carbon Monoxide (CO)	1-hour	20 ppm	Attainment/ Unclassified	35 ppm	Attainment/ Unclassified
	8-hour	9 ppm		9 ppm	
	8-hour (Lake Tahoe)	6 ppm		–	
Nitrogen Dioxide (NO_2)	AAM	0.030 ppm	Attainment	53 ppb	Attainment/ Unclassified
	1-hour	0.18 ppm		100 ppb	
Sulfur Dioxide (SO_2)	AAM	–	Attainment	--	Attainment/ Unclassified
	24-hour	0.04 ppm		--	
	3-hour	–		0.5 ppm	
	1-hour	0.25 ppm		75 ppb	
Lead (Pb)	30-day Average	1.5 µg/m^3	Attainment	–	No Designation/ Classification
	Calendar Quarter	–		--	
	Rolling 3-Month Average	–		0.15 µg/m^3	
Sulfates (SO_4)	24-hour	25 µg/m^3	Attainment	No Federal Standards	
Hydrogen Sulfide (H_2S)	1-hour	0.03 ppm (42 µg/m^3)	Unclassified		
Vinyl Chloride (C_2H_3Cl)	24-hour	0.01 ppm (26 µg/m^3)	Attainment		
Visibility-Reducing Particle Matter	8-hour	Extinction coefficient: 0.23/km-visibility of 10 miles or more due to particles when the relative humidity is less than 70%.	Unclassified		

** For more information on standards visit: https://ww3.arb.ca.gov/research/aaqs/aaqs2.pdf*
*** No Federal 1-hour standard. Reclassified extreme nonattainment for the Federal 8-hour standard.*
****Secondary Standard*
Source: CARB 2015; SJVAPCD 2015

4.3.4 Impact Analysis

a) Would the project conflict with or obstruct implementation of the applicable air quality plan?

Less than Significant Impact with Mitigation Incorporated. CEQA requires that certain projects be analyzed for consistency with the applicable air quality plan. For a project to be consistent with SJVAPCD air quality plans, the pollutants emitted from a project should not exceed the SJVAPCD emission thresholds or cause a significant impact on air quality. In addition, emission reductions achieved through implementation of offset requirements are a major component of the SJVAPCD air quality plans. As discussed below, construction of the Project would not result in the generation of criteria air pollutants that would exceed SJVAPCD thresholds of significance. Implementation of SJVAPCD Regulation VIII would further reduce construction dust impacts. Operational emissions associated with the Project would not exceed SJVAPCD established significance thresholds for ROG, NO_x, CO, sulfur oxides (SO_x), PM_{10}, or $PM_{2.5}$ emissions. With implementation of Rule 9510 and Regulation VIII, NO_x and PM_{10} emissions would further be reduced. The Project would generate short-term emissions associated with construction. Long-term emissions would consist of a negligible amount of vehicular emissions due to incremental maintenance visits, and thus are not further discussed. Construction emissions were estimated using CalEEMod version 2020.4.0. These results can be seen in Table 4-6.

Table 4-6: Short-Term - Construction-Generated Emissions of Criteria Air Pollutants

Short-Term Construction-Generated Emissions of Criteria Air Pollutants							
Year	Phase	Annual Emissions (Tons/Year) [1]					
		ROG	NO_X	CO	SOx	PM_{10}	$PM_{2.5}$
2024	Excavate Portal Work	0.06751	0.6507	0.4406	0.00211	0.1663	0.08815
	Shotcrete Portal Face	0.01516	0.1417	0.0901	0.00062	0.01108	0.00544
	Excavate First 916LF D/S	0.14389	1.1791	0.8477	0.00446	0.0576	0.04001
	Place Concrete Slab D/S	0.01686	0.1666	0.1111	0.00072	0.01177	0.00613
	Tunnel Excavation, Stage 1 Shotcrete	1.6282	19.9601	10.0159	0.04235	0.5386	0.475
	Subtotal	1.87162	22.0982	11.5054	0.05026	0.78535	0.61473
SJVAPCD Significance Thresholds:		***10***	***10***	***100***	***27***	***15***	***15***
Exceed SJVAPCD Thresholds?		***No***	***Yes***	***No***	***No***	***No***	***No***
2025	Tunnel Excavation, Stage 1 Shotcrete	1.669	20.3318	10.6555	0.04547	0.5281	0.4612
	Stage 2 Shotcrete	0.05545	0.5072	0.524	0.00217	0.04	0.02061
	Tunnel Cleanup	0.06421	0.5017	0.4163	0.00198	0.0263	0.01815
	Subtotal	1.78866	21.3407	11.5958	0.04962	0.5944	0.49996
SJVAPCD Significance Thresholds:		***10***	***10***	***100***	***27***	***15***	***15***
Exceed SJVAPCD Thresholds?		***No***	***Yes***	***No***	***No***	***No***	***No***

Emissions as shown above exceed Air District thresholds, and this exceedance is predominantly related to Tunnel Excavation, Stage 1 Shotcrete.

Construction sequence may vary as estimated project schedule components may shift based on equipment and material availability and time of year.

Annual emissions can be reduced to less than significant levels through a variety of measures, including:

- Extending utility services to the construction site.
- Utilizing a generator that exceeds EPA Tier 4 Final emissions standards

Implementation of either of these measures, shown below as **Mitigation Measure AIR-1** would reduce emissions as shown below in Table 4-7. Therefore, impacts would be less than significant.

Table 4-7: Maximum Annual Emissions by Mitigation Strategy

Maximum Annual Emissions (tons per year)						
Mitigation Approach	ROG	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
No Mitigation	1.87162	22.0982	11.5958	0.05026	0.78535	0.61473
Grid-Supplied Electricity	0.9363	7.2844	6.5489	0.0262	0.5157	0.337
Generation Exceeds T4F[1]	1.87162	7.6381	7.6940	0.05026	0.78535	0.61473

[1] CO EF= 0.342 grams per brake horsepower-hour (g/bhp-hr); NOX EF = 0.322g/bhp-hr

b) Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?

Less than Significant Impact with Mitigation Incorporated. During construction, short-term degradation of air quality may occur due to the release of particulate emissions generated by grading, excavation, and hauling. Emissions from construction equipment are also anticipated and would include CO, NO_x, ROG, directly-emitted particulate matter ($PM_{2.5}$ and PM_{10}), and TACs such as diesel exhaust particulate matter. The Guidelines for Assessing and Mitigating Air Quality Impacts (GAMAQI) requires that an Air Dispersion Analysis be prepared for projects that exceed 100 pounds per day of any criteria pollutant, to ensure that no localized exceedance of California or National Ambient Air Quality Standards (AAQSs) would occur. As shown on Table 4-8 below, the Project would exceed this screening threshold.

Table 4-8: Maximum Daily Emissions by Project Phase

Daily Emissions (in pounds per day)						
Phase Name	ROG	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
1. Excavate Portal Work Area	4.5171	43.0988	29.4633	0.1415	11.1147	5.8809
2. Shotcrete Portal Face	2.0287	18.6218	12.0969	0.083	1.5022	0.7327
3. Excavate First 916LF D + S	6.4083	52.1329	37.7604	0.1982	2.5858	1.7829
4. Tunnel Excavation, Stage 1 Shotcrete	24.1341	295.4251	148.47	0.6277	8.0046	7.0429
5. Stage 2 Shotcrete	2.229	20.0118	21.037	0.0874	1.6248	0.831
6. Place Concrete Slab D+S and Invert Concrete	2.2562	21.9391	14.897	0.0958	1.5947	0.8252
7. Tunnel Cleanup	6.4378	49.8944	41.7103	0.1982	2.6597	1.8254

This exceedance only occurs during Phase 4 activities. Replacing the electrical generation equipment with that meeting EPA Tier 4 Final standards, or extending utility service to the site, **Mitigation Measure AIR-1**, would ensure impacts are less than significant, as shown below in Table 4-9.

Table 4-9: Maximum Daily Emissions by Mitigation Approach

Daily Emissions (in pounds per day)						
Mitigation Approach	ROG	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
No Mitigation	24.1341	295.4251	148.4700	0.6277	8.0046	7.0429
Grid-Supplied Phase 4 Electricity	10.2702	76.3863	74.9742	0.2703	4.0367	2.9321
Phase 4 Generation Exceeds T4F[1]	24.1341	99.0300	99.0100	0.6277	8.0046	7.0429

[1] CO EF= 0.342g/bhp-hr; NO_X EF = 0.322g/bhp-hr

c) Would the project expose sensitive receptors to substantial pollutant concentrations?

Less than Significant Impact. Sensitive receptors are defined as people that have an increased sensitivity to air pollution or environmental contaminants. Sensitive receptor locations include schools, parks and playgrounds, day care centers, nursing homes, hospitals, and residential dwelling units. The closest sensitive receptor to the Project site is approximately 1-mile southwest of the Project. There are three (3) sensitive receptors within 0.5-mile of the barge area, however construction emissions are expected to be minimal due to use of the electric-powered barge. Additionally, localized construction emissions are anticipated to be received at the southern portal of the tunnel as the boring activities will run from south to north.

Construction of the Project may expose surrounding sensitive receptors to airborne particulates, as well as construction equipment pollutants (i.e., usually diesel-fueled vehicles and equipment). However, construction contractors would be required to implement Regulatory Control Measure **AIR-1** described above.

In addition, as shown in Table 4-9, the emissions from operations resulting from implementation of the Project are expected to be below the SJVAPCD's project level thresholds. The SJVAPCD's project level thresholds are based in part on Section 180 (e) of the Clean Air Act. The project level thresholds are intended to provide a means of consistency in significance determination within the environmental review process.

Notwithstanding, simply exceeding the SJVAPCD's project level thresholds does not constitute a particular health impact to an individual nearby. The reason for this is that the project level thresholds are in tons/year emitted into the air, whereas health effects are determined based on the concentration of a pollutant in the air at a particular location (e.g., ppm by volume of air or micrograms per cubic meter (µg/m3) of air). CAAQS and NAAQS were developed to protect the most susceptible population groups from adverse health effects and were established in terms of ppm or µg/m3 for the applicable emissions.

Therefore, as identified above, construction emissions associated with the Project would not be expected to exceed the most stringent applicable NAAQS or CAAQS for NO_x, $PM_{2.5}$, and PM_{10}. It should be noted that the AAQS are developed and represent levels at which the most susceptible persons (children and the elderly) are protected. In other words, the AAQS are purposefully set low to protect children, the elderly, and those with existing respiratory problems.

Furthermore, air quality trends for emissions of NO_x, Volatile Organic Compounds (VOCs), and ozone (which is a byproduct of NO_x and VOCs) have been trending downward within the SJVAB even as development has increased over the last several years. Therefore, the Project is not expected to result in any Basin-wide increase in health effects. The impact would be less than significant.

Additionally, the SJVAPCD acknowledges that health effects quantification from ozone, as an example, is correlated with the increases in ambient level of ozone in the air (concentration) that an individual person breathes. The SJVAPCD indicates that it would take a large amount of additional emissions to result in a modeled increase in ambient ozone levels over the entire region. As such, it is not currently possible to accurately quantify ozone-related health impacts caused by NO_x or VOC emissions from relatively small projects (defined as projects with a regional scope) due to photochemistry and regional model limitations.

Therefore, the Project's emissions are not sufficiently high enough to use a regional modeling program to correlate health effects on a basin-wide level. Current scientific, technological, and modeling limitations prevent the relation of expected adverse air quality impacts to likely health consequences. Therefore, implementation of the Project is not expected to result in any basin-wide increase in health effects. Impacts would be less than significant.

d) Would the project result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?

Less than Significant Impact. The SJVAPCD addresses odor criteria within the GAMAQI. The district has not established a rule or standard regarding odor emissions, rather, the district has a nuisance rule, which states, "Any project with the potential to frequently expose members of the public to object able odors to be deemed to have a significant impact." Heavy-duty equipment in the project area during construction would emit odors, primarily from the equipment exhaust. However, construction activities are temporary in nature would cease after the Project is completed. No other sources of objectionable odors have been identified, and therefore, objectionable odors affecting a substantial number of people would not occur as a result of the Project. There would be no impact.

4.3.5 Mitigation

AIR-1 Phase 4 (Tunnel Excavation, Stage 1 Shotcrete) of construction shall utilize an USEPA Tier 4 Final-certified generator with emission factors not exceeding:

i. CO – 0.342g/bhp-hr

ii. NOx – 0.322g/bhp-hour

All other equipment will meet Statewide average emissions.

OR

Temporary grid-delivered electrical service shall power a minimum of 2,000 horsepower of Phase 4 equipment. All other equipment will meet statewide average emissions.

4.4 BIOLOGICAL RESOURCES

Table 4-10: Biological Resources Impacts

Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a) 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 California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	☐	☒	☐	☐
b) 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 California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	☐	☒	☐	☐
c) 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?	☐	☐	☒	☐
d) 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?	☐	☐	☒	☐
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☒	☐
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒

4.4.1 Baseline Conditions

The Area of Potential Effect (APE) includes approximately 770 total acres; however, the majority of the APE is underground, with approximately 8.5 total acres of ground disturbance (Figure 4-2). The APE is within Calaveras, Stanislaus, and Tuolumne Counties, north of the unincorporated community of Knights Ferry, California. The Project lies within the foothills of the Sierra Nevada Mountain Range adjacent to the San Joaquin Valley. The topography is rolling with elevations ranging from approximately 300 to 700 feet, with underlying rock formations of older metamorphic rock and younger volcanic flows and sandstone. The topography around the Project is characterized as rural with rolling hills and oak woodlands surrounding the Stanislaus River, which flows through a steep-sided canyon. The Stanislaus River is obstructed by Goodwin, (see Figure 4-3),Tulloch, and New Melones dams.

The area experiences a Mediterranean climate. Warm, dry summers are followed by cool, moist winters. Summer temperatures range between 70- and 90-degrees Fahrenheit (˚F), but often exceeds 90˚F in the upper reaches of the counties. Winter minimum temperatures are near 40˚F. The average annual precipitation is approximately 13 inches, falling mainly from October to April.

The principal drainage comes from the mainstem of the Stanislaus River. The watersheds begin as precipitation events from the west slopes of the Sierra Nevada Mountain Range, which collect into the Stanislaus River and feed into New Melones Lake, where the Stanislaus River is intercepted by New Melones Dam. Downstream of New Melones Lake, the river flows west into the Tulloch Reservoir and again into the Goodwin Dam Reservoir near the town of Knights Ferry. The river then continues along the northern edge of the Modesto metro area, until it joins the San Joaquin River near Vernalis, California.

The proposed Project lies within two watersheds, the Lower Stanislaus River and Littlejohns Creek; Hydrologic Unit Codes (HUC): 1804001007 and 1804005102, respectively; and encompasses two subwatersheds: Peachys Creek-Littlejohns Creek and Wildcat Creek-Stanislaus River; HUCs: 180400510203 and 180400100701, respectively.

Within the Project area sits Goodwin Dam and the Joint Supply Canal (JSC). The JSC provides water supplies to the cities of Manteca, Lathrop, and Tracy, California, as well as 52,000 acres within the SSJID and and nearly 70,000 acres within OID. Primarily, the JSC is diverted to serve two districts: SSJID and Oakdale Irrigation District. Photographs of the vicinity are available in Appendix B at the end of this document.

4.4.2 Soils

Nine soil mapping units representing nine soil types were identified within the Project site according to the Major Land Resource Area of California 19 map area (see Table 4-11). All nine soils are primarily used for grazing, wildlife habitat, and watershed areas.

Table 4-11: List of Soils Located Onsite and Their Basic Properties

Soil	Soil Map Unit	Percent of APE	Hydric Unit	Hydric Minor Units	Drainage	Permeability	Runoff
Archerdale-Hicksville	Association, 0 to 2 percent slopes	1.3%	No	No	Well drained	Moderately slow	Very slow to slow
Amador	Sandy loam, 2 to 15 percent slopes	7.9%	No	No	Well drained	Moderately high to high	Negligible runoff
Bonanza-Loafercreek	Complex, 3 to15 percent slopes	2.7%	No	No	Well drained	Moderate permeability	Low runoff
	Gopheridge complex, 15 to 30 percent slopes	7.3%	No	No	Well drained	Moderate permeability	Low runoff
Goldwall-Toomes-Rock	Outcrop complex, 1 to 8 percent slopes	42.8%	No	Yes	Moderately well drained	Moderate permeability	Negligible runoff
Jasperpeak-Gopheridge	Complex, 30 to 60 percent slopes	0.5%	No	No	Well drained	Moderately high to high	Low runoff
Miltonhills-Amador	Complex, 15 to	9.8%	No	No	Well drained	Moderately high to high	Negligible runoff

Soil	Soil Map Unit	Percent of APE	Hydric Unit	Hydric Minor Units	Drainage	Permeability	Runoff
	45 percent slopes						
Psammentic Haploxerolls-Mollic Fluvaquents-Riverwash	Complex, 0 to 8 percent slopes	1.9%	No	Yes	Well drained	Moderate permeability	Negligible runoff
Shawsflat-Anglescreek	Complex, 25 to 60 percent slopes	17.9%	No	No	Well drained	Moderately slow	Very slow to slow
Ultic Haploxeralfs	Moderately deep complex, 10 to 35 percent slopes	6.7%	No	No	Well drained	Moderate permeability	Low runoff
Water	-	1.1%	-	-	-	-	-

None of the major soil mapping units were identified as hydric, but two of the nine minor soil mapping units are considered hydric. Hydric soils are defined as soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions such that under sufficiently wet conditions, hydrophytic vegetation can be supported.

4.4.3 Methodology

A reconnaissance-level field survey of the area was conducted on September 16 and 17, 2021 by Provost & Pritchard biologist, Jacob Rogers. The survey consisted of walking and driving thoroughly through the proposed Project site while identifying and noting land uses, biological habitats and communities, plant and animal species encountered and assessed for suitable habitats of various wildlife species. (Appendix B)

The biologist conducted an analysis of potential Project-related impacts to biological resources based on the resources known to exist or with potential to exist within the Project area. Sources of information used in preparation of this analysis included: the California Department of Fish and Wildlife (CDFW) California Natural Diversity Database (CNDDB); the California Native Plant Society (CNPS) Online Inventory of Rare and Endangered Vascular Plants of California; CalFlora's online database of California native plants; the Jepson Herbarium online database (Jepson eFlora); United States Fish and Wildlife Service (USFWS) Environmental Conservation Online System (ECOS); Information for Planning and Consultation (IPaC) system; the NatureServe Explorer online database; the United States Department of Agriculture Natural Resources Conservation Service (NRCS) Plants Database; CDFW California Wildlife Habitat Relationships (CWHR) database; the California Herps online database; and various manuals, reports, and references related to plants and animals of the Sierra Foothills region.

The reconnaissance-level field survey did include one focused survey for special status bat species and was conducted during the dusk hours of the two-day reconnaissance survey. The results of the focused survey can be found in Appendix C at the end of this document.

The field survey conducted included the appropriate level of detail to assess the significance of potential impacts to sensitive biological resources resulting from the Project. Furthermore, the field survey was sufficient to generally describe those features of the Project that could be subject to the jurisdiction of federal and/or State agencies, such as the United States Army Corps of Engineers (USACE), CDFW, Regional

Water Quality Control Board (RWQCB) and State Water Resources Control Board (SWRCB) and used to support CEQA documents.

A specialized fisheries biologist from Kleinfelder/Garcia and Associates was also consulted to provide expertise on the potential for special status fish species to exist upstream of the Goodwin Dam, and whether the Project activities pose any impacts to the species within the reservoir. Thorough research of the California Fish and Game Code (CFGC) was conducted to assess the extent of jurisdiction to be assumed by CDFW. The results of this assessment can be found in Appendix G at the end of this document.

A thorough search of the CNDDB for published accounts of special status plant and animal species was conducted for the *Knights Ferry* and *Keystone* 7.5-minute quadrangles that contain the APE, and for the 10 surrounding quadrangles: *Bachelor Valley*, *Copperopolis, New Melones Dam*, *Sonora, Chinese Camp, La Grange, Cooperstown, Paulsell, Waterford*, and *Oakdale*. These species, and their potential to occur within the Project area, are listed in Table 4-12 and Table 4-13.

Table 4-12: List of Special Status Animals with Potential to Occur Onsite and/or in the Vicinity

Species	Status	Habitat	Occurrence on Project Site
American badger (*Taxidea taxus*)	CSC	Grasslands, savannas, and mountain meadows near timberline are preferred. Most abundant in drier open spaces of shrub and grassland. Burrows in soil.	**Unlikely.** The APE provides potentially suitable habitat for this species, but disturbance from grazing may prevent this species from burrowing. There has only been one historical sighting in the region, over 15 miles from the APE.
Bald Eagle (*Haliaeetus leucocephalus*)	CE, CFP	Resides in old growth forests as well as lower montane coniferous forests. Nests are generally found in large, old-growth trees within a mile of water. Nests and winters along ocean shores, lake margins, and rivers.	**Possible.** Although many trees are present within the APE, no old-growth forest habitat exists. This species could potentially use the Stanislaus River and open areas of the APE for foraging. Bald Eagles are known to forage around dams, where fish concentrate. A flyover is possible, but nesting is unlikely. The last regional observation of this species was a breeding pair was observed in 2004, 10 miles east of the APE.
Burrowing Owl (*Athene cunicularia*)	CSC	Resides in open, dry annual or perennial grasslands, deserts, and scrublands with low growing vegetation. Nests underground in existing burrows created by mammals, most often ground squirrels.	**Unlikely.** The habitat within the APE is unsuitable for this species. Many raptors utilize the APE as foraging habitat, which would deter this species. The only historical observation in the region occurred 11 miles southwest of the APE in 1991.
California Horned Lark (*Eremophila alpestris actia*)	CWL	Frequents open habitats, including short-grass prairie, mountain meadows, open coastal plains, fallow grain fields, and alkali flats. Found primarily in coastal regions, including Sonoma and San Diego Counties.	**Unlikely.** The habitat within the APE is unsuitable for this species. Many raptors utilize the APE as foraging habitat, which would deter this species. The only historical observation in the region occurred 10 miles south of the APE in 1996.

Species	Status	Habitat	Occurrence on Project Site
California red-legged frog (*Rana draytonii*)	FT, CSC	Inhabits perennial rivers, creeks, and stock ponds with vegetative cover within the Coast Range and northern Sierra foothills.	**Absent**. The APE does not provide suitable habitat for this species. The riverine habitat of the APE is surrounded by tall cliff faces which would not support this species. There have been no recorded observations of this species within 10 miles of the APE.
California tiger salamander (*Ambystoma californiense*)	FT, CT, CWL	Requires vernal pools or seasonal ponds for breeding and small mammal burrows for aestivation. Generally found in grassland and oak savannah plant communities in central California from sea level to 1500 feet in elevation.	**Unlikely**. Water appears too deep and moves too fast to support this species. Vernal pools and seasonal ponds are absent from the APE. The riverine habitat of the APE is surrounded by tall cliff faces which would not support this species. This species was last observed in the region in 1993 over 3.5 miles from the APE.
Central California roach (*Hesperoleucus symmetricus symmetricus*)	CSC	Generally found in small streams of the Sierra Nevada foothills flowing into the Central Valley and are particularly well adapted to life in intermittent watercourses; dense populations are frequently observed in isolated pools.	**Unlikely**. Water appears too deep and moves too fast to support this species. This species was last observed in the region in 1998 over 11 miles from the APE.
Coast horned lizard (*Phrynosoma blainvillii*)	CSC	Found in grasslands, coniferous forests, woodlands, and chaparral, primarily in open areas with patches of loose, sandy soil and low-lying vegetation in valleys, foothills, and semi-arid mountains. Frequently found near ant hills and along dirt roads in lowlands along sandy washes with scattered shrubs.	**Unlikely.** The APE provides open areas for this species, but lacks prey resources, as no ant hills were observed. The single regional observation of this species occurred in 2001, 8 miles east of the APE.
Conservancy fairy shrimp	FE	Endemic to the grasslands of the northern two-thirds of the Central Valley; found in large, turbid pools.	**Absent.** Vernal pools are absent from the APE. Based on topography and soils of the APE, water cannot naturally pool, and vernal pools cannot be present. There are no recorded observations of this species on CNDDB within the regional vicinity of the Project.
Crotch bumble bee (*Bombus crotchii*)	CCE	Occurs throughout coastal California, as well as east to the Sierra-Cascade crest, and south into Mexico. Food plant genera include *Antirrhinum, Phacelia, Clarkia, Dendromecon, Eschscholzia*, and *Eriogonum*.	**Absent.** The APE does not provide suitable habitat to support this species. It has not been observed in the region in over 100 years.
Delta smelt (*Hypomesus transpacificus*)	FT, CE	This pelagic and euryhaline species is Endemic to the Sacramento-San Joaquin River Delta, upstream through Contra Costa, Sacramento, San Joaquin, and Solano Counties.	**Absent.** The APE is outside the known range for this species. The multiple dams on the Stanislaus River block the ability for this species to occur within the APE. There are no recorded observations of this species on CNDDB within the regional vicinity of the Project.

Species	Status	Habitat	Occurrence on Project Site
Foothill yellow-legged frog (*Rana boylii*)	CCT, CSC	Frequents rocky streams and rivers with rocky substrate and open, sunny banks in forests, chaparral, and woodlands. Occasionally found in isolated pools, vegetated backwaters, and deep, shaded, spring-fed pools.	**Unlikely.** Water appears too deep and moves too fast to support this species. Although small pools of standing water are present in the APE, it is heavily disturbed by grazing and unshaded. This species was last observed in the region in 2018 over 15 miles from the APE.
Green sturgeon (*Acipenser medirostris*)	FT	Spawns in the Sacramento, Feather and Yuba Rivers. The presence in upper Stanislaus and San Joaquin Rivers may indicate spawning. Non-spawning adults occupy marine/ estuarine waters. Delta Estuary is important for rearing juveniles. Spawning occurs primarily in cool (11-15 C) sections of mainstem rivers in deep pools (8-9 meters) with substrate containing small to medium sized sand, gravel, cobble, or boulder.	**Unlikely.** This species has only been observed below the Goodwin Dam in 2017. This species would not be able to enter the APE due to the dam.
Hardhead (*Mylopharodon conocephalus*)	CSC	Occurs in low- to mid-elevation streams in the Sacramento-San Joaquin drainage. Clear, deep pools with sand-gravel-boulder bottoms and slow-moving water is required. This species is often sympatric with Sacramento pikeminnow and Sacramento sucker. Hardhead are typically absent form streams occupied by centrarchids and from heavily altered habitats.	**Absent.** The multiple dams on the Stanislaus River block the ability for this species to migrate upstream. This species has only been observed in the Stanislaus River 15 miles downstream of the APE.
Least Bell's Vireo (*Vireo bellii pusillus*)	FE, CE	This migratory species breeds in southern California. Breeding habitat consists of dense, low, shrubby, riparian vegetation in the vicinity of water or dry river bottoms. By the early 1980s, this species was extirpated from most of its historic range in California, including the Central Valley. This species now occurs almost exclusively along the coast of southern California (USFWS, 1998).	**Absent.** The APE does not provide suitable habitat to support this species. It has not been observed in the region in over 100 years.
Monarch Butterfly (*Danaus plexippus*)	FC	Roosts located in wind-protected tree groves (eucalyptus, Monterey pine, cypress), with nectar and water sources nearby. Larval host plants consist of milkweeds (*Asclepias* sp.). Winter roost sites extend along the coast from northern Mendocino to Baja California, Mexico.	**Absent.** The APE does not provide suitable habitat to support this species. There are no recorded observations of this species on CNDDB within the regional vicinity of the Project.

Species	Status	Habitat	Occurrence on Project Site
Pallid bat (*Antrozous pallidus*)	CSC	Found in grasslands, chaparral, and woodlands, where it feeds on ground- and vegetation-dwelling arthropods, and occasionally takes insects in flight. Prefers to roost in rock crevices, but may also use tree cavities, caves, bridges, and other man-made structures.	**Likely**. The APE provides suitable roosting and foraging habitat to support this species. There have been many regional observations of this species, including within 2 miles of the APE.
Prairie Falcon (*Falco mexicanus*)	CWL	Inhabits dry, open terrain, either level or hilly, in a variety of scrublands and grasslands. Breeding sites located on cliffs. Forages far afield, even to marshlands and ocean shores.	**Possible.** The APE provides suitable habitat to support this species foraging, and nearby cliffs may support roosting. However, there has only been one regional observation of this species, over 25 years ago, and location information is unavailable for the observation.
San Joaquin kit fox (*Vulpes macrotis mutica*)	FE, CT	Found in underground dens with multiple entrances in alkali sink, valley grassland, and woodland in valleys and adjacent foothills.	**Unlikely**. The APE provides marginally suitable habitat to support this species. Grazing has disturbed potential denning sites. Only one historical observation of this species was recorded in the region, in 1973, over 15 miles from the APE.
Swainson's Hawk (*Buteo swainsoni*)	CT	Nests in large trees in open areas adjacent to grasslands, grain or alfalfa fields, or livestock pastures suitable for supporting rodent populations.	**Unlikely.** The APE provides high quality foraging and nesting habitat for this species. However, only one regional observation has ever been recorded, 15 miles southeast of the APE over 100 years ago.
Steelhead – Central Valley DPS (*Oncorhynchus mykiss irideus pop.11*)	FT	This winter-run fish begins migration to fresh water during peak flows during December and February. Spawning season is typically from February to April. After hatching, fry move to deeper, mid-channel habitats in late summer and fall. In general, both juveniles and adults prefer complex habitat boulders, submerged clay and undercut banks, and large woody debris.	**Absent**. Steelhead are present in the lower segments of the Stanislaus River below Goodwin Dam. There have only been two recorded observations of this species approximately 20 miles downstream of Goodwin Dam. Both observations were recorded in 2014.
Townsend's big-eared bat (*Corynorhinus townsendii*)	CSC	Occurs in a variety of habitats, but prefers cool, dark roost sites, and are often found in caves and mines. They roost in the open, hanging from walls and ceilings. Western populations typically forage on moths in areas of dense foliage.	**Possible**. This species has been documented roosting within the APE in basalt cliffs over Goodwin Dam. Available water, roosting habitat, and foraging habitat are all present within the APE.
Tricolored Blackbird (*Agelaius tricolor*)	CT, CSC	Nests colonially near fresh water in dense cattails or tules, or in thickets of riparian shrubs. Forages in grassland and cropland. Large colonies are often found on dairy farm forage fields.	**Unlikely.** The APE provides some riparian habitat to support this species both upstream and downstream of the dam. This species was not observed during the field surveys. Although there are many regional occurrences of this species, as recent as 2015, none have occurred within 5 miles of the APE.

Species	Status	Habitat	Occurrence on Project Site
Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*)	FT	Lives in mature elderberry shrubs of the Central Valley and foothills. Adults are active March to June.	**Unlikely.** Elderberry shrubs were not observed within the APE. However, within 5 miles of the APE this species has been recorded as recently as 2009.
Vernal pool fairy shrimp (*Branchinecta lynchi*)	FT	Occupies vernal pools, clear to tea-colored water, in grass or mud-bottomed swales, and basalt depression pools.	**Absent.** Vernal pools are absent from the APE. Based on topography and soils of the APE, water cannot naturally pool, and vernal pools cannot be present. This species has never been observed within 8 miles of the APE.
Vernal pool tadpole shrimp (*Lepidurus packardi*)	FE	Occurs in vernal pools, clear to tea-colored water, in grass or mud-bottomed swales, and basalt depression pools.	**Absent.** Vernal pools are absent from the APE. This species has not been observed within 8 miles of the APE.
Western mastiff bat (*Eumops perotis californicus*)	CSC	Found in open, arid to semi-arid habitats, including dry desert washes, flood plains, chaparral, oak woodland, open ponderosa pine forest, grassland, and agricultural areas, where it feeds on insects in flight. Roosts most commonly in crevices in cliff faces but may also use high buildings and tunnels.	**Present**. This species has been documented roosting within the APE in basalt cliffs over Goodwin Dam. Available water, roosting habitat, and foraging habitat are all present within the APE.
Western red bat (*Lasiurus blossevillii*)	CSC	Roosts primarily in trees, 2–40 ft above ground, from sea level up through mixed conifer forests. Prefers habitat edges and mosaics with trees that are protected from above and open below with open areas for foraging.	**Likely**. Trees throughout the APE provide an abundance of high-quality roosting habitat for this species. Open grasslands also provide foraging habitat. This species has been observed 8 times in the region as close as 5 miles to the APE.
Western spadefoot (*Spea hammondii*)	CSC	Prefers open areas with sandy or gravelly soils, in a variety of habitats including mixed woodlands, grasslands, coastal sage scrub, chaparral, sandy washes, lowlands, river floodplains, alluvial fans, playas, alkali flats, foothills, and mountains. Vernal pools or temporary wetlands, lasting a minimum of three weeks, which do not contain bullfrogs, fish, or crayfish are necessary for breeding.	**Absent.** Vernal pools for breeding are absent from the APE. Limited standing water exists within the APE. This species has never been observed within 10 miles of the APE.
Yellow-breasted Chat (*Icteria virens*)	CSC	Summer resident; inhabits riparian thickets of willow and other brushy tangles near watercourses.	**Possible.** Riparian habitat is present, and the APE is within the range of this species.

Table 4-13: List of Special Status Plants with Potential to Occur Onsite and/or in the Vicinity

Species	Status	Habitat	Occurrence on Project Site
Beaked clarkia (*Clarkia rostrata*)	CNPS 1B	Found in woodlands and valley foothill grasslands on the west slope of the Sierra Nevada range, around	**Unlikely.** The APE is outside the known elevational range of this species.

Species	Status	Habitat	Occurrence on Project Site
		1,640 feet in elevation. Blooms April – May.	
Big-scale balsamroot (*Balsamorhiza macrolepis*)	CNPS 1B	Found in chaparral, valley and foothill grassland, cismontane woodland, sometimes found on serpentine at 115–4800 feet.	**Unlikely.** The APE provides suitable habitat for this species, but it has not been observed in the region since 1925.
Chinese Camp brodiaea (*Brodiaea pallida*)	CNPS 1B	Found in valley and foothill grassland, cismontane woodland. Often in rocky, intermittent streambeds, sometimes on serpentine at 540–1260 feet.	**Possible**. The APE includes cismontane woodland and is adjacent to the Stanislaus River. This species was observed 4 miles north of the APE in 2008.
Colusa grass (*Neostapfia colusana*)	FT, CE, CNPS 1B	Found in vernal pools in the San Joaquin Valley at elevations below 410 feet. Blooms May – August.	**Unlikely.** Vernal pool habitat is absent from the APE. However, area designated as critical habitat for this species is located within 2 miles of the APE, south of the Stanislaus River.
Congdon's lomatium (*Lomatium congdonii*)	CNPS 1B	Found in Cismontane woodland, chaparral. Serpentine soils with serpentine chaparral plants and grey pines at 1100–2050 feet.	**Absent.** The APE is outside the known elevational range of this species and there are no serpentine soils located within the APE.
Delicate bluecup (*Githopsis tenella*)	CNPS 1B	Found in chaparral, cismontane woodland, mesic sites, and sometimes on serpentine at 1500–6000 feet.	**Absent.** The APE is outside the known elevational range of this species and disturbance from grazing would deter its presence.
Dwarf downingia (*Downingia pusilla*)	CNPS 2B	Found in vernal pools in valley and foothill grassland communities at elevations below 1600 feet. Blooms March – May.	**Absent.** Vernal pool habitats required by this species are absent from the APE. This species has not been observed in the region in over 40 years and never within 10 miles of the APE.
Forked hare-leaf (*Lagophylla dichotoma*)	CNPS 1B	Found in cismontane woodland, and valley and foothill grassland communities at elevations between 600 and 1100 feet.	**Possible.** Habitat for this species is present within the APE. This species was recorded in the region 1 mile from the APE in 1938.
Greene’s tuctoria (*Tuctoria greenei*)	FE, CR, CNPS 1B	Found in the San Joaquin Valley and other parts of California in vernal pools within valley grassland, wetland, and riparian communities at elevations below 3500 feet. Blooms May – September.	**Possible.** Vernal pool habitats required by this species are absent from the APE. However, area designated as critical habitat for this species is located 2 miles outside of the APE, south of the Stanislaus River.
Hairy Orcutt grass (*Orcuttia pilosa*)	FE, CE, CNPS 1B	Found in vernal pools in valley grassland, wetland, and riparian communities at elevations below 650 feet. Blooms May – September.	**Absent.** Vernal pool habitats required by this species are absent from the APE. This species has not been observed in the region since 1938 and that population is considered extirpated.
Hartweg’s golden sunburst (*Pseudobahia bahifolia*)	FE, CE, CNPS 1B	Found in valley and foothill grassland and cismontane woodland communities in clay soils that are often acidic. Occurs predominantly on northern slopes, but also along shady creeks and near vernal pools	**Unlikely.** Foothill grassland and cismontane woodland habitat are present within the APE, but vernal pools and shady creeks are not. This species was last observed in 2010, 12 miles south of the APE.

Species	Status	Habitat	Occurrence on Project Site
		at elevations between 300 feet and 650 feet. Blooms March – May.	
Henderson's bent grass (*Agrostis hendersonii*)	CNPS 3.2	Found in valley and foothill moist grasslands and vernal pools at 210–3380 feet.	**Absent.** Vernal pool habitats required by this species are absent from the APE. This species was last observed in the region in 1936.
Hoover's calycadenia (*Calycadenia hooveri*)	CNPS 1B	Found in valley and foothill grassland and cismontane woodland communities on exposed, rocky, barren soil at elevations between 300 feet and 1300 feet. Blooms June – September.	**Possible.** Foothill grassland and cismontane woodland habitat are present within the APE. This species was last observed 5 miles southeast of the APE in 2016.
Hoover's cryptantha (*Cryptantha hooveri*)	CNPS 1A	Presumed extirpated in California. Found in valley and foothill grassland and inland dunes in coarse sand at elevations below 250 feet. Blooms Mar – May.	**Absent.** The APE is outside the known elevational range of this species and is presumed extirpated in California.
Hoover's spurge (*Euphorbia hooveri*)	FT, CNPS 1B	Found in the San Joaquin Valley and Sacramento Valley in vernal pools within valley grassland, freshwater wetland, and riparian communities at elevations below 800 feet. Blooms July – September.	**Absent.** Vernal pool habitats required by this species are absent from the APE. This species was last observed in the region 12 miles south of the APE in 1986.
Jepson's onion (*Allium jepsonii*)	CNPS 1B.2	Found in chapparal, cismontane woodland, and lower montane coniferous forest. Often on serpentine soils, volcanic soils, slopes and flats, usually in an open area at 1150–3700 feet.	**Absent.** The APE is outside the known elevational range of this species. This species was last observed in the region in 1991, 11 miles north of the APE.
Layne's ragwort (*Packera layneae*)	CNPS 1B.2	Found in chaparral and cismontane woodland. Ultramafic soil (serpentine or gabbro); occasionally along streams at 650–3500 feet.	**Absent.** The APE is outside the known elevational range of this species and there are no ultramafic soils within the APE.
Mariposa clarkia (*Clarkia biloba ssp. Australis*)	CNPS 1B.2	Found in chaparral, cismontane woodland on serpentine. Especially within foothill woodland/riparian ecotone at 400–4850 feet.	**Possible.** Cismontane woodland habitat is present within the APE. This species was last observed 8 miles east of the APE in 2018. However, the APE is on the lower elevational boundary of this species range.
Mariposa cryptantha (*Cryptantha mariposae*)	CNPS 1B.3	Found in chaparral on serpentine outcrops at 300–2700 feet.	**Absent.** Habitats required by this species are absent from the APE. Serpentine soils are not present.
Merced monardella (*Monardella leucocephala*)	CNPS 1A	Found in the San Joaquin Valley, associated with valley and foothill grasslands. Grows along rivers in moist, sandy soils at elevations between 164 feet and 328 feet. Blooms May – July.	**Possible.** Cismontane woodland habitat is present within the APE, as well as the Stanislaus River, and proper elevational range. The single regional observation of this species was recorded 10 miles east of the APE in 1998.
Nissenan manzanita (*Arctostaphylos nissenana*)	CNPS 1B.2	Found in closed-cone coniferous forest and chaparral. Usually on metamorphics, associated with other chaparral species at 1600–3300 feet.	**Absent.** Habitats required by this species are absent from the APE, the APE is also outside the elevational range of this species.

Species	Status	Habitat	Occurrence on Project Site
Patterson's navarretia (*Navarretia paradoxiclara*)	CNPS 1B	Found in meadows and seeps. This species is serpentinite, prefers openings, is vernally mesic, and often found drainages at 500–1450 feet.	**Absent.** Habitats required by this species are absent from the APE, the APE is also outside the elevational range of this species.
Rawhide Hill onion (*Allium tuolumnense*)	CNPS 1B	Found in cismontane woodland. Restricted to serpentine soil, usually in grey pine chaparral. steep, rocky, south-facing slopes or small drainages. 700–1650 feet.	**Absent.** Soils required by this species are absent from the APE, the APE is also outside the elevational range of this species.
Red Hills cryptantha (*Cryptantha spithamaea*)	CNPS 1B	Found in chaparral, cismontane woodland. This species is serpentinite, sometimes found in streambeds and openings at 900–1800 feet.	**Absent.** Habitats required by this species are absent from the APE, the APE is also outside the elevational range of this species.
Red Hills ragwort (*Senecio clevelandii var. heterophyllus*)	CNPS 1B	Found in cismontane woodland, on drying serpentine soils, often along streams at 850–1300 feet.	**Absent.** Habitats required by this species are absent from the APE, the APE is also outside the elevational range of this species.
Red Hills soaproot (*Chlorogalum grandiflorum*)	CNPS 1B	Found in cismontane woodland, chaparral, and lower montane coniferous forest. Occurs frequently on serpentine or gabbro, but also on non-ultramafic substrates; often on "historically disturbed" sites at 870–5561 feet.	**Absent.** Habitats required by this species are absent from the APE, the APE is also outside the elevational range of this species.
Red Hills vervain (*Verbena californica*)	CNPS 1B	Found in cismontane woodland, valley and foothill grassland, and mesic sites on serpentine, usually serpentine seeps or creeks at 2625–3770 feet.	**Absent.** The APE is outside the known elevational range of this species, the APE also lacks serpentine soils required by this species.
San Joaquin Valley Orcutt grass (*Orcuttia inaequalis*)	FT, CE, CNPS 1B	Found in the eastern San Joaquin Valley and the Sierra Nevada foothills in vernal pools within valley grassland, freshwater wetland, and wetland-riparian communities at elevations below 2600 feet. Blooms April – September.	**Absent.** Vernal pool habitats required by this species are absent from the APE. There are no considered extant populations of this species within the region.
Shaggyhair lupine (*Lupinus spectabilis*)	CNPS 1B	Found in chaparral, cismontane woodland. Mostly on open rocky slopes of serpentine chaparral surrounded by grey pine woodland. 980–2700 feet.	**Absent.** The APE is outside the known elevational range of this species and the APE lacks serpentine chaparral habitat.
Spiny-sepaled button-celery (*Eryngium spinosepalum*)	CNPS 1B	Found in the Sierra Nevada Foothills and the San Joaquin Valley. Occurs in vernal pools, swales, and roadside ditches. Often associated with clay soils in vernal pools within grassland communities. Occurs at elevations between 50–4160 feet. Blooms April–July.	**Absent.** Vernal pool habitats required by this species are absent from the APE. This species has not been observed in the region in over 20 years.
Stanislaus monkeyflower	CNPS 1B	Found in cismontane woodland and lower montane coniferous forest at 980–4700 feet.	**Absent.** The APE is outside the known elevational range of this species and

Species	Status	Habitat	Occurrence on Project Site
(*Erythranthe marmorata*)			lacks woodland or forest habitat required by this species.
Stinkbells (*Fritillaria agrestis*)	CNPS 1B	Found in cismontane woodland, chaparral, valley and foothill grassland, pinyon and juniper woodland. This species is sometimes found on serpentine; but generally in nonnative grassland or in grassy openings in clay soil at 30–5100 feet.	**Unlikely.** Cismontane woodland habitat is present within the APE and proper elevational range. The most recent regional observation of this species was recorded 10 miles east of the APE in 1992.
Succulent owl's-clover (*Castilleja campestris var. succulenta*)	CNPS 1B.2	Found in vernal pools and moist places, often in acidic soils at 65–2300 feet.	**Absent.** Vernal pool habitats required by this species are absent from the APE. This species was last observed in the region in 1978, 10 miles south of the APE.
Tongue-leaf copper moss (*Scopelophila cataractae*)	CNPS 2B	Found in cismontane woodland, on moss on metamorphic substrate at elevations around 1300 feet.	**Absent.** The APE is outside the known elevational range of this species and lacks required woodland habitat.
Tuolumne button-celery (*Eryngium pinnatisectum*)	CNPS 1B	Found in vernal pools in cismontane woodland and lower montane coniferous forest at 200-3000 feet.	**Absent.** Vernal pool habitats required by this species are absent from the APE and lacks required woodland and forest habitat.
Veiny monardella (*Monardella venosa*)	CNPS 1B.1	Found in valley and foothill grassland and cismontane woodland in heavy clay at 100–1300 feet.	**Unlikely.** Habitat is present, but soils required by this species are absent from the APE.

EXPLANATION OF OCCURRENCE DESIGNATIONS AND STATUS CODES

Present: Species observed on the site at time of field surveys or during recent past.
Likely: Species not observed on the site, but it may reasonably be expected to occur there on a regular basis.
Possible: Species not observed on the site, but it could occur there from time to time.
Unlikely: Species not observed on the site, and would not be expected to occur there except, perhaps, as a transient.
Absent: Species not observed on the site and precluded from occurring there due to absence of suitable habitat.

STATUS CODES

FE Federally Endangered
FT Federally Threatened
FC Federal Candidate

CE California Endangered
CT California Threatened
CCT California Threatened (Candidate)
CFP California Fully Protected
CSC California Species of Concern
CWL California Watch List
CCE California Endangered (Candidate)
CR California Rare

CNPS LISTING

1A Plants Presumed Extinct in California.
1B Plants Rare, Threatened, or Endangered in California and elsewhere.
2B Plants Rare, Threatened, or Endangered in California, but more common elsewhere.

Thresholds

4.4.3.1 Threatened and Endangered Species

Permits may be required from the USFWS and/or CDFW if activities associated with a Project have the potential to result in the "take" of a species listed as threatened or endangered under the federal and/or state Endangered Species Acts. Take is defined by the State of California as "to hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture or kill" (California Fish and Game Code, Section 86). Take is more broadly defined by the federal Endangered Species Act to include "harm" (16 United States Code (USC), Section 1532(19), 50 Code of Federal Regulation, Section 17.3). CDFW and USFWS are responsible agencies under CEQA and the National Environmental Policy Act (NEPA). Both agencies review CEQA and NEPA documents in order to determine the adequacy of their treatment of endangered species issues and to make project-specific recommendations for their conservation.[9]

California's Fish and Game Code gives CDFW the responsibility to inspect diversion conduits and require fish screens where the Department deems fish screens necessary to protect the ecological health of the fish community. Fish and Game Code, Division 6, Part 1, Chapter 3, Article 3, Sections 5980-5993 recognizes that large conduits, diverting more than 250 cubic feet per second of water, "tend to destroy fish in a greater degree than conduits of smaller size." Under Section 5981, CDFW has the right to determine if the Project requires a protective fish screen to be installed by the owner of the conduit in order to reduce the risk of fish injury or death.

4.4.3.2 Designated Critical Habitat

When species are listed as threatened or endangered, the USFWS often designates areas of "Critical Habitat" as defined by Section 3(5)(A) of the federal Endangered Species Act (ESA). Critical Habitat is a term defined in the ESA as a specific geographic area that contains features essential for the conservation of a threatened or endangered species and that may require special management and protection. Critical Habitat is a tool that supports the continued conservation of imperiled species by guiding cooperation with the federal government. Designations only affect federal agency actions or federally funded or permitted activities. Critical Habitat does not prevent activities that occur within the designated area. Only activities that involve a federal permit, license, or funding and are likely to destroy or adversely modify Critical Habitat will be affected.[10]

4.4.3.3 Migratory Birds

The Federal Migratory Bird Treaty Act (MBTA) (16 USC 703-712) prohibits killing, possessing, or trading in any bird species covered in one of four international conventions to which the United States is a party, except in accordance with regulations prescribed by the Secretary of the Interior. The name of the act is misleading, as it covers nearly all bird's native to the United States, even those that are non-migratory. The MBTA encompasses whole birds, parts of birds, nests, and eggs. Additionally, California Fish and Game Code makes it unlawful to take or possess any non-game bird covered by the MBTA (Section 3513), as well as any other native non-game bird (Section 3800).[11]

4.4.3.4 Birds of Prey

Birds of prey are protected in California under provisions of Fish and Game Code (Section 3503.5), which states that it is unlawful to take, possess, or destroy any birds in the order Falconiformes (hawks and eagles) or Strigiformes (owls), as well as their nests and eggs. The Bald Eagle and Golden Eagle are afforded additional protection under the federal Bald and Golden Eagle Protection Act (16 USC 668), which makes it unlawful to kill birds or their eggs.[12]

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[9] (California Natural Diversity Database (CNDDB) 2023)
[10] United States Fish and Wildlife Service. (2022). *Environmental Conservation Online System (ECOS)*. Retrieved from https://ecos.fws.gov/ecp/ (Accessed January 2022).
[11] United States Fish and Wildlife Service. (2022). *Environmental Conservation Online System (ECOS)*. Retrieved from https://ecos.fws.gov/ecp/ (Accessed January 2022).
[12] United States Fish and Wildlife Service. (2022). *Environmental Conservation Online System (ECOS)*. Retrieved from https://ecos.fws.gov/ecp/ (Accessed January 2022).

4.4.3.5 Nesting Birds

In California, protection is afforded to the nests and eggs of all birds. California Fish and Game Code (Section 3503) states that it is "unlawful to take, possess, or needlessly destroy the nest or eggs of any bird except as otherwise provided by this code or any regulation adopted pursuant thereto". Breeding-season disturbance that causes nest abandonment and/or loss of reproductive effort is considered a form of "take" by the CDFW.[13]

4.4.3.6 Wetlands and other "Jurisdictional Waters"

Natural drainage channels and adjacent wetlands may be considered "waters of the U.S." or "jurisdictional waters" subject to the jurisdiction of the USACE. The extent of jurisdiction has been defined in the Code of Federal Regulations but has also been subject to interpretation of the federal courts. Jurisdictional waters generally include:

- All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
- All interstate waters including interstate wetlands;
- All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce;
- All impoundments of waters otherwise defined as waters of the U.S. under the definition;
- Tributaries of waters identified in paragraphs (a)(1)-(4) (i.e. the bulleted items above).

As determined by the U.S. Supreme Court in its 2001 *Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers* (*SWANCC*) decision, channels and wetlands isolated from other jurisdictional waters cannot be considered jurisdictional on the basis of their use, hypothetical or observed, by migratory birds. Similarly, in its 2006 consolidated *Carabell/Rapanos* decision, the Supreme Court ruled that a significant nexus between a wetland and other navigable waters must exist for the wetland itself to be considered a navigable and therefore jurisdictional water. Furthermore, the Supreme Court clarified that the U.S. Environmental Protection Agency (EPA) and the USACE will not assert jurisdiction over ditches excavated wholly in and draining only uplands and that do not carry a relatively permanent flow of water.

The USACE regulates the filling or grading of Waters of the United States. under the authority of Section 404 of the Clean Water Act. The extent of jurisdiction within drainage channels is defined by "ordinary high-water marks" on opposing channel banks. All activities that involve the discharge of dredge or fill material into Waters of the United States are subject to the permit requirements of the USACE. Such permits are typically issued on the condition that the applicant agrees to provide mitigation that results in no net loss of wetland functions or values. No permit can be issued until the RWQCB issues a Section 401 Water Quality Certification (or waiver of such certification) verifying that the proposed activity will meet State water quality standards.

Under the Porter-Cologne Water Quality Control Act of 1969, the SWRCB has regulatory authority to protect the water quality of all surface water and groundwater in the State of California ("Waters of the State"). Nine RWQCBs oversee water quality at the local and regional level. The RWQCB for a given region

[13] United States Fish and Wildlife Service. (2022). *Environmental Conservation Online System (ECOS)*. Retrieved from https://ecos.fws.gov/ecp/ (Accessed January 2022).

regulates discharges of fill or pollutants into Waters of the State through the issuance of various permits and orders. Discharges into Waters of the State that are also Waters of the United States require a Section 401 Water Quality Certification from the RWQCB as a prerequisite to obtaining certain federal permits, such as a Section 404 Clean Water Act permit. Discharges into all Waters of the State, even those that are not also Waters of the United States., require Waste Discharge Requirements (WDRs), or waivers of WDRs, from the RWQCB. The RWQCB also administers the Construction Storm Water Program and the federal National Pollution Discharge Elimination System (NPDES) program. Projects that disturb one acre or more of soil must obtain a Construction General Permit under the Construction Storm Water Program. A prerequisite for this permit is the development of a Storm Water Pollution Prevention Plan (SWPPP) by a certified Qualified SWPPP Developer. Projects that discharge wastewater, storm water, or other pollutants into a Water of the United States. may require a NPDES permit.

CDFW has jurisdiction over the bed and bank of natural drainages and lakes according to provisions of Section 1601 and 1602 of the California Fish and Game Code. Activities that may substantially modify such waters through the diversion or obstruction of their natural flow, change or use of any material from their bed or bank, or the deposition of debris require a notification of a Lake or Streambed Alteration. If CDFW determines that the activity may adversely affect fish and wildlife resources, a Lake or Streambed Alteration Agreement will be prepared. Such an agreement typically stipulates that certain measures will be implemented to protect the habitat values of the lake or drainage in question.[14]

4.4.4 Impact Analysis

a) 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 California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?

Less than Significant Impact with Mitigation Incorporated.

Project-Related Mortality and/or Disturbance of Nesting Raptors, Migratory Birds, and Special Status Birds.

The Project area contains suitable nesting and/or foraging habitat for a variety of avian species. The survey was conducted outside nesting bird season, so no active nests were observed. It is anticipated that during nesting bird season, numerous species of birds would use the Project site for nesting, as abundant high-quality habitat is present. Bald Eagles, Prairie Falcons, and Yellow-breasted Chat were deemed the only special status avian species likely to occur within the Project site. Birds nesting within the Project area during construction have the potential to be injured or killed by Project-related activities. In addition to the direct “take” of nesting birds, nesting birds within the Project site or adjacent areas could be disturbed by Project-related activities resulting in nest abandonment. Projects that adversely affect the nesting success of raptors and migratory birds or result in the mortality of individual birds is considered a violation of State and federal laws and are considered a potentially significant impact under CEQA.

Implementation of Mitigation Measures **BIO-3** (Avoidance), **BIO-4** (Pre-construction Surveys), and **BIO-5** (Establish Buffers) will reduce potential impacts to nesting raptors, migratory birds, and special status

[14] (United States Environmental Protection Agency (USEPA) 2023)

birds to a less than significant level under CEQA and will ensure compliance with State and federal laws protecting these avian species.

Project-Related Mortality and/or Disturbance of Bats

In reviewing the CNDDB, the following special status bat species were identified to occur within or adjacent to the Project site: pallid bats, Townsend's big eared bats, and western mastiff bats, all of which are designated as California Species of Special Concern (CSC). Additionally, many oak trees in the area are likely to support tree-roosting species of bats like western red bats, also a CSC. Roosting habitat becomes especially sensitive to bat populations during the maternity season (March 1 to September 30) while pups are maturing.

A focused survey for bats was determined to be necessary to identify if proposed Project activities would impact existing bat habitat, presence of high-quality roosting habitat, and/or foraging areas surrounding Goodwin Dam. The area above and around Goodwin Dam contains small caves, rocky outcroppings, and oak woodlands all of which are considered potential bat roosting habitat. The Goodwin Dam area and Stanislaus River are typical drinking and foraging habitat for many bat species, as the artificial lights around Goodwin Dam attract insects which often increase bat activity. Greater abundance of insects, access to a large and open body of freshwater, and roosting habitat are often driving forces for bat activity.

On September 16 and 17, 2021, a focused survey was performed by P&P bat biologist Jacob Rogers. The goals of this survey were to identify the presence or absence of potential bat roosts within the Project site and provide appropriate mitigation measures[15] to protect bat species and associated habitat. The methods and results of the focused survey can be found in Appendix D of Appendix B. Implementation of Mitigation Measures BIO-6 (Pre-construction Surveys), BIO-7 (Avoidance), BIO-8 (Establish Buffers), and BIO-9 (Disturbance to Trees) will reduce potential impacts to bats to a less than significant level under CEQA and will ensure compliance with State and Federal laws protecting this species.

Project-Related Impacts to Special Status Plant Species

In reviewing the CNDDB, the following special status plant species were identified to occur within or adjacent to the APE: Chinese Camp brodiaea, Greene's tuctoria, forked hare-leaf, Hoover's calycadenia, Mariposa clarkia, and Merced monardella. The survey of the APE was conducted outside the blooming season for these plants. It is recommended a more detailed survey be conducted within the blooming season.

Projects that adversely affect special status plants or result in the mortality of special status plants is considered a violation of State and federal laws and are considered a potentially significant impact under CEQA.

Implementation of Mitigation Measures BIO-10 (Pre-construction Surveys), BIO-11 (Avoidance), and BIO-12 (Establish Buffers) will reduce potential impacts to special status plants to a less than significant level under CEQA and will ensure compliance with State and Federal laws protecting these plant species.

[15] H.T. Harvey & Associates. 2004. California Bat Mitigation Techniques, Solutions, and Effectiveness. December 29, 2004.

Project-Related Impacts to Special Status Animal Species Absent From, or Unlikely to Occur on, the Project Site

Of the 30 regionally occurring special status animal species, 23 are considered absent from or unlikely to occur within the APE due to past or ongoing disturbance and/or the absence of suitable habitat. These species include: American badger, Burrowing Owl, California Horned Lark, California red-legged frog, California tiger salamander, central California roach, coast horned lizard, conservancy fairy shrimp, Crotch bumble bee, Delta smelt, foothill yellow-legged frog, green sturgeon, hardhead, Least Bell's Vireo, monarch butterfly, San Joaquin kit fox, Swainson's Hawk, steelhead, Tricolored Blackbird, Valley elderberry longhorn beetle, vernal pool fairy shrimp, vernal pool tadpole shrimp, and western spadefoot.

Since it is unlikely these species would occur onsite, implementation of the Project should have no impact on these 23 special status species through construction mortality, disturbance, or loss of habitat. Mitigation measures are not warranted.

Project-Related Impacts to Special Status Plant Species Absent From, or Unlikely to Occur on, the Project Site

Of the 36 regionally occurring special status plant species, 30 are considered absent from or unlikely to occur within the APE due to past or ongoing disturbance and/or the absence of suitable habitat. These species include: beaked clarkia, big-scale balsamroot, Colusa grass, Congdon's lomatium, delicate bluecup, dwarf downingia, hairy orcutt grass, Hartweg's golden sunburst, Henderson's bent grass, Hoover's cryptantha, Hoover's spurge, Jepson's onion, Layne's ragwort, Mariposa Cryptantha, Nissenan manzanita, Patterson's navarretia, Rawhide Hill onion, Red Hills cryptantha, Red Hills ragwort, Red Hills soaproot, Red Hills vervain, San Joaquin Valley Orcutt grass, shaggyhair lupine, spiny-sepaled button-celery, Stanislaus monkeyflower, stinkbells, succulent owl's-clover, tongue-leaf copper moss, Tuolumne button-celery, and veiny monardella.

Since it is unlikely these species would occur onsite, implementation of the Project should have no impact on these 30 special status species through construction mortality, disturbance, or loss of habitat. Mitigation measures are not warranted.

Project-Related Impacts to Special Status Fishes Absent From, or Unlikely to Occur on, the Project Site

Historically, steelhead distribution extended into the headwaters of the Stanislaus River. Dam construction and water diversion for mining and irrigation purposes first began during the Gold Rush (mid-1800s). Goodwin Dam, constructed in 1913, was probably the first permanent barrier to significantly affect salmonid access to upstream habitat. Goodwin Dam historically had a fishway which allowed salmonids to access the reach of Stanislaus River up to the Melones Dam. Historical records note, however, that salmonoids could seldom pass Goodwin Dam, even when the fishway existed[16].

Goodwin Dam does not contain a fish ladder as it was destroyed by falling boulders in the early- to mid-1900s and therefore becomes a migratory barrier for salmon migration. The reduction of peak flows and sediment trapping in the reservoir decreases river dynamics, isolates the river floodplains, and removes the side channels – this causes channels to be overrun by riparian vegetation. Combined with in-river aggregate mining and the conversion of floodplain into farm land, the area of suitable salmonid spawning

[16] (United States Department of the Interior, Bureau of Reclamation 2007)

and rearing habitats has been reduced downstream of Goodwin Dam. As a result, anadromous salmonids are limited to the lower 60 miles downstream of Goodwin Dam[17].

Expertise provided by the fisheries biologist determined that none of the fish expected to occur upstream of Goodwin Dam and in Goodwin Reservoir are protected under the ESA or the CESA. Rainbow trout that may occur in the reservoir would be of hatchery origin and are not protected under the ESA. Further, migratory fish occurring in the lower Stanislaus River below Goodwin Dam would not be affected by the Project, as Project activities would not alter the existing flows or annual diversion limits. Because the Project involves maximum flow capacity of approximately 1,250 cubic feet per second (cfs), it falls under the jurisdiction of CDFW. Consultation with regulatory agencies has provided concurrence with these findings and has determined that a fish screen is not warranted as part of Project requirements. Fish screen determination between CDFW, National Oceanic and Atmospheric Administration, and USFWS is summarized in Table below.

Table 4-14: Responsible Agency Determinations for Fish Screen

Responsible Agency	Contact	Means of Correspondence	Date of Correspondence	Determination
California Department of Fish and Wildlife	Zachary Kearns, Environmental Scientist	Email	June 16, 2022	"Based on my conversation with fisheries, we have no intention to ask for a fish screen along the full portion of the channel."
National Oceanic and Atmospheric Administration	Monica Gutierrez, Acting San Joaquin River Branch Chief	Email	July 9, 2021	"Since the project area is located above Goodwin Dam, which is the upper extent of anadromy for listed fish species, there is no requirement to fish screen the project."
United States Fish and Wildlife Service	USFWS Staff	Phone call	July 2021	"No fish screen required".

The current fish community has been highly altered through historical changes to the flow regime and species introductions. The existing water diversion has remained unscreened since construction. Special status fishes are not considered present or likely to occur within the APE. Mitigation measures identified in consultation with CDFW, those identified within the Lake or Streambed Alteration (LSA) Agreement, BMPs, and a Fish Rescue and Relocation Plan has been developed by a qualified biologist and approved by CDFW as a preventative measure in the event that any existing fish become entrained during installation of stoplog dam activities. Therefore, additional mitigation measures are not warranted.

b) 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 California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?

No Impact. The Project site is made up primarily of live oak woodland and grassland habitat. This time of natural community is designated by CDFW as being an apparently secure (G4) - uncommon but not rare (S4) ranking on the California Natural Community List[18].The Project activities do not include removal

[17] U.S. Department of the Interior Bureau of Reclamation California-Great Basin Region, 2022. https://www.usbr.gov/mp/mpr-news/docs/factsheets/goodwin.pdf
[18] (California Department of Fish and Wildlife 2021)

of oak trees. Further there were no additional sensitive natural communities identified in or near the Project site in the California Natural Diversity Database (CNDDB) or within the USFWS critical habitat database. Therefore, there would be no impact to natural communities in the area.

c) 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?

Less than Significant Impact. The Project involves constructing barge landings within Goodwin Dam Reservoir. An Aquatic Resources Delineation was conducted on October 17, 2022, to delineate potential jurisdictional boundaries of these features. The investigation and delineation were conducted in accordance with the *1987 Corps of Engineers Wetland Delineation Manual, the Arid West Regional Supplement*[19], the *State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State*[20], and the *United States Fish and Wildlife Service National Wetlands Inventory Map*[21] was consulted for known wetlands in the area.

The Goodwin Dam Reservoir located within the APE is regulated by USACE and RWQCB as jurisdictional waters. Construction activities in this area would be subject to USACE permit requirements pursuant to Section 404 of the CWA. This Project may be authorized under a Nationwide Permit but could require an individual permit if Nationwide Permit limits are exceeded. In addition, Section 401 of the CWA Water Quality Certification from the RWQCB is required for dredge and fill of waters of the State and activities must meet State water quality standards. Compliance with each permit requires avoidance, minimization, and mitigation measures to ensure that Project-related impacts to these potentially jurisdictional waters are less-than-significant in nature or are fully mitigated.

Project activities with potential to alter the Goodwin Dam Reservoir including the bed, bank, floodplain and associated riparian habitat, would be within CDFWs jurisdiction, pursuant to Section 1602 of the California Fish and Game Code. The Project proponent would be required to notify CDFW if the Project's activities have potential to impact rivers, streams, or the riparian corridor of any aquatic features onsite that may be beneficial to fish or wildlife resources. If CDFW determines that the Project could potentially adversely affect fish and wildlife resources and/or riparian habitat, LSA Agreement would be issued prior to construction. LSA Agreements are typically issued with mandatory avoidance and minimization measures, protective measures for special status species, and required compensatory mitigation for removal of riparian trees, shrubs, and herbaceous cover along the banks. Compliance with measures of the LSA Agreement would ensure that the Project's impacts to aquatic species, features, and riparian habitat within CDFW's jurisdiction remain less-than-significant or are fully mitigated.

There are no designated wild and scenic rivers within the APE; therefore, the Project would not result in direct impacts to wild and scenic rivers. Compliance with USACE, RWQCB, and CDFW permits, certifications, and agreements would ensure there are no indirect downstream effects to jurisdictional waters.

Since construction will involve ground disturbance over an area greater than one acre, the Project will also be required to obtain a Construction General Permit under the Construction Storm Water Program

[19] (United States Army Corps of Engineers 1987)
[20] (State Water Resources Control Board 2021)
[21] (National Wetlands Inventory (NWI) map 2023)

administered by the RWQCB. A prerequisite for this permit is the development of a Storm Water Pollution Prevention Plan (SWPPP) to ensure construction activities do not adversely affect water quality.

d) 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?

Less than Significant Impact. The Project site does contain features that would be likely to function as wildlife movement corridors. Although wildlife movement in this area is great, the Project would not impede wildlife from continuing to move throughout the area freely. Temporary construction does not include activities that would limit wildlife movement or entrap wildlife within the Project area. With the majority of construction activities occurring underground, wildlife dispersion would continue unimpeded throughout Project site. The oak savanna habitat within the Project site is moderately disturbed by cattle grazing but provides expansive high-quality habitat to a variety of wildlife, year-round. The Project site serves foraging birds, including raptors, during the day, as well as bats, coyotes, and other nocturnal animals at night. Although wildlife movement would not be impeded by Project activities, BIO-1 through BIO-14 mitigation measures provided below are designed to avoid impacts to special status species and their habitats. Therefore, the Project would be less than significant.

e) Would the project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

Less than Significant Impact. The Project appears to be consistent with the goals and policies of the Calaveras, Stanislaus, and Tuolumne County General Plans. Tuolumne County is the only county with current applicable goals, policies, and laws. The Project does not intend to remove or disturb any trees. If trees were to be disturbed appropriate tree removal permits will be required based on the Tuolumne County Chapter 9.24 Ordinance.

f) Would the project conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?

No Impact. There are no known habitat conservation plans or Natural Community Conservation Plans in the Project area. There would be no impact.

4.4.5 Mitigation

BIO-1 (*WEAP Training*): Prior to initiating construction activities (including staging and mobilization), all personnel associated with Project construction will attend mandatory Worker Environmental Awareness Program (WEAP) training, conducted by a qualified biologist, to aid workers in identifying special status resources that may occur in the APE. The specifics of this program will include identification of the sensitive species and suitable habitats, a description of the regulatory status and general ecological characteristics of sensitive resources, and review of the limits of construction and mitigation measures required to reduce impacts to biological resources within the work area. This training will discuss special status species, describe the laws and regulations in place to provide protection of these species, identify the penalties for violation of applicable environmental laws and regulations, and a list of required protective measures to avoid "take." A fact sheet conveying this information, along with photographs or illustrations of sensitive species with potential to occur onsite, will also be prepared for distribution to all contractors, their employees, and all other personnel involved with construction of the Project. All employees will sign a form documenting that they have attended WEAP training and understand the information presented to them.

BIO-2 (*BMPs*): The Project proponent will ensure that all workers employ the following best management practices (BMPs) in order to avoid and minimize potential impacts to special status species:

- Vehicles will observe a 15-mph speed limit while on unpaved access routes.
- Workers will inspect areas beneath parked vehicles prior to mobilization. If special status species are detected beneath vehicles, the individual will either be allowed to leave of its own volition or will be captured by the qualified biologist (must possess appropriate collecting/handling permits) and relocated out of harm's way to the nearest suitable habitat beyond the influence of the Project work area. "Take" of a listed (rare, threatened, or endangered) species is prohibited.
- The presence of any special status species and/or any wildlife mortalities will be reported to the Project's designated biologist and the appropriate regulatory agencies

BIO-3 (*Avoidance*): The Project's construction activities will occur, if feasible, between September 16 and January 31 (outside of nesting bird season) in an effort to avoid impacts to nesting birds.

BIO-4 (*Pre-construction Surveys*): If activities must occur within nesting bird season (February 1 to September 15), a qualified biologist will conduct pre-construction surveys for active nests within ten (10) days prior to the start of construction. The survey will include the proposed work area and surrounding lands within 50 feet. If no active nests are observed, no further mitigation is required. Raptor nests are considered "active" upon the nest-building stage.

BIO-5 (*Establish Buffers*): On discovery of any active nests or breeding colonies near work areas, the biologist will determine appropriate construction setback distances based on applicable CDFW and/or USFWS guidelines and/or the biology of the species in question. Construction buffers will be identified with flagging, fencing, or other easily visible means, and will be maintained until the biologist has determined that the nestlings have fledged.

BIO-6 (*Pre-construction Surveys*): A pre-construction survey will be performed for construction activities that fall between March 1 and September 30 (bat maternity season) to identify current bat roosting locations in oak trees near the dam and around the tunnel outlet prior to the start of construction. A qualified biologist will conduct the survey 7 days or less prior to construction.

BIO-7 (*Avoidance*): Impacts and interactions with bat species are to be avoided whenever possible through timing of work, method selections, and retention of feature that provide naturalized habitat.

BIO-8 (*Establish Buffers*): On discovery of any bat roosts near work, the dam, or tunnel outlet, a qualified biologist will determine appropriate construction setback distances (buffer zones) to minimize disturbance and avoid take. Construction buffers will be identified with flagging, fencing, or other easily visible means, and will be maintained until the biologist has determined that the roost will no longer be impacted by construction.

BIO-9 (*Disturbance to Trees*): In addition to complying with the Tuolumne County Oak Tree Ordinance, if a tree or trees must be removed a qualified biologist will inspect the tree prior to removal to verify that the tree is not active roosting habitat. Once the tree is deemed clear of bats, the tree will be removed within two days.

BIO-10 (*Pre-construction Surveys*): A qualified botanist/biologist will conduct focused botanical surveys for Chinese Camp brodiaea, Greene's tuctoria, forked hare-leaf, Hoover's calycadenia, Mariposa clarkia, and Merced monardella, according to CDFW's Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities (2018) for areas where ground disturbance will occur and prior to the start of construction.

BIO-11 (*Avoidance*): If special status plants are identified during a survey, a disturbance-free buffer and use of exclusion fencing will be placed around the area as not to disturb the plants or its root system.

BIO-12 (*Formal Consultation*): If rare plant individuals or populations or sensitive natural communities are detected within Project work areas during the focused botanical survey, and the plants cannot be avoided, the Project proponent will initiate consultation with CDFW and/or USFWS to determine next steps for relocation or to obtain an Incidental Take Permit (ITP).

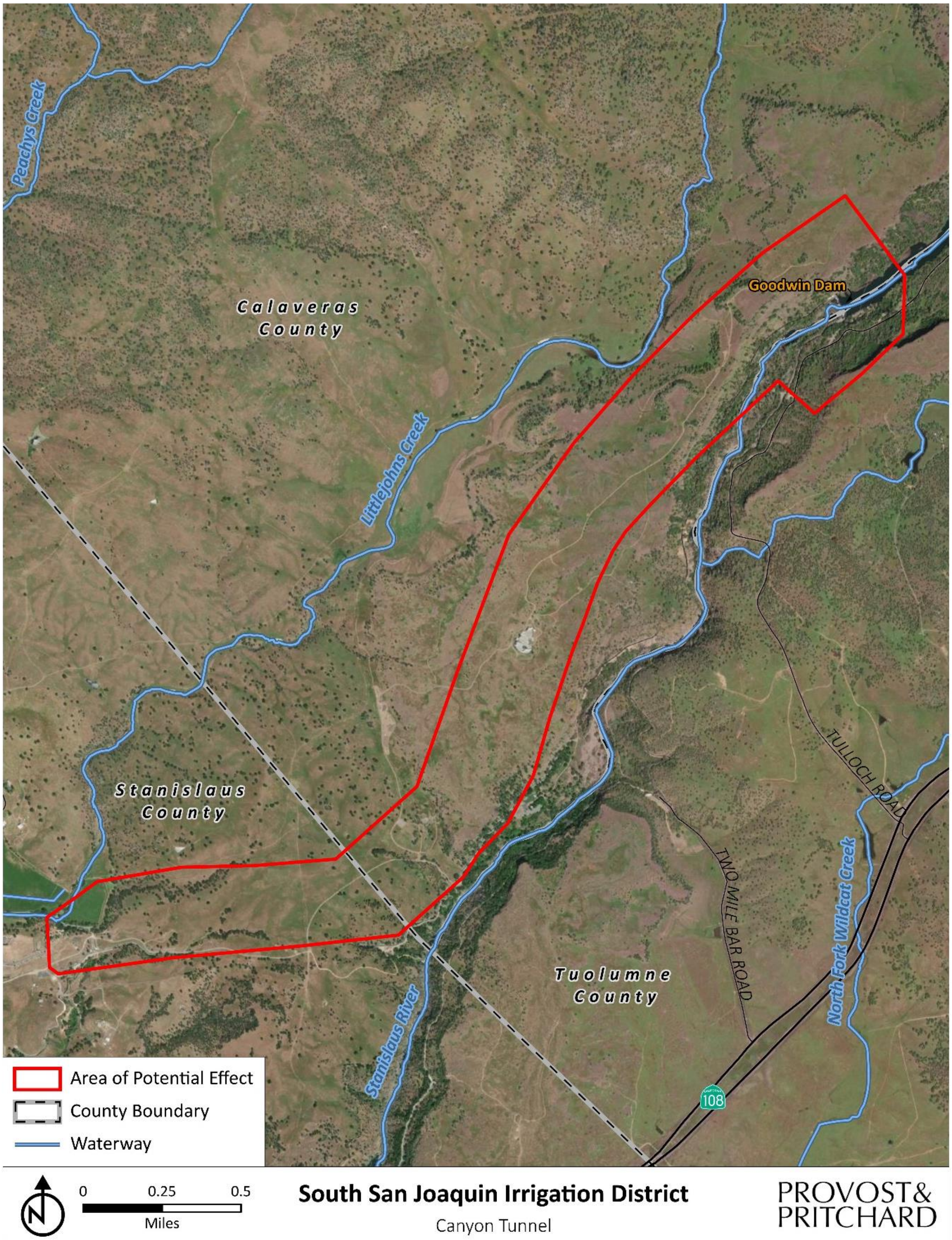

Figure 4-2: Area of Potential Effect Map

Figure 4-3: Goodwin Dam

4.5 CULTURAL RESOURCES

Table 4-15: Cultural Resources Impacts

Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a) Cause a substantial adverse change in the significance of a historical resource pursuant to in § 15064.5?	☐	☒	☐	☐
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to § 15064.5?	☐	☒	☐	☐
c) Disturb any human remains, including those interred outside of dedicated cemeteries?	☐	☒	☐	☐

4.5.1 Baseline Conditions

The prehistory of the Sierra Nevada Mountains has been described in detail in the Cultural Study (Appendix D) and places the Project location in the central Sierran archaeological subregion, encompassing the watersheds of the Cosumnes, Mokelumne, Calaveras, Stanislaus, Tuolumne, Merced, Chowchilla, and Fresno rivers. Evidence indicates that Yosemite Valley, to the south, has been inhabited for as long as 4,000 to 6,000 years before present. In addition, archaeological sites in the vicinity of El Portal indicate that the Merced River canyon may have been inhabited as early as 9,500 years ago. Substantial additional evidence of early occupation is found in the central valley, especially to the southwest around Tulare Lake, where a number of sites are known to date to the Paleoindian Period, circa 12,500 to 9,000 YBP. (See Appendix D for full details)

The Project site is located along the Stanislaus River, in portions of Tuolumne, Calaveras and Stanislaus counties, in the western foothills of the Sierra Nevada. Elevation ranges from roughly 230-ft above mean sea level (amsl), at the western/outlet and eastern/inlet end APE areas, to about 500-ft amsl above the tunnel alignment. Topography consists of a steeply-sided canyon on the east with canyon sides and rolling hills on the west. (Appendix D)

The Project will require grading for inlet and outlet canal facilities and boring a tunnel through older metamorphic rock and younger volcanic flows and sandstone. These areas consist of bedrock and the periodically flood-scoured sides of the Stanislaus River Canyon, neither of which could result in the preservation of archaeological deposits. The Project area is considered to have a very low sensitivity for a subsurface archaeological deposit. (Appendix D)

The cultural APE for ground disturbing activities is approximately 8.5 acres outlined below:

Tuolumne County
Existing Staging Area (barge landing and related improvements) = 16,560 sf = ~0.4 acres
Existing Access Road (may need to be widened) = 780 lf @ 16'w = 12,480 sf = ~0.3 acres

Stanislaus County

Existing Access Road (From Diversion Works – improvements to restore conditions following construction) = 5,481 lf @ 16'w = 87,696 sf = ~2.2 acres

Temporary Contractor Laydown Area (improve then reclaim) = ~3 acres

Calaveras County

New Barge Landing/Cap over Upstream Portal = 12,093 sf = ~0.3 acres

Existing Access Road (To Downstream Tunnel Portal and Staging Area - improvements to restore conditions following construction) = 1,508 lf @ 16'w = 24,128 sf = ~ 0.6 acres

New Downstream Tunnel Portal and Staging Area = 19,446 sf = ~ 0.5 acres

Temporary Construction Staging, Spoils Pile/Staging Area with connecting Road (improve then reclaim) = 49,285 sf = ~ 1.2 acres

Cultural Records Search - California Historical Resources Information System

A records search from the Central California Information Center (CCIC) of the California Historical Resources Information System (CHRIS), located at California State University, Stanislaus was conducted in December 2021 by ASM Associates, Inc. The CCIC records search includes a review of all recorded archaeological and built-environment resources as well as a review of cultural resource reports on file. In addition, the California Points of Historical Interest (SPHI), the California Historical Landmarks (SHL), the California Register of Historical Resources (CAL REG), the National Register of Historic Places (NRHP), and the California State Built Environment Resources Directory (BERD) listings were reviewed for the above referenced APE and an additional ¼-mile radius. Due to the sensitive nature of cultural resources, archaeological site locations are not released.

Additional sources included the State Office of Historic Preservation (SHPO) Historic Properties Directory, Archaeological Determinations of Eligibility, and the California Inventory of Historic Resources. (Appendix D)

Table 4-16: Previous Surveys within APE

Report	Date	Author	Title
CA-00193	1975	Moratto & Riley	Evaluation of Archaeological Resources On & Near Bostwick Mountain, Calaveras County
CA-7714	2012	Williams, Dunay & Fogerty	Cultural Resource Inventory & Finding of Effect, Two Mile Bar Salmonoid Restoration Project
TO-921	1977	Orlins	Cultural Resources Survey of Fee Lands for Public Access, Lower Stanislaus River
TO-1070	1982	Decater	Archaeological Survey for the Proposed Goodwin Dam Hydroelectric Project
TO-1670	1981	True & Slaymaker	Archaeological Investigations for the Oakdale Irrigation District

Table 4-17: Survey Reports within the 0.5-mi of the APE

Report	Date	Author	Title
CA-369/TO-369	1982	Swernoff	Archaeological Investigations at the Lower Stanislaus River Recreation Areas
ST-921/TO-921	1977	Orlins	Cultural Resources Survey of Fee Lands for Public Access, Lower Stanislaus River
ST-1670/TO-1670	1982	Decater	Archaeological Survey for the Proposed Goodwin Dam Hydroelectric Project

Report	Date	Author	Title
ST-7714/CA-7714	2012	Williams, Dunay & Fogerty	Cultural Resource Inventory & Finding of Effect, Two Mile Bar Salmonoid Restoration Project

Table 4-18: Resources within 0.5-mi of the APE

Primary	Date Recorded	Site Type
P-05-1144/55-2286	1979	Historic: Two Mile Bar mining camp; Native American: Possible Keweno village
P-05-3601	2015	Prehistoric: Bedrock mortars
P-50-203	1959	Prehistoric: Cave w/ habitation
P-50-2003	2007	Historic: Oakdale South Main Canal
P-50-2109/05-739	2001	Historic: South San Joaquin Main Canal
P-50-2303	2014	Historic: Oakdale Irrigation District
P-55-1711	1982	Historic: Mine tailings; Prehistoric: Bedrock mortars
P-55-1269	1939	Prehistoric (no information)
P-55-2289	1982	Historic: Canal & retaining wall
P-55-2302	1982	Historic: Mine camp
P-55-9480	2016	Prehistoric: Bedrock mortars, possible village of Tulanachi
P-55-9497	2017	Prehistoric: Bedrock mortars, possible house-pit

Native American Heritage Commission – Sacred Lands File Search and Native American Outreach

The Native American Heritage Commission (NAHC) in Sacramento was contacted in July 2021. They were provided with a brief description of the Project and a map showing its location and requested that the NAHC perform a search of the Sacred Lands File to determine if any Native American resources have been recorded in the immediate APE. The NAHC identifies, catalogs, and protects Native American cultural resources -- ancient places of special religious or social significance to Native Americans and known ancient graves and cemeteries of Native Americans on private and public lands in California. The NAHC is also charged with ensuring California Native American tribes' accessibility to ancient Native American cultural resources on public lands, overseeing the treatment and disposition of inadvertently discovered Native American human remains and burial items, and administering the California Native American Graves Protection and Repatriation Act, among many other powers and duties. NAHC provide a current list of Native American Tribal contacts to notify of the project. The ten tribal representatives identified by NAHC were contacted in writing via United States Postal Service in a letter mailed December 27, 2021, informing each Tribe of the Project. Follow up emails were sent in January and February 2022. Appendix D

1. Calaveras Band of Mi-Wuk Indians, Gloria Grimes, Chairperson
2. Calaveras Band of Mi-Wuk Indians, Debra Grimes, Cultural Resources Specialist
3. Calaveras Band of Mi-Wuk Indians, General Contact
4. California Valley Miwok Tribe, General Contact
5. California Valley Miwok Tribe, General Contact
6. Chicken Ranch Rancheria of Me-Wuk Indians, Lloyd Mathieson, Chairperson
7. Ione Band of Miwok Indians, Sara Dutschke, Chairperson
8. Nashville Enterprise Miwok Maidu-Nishinam Tribe, Cosme Valdez Chairperson
9. North Valley Yokuts Tribe, Katherine Perez, Chairperson
10. North Valley Yokuts Tribe, Timothy Perez, Tribal Contact
11. Southern Sierra Miwuk Nation, William Leonard, Chairperson
12. Tule River Indian Tribe, Kerri Vera, Environmental Department

13. Tule River Indian Tribe, Joey Garfield, Tribal Archaeologist
14. Tule River Indian Tribe, Neil Peyron, Chairperson
15. Wilton Rancheria, Dahlton Brown, Director of Administration
16. Wilton Rancheria, Steven Hutchason
17. Wilton Rancheria, Jesus Tarango, Chairperson
18. Wuksache Indian Tribe/Eshom Valley Band, Kenneth Woodrow, Chairperson

No responses were received during the initial tribal outreach coordination effort, however, ongoing tribal outreach has occurred over the last year with the Chicken Ranch Rancheria of Me-Wuk Indians. Details of those efforts can be found below in Section 4.18.

Field Survey and Results

An intensive Class III inventor/Phase I survey of the Project APE was conducted by ASM Affiliates on January 12, 2022. The field methods employed included intensive pedestrian examination of the ground surface for evidence of archaeological sites in the form of artifacts, surface features (such as bedrock mortars, historical mining equipment), and archaeological indicators (e.g., organically enriched midden soil, burnt animal bone); the identification and location of any discovered sites, should they be present; tabulation and recording of surface diagnostic artifacts; site sketch mapping; preliminary evaluation of site integrity; and site recording, following the California Office of Historic Preservation Instructions for Recording Historic Resources, using DPR 523 forms. Parallel survey transects spaced at 15-m apart were employed for the inventory. These covered the entirety of the dispersed segments of the APE. (See Appendix D)

a) Would the project cause a substantial adverse change in the significance of a historical resource pursuant to in § 15064.5?

Less than Significant Impact with Mitigation Incorporated. The new water conveyance tunnel would bypass the existing canal and the tunnel would be drilled low into the existing cliffside, so that the chance to impact archaeological resources would be very slim. The existing barge landing would be rehabilitated, a new barge platform would be constructed and the remaining work at the inlet tunnel would be performed within the dry area of the existing forebay also minimizing any potential impacts to archaeological resources. There are no historical structures or resources that would be demolished, destructed, relocated, or altered in any way as part of or during Project activities. Exclusion fencing would be utilized as needed to protect the surrounding areas and help minimize any impacts to the surrounding area.

All Project construction activities will use existing roads to transport crews, materials, and equipment to areas of the Project. A historic era cobble stone rock wall runs alongside the existing unnamed access road that would be utilized for crews, trucks and materials needing to get to the Project site. Construction equipment transportation activities would avoid this wall and have no impact to this historic era wall during construction activities. There is space if the access road may need to be widened and exclusion fencing will be utilized to avoid unnecessary impacts to the rock wall.

Figure 4-4: Historic era rock wall adjacent to existing unnamed access road

The IC records search indicated that a segment of one cultural resource, P-5-000769/P-50-002109, the JSC, is present within the project area while 11 resources are located within a half-mile radius. (See Table 4-18 above). There have been five previous studies which have covered portions of the APE, with four additional studies conducted within a half-mile radius of the proposed Project.

Although the South San Joaquin Main Canal segment, see above, was recorded during the survey and is still in operation, is has been altered significantly since first constructed. Alterations include the addition of concrete cast water control and diversion structures, road/bridge crossings, and intermittent concrete wall repairs. The South San Joaquin Main Canal thus lacks integrity of location, setting, materials, design and workmanship and is recommended as not eligible for listing on the National Register of Historic Places or the California Register of Historical Resources under any criteria.

b) Would the project cause a substantial adverse change in the significance of an archaeological resource pursuant to § 15064.5?

Less than Significant Impact with Mitigation Incorporated. As stated above, the Project area is considered to have a very low sensitivity for a subsurface archaeological deposit. A CHRIS records search confirmed five previous studies which covered portions of the Project area, with four additional studies within a half-mile radius. The search also confirmed and identified one cultural resource, the JSC within the Project area, see Section 4.5.1 above. The search, however, indicated that there were 11 cultural resources within a one-quarter mile radius. These resources are in the form of historic era buildings. It is unlikely that the Project has the potential to result in significant impacts or adverse effects to cultural or historical resources, such as archaeological remains, artifacts or historic properties. However, in the unlikely event that cultural resources, such as artifacts, are unearthed during Project construction activities, implementation of mitigation measure **CUL-1** outlined below, would reduce any impacts to less than significant.

c) Would the project disturb any human remains, including those interred outside of dedicated cemeteries?

Less than Significant Impact with Mitigation Incorporated. Although no such remains have been identified within the project site, there is a possibility of encountering remains, either in isolation or with prehistoric archaeological deposits. Native American villages have been identified as currently or previously existing upstream and away from the eastern Project APE. The Project would have a significant effect on the environment if any disturbance to human remains were to occur, including those interred outside of formal cemeteries.

Implementation of mitigation measure **CUL-2** outlined below would reduce potential impacts to the discovery of human remains to a less-than-significant level by ensuring compliance with California Health and Safety Code Section 7050.5 in the event that any human remains are encountered during project-related ground-disturbing activities.

4.5.2 Mitigation

CUL-1 (Archaeological Resources): In the unlikely event that archaeological resources (sites, features or artifacts) are unearthed or exposed during any stage of Project construction activities, work in the area of discovery will cease until the area is evaluated by a qualified archaeologist. If mitigation is warranted, the project proponent will abide by recommendations of the archaeologist on site.

CUL-2 (Human Remains): In the unlikely event that any human remains are discovered on the Project site, the appropriate County Coroner (Calaveras County, Stanislaus County, and/or Tuolumne County) must be notified of the discovery (California Health and Safety Code, Section 7050.5) and all activities in the immediate area of the find or in any nearby area reasonably suspected to overlie adjacent human remains must cease until appropriate and lawful measures have been implemented. If the Coroner determines that the remains are not recent, but rather of Native American origin, the Coroner will notify the Native American Heritage Commission (NAHC) in Sacramento within 24 hours to permit the NAHC to determine the Most Likely Descendent of the deceased Native American.

4.6 ENERGY

Table 4-19: Energy Impacts

Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?	☐	☐	☒	☐
b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	☐	☐	☐	☒

4.6.1 Baseline Conditions

Pacific Gas and Electric (PG&E) supplies electricity and natural gas to the Project area. PG&E obtains its power through hydroelectric, thermal (natural gas), wind, and solar generation of purchases. PG&E continually produces new electric generation and natural gas sources and implements continuous improvements to gas lines throughout its service areas to ensure the provision of services to residents. Energy on a construction site is usually provided by gasoline and diesel fuel, electricity, and natural gas. Of these four energy sources, diesel fuel and electricity are responsible for the greatest total air emissions.

4.6.2 Impact Analysis

a) Would the project result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?

Less than Significant Impact. Fuel consumed by construction equipment would be the primary energy resource expended over the course of Project construction. For heavy-duty construction equipment, horsepower and load factor were assumed using default data from the CalEEMod. Fuel use associated with construction vehicle trips generated by the Project was also estimated; trips would include construction worker trips, haul truck trips for material transport, and vendor trips for construction material deliveries. Fuel use from these vehicles traveling to and from the Project was based on (1) the projected number of trips the Project would generate (CalEEMod default values), (2) default average trip distance by land use in CalEEMod, and (3) fuel efficiencies estimated in the CARB 2023 Emissions Factors model (EMFAC2021) mobile source emission model. Construction is estimated to consume a total of 38,525 gallons of diesel fuel and 4,152 gallons of gasoline fuel. California Code of Regulations Title 13, Motor Vehicles, Section 2449(d)(2)-Idling, limits idling times of construction vehicles to no more than 5 minutes, thereby precluding unnecessary and wasteful consumption of fuel because of unproductive idling of construction equipment. In addition, the energy consumption for construction activities would not be ongoing as they would be limited to construction of the Project. These requirements would result in fuel savings. In addition, because of increasing transportation costs and fuel prices, contractors and owners have a strong financial incentive to avoid wasteful, inefficient, and unnecessary consumption of energy during construction. Project operations would be passive in nature and construction energy impacts would be less than significant.

b) Would the project conflict with or obstruct a state or local plan for renewable energy or energy efficiency?

No Impact. The State of California's Clean Energy and Pollution Reduction Act (Ch. 547, Stats. 2015) establishes California's greenhouse gas (GHG) emissions reduction target of 40 percent below 1990 levels by 2030, and 80 percent by 2050.[22] Additionally, California's 100 Percent Clean Energy Act (Ch. 312, Stats. 2018) establishes a State policy that eligible renewable energy resources and zero-carbon resources supply 100 percent of retail sales of electricity to California end-use customers by December 31, 2045.[23]

The Project does not involve the construction of any new or decommissioning of any existing power generating facilities. In addition, the Project would not result in a reduction in energy generation from existing SSJID hydroelectric facilities during or after construction activities. Therefore, the Project would not result in an increase in fossil fuel use and would not affect existing availability of renewable energy sources. In addition, operations following implementation of the Project would not change the power generation capacity of the existing SSJID facilities. Therefore, the Project would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency. As a result, there would be no impact.

[22] (State of California 2015)
[23] (State of California 2018)

4.7 GEOLOGY AND SOILS

Table 4-20: Geology and Soils Impacts

Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:	☐	☐	☒	☐
i. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☒	☐
ii. Strong seismic ground shaking?	☐	☐	☒	☐
iii. Seismic-related ground failure, including liquefaction?	☐	☐	☒	☐
iv. Landslides?	☐	☒	☐	☐
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☒	☐
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☒	☐	☐
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994) creating substantial direct or indirect risks to life or property?	☐	☒	☐	☐
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of wastewater?	☐	☐	☐	☒
f) Directly or indirectly destroy a unique paleontological resource or site or unique geological feature?	☐	☐	☐	☒

4.7.1 Baseline Conditions

Geology and Soils

The Project is located in the northern region of the San Joaquin Valley, specifically in a portion of Calaveras County, Stanislaus County, and Tuolumne County. Calaveras County is located within the Sierra Nevada foothills. The terrain ranges from low rolling foothills in the western portion of the County to rugged high mountains, with Project area elevations ranging from 300-700 feet. The Project lies within the geologic region of California referred to as the Sierra Nevada geomorphic province. The Sierra Nevada geomorphic province is a tilted fault block approximately 400 miles long that extends from the eastern slope to the western slope of the Sierra Nevada. The Sierra Nevada geomorphic province overlies metamorphic bedrock that contains gold-bearing veins in the northwest trending Mother Lode. The Mother Lode region in the

Sierra Nevada extends through Calaveras County and ends in Mariposa County.[24] Tuolumne County is located primarily within the Sierra Nevada geomorphic province, with an extremely small portion (less than 10 percent) of the western boundary within the Great Valley province.[25] Stanislaus County spans three geomorphic provinces: the Great Valley, the Coast Ranges, and the Sierra Nevada geomorphic provinces. The largest area of the county is in the San Joaquin Valley portion of the Great Valley geomorphic province, which is in the flat, lowland center of the county; a narrow band on the eastern edge of the county is the Sierra Nevada foothills of the Sierra Nevada geomorphic province; and a broad band on the west side of the county is the steeper Coast Ranges geomorphic province.[26] Various areas along the existing cliffsides overlooking the JSC contains loose rock that is susceptible to falling, causing unstable conditions. This is common in this region of California and the particular localized setting. See Table 4-11 for Project soils.

Faults and Seismicity

The Project site is not located within an Alquist-Priolo Earthquake Fault Zone and no known faults cut through the soil at the site.[27] The nearest major fault is the San Andreas Fault, located over 80 miles west of the Project APE. The San Andreas Fault is the dominant active tectonic feature of the Coast Ranges and represents the boundary of the North American and Pacific plates. A smaller fault zone, the Negro Jack Point fault, is approximately four miles northeast of the site.

Liquefaction

The potential for liquefaction, which is the loss of soil strength due to seismic forces, is dependent on soil types and density, the groundwater table, and the duration and intensity of ground shaking. Due to Calaveras and Tuolumne County's low seismicity risk, the risk and danger of liquefaction is also low.[28] In Stanislaus County, there is potential for liquefaction, but the potential is located in the western portion of the County, the opposite end of where the Project is located.[29]

Soil Subsidence

Subsidence occurs when a large land area settles due to over-saturation or extensive withdrawal of ground water, oil, or natural gas. These areas are typically composed of open-textured soils that become saturated, high in silt or clay content. According to the United States Geological Survey (USGS) Areas of Land Subsidence in California map, the Project site is not located in an area determined be susceptible to soil subsidence.[30]

Dam and Levee Failure

The nearest flooding inundation zone would come from unexpected releases from Goodwin Dam Reservoir and Tulloch Reservoir. Goodwin Dam Reservoir is located within the Project area and the Tulloch Reservoir is located approximately 1.7 miles upstream of the Stanislaus River. The California Division of Safety of Dams (DSOD) is responsible for regulating dams to prevent failure, safeguard life, and protect property. DSOD provides oversight to the design, construction, and maintenance of dams.

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[24] (Raney Planning & Management, Inc. 2018)
[25] (Ascent Environmental, Inc. 2018)
[26] (ICF International 2016)
[27] (California Department of Conservation 2015)
[28] (Raney Planning & Management, Inc. 2018); (Ascent Environmental, Inc. 2018)
[29] (ICF International 2016)
[30] (United States Geological Survey 2020)

4.7.2 Impact Analysis

a) Would the project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:

i. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.

ii. Strong seismic ground shaking?

iii. Seismic-related ground failure, including liquefaction?

a-i – a -iii) Less than Significant Impact.. The Project does not contain any known Alquist-Priolo Earthquake Fault Zones, as listed by the California Geological Survey. According to the Fault Activity Map of California, no active faults are located on the Project site. The closest fault is the Negro Jack Point fault, located approximately four miles northeast of the Project. Risks associated with seismic-related activity such as rupture of a fault, strong ground shaking, and ground failure would be less than significant. In addition, the Project is not located in area known for high risk for liquefaction. Impacts would be less than significant.

iv. Landslides?

Less than Significant Impact The Project would construct a tunnel underground to bypass a segment of the JSC to avoid recurring rockslides that have affected the canal. A portion of the JSC is located along a steep slope where material such as rocks, sand, gravel, and trees pose as a hazard. Project construction involves boring and blasting in the vicinity where these hazards exist. Vibration generated from construction equipment has the potential to loosen already unstable rock, resulting in the shifting and displacement of rocks along the cliffside towards the Stanislaus River. Although the rockfall hazard would no longer be an issue as the hazardous segment of the JSC would be abandoned, during construction, these hazards would remain, and impacts have the potential to be significant. In order to maintain a safe work environment from potential landslides and rockfall hazards, construction safety protocols would be implemented. Cal/OSHA requires construction projects to abide by and maintain safety plans. Abiding by Cal/OSHA requirements would assist in minimizing potential hazards from landslides and rock falls, ultimately maintaining a safe work environment.

Post-construction and in operation, the Project would result in a safer and less hazardous environment due to maintenance taking place within the tunnel, versus within and around the current hazardous JSC. Implementation of the Project would help avoid these hazards ultimately allowing stronger reliability of water supply for its users. Implementation of the Project would do just that. Post-construction impacts would be less than significant.

b) Would the project result in substantial soil erosion or the loss of topsoil?

Less than Significant Impact. The Project would result in less than 10-acres of ground disturbance for the grading of the staging areas. Most of the Project would occur underground with tunnel activities. Tunnel spoils would be used to upgrade private property dirt roads in the vicinity or the existing access roads. Topsoil disturbance would occur at the outlet tunnel area and additionally consist of disturbance to existing dirt roads and laydown areas. All areas disturbed during construction would be stabilized in accordance with erosion control BMPs identified in Project plans and as specified in the SWPPP required for the Project. The SWPPP would be prepared as required to obtain coverage under the State Construction General Permit and would specify the use of appropriate BMPs for erosion control, sedimentation, and spill prevention during and following construction. With implementation of the SWPPP, impacts from erosion would be less than significant.

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

Less than Significant Impact with Mitigation Incorporated. The Project area is located in an area known to be geologically unstable. The purpose of the Project was to find a solution to avoid rock fall hazards that the JSC experiences so that water can be conveyed efficiently and reliably to District landowners. In order to understand the underlying geologic features and to determine the most optimal alignment for tunnel construction, a preliminary geologic data report and geotechnical baseline report has been prepared for the Project. Implementation of Mitigation Measure **GEO-1** would ensure that the final geologic data report and geotechnical baseline report to verify the optimal alignment for the tunnel would be completed for the Project. Therefore, with implementation of **GEO-1**, the Project would have a less than significant impact associated with geologic or soils instability.

d) Would the project be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?

Less than Significant Impact with Mitigation Incorporated. A geologic data report and geotechnical baseline report has been prepared to verify that the location of the tunnel is the optimal path and alignment for the Project's efficiency, reliability and safety. The current plans illustrate an alignment that is based on preliminary reviews. As mentioned above, **GEO-1** would be implemented to ensure the optimal path for the construction of the tunnel. The optimal path would help in avoiding any significant impacts associated with geology and soils. Therefore, the Project would have a less than significant impact associated with expansive or otherwise unstable soils.

e) Would the project have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?

No Impact. The Project would not include permanent work or living facilities and thus would not require the use of septic tanks or alternative wastewater disposal systems. There would be no impact.

f) Would the project directly or indirectly destroy a unique paleontological resource or site or unique geological feature?

No Impact. According to the Cultural Report prepared for the Project, there are no paleontological or unique geological features located within the Project APE. There would be no impact.

4.7.3 Mitigation

GEO-1	A final geologic data report and geotechnical baseline report to verify the optimal alignment for the tunnel will be completed for the Project.

4.8 GREENHOUSE GAS EMISSIONS

Table 4-21: Greenhouse Gas Emissions Impacts

Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☒	☐
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☒	☐

4.8.1 Baseline Conditions

Commonly identified GHG emissions and sources include the following:

Carbon dioxide (CO_2) is an odorless, colorless natural greenhouse gas. CO_2 is emitted from natural and anthropogenic sources. Natural sources include the following: decomposition of dead organic matter; respiration of bacteria, plants, animals, and fungus; evaporation from oceans; and volcanic out gassing. Anthropogenic sources include the burning of coal, oil, natural gas, and wood.

Methane (CH_4) is a flammable greenhouse gas. A natural source of methane is the anaerobic decay of organic matter. Geological deposits, known as natural gas fields, also contain methane, which is extracted for fuel. Other sources are from landfills, fermentation of manure, and ruminants such as cattle.

Nitrous oxide (N_2O), also known as laughing gas, is a colorless greenhouse gas. Nitrous oxide is produced by microbial processes in soil and water, including those reactions that occur in fertilizer containing nitrogen. In addition to agricultural sources, some industrial processes (fossil fuel-fired power plants, nylon production, nitric acid production, and vehicle emissions) also contribute to its atmospheric load.

Carbon dioxide equivalent (CO_2e), CO2e is the summation of CO_2, CH_4, and N_2O, multiplied by each greenhouse gases' global warming potential (GWP). For purposes of this analysis, CH_4 and N_2O are assigned a multiplier of 25 and 298, respectively, based on longevity in the atmosphere and the intensity of infrared absorbed. This is consistent with CARB's calculation and the 2007 Intergovernmental Panel on Climate Change (IPCC) fourth assessment report (AR4).

Water vapor is the most abundant, and variable greenhouse gas. It is not considered a pollutant; in the atmosphere, it maintains a climate necessary for life.

Ozone (O_3) is known as a photochemical pollutant and is a greenhouse gas; however, unlike other greenhouse gases, ozone in the troposphere is relatively short-lived and, therefore, is not global in nature. Ozone is not emitted directly into the atmosphere but is formed by a complex series of chemical reactions between volatile organic compounds, nitrogen oxides, and sunlight.

Aerosols are suspensions of particulate matter in a gas emitted into the air through burning biomass (plant material) and fossil fuels. Aerosols can warm the atmosphere by absorbing and emitting heat and can cool the atmosphere by reflecting light.

Chlorofluorocarbons (CFCs) are nontoxic, nonflammable, insoluble, and chemically unreactive in the troposphere (the level of air at the earth's surface). CFCs were first synthesized in 1928 for use as refrigerants, aerosol propellants, and cleaning solvents. CFCs destroy stratospheric ozone; therefore, their production was stopped as required by the Montreal Protocol in 1987.

Hydrofluorocarbons (HFCs) are synthetic chemicals that are used as a substitute for CFCs. Of all the greenhouse gases, HFCs are one of three groups (the other two are perfluorocarbons and sulfur hexafluoride) with the highest global warming potential. HFCs are human-made for applications such as air conditioners and refrigerants.

Perfluorocarbons (PFCs) have stable molecular structures and do not break down through the chemical processes in the lower atmosphere; therefore, PFCs have long atmospheric lifetimes, between 10,000 and 50,000 years. The two main sources of PFCs are primary aluminum production and semiconductor manufacture.

Sulfur hexafluoride (SF_6) is an inorganic, odorless, colorless, nontoxic, nonflammable gas. It has the highest global warming potential of any gas evaluated. Sulfur hexafluoride is used for insulation in electric power transmission and distribution equipment, in the magnesium industry, in semiconductor manufacturing, and as a tracer gas for leak detection.

There are uncertainties as to exactly what the climate changes would be in various local areas of the earth, and what the effects of clouds would be in determining the rate at which the mean temperature would increase. There are also uncertainties associated with the magnitude and timing of other consequences of a warmer planet: sea level rise, spread of certain diseases out of their usual geographic range, the effect on agricultural production, water supply, sustainability of ecosystems, increased strength and frequency of storms, extreme heat events, air pollution episodes, and the consequence of these effects on the economy.

Emissions of GHGs contributing to global climate change are largely attributable to human activities associated with the industrial/manufacturing, utility, transportation, residential, and agricultural sectors. About three-quarters of human emissions of CO_2 to the global atmosphere during the past 20 years are due to fossil fuel burning. Atmospheric concentrations of CO_2, CH_4, and N_2O have increased 31 40 percent, 151 percent, and 17 20 percent respectively since the year 1750.[31] GHG emissions are typically expressed in carbon dioxide-equivalents ($CO2_e$), based on the GHG's Global Warming Potential (GWP). The GWP is dependent on the lifetime, or persistence, of the gas molecule in the atmosphere. For example, one ton of CH_4 has the same contribution to the greenhouse effect as approximately 21 tons of CO_2. Therefore, CH_4 is a much more potent GHG than CO_2.

The Air Quality Output Files were prepared in January 2022 and are contained in Appendix A.

4.8.2 Thresholds

South San Joaquin Irrigation District has not established a greenhouse gas threshold, nor has it adopted a Greenhouse Gas Reduction Plan. CEQA Guidelines Section 15064.7(b), it may consider and use thresholds of significance previously adopted or recommended by other public agencies or recommended by experts. The Bay Area Air Quality Management District (BAAQMD) has adopted a "bright line" threshold of 1,100 $MTCO2_e$ for land use development projects.

[31] (California AIr Resources Board 2014)

4.8.3 Impact Analysis

a) Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

Less than Significant Impact with Mitigation Incorporated. Construction of the Project would result in GHG emissions from operation of both on-road and off-road equipment. As discussed previously, Project operations would require routine maintenance conducted by existing staff and would not be a source of new emissions, and therefore, are not addressed further. As shown in Table 4-22, the Project would be below the BAAQMD thresholds for total Project emissions and well below the thresholds after amortizing the construction emissions. Therefore, the GHG emissions from the proposed Project would not have significant impacts on climate change.

Table 4-22: Greenhouse Gas Emissions

	Emissions ($MTCO2_e$)
Unmitigated Construction	9,704.0843
Amortized over Life of Project (30 years)	323.4695
AB 32 Consistency Threshold for Land-Use Development Projects	1,100
Exceed Threshold?	No

b) Would the project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

Less than Significant Impact. After Project construction, operational GHG emissions would consist of routine maintenance conducted by existing staff and would not generate any new emissions during operations. GHG emissions from the Project construction activities would be temporary and would not have a long-term impact on the state's ability to achieve the Scoping Plan's emission reduction targets for 2030 or beyond. Based on this, the Project would be consistent with the 2017 Scoping Plan and would not conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions; therefore, impacts would be less than significant.

4.9 HAZARDS AND HAZARDOUS MATERIALS

Table 4-23: Hazards and Hazardous Materials Impacts

Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☒	☐
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☐	☒	☐
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☒
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☒
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?	☐	☐	☐	☒
f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☒	☐
g) Expose people or structures, either directly or indirectly to a significant risk of loss, injury or death involving wildland fires?	☐	☐	☒	☐

4.9.1 Baseline Conditions

Hazardous Materials

The Hazardous Waste and Substances Sites (Cortese) List is a planning document used by the State, local agencies, and developers to comply with CEQA requirements in providing information about the location of hazardous materials release sites. Government Code (GC) Section 65962.5 requires the California Environmental Protection Agency to develop at least annually an updated Cortese List. The Department of Toxic Substances Control (DTSC) is responsible for a portion of the information contained in the Cortese List. Other State and local government agencies are required to provide additional hazardous material release information for the Cortese List. DTSC's EnviroStor database provides DTSC's component of Cortese List data. In addition to the EnviroStor database, the State Water Resources Control Board (SWRCB)

Geotracker database provides information on regulated hazardous waste facilities in California, including underground storage tank cases and non- underground storage tank cleanup programs, including Spills-Leaks-Investigations-Cleanups sites, Department of Defense sites, and Land Disposal program. A search of the DTSC EnviroStor database and the SWRCB Geotracker performed on December 21, 2021, determined that there are no known active hazardous waste generators or hazardous material spill sites within the Project.

Airports

The Oakdale Municipal Airport is located approximately 8.5 miles southwest of the Project.

Emergency Response Plan

The Calaveras County Office of Emergency Services coordinates the development and maintenance of the Calaveras County Emergency Operations Plan. The Stanislaus County Office of Emergency Services coordinates the development and maintenance of the Stanislaus County Emergency Operations Plan. The Tuolumne County Office of Emergency Services coordinates the development and maintenance of the Tuolumne County Emergency Operations Plan.

Sensitive Receptors

There are seven sensitive receptors within a ½ mile radius of the Project site (See Figure 4-5). These sensitive receptors include cabin owners across the reservoir to the east that are used seasonally, and large lot size residential homes used as primary residences year-round to the west.

4.9.2 Impact Analysis

a) Would the project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?

b) Would the project create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?

a) and b) Less than Significant Impact. A minor amount of hazardous waste, such as oil, diesel fuel, lubricants, and blasting materials, is anticipated to be generated by construction activities related to Project implementation. In addition to the use of a road header for tunnel boring, the Project would also require rock blasting within the tunnel for excavation. Most of the blasting materials are anticipated to be delivered from the supplier on the day of use, therefore would not be stored on-site. In the event that blasting materials would be stored on-site, storage magazines would be used to store these materials safely and properly. The storage of blasting materials is strictly regulated, and the Project would comply with applicable regulations. The on-site locked storage containers and potentially stored blasting magazines would be located at the temporary laydown yard and the construction staging areas. In addition, the required SWPPP identified previously would include procedures for quick and safe cleanup of accidental spills. The SWPPP would prescribe hazardous materials handling procedures for reducing the potential for a spill during construction and would include an emergency response program to ensure quick and safe cleanup of accidental spills.

During construction, a previously unknown hazardous waste site could potentially be encountered. If hazardous waste is identified, the waste would be removed by a certified hazardous waste collection company and either recycled or deposited in a Class I landfill in full compliance with all applicable laws, ordinances, and regulations, including those of the California Department of Toxic Substances Control.

Hazardous materials (e.g., oil, and lubricants) used during construction could potentially be released. However, this impact is considered less than significant because of the small amount of such materials that would be used during construction. Additionally, the contractor prepared SWPPP would require the Project to meet the regulatory compliance requirements which include BMPs to control and contain any potential release of hazardous materials. The SWPPP identified above would include procedures for quick and safe cleanup of accidental spills. The SWPPP would prescribe hazardous materials handling procedures for reducing the potential for a spill during construction and would include an emergency response program to ensure quick and safe cleanup of accidental spills. The SWPPP would identify areas where refueling and vehicle maintenance activities and storage of hazardous materials, if any, shall be permitted. Implementation of these BMPs would ensure any potential impact to be less than significant.

c) Would the project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?

No Impact. There are no schools within one-quarter mile of the Project APE. The nearest school to the Project is Knights Ferry Elementary School located 0.85 miles to the south; therefore, there would be no impacts.

d) Would the project be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?

No Impact. The Project is not located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5; therefore, there would be no impact.

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?

No Impact. The Project site is not located in an airport land use plan or within two miles of an airport. Oakdale Municipal Airport, the nearest airport to the Project site, is located approximately 8.5 miles southwest of the Project APE. There would be no impact.

f) Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

Less than Significant Impact. During normal operations, the Project would not occur on an existing busy roadway or somewhere that could impede or impair an adopted emergency response plan or emergency evacuation plan. During construction, there would be traffic generated for the transport of spoils and equipment, and construction workers driving to and from the construction site. Traffic would increase, but it would meet the approved routes ordered by the Counties' traffic control plan. The staging area for construction equipment would be located on access road to the Project site, but the equipment would be placed in a way to not impede access. Impacts would be less than significant.

g) Would the project expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?

Less than Significant Impact. The Project would not result in population growth, and it does not involve the construction of structures, habitable or otherwise. Although the Project is located in a State Responsibility Area and portions are located in a High Fire Hazard Severity Zone, the Project site has access for fire equipment in the case of a wildland fire occurring. The potential to increase the risk for death and injury due to a wildfire would be less than significant. Please see Section 4.20 for further analysis.

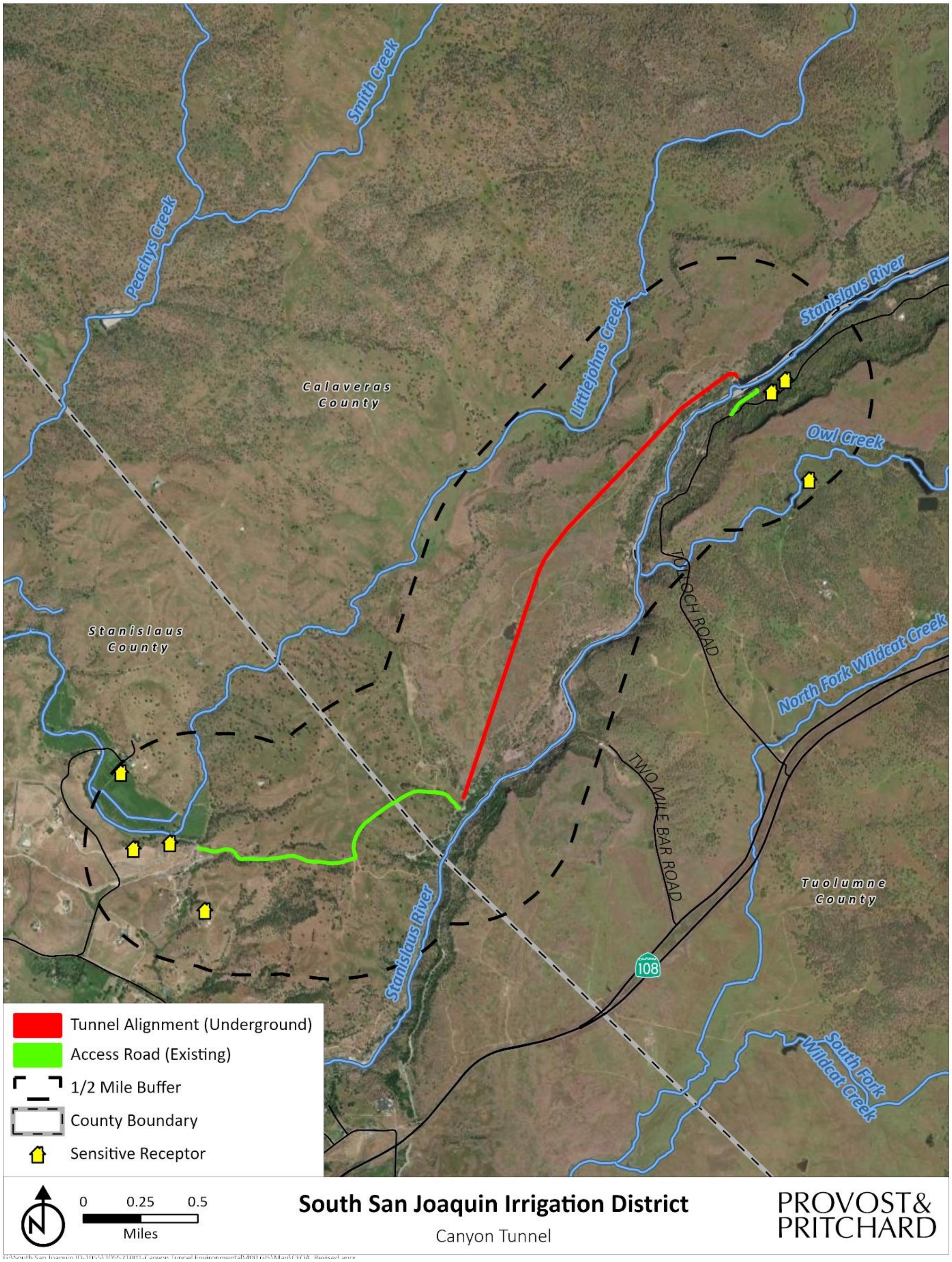

Figure 4-5: Sensitive Receptors

4.10 HYDROLOGY AND WATER QUALITY

Table 4-24: Hydrology and Water Quality Impacts

Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?	☐	☒	☐	☐
b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?	☐	☐	☐	☒
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:	☐	☐	☐	☒
i. result in substantial erosion or siltation on- or off-site;	☐	☐	☐	☒
ii. substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site;	☐	☐	☐	☒
iii. create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or	☐	☐	☐	☒
iv. impede or redirect flood flows?	☐	☐	☒	☐
d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?	☐	☐	☒	☐
e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	☐	☐	☒	☐

4.10.1 Baseline Conditions

The Project area contains water sources associated with the Stanislaus River and the Goodwin Dam Reservoir, which is the borderline for Calaveras and Tuolumne County (see Figure 4-6). The Stanislaus River carries runoff from the western slopes of the Sierra Nevada westward and into the Central Valley. Man-made canals, such as the JSC and the South Main Canal, are used to divert water from the Stanislaus River to areas where water is needed and can be used. The varying topography of the land can make it difficult for water to move in certain locations. Within the Project area, in order to move water uphill, the JSC utilizes a ram pump. Alternately, most of the time the JSC takes advantage of gravity to transport water.

Average annual precipitation near the Project area is 13-inches, but the head of the Stanislaus River, located within the Sierra Nevada Mountain Range, receives closer to 60 inches of rainfall.[32] Throughout the Project area are many wells utilized by private property owners. These wells provide water for agricultural and domestic uses. A portion of the Project is located in the Eastern San Joaquin Subbasin, which is a part of the underlying San Joaquin Valley Groundwater Basin.[33] Refer to Section 4.4 for more discussion regarding Project watersheds and subwatersheds.

4.10.2 Impact Analysis

a) Would the project violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?

Less than Significant Impact. Work within the Goodwin Dam Reservoir would require permits from CDFW, USACE and RWQCB to meet the regulatory compliance requirements for potentially jurisdictional waters of the United States and State and would provide the necessary avoidance and minimization measures to protect water quality. Further, SWRCB requires that a SWPPP be prepared for projects that disturb one (1) or more acres of soil. A SWPPP would include site planning and scheduling, limiting disturbed soil areas, and determining best management practices to minimize the risk of pollution and sediments being discharged from construction areas. Implementation of the SWPPP would minimize the potential for the Project to substantially alter the existing drainage pattern in a manner that would result in substantial erosion or siltation onsite or offsite. In addition, an environmental training program would be established to communicate environmental concerns and appropriate work practices, including spill prevention and response measures and SWPPP measures, to all construction crew members. A monitoring program shall be implemented to ensure that the plans are followed throughout the period of construction. The construction SWPPP identified above would include procedures for quick and safe cleanup of accidental spills. The construction SWPPP would prescribe hazardous materials handling procedures for reducing the potential for a spill during construction and would include an emergency response program to ensure quick and safe cleanup of accidental spills. The SWPPP would identify areas where refueling and vehicle maintenance activities and storage of hazardous materials, if any, shall be permitted. Use of chemicals or surfactants would not be generated through the maintenance or operation of the Project and as such, there would be no discharge directly associated with Project implementation that could impact water quality standards during operation or maintenance. With meeting the regulatory requirements, the Project would not violate any water quality standards and would not impact waste discharge requirements. The impact would be less than significant.

b) Would the project substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?

No Impact. The Project includes no use of groundwater and would not result in any impacts associated with the depletion of groundwater supply or recharge. The existing Ram Pump that pumps canal water up the hill would be abandoned. A new well would be constructed, but the well would not pump groundwater. The well would act as a vertical conduit from surface of the earth to the tunnel to tap tunnel water. There would be no impact.

[32] (Raney Planning & Management, Inc. 2018)
[33] (State of California Department of Water Resources n.d.)

c) Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:

i. result in substantial erosion or siltation on- or off-site;

Less than Significant Impact with Mitigation Incorporated. The Project proposes to construct a water conveyance tunnel to bypass a hazardous segment of the existing JSC. During construction, water from the Stanislaus River would not be flowing through the tunnel construction site. During a rain event, erosion or siltation may occur on and off-site. In order to minimize erosion and run-off during construction activities, a SWPPP would be implemented, and the contractor would comply with all Cal/OSHA regulations regarding regular maintenance and inspection of equipment, spill prevention, and spill remediation in order to reduce the potential for incidental release of pollutants or hazardous substances. Work done in locations near the reservoir, such as the staging areas would be significantly impacted, but the implementation of the SWPPP would bring impacts to less than significant. The staging area would be improved in a stable manner to contain any erosion or movement of earth into the Goodwin Dam Reservoir. In addition, to prevent falling rock from falling into the Project site and impacting the reservoir, **GEO-1** has been implemented to reduce risks. during Project operation, the tunnel would be lined with shotcrete to create an impervious surface, which would not allow erosion to occur. Impacts would be less than significant.

ii. substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site;

No Impact. The Project proposes a manmade pathway for water to flow, replacing an existing segment of the JSC, for water users of SSJID and the OID. The Project would not increase the rate or amount of surface runoff in a manner which would result in flood, either on or off-site. There would be no impact.

iii. create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or

No Impact. Water that would flow through the proposed tunnel is the same water that has been flowing through the JSC. As mentioned previously, the Project would require that a SWPPP be prepared. The Project would not create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff. There would be no impact.

iv. impede or redirect flood flows?

Less than Significant Impact. Currently, water from the Stanislaus River is diverted into the JSC at the Goodwin Dam. The water is then sent to users within, or contracted with, OID and SSJID. The Project would continue to maintain the same operations that currently exist, but it would provide a more reliable transportation mechanism. The Project and the current operations, in itself, redirect flood flows, but the redirection destination would stay the same. Impacts would be less than significant.

d) Would the project in flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundations?

Less than Significant Impact. The Project site is not located in a coastal area subject to tsunami, near the shores of a body of water that could result in a seiche, or in areas with high susceptibility to mudflow (see

Section 3.7 for a discussion of site geological conditions). There would be no impacts associated with risk of inundation by seiche, tsunami, or mudflow.

e) Would the project conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

Less than Significant Impact. During operation, Project water would flow through a concrete-lined tunnel that has been constructed following all applicable regulations related to water quality. During construction, these same regulations would be regulated. Also, water would be redirected during construction, avoiding any potential water contamination from construction debris. Impacts would be less than significant.

4.10.3 Mitigation

HYD-1 Refer to GEO-1.

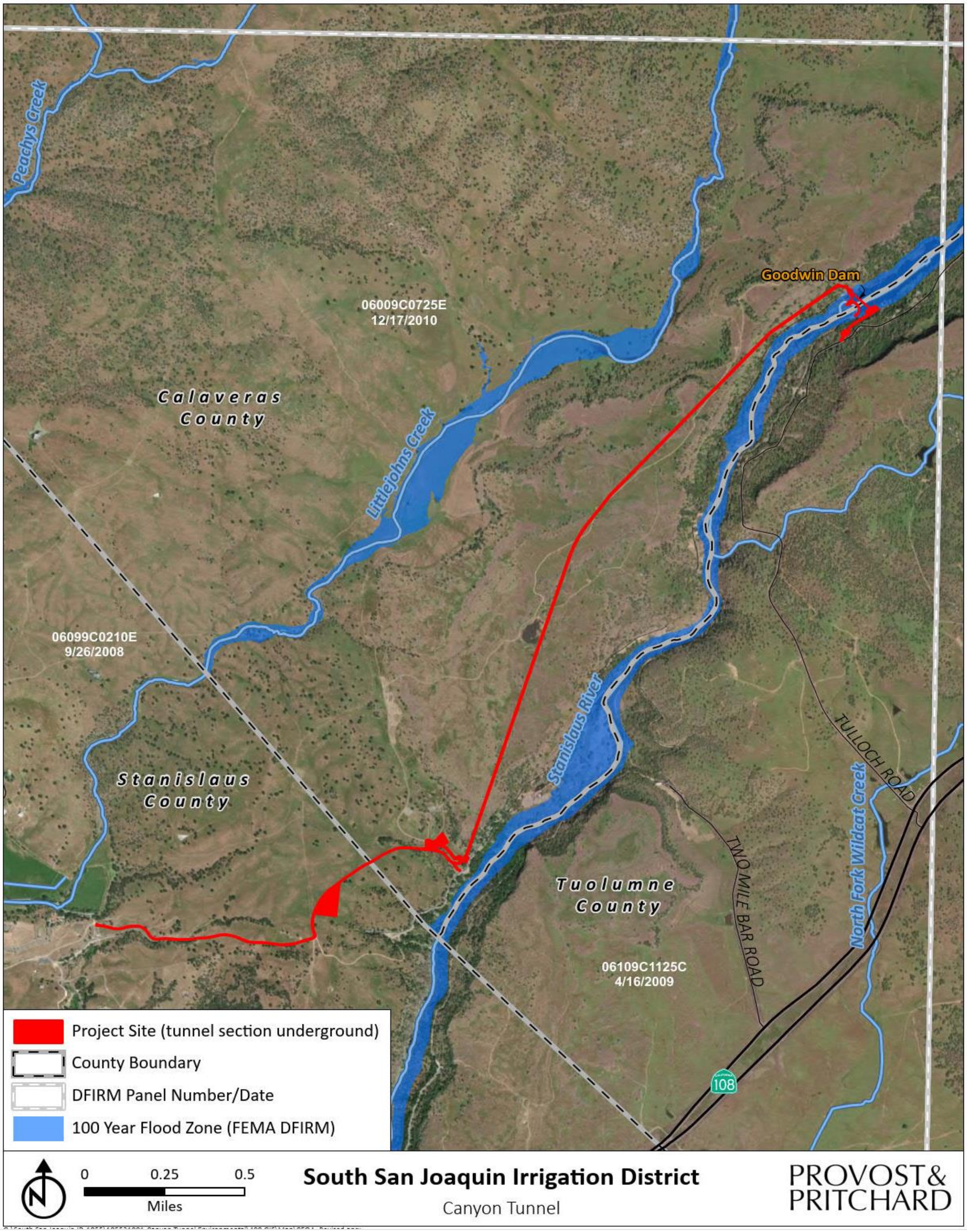

Figure 4-6: FEMA Flood Map

4.11 LAND USE AND PLANNING

Table 4-25: Land Use and Planning Impacts

Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a) Physically divide an established community?	☐	☐	☐	☒
b) Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☒

4.11.1 Baseline Conditions

The Project spans over 23 parcels within three counties: Calaveras County, Stanislaus County, Tuolumne County. Zoning designations for the Project site consist of General Agriculture, Agricultural Preserve, Exclusive Agricultural, Open Space, Residential Estate, and Water Right-of-Way (see Table 2-2 in Chapter 2). The Project is designated by the three counties' general plan as Agricultural, Estate Residential, Public, Resource Production, Rural Residential, and Water Right-of-Way (see Table 2-2 in Chapter 2). The proposed tunnel would be located less than one mile north of the unincorporated Stanislaus County community of Knights Ferry. Topographically, the Project area has a maximum elevation of approximately 741 feet above mean sea level.

4.11.2 Impact Analysis

a) Would the project physically divide an established community?

No Impact. The Project site is located in a rural area primarily designated for open space and agriculture. The nearest community to the Project is the unincorporated community of Knights Ferry located approximately one mile away. The majority of the lineal Project consist of tunneling underground. The Project does not have the potential to physically divide an established community. There would be no impact.

b) Would the project cause a significant environmental conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?

No Impact. Construction and operation of the Project would be consistent with policies established in the Calaveras County General Plan, the Stanislaus County General Plan, and the Tuolumne County General Plan.[34] No county grading permits required. Therefore, the Project would not conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect. As a result, there would be no impact.

[34] (Calaveras County 2019); (Stanislaus County 2015); (Tuolumne County Community Resources Agency 2018)

4.12 MINERAL RESOURCES

Table 4-26: Mineral Resources Impacts

Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☒	☐
b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☒	☐

4.12.1 Baseline Conditions

Mineral resources in Stanislaus County include gold, marble and limestone products, and aggregate (that is, sand and gravel), among others. Aggregate mining in Stanislaus County historically occurred within the Tuolumne River active channel, as well as in off-channel sites.[35]

Tuolumne County has an extensive history as a mining community. Tuolumne County was historically mined for gold during the early 1850s. Current mining operations within Tuolumne County mine for limestone and dolomite, and various crushed rock, gravel, and sand products.[36]

In Calaveras County, at least 26 minerals have been produced commercially. Gold, copper, limestone, and limestone products account for the greatest contribution towards the County's total mineral production. Other mineral commodities that have been produced in quantity include zinc, silver, lead, chromite, clay, stone, sand, and gravel. In addition, numerous mineral commodities have not been mined commercially, but are known to be present within the County.[37]

The State legislature adopted the Surface Mining and Reclamation Act in 1975, which designated Mineral Resource Zones (MRZs) for designating areas with varying degrees of mineral potential, as described below (DOC 1993):

- MRZ-1: Areas of no mineral resource significance.
- MRZ-2a: Areas that contain mineral reserves.
- MRZ-2b: Areas where geologic information infers mineral reserves are likely to be present.
- MRZ-3a: Areas with known occurrences of minerals with undetermined resource significance.
- MRZ-3b: Areas where geologic information infers occurrences of minerals with undetermined resource significance.
- MRZ-4: Areas of unknown mineral resource significance.

[35] (ICF International 2016)
[36] (Raney Planning & Management, Inc. 2018)
[37] (Ascent Environmental, Inc. 2018)

MRZs are identified in the DOC Division of Mines and Geology's Mineral Land Classification Report for Calaveras, Stanislaus, and Tuolumne Counties. The Project itself does not have a mineral resource designation. The nearest MRZ-2 area is located across the Stanislaus River in Tuolumne County.

According to the Calaveras County General Plan EIR, there is a reclaimed mine, once known as Alto Mine, located approximately two miles north of the Project site.[38] The Alto Mine was an open pit, plant, or mill that was used for the mining of gold. The mine is a part of the Assembly Bill (AB) 3098 list. For a mining operation to be put on the AB 3098 list, the operation must meet all of the following conditions:

- The operation has an approved reclamation plan;
- The operation has an approved financial assurance;
- The operation has filed an annual report;
- The operation has paid a reporting fee; and
- The operation has had an annual inspection by the lead agency which reflects the operation is in full compliance with the law.

4.12.2 Impact Analysis

a) Would the project result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?

Less than Significant Impact. According to the California Geological Survey Mineral Land Classification interactive web maps, the proposed tunnel location, where the excavation would occur, is not designated because it has not been officially studied. Areas of unknown mineral resource significance are designated as MRZ-4. The closest active mine is located approximately two miles north of the nearest portion of the Project. The Project would not result in the loss of availability a known mineral resource that would be of value to the region and the residents of the state. Spoils from excavation would not be harvested and would be transported to the nearest aggregate storage facility, Ohe Sand and Gravel. Impacts would be less than significant.

b) Would the project result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?

Less than Significant Impact. As discussed above in impact a, the proposed tunnel location, where the excavation would occur, is not designated because it has not been studied. Areas of unknown mineral resource significance are designated as MRZ-4 area. The closest active mine is located approximately two miles north of the nearest portion of the Project; therefore, there would be no impact to the existing mine. The Project would not result in the loss of availability a known mineral resource that would be of value to the region and the State. Impacts would be less than impact.

[38] (Raney Planning & Management, Inc. 2018)

4.13 NOISE

Table 4-27: Noise Impacts

Would the project result in:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☒	☐
b) Generation of excessive ground borne vibration or ground borne noise levels?	☐	☐	☒	☐
c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

4.13.1 Baseline Conditions

Ambient noise levels in Calaveras, Stanislaus, and Tuolumne counties vary widely and mainly come from noise generators such as major roads, agricultural equipment, airports, industrial and commercial areas, and rail lines. The Project site is located in an undeveloped area and is not near any significant noise sources. The existing JSC and the South Main Canal generates noise from water flowing and occasional maintenance activities. Noise-sensitive land uses in the area include residences approximately 1,000 feet east of where construction would take place.

According to Section 10.46.080 of the Stanislaus County Noise Ordinance, construction or maintenance activities performed by or at the direction of any public entity or public utility is exempt.

According to Section 9.02.060 of the Calaveras County Noise Ordinance, sound from construction activity, provided that all construction in or adjacent to residential areas shall be limited to the daytime hours between 7 a.m. and 6 p.m., unless otherwise subject to conditions in a valid discretionary land use permit that addresses construction noise associated with the Project is exempt.

Tuolumne County does not have a noise ordinance.

4.13.2 Impact Analysis

a) Would the project result in generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

Less than Significant Impact. It is assumed that the zoning regulations of these counties do not apply, given the Project is a water conveyance project pursuant to California Government Code Section 53091(e). Furthermore, research of each County's noise ordinance indicates that Project construction activities are exempt in Tuolumne and Stanislaus Counties and would be limited to the hours of 7:00 a.m. to 6:00 p.m. if in or adjacent to a residential area in Calaveras County. Construction noise and levels vary from hour-to-hour and day-to-day, depending on the equipment in use, the operations being performed, and the distance between the source and receptor. The Project would create temporary construction noise, but the noise would be unsubstantial due to the Project's rural location with limited sensitive receptors. The most significant noise generator would be the tunnel ventilation fans, but they would be muffled, in addition to the tunnel's muffling properties. Generators to be used on site are built with muffling qualities to keep noise impacts low; therefore, they would not generate significant noise. Impacts would be less than significant.

b) Would the project result in generation of excessive ground borne vibration or ground borne noise levels?

Less than Significant Impact with Mitigation Incorporated. Due to the nature of the Project, drilling-related vibrations are likely to occur. The Federal Transit Administration (FTA) has established a threshold for Category IV buildings, defined as those most susceptible to vibration damage, as 0.12 inches per second peak particle velocity (PPV)[39]. A noise study prepared for the Los Angeles Metro RCTC project, which utilized a tunnel boring machine, recognized two studies that measured vibrations between 0.0024 to 0.0551 inches per second PPV, when measured 33 feet away from the vibration source.[40] Given the distance between the proposed tunnel and any nearby structure is greater than 33 feet, the Project would not result in generation of excessive ground borne vibration or ground borne noise levels.

The Biological Evaluation prepared for the Project did determine that the existing setting is considered potential habitat for many bat species. With the generation of ground borne vibration, although insignificant, **BIO-6** through **BIO-11** would be implemented to maintain impacts at a less than significant level.

c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

No Impact. The Oakdale Municipal Airport is located approximately 8.5 miles southwest of the Project. As the Project is not located within an airport land use plan or two miles of an airport, there would be no impact.

4.13.3 Mitigation

NOI-1 Refer to **BIO-6** through **BIO-11**.

[39] (John A. Volpe National Transportation Systems Center 2018)
[40] (Los Angeles County Metropolitan Transportation Authority n.d.)

4.14 POPULATION AND HOUSING

Table 4-28: Population and Housing Impacts

Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a) Induce substantial unplanned population growth in an area, either directly (for Sample, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	☒
b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

4.14.1 Baseline Conditions

The Project is located approximately one mile south of the unincorporated historical community of Knights Ferry and approximately 10 miles northeast of the City of Oakdale. The immediate area surrounding the Project is currently open space consisting of grassy rolling hills with oak trees scattered throughout. The Stanislaus River and the Goodwin Dam Reservoir are adjacent and within the Project site. The Project site is not located in a densely-populated region. There are less than 10 residences with the one mile of the Project area.

4.14.2 Impact Analysis

a) Would the project induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?

No Impact. The Project would not directly or indirectly induce substantial population growth in the area. The Project proposes to construct a water conveyance tunnel to bypass a segment of the existing JSC that is susceptible to geologic hazards. Water supply would continue to be used for existing customers and would not increase supplies, but rather just reroute existing, approved diversion water. There would be no impact.

b) Would the project displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?

No Impact. The proposed tunnel would be constructed underground under an area where no housing units lie. The Project would not displace people or housing, necessitating the construction of replacement housing elsewhere. There would be no impact.

4.15 PUBLIC SERVICES

Table 4-29: Public Services

Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a) Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:	☐	☐	☒	☐
Fire protection?	☐	☐	☐	☒
Police protection?	☐	☐	☐	☒
Schools?	☐	☐	☐	☒
Parks?	☐	☐	☐	☒
Other public facilities?	☐	☐	☐	☒

4.15.1 Baseline Conditions

Fire Protection: The Project area would be served by the Copperopolis Fire Protection District. The closest fire station is Knights Ferry Fire Station 2, approximately one mile northeast of the Project.

Police Protection: The closest police protection station is Tuolumne County Sheriff – Sonora located approximately 21.6 miles (driving distance) northeast of the Project site.

Schools: Knights Ferry Elementary School (TK-8), the closest school to the Project site, is located approximately 0.85 miles south of the Project site.

Parks: The closest park to the Project site is the Goodwin Dam Recreation Area, which is located approximately 0.3 miles downstream from the Goodwin Dam.

Landfills: The nearest landfill to the Project site is the Rock Creek Landfill, located approximately 16.4 miles to the northwest.

4.15.2 Impact Analysis

a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:

i. Fire Protection:

Less than Significant Impact. No new buildings are proposed as part of this Project. The number of workers on site during construction, at any given time, would not exceed 20 and the contractor would have fire protection measures on site (see 4.20 Wildfire). Additionally, Project work would be temporary and limited in nature. Therefore, the Project would have no impact on service ratios or response times for fire protection in the area.

Police Protection:

No Impact. No new buildings or facilities would be created as a result of the Project. Increased response times or increased need for police protection would not be required as a result of the Project. The northern portion of the Project area is private property which prevents access from recreational users on the north side, but the southern portion near the reservoir is open to the public. Recreation users in the vicinity of the reservoir may need police assistance or emergency services if one were to access the Project site and/or Project construction equipment during construction. As a Best Management Practice (BMP), safety measures would be put into place to provide adequate safety protection. Additionally, Project work would be temporary and limited in nature. Normal operations post construction would not increase public service needs. With the implementation of BMP safety measures, the Project would have a less than significant impact on service ratios or response times for police protection in the area.

Schools:

No Impact There are no schools in the Project area and the nearest school (Knights Ferry Elementary) is roughly 0.85 miles away. Furthermore, no new housing would be created as a result of the Project. Therefore, the Proposed Project would have no impact on schools in the area.

Parks:

Less than Significant Impact. The Goodwin Dam Reservoir is located adjacent to the Project site. During construction, the Project would not have impacts on reservoir use as construction would be located in a public-restricted area. The Goodwin Dam Recreation Area is an existing designated recreation area by the USACE, which is located 0.3 miles downstream of the Goodwin Dam Reservoir. Construction equipment and construction would not hinder recreational users access or enjoyment of the whole recreational area. Users who utilize the recreation area park along Tulloch Road, as there is no public parking provided. While there is no public access to the proposed barge landing areas or the dam itself, recreational users and residents around the reservoir can access via trails/footpaths along the banks of the reservoir. These impacts would be less than significant as construction is temporary. The Project, post construction, would not generate an increase in population that would affect parks. Therefore, the Project would have less than significant impact on service ratios for parks in the area.

Other public facilities:

No Impact. There is a Bureau of Land Management owned parcel located on the south side of the Stanislaus River that is a designated a national public land. To the east, there is a grassland reserve that is operated by the National Resources Conservation Service. Although these lands are nearby, they would not be affected by the Project. No other public facilities would be affected by the Project because the Project would not construct housing or create general increases in population or service requirements. As a result, no impact would occur.

4.16 RECREATION

Table 4-30: Recreation Impacts

Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☒
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☐	☒

4.16.1 Baseline Conditions

The northeast portion of the Project site contains the Goodwin Dam Recreation Area, which is downstream of Goodwin Dam. The Goodwin Dam Recreation Area is used for activities such as fishing, and the Stanislaus River is known for white water rafting. There is also a frequently-used hiking trail which is approximately one mile in length which makes it accessible for all types of users. The trail is primarily used for hiking, fishing, and mountain biking.

Along the Stanislaus River downstream of the Project there is the Knights Ferry Recreation Area, Stanislaus River Parks, Horseshoe Road Recreation Area, and Honolulu Bar Recreation Area. These areas are used for activities such as kayaking, rafting, canoeing, camping, hiking, and picnicking.

Upstream of the Project area is the Tulloch Reservoir that has approximately 55 miles of shoreline utilized year-round by recreational users. Tulloch Reservoir is a popular location for boating, swimming, and fishing, waterskiing, and kayaking.

Along Highway 120 there is the Two Mile Bar Recreation Area which is another area utilized for recreational users. The trail within this area is used for many activities such as hiking, fishing, and mountain biking.

4.16.2 Impact Analysis

a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?

No Impact. The Project would not create any new housing or public facilities that would draw visitors to the area. The Project proposes to construct a water conveyance tunnel to replace an existing segment of the JSC. The Goodwin Dam Recreation Area is located within the buffer zone for the Project; therefore, safety measures would be followed during construction to maintain a safe environment for potential recreational visitors. The Goodwin Dam Area and the barge area parking lot does not have public access; therefore, construction would not affect the use of that area. Goodwin Dam Recreation Area users who park along Tulloch Road would be insignificantly impacted as construction staging areas would be located along the private road off Tulloch Road, but not on Tulloch Road. The only impacts on Tulloch Road would be trucks and construction equipment driving on it. These impacts are temporary in nature and would be less than significant. In addition, there are multiple recreation areas nearby that can be used in the during the construction period. These areas include Knights Ferry Recreation Area (approximately three miles southwest), Stanislaus River Parks (approximately three miles southwest), Horseshoe Road Recreation Area (approximately six miles southwest), Honolulu Bar Recreation Area (approximately 6.5 miles southwest), Tulloch Reservoir (approximately two miles northeast), and the Two Mile Bar Recreation Area (approximately two miles south). Therefore, there would be no impacts to recreation.

b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?

No Impact. Although the Project is located within the recreational area of the Goodwin Dam, impacts during construction would be temporary in nature and the integrity of the recreational area would not be compromised. The Goodwin Dam Recreation Area would be essentially the same once construction is complete and the Project is in operation. The Project does not include construction of new recreational facilities or require the construction or expansion of existing recreational facilities. There would be no impact.

4.17 TRANSPORTATION

Table 4-31: Transportation Impacts

Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a) Conflict with a program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?	☐	☐	☐	☒
b) Conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)??	☐	☐	☒	☐
c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☒
d) Result in inadequate emergency access?	☐	☐	☒	☐

4.17.1 Baseline Conditions

The Project site is surrounded by open space with very little urban development. Traffic in the vicinity of the Project can be described as seasonal. During the colder times of the year, the roads are less active, but during the summer, traffic is at its peak with travelers driving to the nearby recreational areas. California SR 120 is located just under one mile south of the Project. The Project area can be accessed from SR 120 via Sonora Road or Tulloch Road. There is also an existing access road off of Tulloch Road that leads to the vicinity of the Goodwin Dam. The Project site itself is located on public and private property, with private roads provided as access.

The nearest airport is the Oakdale Municipal Airport, located approximately 8.5 miles southwest of the Project.

4.17.2 Impact Analysis

a) Would the project conflict with a plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?

Less than Significant Impact. Post-construction, traffic in and out of the Project area would be minimal, mostly for maintenance reasons. During construction, nearby roads and highways would be utilized for the following:

- Traveling to and from the construction site to a hotel in Oakdale
- Traveling to and from the disposal site to transport excavation spoils
- Traveling to and from the batch plant to transport transit-mix concrete
- Traveling to and from the construction site to the temporary excavation spoils destination

Although the roads and highways will see an uptick in utilization due to construction, the use of the roads and highways in the vicinity would not conflict with a plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities. Impacts would be less than significant.

b) Would the project conflict or be inconsistent with CEQA Guidelines section 15064.3 subdivision (b)?

Less than Significant Impact. CEQA Guidelines Section 15064.3(b) indicates that for construction-related automobile vehicle miles traveled (VMT) impacts, a qualitative analysis may be appropriate. However, given the large scale of this project, it was deemed appropriate to provide a quantitative analysis of VMT for the construction-related traffic. We include heavy duty truck vehicle miles traveled in this analysis, not for transportation-related impacts, but other impacts that are influenced by these truck trips (e.g. air quality, greenhouse gas emissions, noise).

The construction crew, anticipated to comprise of 20 individuals staying at local hotels in Oakdale, would travel to the site each construction day in two (2) separate shifts, each with approximately ten (10) workers each. One phase of the Project would require two (2) shifts for approximately 325 days, followed by a phase requiring one (1) shift for approximately 195 days. Equipment maintenance visits are anticipated to occur weekly by two (2) individuals. For purposes of determining distance, from a centralized location of hotels (37°46'06.9" N, 120°50'31.3" W). This distance is approximately 12.78 miles from the construction site. It is conservatively assumed that each automobile would be single-occupancy.

Approximately 169,000 cubic yards (cy) of spoils would be excavated and transported to a nearby location at 16643 State Highway 120, Oakdale, California, located approximately 6.08 miles away from the construction site. It is assumed that each truck can haul away approximately 14 cy of spoils. Spoils excavation is expected to occur over a course of 450 days.

Concrete would be delivered to the site from a batch plant located at 5695 O'Byrnes Ferry Road, Jamestown, California, approximately 17.78 miles away from the construction site. Based on the client-provided Operational Statement, concrete delivery would involve six (6) one-way trips per day. Concrete delivery is expected to occur over a course of 350 days. These locations and their distances can be found in Figure 4-7.

Given these assumptions, the following VMT data can be produced as seen in Table 4-32.

Table 4-32: VMT Data

Trip Type	One-Way Trips per Day	Workdays	One-Way Distance (miles)	Project VMT
Worker	20	325	12.78	166,140
	10	195		49,842
	2	104		5,316
	Subtotal			221,298
Concrete	6	350	17.78	74,676
Spoils	27	450	6.08	147,744

SSJID, the lead agency for the Project, has not established a construction-related automobile VMT threshold of significance, nor has any other jurisdiction known to Provost & Pritchard. As construction of the Project is temporary, impact of the Project would be less than significant.

c) Would the project substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

No Impact. The Project does in include any geometric design features such a sharp curves or dangerous intersections. The Project would require construction equipment such as bulldozers and excavators to use existing roads and would be stored in the designated staging areas which would be located in a manner that would not pose a public hazard. There would be no impact.

d) Would the project result in inadequate emergency access?

Less than Significant Impact. The Project and temporary construction would not change access routes to or within the Project vicinity that would result in inadequate emergency access. The Project does include temporary staging areas, one of which would be located at the end of an existing access road to the upstream portal. The staging area would be improved in a manner that would not block or deter authorized vehicles or pedestrians from accessing and/or utilizing the road and having access to emergency assistance. In addition, as a result of the Project, the existing access road would be improved in a manner that is more suitable for access. Impacts would be less than significant.

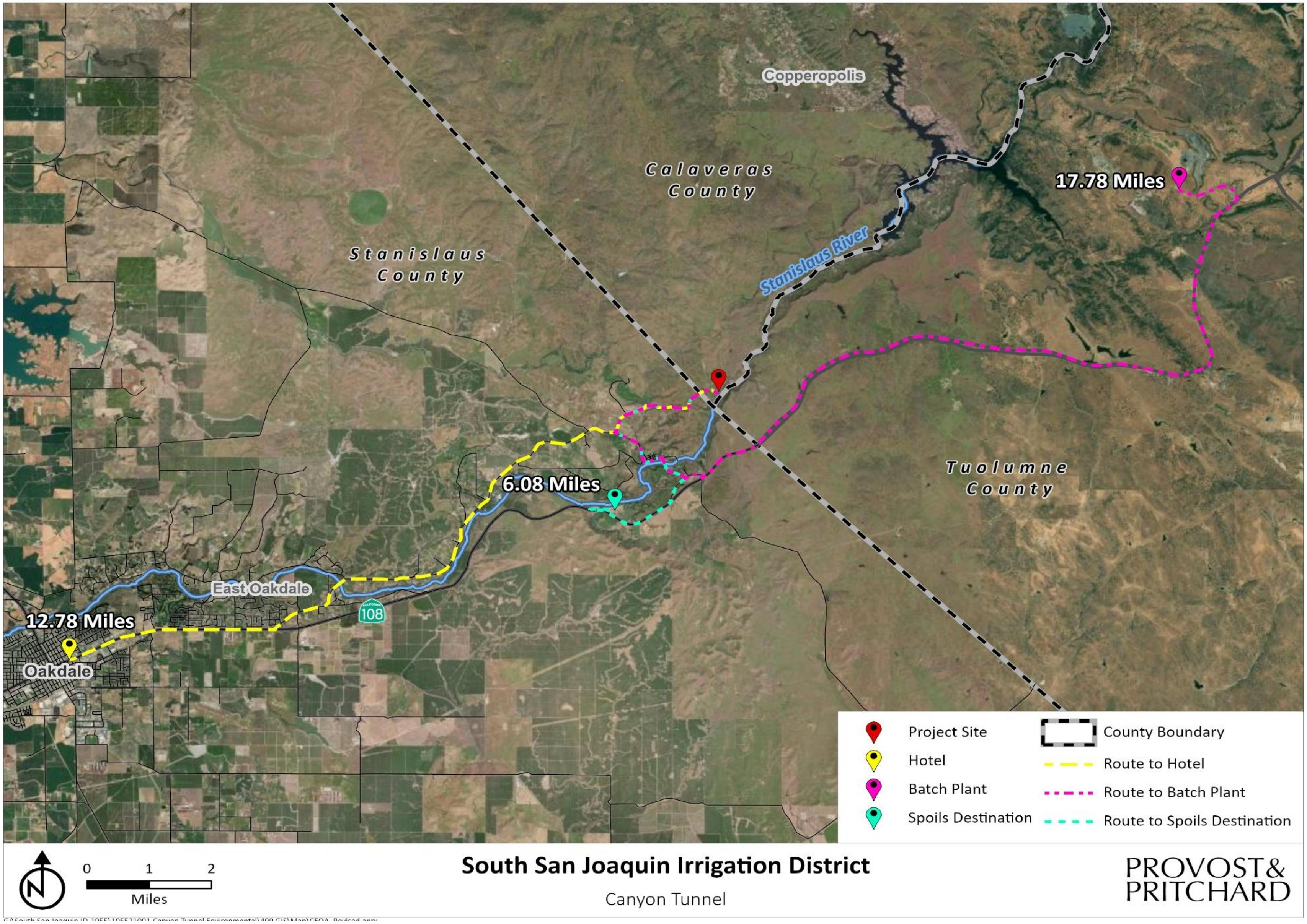

Figure 4-7: Transportation Routes

4.18 TRIBAL CULTURAL RESOURCES

Table 4-33: Tribal Cultural Resources Impacts

Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a) Cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:	☐	☒	☐	☐
i. Listed or eligible for listing in the California Register of Historical Resources, or in the local register of historical resources as defined in Public Resources Code section 5020.1(k), or	☐	☒	☐	☐
ii. 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 Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	☐	☒	☐	☐

4.18.1 Baseline Conditions

The Project is located within the general territory of the central and southern Sierra Miwoks (alternatively Me-Wuk or Miwuk). The Sierra Miwok, members of the Penutian language family, occupied the territory between the Mokelumne and Fresno rivers, as well as the full width of the west slope of the Sierra Nevada Mountain Range, from the edge of the Central valley to the Sierra Crest.

The influx of outsiders to the central Sierra region during the Gold Rush period resulted in a major disruption for the Miwoks and their way of life. Within a decade, introduced diseases, environmental damage, and cultural conflicts with the outsiders had decimated much of the population. Despite this calamity, some tribal members managed to survive and have continued their cultural traditions. See Appendix C.

Records Search

A records search from the CCIC of the CHRIS, located at California State University, Stanislaus was conducted in December 2021. The CCIC records search includes a review of all recorded archaeological and built-environment resources as well as a review of cultural resource reports on file. In addition, the SPHI, the California SHL, the CAL REG, the NRHP, and the California State BERD listings were reviewed for the APE and an additional ¼-mile radius. Due to the sensitive nature of cultural resources, archaeological site locations are not released.

Additional sources included the SHPO Historic Properties Directory, Archaeological Determinations of Eligibility, and the California Inventory of Historic Resources. (Appendix C)

Native American Outreach

A record search of the Sacred Lands Files was obtained on July 14, 2021. This indicated that no known tribal cultural resources or sacred sites were within or near the Project. Outreach letters and follow-up emails were sent to tribal organizations using the NAHC contact list to further identify Native American interests and concerns in the Project area. Responses were received from the Cultural Preservation Department, Wilton Rancheria, inquiring whether the Table Mountain Rancheria was requesting consultation (no such request has been received); the Chicken Ranch Rancheria of Me-Wuk Indians of California, stating that they are aware of archaeological sites and traditional cultural properties in or in the vicinity of the Project, and requesting involvement in it; and the Nototomne Cultural Preservation/Northern Valley Yokuts stating that the Project is in a sensitive area and it should be monitored by tribal and archaeological monitors. No other responses were received.

Table 4-34: Summary of General Tribal Outreach Efforts and Correspondence

Date	
October 21, 2022	Email from SSJID to Katherine Perez, Northern Valley Yokuts, first email to tribe
October 23, 2022	Response from Katherine to SSJID that Calaveras Mi-wuk can help with any unanticipated discoveries
October 27, 2022	Email response to SSJID: Katherine Perez mentioned Calaveras Mi-Wuk vs. Chicken Ranch Rancheria, recommending the SSJID contact this additional tribe
November 1, 2022	SSJID reached out to Debra Grimes at Calaveras Mi-wuk
November 2, 2022	SSJID reached out to Stephanie Suess at Chicken Ranch Tribal
November 2, 2022	Response from Stephanie Suess to SSJID to contact Cynthia Reyes at Chicken Ranch Rancheria
November 7, 2022	SSJID reached out to Cynthia Reyes and sent all the original cultural attachments for review
December 5, 2022	Email from Cynthia Reyes at Chicken Ranch requesting informal consultation
December 16, 2022	Email between SSJID and Tribe re phone call
January 4, 2023	Email to SSJID from Debra Grimes of Calaveras Mi-Wuk Indians regarding Cultural consultation not being necessary for their Tribe
January 5, 2023	Email response summary from SSJID regarding phone conversation with Cynthia Reyes regarding Tribal Monitoring for Project

Tribal communications have occurred and are continuous and all agreed upon items will be executed by the District. See Appendix C.

Field Survey

The Cultural APE is approximately 8.5 acres. An intensive Class III cultural resources inventory/Phase I survey was conducted by ASM Affiliates, Inc. for the Project in Tuolumne, Calaveras and Stanislaus counties. The Project is located along the Stanislaus River approximately 20 kilometers upstream/northeast of the City of Oakdale. The study was undertaken to assist with compliance with Section 106 of the National Historic Preservation Act of 1966, as amended, and CEQA. See Appendix C.

Impact Assessment

a) Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:

i. Listed or eligible for listing in the California Register of Historical Resources, or in the local register of historical resources as defined in Public Resources Code section 5020.1(k), or

Less than Significant Impact with Mitigation Incorporated. The Class III Inventory/Phase I Survey has not identified any resources of cultural value to a California Native American tribe within the Project area that have been listed or are eligible for listing on the CRHR. However, the remote possibility for encountering previously unidentified Tribal Cultural Resources during implementation of the Project does exist. In the case of inadvertent discoveries of cultural resources, including potential Tribal Cultural Resources, mitigation measures outlined in **Section 4.5 CUL-1 and CUL-2** would be implemented, therefore reducing the impact to a less-than-significant level.

ii. 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 Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.

Less than Significant Impact with Mitigation Incorporated. The NAHC results indicated that there are no known tribal cultural resources or sacred sites were within or near the Project. Outreach letters and follow-up emails were sent to tribal organizations using the NAHC list to further identify Native American interests and concerns in the Project area. Responses were received from the Chicken Ranch Rancheria of Me-Wuk Indians of California, the North Valley Yokuts Tribe and the Wilton Rancheria Tribe stating that they are aware of archaeological sites, traditional cultural properties in the vicinity of the Project area, and that the Project is in a sensitive area, and it should be monitored by tribal and archaeological monitors. No other responses were received. With the implementation of mitigation measures **CUL-1** and **CUL-2** above, and the implementation of **TCR-1, TCR-2, and TCR-3** mitigation measures outlined below, any impacts to Tribal Cultural Resources would be less than significant.

In addition, although there is little or no chance the Project would cause a substantial adverse change to the significance of a tribal cultural resource as defined. Mitigation Measure **CUL-1 and CUL-2,** described in Mitigation, Monitoring, and Reporting Program is recommended in the event cultural materials or human remains are unearthed during excavation or construction.

Mitigation

TCR-1 (Cultural Awareness Training): Prior to construction, a Cultural Awareness Training Program shall be provided to all construction managers and construction personnel prior to commencing ground disturbance work at the project site. The training shall be prepared and conducted by a qualified archaeologist to the satisfaction of the District. The training shall be a length of time adequate to explain applicable statues, regulations, enforcement provisions; the prehistoric and historic environmental setting and context, local tribal groups; show sample artifacts; and what prehistoric and historic archaeological deposits look like at the surface and when exposed during construction.

The training may be discontinued to new workers to the site when ground disturbance is completed. Construction personnel shall not be permitted to operate equipment within the construction area unless they have attended the training. A list of the names of all personnel who attended the training and copies of the signed acknowledgement forms shall be submitted to the District for their review and approval.

TCR-2 (Inadvertent Discoveries): In the case of any inadvertent discoveries at any time during the duration of construction or implementation, SSJID shall contact Calaveras Band of Mi-Wuk Indians for further information, investigation, and guidance on the process for handling such discoveries.

Ongoing tribal outreach has occurred over the last year and the Chicken Ranch Rancheria of Me-Wuk Indians has expressed interest in doing a site visit and getting a tour of the Project area with the District. This is expected to occur in Spring of 2023.

TCR-3 (Monitoring): The District will continue to collaborate with the Chicken Ranch Tribe to identify areas that may require tribal monitoring during ground disturbing activities. Once areas have been identified within the cultural area of potential effect (APE) and agreed upon by both parties, a qualified representative will monitor for tribal resources during ground disturbing activities, as needed. Tribal monitoring will end at the conclusion of the ground disturbance activities, including project site grading and ground excavation/trenching activities.

4.19 UTILITIES AND SERVICE SYSTEMS

Table 4-35: Utilities and Service Systems Impacts

Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a) Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?	☐	☐	☐	☒
b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?	☐	☐	☐	☒
c) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☒
d) Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?	☐	☐	☒	☐
e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?	☐	☐	☒	☐

4.19.1 Baseline Conditions

SSJID and OID's water supply comes primarily from surface water captured into the Tulloch and Goodwin Dam Reservoirs and diverted into the existing JSC and South Main Canal. Partnering with the OID, the SSJID developed the Tri-Dam Project, a system of reservoirs, dams and powerhouses that provide storage capacity and reliability of water supply.

The nearest wastewater facility is the Oakdale Wastewater Treatment Plant, located approximately 12.5 miles east of the Project site.

There are various solid waste facilities within a 35-mile radius of the Project area.

Gas and electricity services are provided by PG&E.

4.19.2 Impact Analysis

a) Would the project require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?

No Impact. The Project would involve construction of a new water conveyance tunnel and to bypass existing water conveyance infrastructure that is highly susceptible to hazards. The Project would not require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas or telecommunications facilities. The Project may require extension telecommunication services from existing poles but would not relocate or construct new telecommunication facilities. Therefore, there would be no impact.

b) Would the project have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?

No Impact. The Project, post construction, would utilize water from the Stanislaus River. The Stanislaus River is harnessed by SSJID and OID in the JSC and the South Main Canal to convey and supply water to its users. Although the Project is a mechanism for the conveyance of water, it would not require additional water supplies; therefore, there would be no impact.

c) Would the project result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?

Less than Significant Impact. The Project, in operation, would not generate any wastewater. During construction, concrete trucks would be used which generate wash wastewater. This wastewater would be properly disposed of at a licensed facility or according to the SWPPP. In addition, waste generated within the onsite portable toilets would be stored in a secondary containment tray that is removeable and can be transferred and treated offsite at a licensed facility to handle such waste. Impacts would be less than significant.

d) Would the project generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?

Less than Significant Impact. Materials used during construction may include trash, concrete, wood, plastic, glass, metal, or other items typical of a construction site. These materials would be properly stored in a solid waste dumpster on site, with regularly scheduled pickups. Although solid waste would be generated, the amount is not expected to be excessive or substantial, and the temporary nature of solid waste generated during construction for the Project would result in a minor impact. Anticipated solid waste generated during operation or maintenance would be miniscule. Impacts would be less than significant.

e) Would the project comply with federal, state, and local management and reduction statutes and regulations related to solid waste?

Less than Significant Impact. Materials used during construction, which may include trash, concrete, wood, plastic, glass, metal, etc. would be disposed of properly and would comply with federal, state, and local management and reduction statutes and regulations. Solid waste generated from construction would be hauled from the laydown area, located within Stanislaus County, to a nearby licensed solid waste facility. The Project would result in less than significant impacts.

4.20 WILDFIRE

Table 4-36: Wildfire Impacts

If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a) Substantially impair an adopted emergency response plan or emergency evacuation plan?	☐	☒	☐	☐
b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrollable spread of wildfire?	☐	☒	☐	☐
c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?	☐	☒	☐	☐
d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?	☐	☒	☐	☐

4.20.1 Baseline Conditions

The Project site is served by the California Department of Forestry and Fire Protection (CAL FIRE) for its fire protection needs. The Project is not located in a densely populated area but is a rather sparse region occupied by open space and agricultural land. The site is located in a State Responsibility Area.[41] A State Responsibility Area is an area recognized by the Board of Forestry and Fire Protection as areas where CAL FIRE is the primary emergency response agency responsible for fire suppression and prevention. Portions of the Project are located in a high fire hazard severity zone, with other portions considered to be moderate.[42] Fire Hazard Severity Zones are found in areas where the State has financial responsibility for wildfire protection and prevention. The Fire Hazard Severity Zone maps are developed using a science-based and field-tested model that assigns a hazard score based on the factors that influence fire likelihood and fire behavior. Many factors are considered such as fire history, existing and potential fuel (natural vegetation), predicted flame length, blowing embers, terrain, and typical fire weather for the area. There are three levels of hazard in the State Responsibility Areas: moderate, high and very high See Figure 4-8 for the Project's designation.

[41] (ArcGIS n.d.)
[42] (Arc GIS n.d.)

The Project area is known for wildfire activity. In 2018, the Tulloch Fire burned near the Project area, ultimately burning 573 acres. The fire was thought to have been caused by a vehicle. Vehicle exhaust has the potential to start fires in the area with the sprawling grasslands as its fire starter.[43]

Due to California's increasing issue with wildfires, Governor Gavin Newsom bolstered the state's wildfire response and resilience efforts by directing $138 million in funding for 105 local fire prevention projects that would help protect communities in California. Recently, the Tuolumne-Calaveras Unit 2021 Strategic Fire Plan was implemented to reduce the loss of life, property, and natural resources from wildland fire.[44]

4.20.2 Impact Analysis

a) If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project substantially impair an adopted emergency response plan or emergency evacuation plan?

Less than Significant Impact with Mitigation Incorporated. On a long-term basis, operation and maintenance of the Project would have a less than significant impact on traffic in the Project area, and the Project would not involve construction of any facilities that could affect existing evacuation and emergency service routes. Therefore, during long-term operations, the Project would not interfere with emergency response or evacuation plans.

The potential for a fire to break out at the Project site is high due to the surrounding open grassland and oak woodlands. Construction activities could increase fire risk in the area due to welding, equipment sparks, hot exhaust pipes, etc. On a temporary basis, construction associated with the Project could result in temporary and minor impacts to local traffic during the construction period. In order to prevent the potential for fire to break out and impact adopted emergency response plans and emergency evacuation plans, mitigation measures **WLD-1**, **WLD-2**, **WLD-3**, and **WLD-4** would be implemented to reduce impacts during construction.

b) If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project due to slope, prevailing winds, and other factors, exacerbate wildfire risks and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?

Less than Significant Impact with Mitigation Incorporated. The Project area contains natural areas of steep-sloped vegetation that are subject to periodic wildfire. In addition to these steep slopes, the surrounding lands include grassland and oak trees that are catalysts for the starting and spreading of wildfires. Further, construction of the Project would involve use of motorized vehicles, and it has been determined that equipment use is one of the top causes of fire in California.[45] Project construction workers would temporarily occupy the Project area during work hours for the duration of the construction work. Therefore, the Project would have the potential to exacerbate fire risk and could expose workers to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire during construction. Construction activities involving vehicles, heavy machinery, and personnel smoking within and near the Project area could result in the ignition of a fire. During construction, heavy equipment and passenger vehicles driving on vegetated areas prior to clearing and grading could increase the risk of fire.

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[43] (Capradio 2020)
[44] (California Department of Forestry and Fire Protection 2021)
[45] (California Department of Forestry and Fire Protection 2019)

Heated mufflers and improper disposal of cigarettes could potentially ignite surrounding vegetation. Implementation of Mitigation Measure **WLD-1** would help reduce the potential for construction activities to result in severe fires by requiring the preparation of a Fire Safety Plan that would outline safe construction and maintenance practices. In addition, **WLD-2**, **WLD-3**, and **WLD-4** would be implemented to reduce fire impacts**.** Impacts would remain less than significant after implementation of mitigation measures

c) If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?

Less than Significant Impact with Mitigation Incorporated. The Project would involve construction of a new water conveyance tunnel to bypass approximately 12,012 lineal feet of existing canal and tunnels which are components of the JSC. In addition, the Project would improve and existing access road for improved access to the Project site. Installation or maintenance of this infrastructure would have the potential to affect the environment in a way that would exacerbate fire risks beyond that of existing conditions. Therefore, with the inclusion of **WLD-1**, **WLD-2**, **WLD-3**, and **WLD-4**, impacts would be less than significant.

d) If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?

Less than Significant Impact with Mitigation Incorporated. The majority of the Project would be approximately 200 feet below the earth's surface with the upstream and downstream openings opening up to the earth's surface. While the Project would cause a small increase in the amount of impervious surfaces in the Project area, the Project would be located in a rocky area that is already used for water conveyance with existing canal and tunnels. In addition, the small increase in the amount of impervious surface in the Project area would not alter current surface drainage and would not create new flood or landslide risks. The Project's intent is to avoid existing hazardous areas that have resulted in damage from landslides and rockslides in the past. The Project would not permanently expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes. For best practice, **WLD-1, WLD-2**, **WLD-3**, and **WLD-4** would continue to be implemented to reduce any potential impacts. With the inclusion of these mitigation measures, impacts would be less than significant.

4.20.3 Mitigation Measures

WLD-1 (Fire Safety Plan): Prior to the start of construction, the contractor shall coordinate with the CAL FIRE to prepare a Fire Safety Plan for use during construction. The Fire Safety Plan will contain notification procedures and emergency fire precautions including, but not limited to, the following:

- Dry grass shall be cut low or removed from construction equipment staging areas.
- All internal combustion engines, stationary and mobile, shall be equipped with spark arresters. Spark arresters shall be in good working order.

- Light trucks and cars with factory-installed (type) mufflers shall be used only on roads where the roadway is cleared of vegetation. Said vehicle types shall maintain their factory-installed (type) muffler in good condition.

- Equipment parking areas (staging areas) shall be cleared of all extraneous flammable materials.

- Personnel shall be trained in the practices of the Fire Safety Plan relevant to their duties. Construction personnel will be trained and equipped to extinguish small fires in order to prevent them from growing into more serious threats.

- Smoking shall be prohibited in wildland areas and will be limited to designated and paved areas.

WLD-2 Water trucks shall be on site at all times during construction.

WLD-3 All construction vehicles on site during construction shall have a fire extinguisher in the event that there is a fire emergency.

WLD-4 Construction crew shall have water backpacks available during construction activities that may create sparks, to combat fire during construction activities near dry, vegetative area in the event that there is a fire emergency.

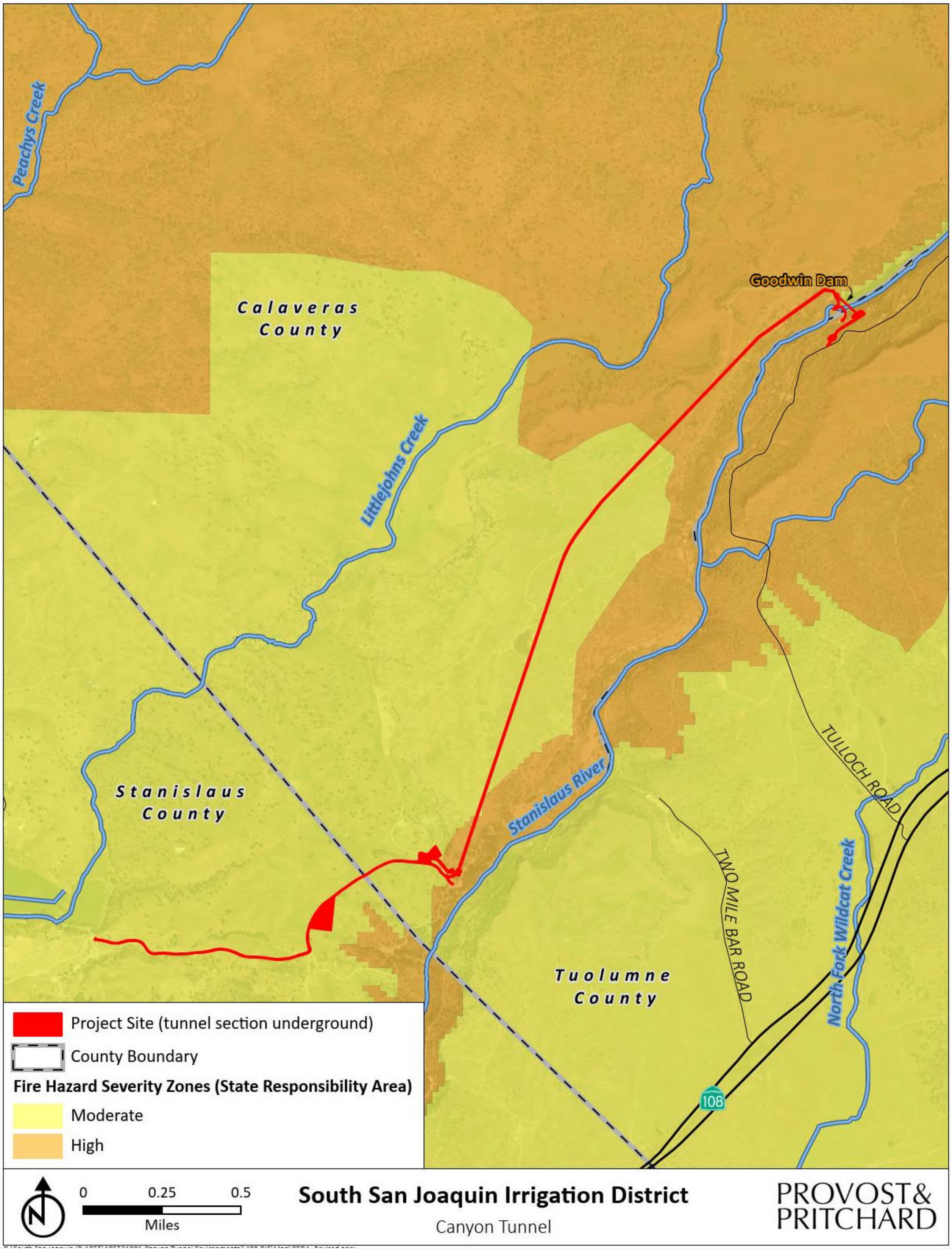

Figure 4-8: Fire Hazard Severity Zones Map

4.21 CEQA MANDATORY FINDINGS OF SIGNIFICANCE

Table 4-37: CEQA Mandatory Findings of Significance

Does the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a) Have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☒	☐	☐
b) Have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☐	☒	☐	☐
c) Have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☒	☐

4.21.1 Statement of Findings

a) Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?

Less than Significant with Mitigation Incorporated. The analysis conducted in this IS/MND results in a determination that the Project, with incorporation of mitigation measures, would have a less than significant effect on the environment. The potential for impacts to aesthetics, air quality, biological resources, cultural resources, geology and soils, noise, hydrology, and tribal cultural resources from the construction and operation of the Project would be less than significant with the incorporation of the mitigation measures discussed in Chapter 5 Mitigation, Monitoring, and Reporting Program. Accordingly, the Project would involve no potential for significant impacts through the degradation of the quality of the environment, the reduction in the habitat or population of fish or wildlife, including endangered plants or animals, the elimination of a plant or animal community or example of a major period of California history or prehistory.

b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?

Less than Significant with Mitigation Incorporated. CEQA Guidelines Section 15064(i) States that a Lead Agency shall consider whether the cumulative impact of a project is significant and whether the effects of the project are cumulatively considerable. The assessment of the significance of the cumulative effects of a project must, therefore, be conducted in connection with the effects of past projects, other current projects, and probable future projects. The Project would include the construction of a new water conveyance tunnel to bypass approximately 12,012 lineal feet of existing JSC. No additional roads would be constructed as a result of the Project, nor would any additional public services be required. The Project is not expected to result in direct or indirect population growth. Therefore, implementation of the Project would not result in significant cumulative impacts and all potential impacts would be reduced to less than significant through the implementation of mitigation measures and basic regulatory requirements incorporated into future Project design.

c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?

Less than Significant. The Project would include the construction of a new water conveyance tunnel to bypass a hazardous section of the existing JSC. The Project in and of itself would not create a significant hazard to the public or the environment. Construction-related air quality/dust exposure impacts could occur temporarily as a result of project construction. However, implementation of basic regulatory requirements identified in this IS/MND would ensure that impacts are less than significant. Therefore, the Project would not have any direct or indirect adverse impacts on humans. This impact would be less than significant.

CHAPTER 5 MITIGATION, MONITORING, AND REPORTING PROGRAM

This Mitigation Monitoring and Reporting Program (MMRP) has been formulated based upon the findings of the Initial Study/Mitigated Negative Declaration (IS/MND) for the Project in portions of Calaveras County, Stanislaus County, and Tuolumne County, as a part of SSJID's Project. The MMRP lists mitigation measures recommended in the IS/MND for the Project and identifies monitoring and reporting requirements.

Table 5-1*:* Mitigation, Monitoring, and Reporting Program presents the mitigation measures identified for the Project. Each mitigation measure is numbered with a symbol indicating the topical section to which it pertains, a hyphen, and the impact number. For example, AIR-2 would be the second mitigation measure identified in the Air Quality analysis of the IS/MND.

The first column of Table 5-1 identifies the mitigation measure. The second column, entitled "When Monitoring is to Occur," identifies the time the mitigation measure should be initiated. The third column, "Frequency of Monitoring," identifies the frequency of the monitoring of the mitigation measure. The fourth column, "Agency Responsible for Monitoring," names the party ultimately responsible for ensuring that the mitigation measure is implemented. The last columns will be used by the Lead and Responsible Agencies to ensure that individual mitigation measures have been complied with and monitored.

Table 5-1: Mitigation, Monitoring, and Reporting Program

Mitigation, Monitoring, and Reporting Program						
Item	Mitigation Measure	When Monitoring is to Occur	Frequency of Monitoring	Agency Responsible for Monitoring	Method to Verify Compliance	Verification of Compliance
Aesthetics						
AES-1	All new permanent outdoor lighting shall be hooded or have protective shielding to direct and minimize light downward so as not to shine on adjacent properties or nearby sensitive receptors.	During construction activities	Once, near project completion	SSJID		
AES-2	At a minimum, the construction contractor shall minimize project-related light and resulting glare to the maximum extent feasible, given safety considerations when used. Color-corrected halide lights will be used. Portable lights will be operated at the lowest allowable wattage and height and will be raised to a height no greater than 20 feet. All lights will be screened and directed downward toward work activities and away from the night sky and nearby residents and sensitive visual resource areas to the maximum extent possible. The number of nighttime lights used will be minimized to the greatest extent possible.	During construction activities	Daily during construction activities	SSJID		
AES-3	Material and equipment shall be brought to staging areas during daytime hours, to the extent possible, to minimize nighttime traffic lights going to and from the site.	During construction activities	Daily during construction activities	SSJID		
AES-4	The contractor shall install visual barriers as needed to obstruct nighttime lighting and glare from sensitive receptors, namely near residential or sensitive visual resource areas to contain and focus necessary nighttime lighting.	During construction activities	Daily during construction activities	SSJID		
Air Quality						
AIR-1	Phase 4 of construction shall utilize an USEPA Tier 4 Final-certified generator with emission factors not exceeding: iii. CO – 0.342g/bhp-hr iv. NOx – 0.322g/bhp-hour	During construction, Phase 5	Daily during construction activities	SSJID		

Mitigation, Monitoring, and Reporting Program						
Item	Mitigation Measure	When Monitoring is to Occur	Frequency of Monitoring	Agency Responsible for Monitoring	Method to Verify Compliance	Verification of Compliance
	All other equipment will meet Statewide average emissions. OR Temporary grid-delivered electrical service shall power a minimum of 2,000 horsepower of Phase 4 equipment. All other equipment will meet statewide average emissions.					
Biological Resources						
BIO-1	**(*WEAP Training*):** Prior to initiating construction activities (including staging and mobilization), all personnel associated with Project construction will attend mandatory Worker Environmental Awareness Program (WEAP) training, conducted by a qualified biologist, to aid workers in identifying special status resources that may occur in the APE. The specifics of this program will include identification of the sensitive species and suitable habitats, a description of the regulatory status and general ecological characteristics of sensitive resources, and review of the limits of construction and mitigation measures required to reduce impacts to biological resources within the work area. This training will discuss special status species, describe the laws and regulations in place to provide protection of these species, identify the penalties for violation of applicable environmental laws and regulations, and a list of required protective measures to avoid "take." A fact sheet conveying this information, along with photographs or illustrations of sensitive species with potential to occur onsite, will also be prepared for distribution to all contractors, their employees, and all other personnel involved with construction of the Project. All employees will sign a form documenting that they have attended WEAP training and understand the information presented to them.	Prior to construction activities	One time training prior to construction activities	SSJID		

Mitigation, Monitoring, and Reporting Program						
Item	Mitigation Measure	When Monitoring is to Occur	Frequency of Monitoring	Agency Responsible for Monitoring	Method to Verify Compliance	Verification of Compliance
BIO-2	(BMPs): The Project proponent will ensure that all workers employ the following best management practices (BMPs) in order to avoid and minimize potential impacts to special status species: • Vehicles will observe a 15-mph speed limit while on unpaved access routes. • Workers will inspect areas beneath parked vehicles prior to mobilization. If special status species are detected beneath vehicles, the individual will either be allowed to leave of its own volition or will be captured by the qualified biologist (must possess appropriate collecting/handling permits) and relocated out of harm's way to the nearest suitable habitat beyond the influence of the Project work area. "Take" of a listed (rare, threatened, or endangered) species is prohibited. • The presence of any special status species and/or any wildlife mortalities will be reported to the Project's designated biologist and the appropriate regulatory agencies	During construction activities	Daily during construction activities	SSJID		
BIO-3	(*Avoidance*): The Project's construction activities will occur, if feasible, between September 16 and January 31 (outside of nesting bird season) in an effort to avoid impacts to nesting birds.	Prior to the start of construction activities	Once, prior to the start of construction	SSJID		
BIO-4	(*Pre-construction Surveys*): If activities must occur within nesting bird season (February 1 to September 15), a qualified biologist will conduct pre-construction surveys for active nests within ten (10) days prior to the start of construction. The survey will include the proposed work area and surrounding lands within 50 feet. If no active nests are observed, no further mitigation is required. Raptor nests are considered "active" upon the nest-building stage.	If activities must occur within nesting bird season (February 1 to September 15)	Daily during construction activities to avoid impacts to nesting birds.	SSJID		
BIO-5	(*Establish Buffers*): On discovery of any active nests or breeding colonies near work areas, the biologist will	During construction activities upon	Daily, upon discovery of any active nests or	SSJID		

Mitigation, Monitoring, and Reporting Program						
Item	Mitigation Measure	When Monitoring is to Occur	Frequency of Monitoring	Agency Responsible for Monitoring	Method to Verify Compliance	Verification of Compliance
	determine appropriate construction setback distances based on applicable CDFW and/or USFWS guidelines and/or the biology of the species in question. Construction buffers will be identified with flagging, fencing, or other easily visible means, and will be maintained until the biologist has determined that the nestlings have fledged.	discovery of active nests or breeding colonies near work areas.	breeding colonies near work areas			
BIO-6	(*Pre-construction Surveys*): A pre-construction survey will be performed for construction activities that fall between March 1 and September 30 (bat maternity season) to identify current bat roosting locations in oak trees near the dam and around the tunnel outlet prior to the start of construction. A qualified biologist will conduct the survey 7 days or less prior to construction.	Seven days or less prior to construction if construction activities fall between March 1 and September 30 (bat maternity season)	One time survey, seven days or less prior to construction	SSJID		
BIO-7	(*Avoidance*): Impacts and interactions with bat species are to be avoided whenever possible through timing of work, method selections, and retention of feature that provide naturalized habitat.	During construction activities March 1 through September 30	Daily during construction activities March 1 through September 30	SSJID		
BIO-8	(*Establish Buffers*): On discovery of any bat roosts near work, the dam, or tunnel outlet, a qualified biologist will determine appropriate construction setback distances (buffer zones) to minimize disturbance and avoid take. Construction buffers will be identified with flagging, fencing, or other easily visible means, and will be maintained until the biologist has determined that the roost will no longer be impacted by construction.	During construction activities upon discovery of any bat roosts	Daily during construction activities upon discovery of any bat roosts	SSJID		
BIO-9	(*Disturbance to Trees*): In addition to complying with the Tuolumne County Oak Tree Ordinance, if a tree or trees must be removed a qualified biologist will inspect the tree prior to removal to verify that the tree is not active roosting habitat. Once the tree is deemed clear of bats, the tree will be removed within two days.	During the first two days of construction at the roost location found along the cliff side above the canal and river	During the first two days of construction	SSJID		

Mitigation, Monitoring, and Reporting Program						
Item	Mitigation Measure	When Monitoring is to Occur	Frequency of Monitoring	Agency Responsible for Monitoring	Method to Verify Compliance	Verification of Compliance
BIO-10	(*Pre-construction Surveys*): A qualified botanist/biologist will conduct focused botanical surveys for Chinese Camp brodiaea, Greene's tuctoria, forked hare-leaf, Hoover's calycadenia, Mariposa clarkia, Mariposa cryptantha, and Merced monardella, according to CDFW's Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities (2018) for areas where ground disturbance will occur and prior to the start of construction.	Prior to the start of construction activities during known blooming periods for these species	One pre-construction survey prior to the start of construction	SSJID		
BIO-11	(*Avoidance*): If special status plants are identified during a survey, a disturbance-free buffer and use of exclusion fencing will be placed around the area as not to disturb the plants or its root system.	During construction activities, if special status plants are identified	Daily during construction	SSJID		
BIO-12	(*Formal Consultation*): If rare plant individuals or populations or sensitive natural communities are detected within Project work areas during the focused botanical survey, and the plants cannot be avoided, the Project proponent will initiate consultation with CDFW and/or USFWS to determine next steps for relocation or to obtain an Incidental Take Permit (ITP).	Areas where ground disturbance will occur and prior to the start of construction.	A onetime focused botanical survey according to CDFW's Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities (2018)	SSJID		
	Cultural Resources					
CUL-1	(Archaeological Resources): In the unlikely event that archaeological resources (sites, features or artifacts) are unearthed or exposed during any stage of Project construction activities, work in the area of discovery will cease until the area is evaluated by a qualified archaeologist. If mitigation is warranted, the project proponent will abide by recommendations of the archaeologist on site.	During construction and ground disturbing activities	In the event archaeological resources (sites, features or artifacts) are unearthed or exposed during any stage of Project construction activities	SSJID		
CUL-2	(Human Remains): In the unlikely event that any human remains are discovered on the Project site, the appropriate County Coroner (Calaveras County, Stanislaus County, and/or Tuolumne County) must be	During construction activities	Daily or as needed in the event that any human remains are	SSJID		

Mitigation, Monitoring, and Reporting Program						
Item	Mitigation Measure	When Monitoring is to Occur	Frequency of Monitoring	Agency Responsible for Monitoring	Method to Verify Compliance	Verification of Compliance
	notified of the discovery (California Health and Safety Code, Section 7050.5) and all activities in the immediate area of the find or in any nearby area reasonably suspected to overlie adjacent human remains must cease until appropriate and lawful measures have been implemented. If the Coroner determines that the remains are not recent, but rather of Native American origin, the Coroner will notify the Native American Heritage Commission (NAHC) in Sacramento within 24 hours to permit the NAHC to determine the Most Likely Descendent of the deceased Native American.		discovered on the Project site			
Geology and Soils						
GEO-1	A final geologic data report and geotechnical baseline report to verify the optimal alignment for the tunnel will be completed for the Project.	Prior to construction and tunneling activities	One final report prior to construction or tunneling activities	SSJID		
Hydrology and Water Quality						
HYD-1	Refer to **GEO-1**.	Refer to **GEO-1**.	Refer to **GEO-1**.	SSJID		
Noise						
NOI-1	Refer to **BIO-6** through **BIO-11**.	Refer to **BIO-6** through **BIO-11**	Refer to **BIO-6** through **BIO-11**	SSJID		
Tribal Cultural Resources						
TCR-1	**(Cultural Awareness Training)**: Prior to construction, a Cultural Awareness Training Program shall be provided to all construction managers and construction personnel prior to commencing ground disturbance work at the project site. The training shall be prepared and conducted by a qualified archaeologist to the satisfaction of the District. The training shall be a length of time adequate to explain applicable statues, regulations, enforcement provisions; the prehistoric and historic environmental setting and context, local tribal groups; show sample artifacts; and what prehistoric and historic archaeological deposits look like at the surface and when exposed during construction. The training may be discontinued to new	Prior to construction	One Cultural Awareness Training prior to construction activities	SSJID		

Mitigation, Monitoring, and Reporting Program						
Item	Mitigation Measure	When Monitoring is to Occur	Frequency of Monitoring	Agency Responsible for Monitoring	Method to Verify Compliance	Verification of Compliance
	workers to the site when ground disturbance is completed. Construction personnel shall not be permitted to operate equipment within the construction area unless they have attended the training. A list of the names of all personnel who attended the training and copies of the signed acknowledgement forms shall be submitted to the District for their review and approval.					
TCR-2	**(Inadvertent Discoveries):** In the case of any inadvertent discoveries at any time during the duration of construction or implementation, SSJID shall contact Calaveras Band of Mi-Wuk Indians for further information, investigation, and guidance on the process for handling such discoveries.	During construction and all ground disturbing activities	In the event any inadvertent discoveries are unearthed or exposed during any stage of Project construction activities	SSJID		
TCR-3	**(Monitoring)**: The District will continue to collaborate with the Chicken Ranch Tribe to identify areas that may require tribal monitoring during ground disturbing activities. Once areas have been identified within the cultural area of potential effect (APE) and agreed upon by both parties, a qualified representative will monitor for tribal resources during ground disturbing activities, as needed. Tribal monitoring will end at the conclusion of the ground disturbance activities, including project site grading and ground excavation/trenching activities.	During construction and ground disturbing activities in identified areas within the cultural APE	Daily monitoring during construction and all ground disturbing activities in identified areas within the cultural APE	SSJID		
Wildfire						
WLD-1	(Fire Safety Plan): Prior to the start of construction, the contractor shall coordinate with the CAL FIRE to prepare a Fire Safety Plan for use during construction. The Fire Safety Plan will contain notification procedures and emergency fire precautions including, but not limited to, the following: • Dry grass shall be cut low or removed from construction equipment staging areas.	Prior to the start of construction activities	One time preparation of Fire Safety Plan prior to construction activities. Precautionary procedures daily during construction activities	SSJID		

Mitigation, Monitoring, and Reporting Program						
Item	Mitigation Measure	When Monitoring is to Occur	Frequency of Monitoring	Agency Responsible for Monitoring	Method to Verify Compliance	Verification of Compliance
	• All internal combustion engines, stationary and mobile, shall be equipped with spark arresters. Spark arresters shall be in good working order. • Light trucks and cars with factory-installed (type) mufflers shall be used only on roads where the roadway is cleared of vegetation. Said vehicle types shall maintain their factory-installed (type) muffler in good condition. • Equipment parking areas (staging areas) shall be cleared of all extraneous flammable materials. • Personnel shall be trained in the practices of the Fire Safety Plan relevant to their duties. Construction personnel will be trained and equipped to extinguish small fires in order to prevent them from growing into more serious threats. • Smoking shall be prohibited in wildland areas and will be limited to designated and paved areas.					
WLD-2	Water trucks shall be on site at all times during construction.	During construction activities	Daily during construction activities	SSJID		
WLD-3	All construction vehicles on site during construction shall have a fire extinguisher in the event that there is a fire emergency.	During construction activities	Daily during construction activities	SSJID		
WLD-4	Construction crew shall have water backpacks available during construction activities that may create sparks, to combat fire during construction activities near dry, vegetative area in the event that there is a fire emergency.	During construction activities	Daily during construction activities	SSJID		

CHAPTER 6 REFERENCES

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Appendix A: CalEEMod Output Files

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Canyon Tunnel

Stanislaus County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	1.00	Acre	1.00	43,560.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	46
Climate Zone	3			**Operational Year**	2025
Utility Company	Pacific Gas and Electric Company				
CO2 Intensity (lb/MWhr)	203.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Construction schedule based on assumptions provided

Off-road Equipment - Provided by consultant

Off-road Equipment - Construction model based on provided assumptions

Off-road Equipment - Provided by consultant

Off-road Equipment - Construction assumptions provided by consultant

Off-road Equipment - Provided by consultant

Off-road Equipment - Provided by consultant

Off-road Equipment - Provided by consultant

Trips and VMT - Provided by consultant

Grading - Provided by consultant

Consumer Products - No consumer products used

Area Coating - No parking lot

Landscape Equipment - No landscape equipment

Construction Off-road Equipment Mitigation -

Table Name	Column Name	Default Value	New Value
tblAreaCoating	Area_Parking	2614	0
tblConstructionPhase	NumDays	2.00	30.00
tblConstructionPhase	NumDays	2.00	15.00
tblConstructionPhase	NumDays	2.00	45.00
tblConstructionPhase	NumDays	2.00	15.00
tblConstructionPhase	NumDays	2.00	280.00
tblConstructionPhase	NumDays	2.00	50.00
tblConstructionPhase	NumDays	2.00	20.00
tblConstructionPhase	PhaseEndDate	12/21/2021	3/10/2023
tblConstructionPhase	PhaseEndDate	12/23/2021	3/31/2023
tblConstructionPhase	PhaseEndDate	12/27/2021	6/2/2023
tblConstructionPhase	PhaseEndDate	12/29/2021	6/23/2023
tblConstructionPhase	PhaseEndDate	12/31/2021	7/19/2024
tblConstructionPhase	PhaseEndDate	1/4/2022	9/27/2024
tblConstructionPhase	PhaseEndDate	1/6/2022	10/25/2024
tblConstructionPhase	PhaseStartDate	12/20/2021	1/30/2023
tblConstructionPhase	PhaseStartDate	12/22/2021	3/11/2023
tblConstructionPhase	PhaseStartDate	12/24/2021	4/1/2023
tblConstructionPhase	PhaseStartDate	12/28/2021	6/3/2023
tblConstructionPhase	PhaseStartDate	12/30/2021	6/24/2023
tblConstructionPhase	PhaseStartDate	1/1/2022	7/20/2024
tblConstructionPhase	PhaseStartDate	1/5/2022	9/28/2024
tblConsumerProducts	ROG_EF	2.14E-05	0

tblConsumerProducts	ROG_EF_Degreaser	3.542E-07	0
tblConsumerProducts	ROG_EF_PesticidesFertilizers	5.152E-08	0
tblGrading	AcresOfGrading	18.75	30.00
tblGrading	MaterialExported	0.00	11,143.00
tblGrading	MaterialImported	0.00	838.00
tblLandscapeEquipment	NumberSummerDays	180	0
tblOffRoadEquipment	HorsePower	84.00	400.00
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tblOffRoadEquipment	HorsePower	402.00	300.00
tblOffRoadEquipment	HorsePower	402.00	220.00
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tblOffRoadEquipment	HorsePower	247.00	200.00

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblOffRoadEquipment	HorsePower	203.00	500.00
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tblOffRoadEquipment	LoadFactor	0.48	0.75
tblOffRoadEquipment	LoadFactor	0.48	0.75
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tblOffRoadEquipment	LoadFactor	0.38	0.50
tblOffRoadEquipment	LoadFactor	0.38	0.50
tblOffRoadEquipment	LoadFactor	0.36	0.30
tblOffRoadEquipment	LoadFactor	0.48	0.75
tblOffRoadEquipment	LoadFactor	0.38	0.10
tblOffRoadEquipment	LoadFactor	0.38	0.10
tblOffRoadEquipment	LoadFactor	0.38	0.50
tblOffRoadEquipment	LoadFactor	0.38	0.10
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tblOffRoadEquipment	LoadFactor	0.36	0.30
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tblOffRoadEquipment	OffRoadEquipmentType		Generator Sets
tblOffRoadEquipment	OffRoadEquipmentType		Generator Sets
tblOffRoadEquipment	OffRoadEquipmentType		Air Compressors
tblOffRoadEquipment	OffRoadEquipmentType		Air Compressors
tblOffRoadEquipment	OffRoadEquipmentType		Generator Sets
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentType		Rubber Tired Loaders
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblOffRoadEquipment	OffRoadEquipmentType		Rubber Tired Loaders
tblOffRoadEquipment	OffRoadEquipmentType		Air Compressors
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tblOffRoadEquipment	UsageHours	6.00	10.00
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	HaulingTripLength	20.00	17.78
tblTripsAndVMT	HaulingTripLength	20.00	17.78
tblTripsAndVMT	HaulingTripLength	20.00	17.78
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tblTripsAndVMT	HaulingTripNumber	0.00	1,061.00
tblTripsAndVMT	VendorTripLength	6.60	6.08
tblTripsAndVMT	VendorTripLength	6.60	6.08
tblTripsAndVMT	VendorTripLength	6.60	6.08
tblTripsAndVMT	VendorTripLength	6.60	6.06

tblTripsAndVMT	VendorTripLength	6.60	6.08
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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					
2023	1.8715	22.0982	11.5054	0.0503	0.2523	0.5331	0.7854	0.0975	0.5171	0.6147	0.0000	4,848.9727	4,848.9727	0.5434	0.0523	4,878.1458
2024	1.7887	21.3407	11.5958	0.0496	0.1103	0.4841	0.5945	0.0302	0.4697	0.4999	0.0000	4,798.7906	4,798.7906	0.5364	0.0461	4,825.9385
Maximum	**1.8715**	**22.0982**	**11.5958**	**0.0503**	**0.2523**	**0.5331**	**0.7854**	**0.0975**	**0.5171**	**0.6147**	**0.0000**	**4,848.9727**	**4,848.9727**	**0.5434**	**0.0523**	**4,878.1458**

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					
2023	1.8715	22.0982	11.5054	0.0503	0.2523	0.5331	0.7854	0.0975	0.5171	0.6147	0.0000	4,848.9673	4,848.9673	0.5434	0.0523	4,878.1404
2024	1.7887	21.3407	11.5958	0.0496	0.1103	0.4841	0.5945	0.0302	0.4697	0.4999	0.0000	4,798.7853	4,798.7853	0.5364	0.0461	4,825.9332
Maximum	**1.8715**	**22.0982**	**11.5958**	**0.0503**	**0.2523**	**0.5331**	**0.7854**	**0.0975**	**0.5171**	**0.6147**	**0.0000**	**4,848.9673**	**4,848.9673**	**0.5434**	**0.0523**	**4,878.1404**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
5	12-20-2022	3-19-2023	0.7537	0.7537
6	3-20-2023	6-19-2023	1.5543	1.5543
7	6-20-2023	9-19-2023	10.0779	10.0779
8	9-20-2023	12-19-2023	10.3972	10.3972
9	12-20-2023	3-19-2024	9.9370	9.9370
10	3-20-2024	6-19-2024	9.9638	9.9638
11	6-20-2024	9-19-2024	3.7410	3.7410
12	9-20-2024	9-30-2024	0.1239	0.1239
		Highest	10.3972	10.3972

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	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					
Area	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						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**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	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					
Area	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						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**

	ROG	**NOx**	**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**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**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	Excavate Portal Work Area and Concrete Slab	Grading	1/30/2023	3/10/2023	5	30	
2	Shotcrete Portal Face	Grading	3/11/2023	3/31/2023	5	15	
3	Excavate First 916LF D + S	Grading	4/1/2023	6/2/2023	5	45	

4	Place Concrete Slab D + S	Grading	6/3/2023	6/23/2023	5	15	
5	Tunnel Excavation, Stage 1 Shotcetre and Invert Concrete	Grading	6/24/2023	7/19/2024	5	280	
6	Stage 2 Shotcrete	Grading	7/20/2024	9/27/2024	5	50	
7	Tunnel Cleanup	Grading	9/28/2024	10/25/2024	5	20	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 30

Acres of Paving: 1

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Shotcrete Portal Face	Generator Sets	1	10.00	400	0.74
Shotcrete Portal Face	Air Compressors	1	10.00	200	0.75
Excavate First 916LF D + S	Generator Sets	1	20.00	400	0.74
Excavate First 916LF D + S	Air Compressors	1	20.00	200	0.75
Excavate First 916LF D + S	Off-Highway Trucks	6	20.00	300	0.10
Excavate First 916LF D + S	Rubber Tired Loaders	1	20.00	230	0.50
Place Concrete Slab D + S	Generator Sets	1	20.00	400	0.74
Tunnel Excavation, Stage 1 Shotcetre and Invert Concrete	Generator Sets	1	22.00	2000	0.74
Tunnel Excavation, Stage 1 Shotcetre and Invert Concrete	Off-Highway Trucks	3	22.00	220	0.50
Tunnel Excavation, Stage 1 Shotcetre and Invert Concrete	Off-Highway Trucks	2	22.00	140	0.50
Tunnel Excavation, Stage 1 Shotcetre and Invert Concrete	Rubber Tired Loaders	1	22.00	280	0.30
Tunnel Excavation, Stage 1 Shotcetre and Invert Concrete	Air Compressors	1	22.00	200	0.75
Tunnel Excavation, Stage 1 Shotcetre and Invert Concrete	Off-Highway Trucks	6	22.00	300	0.10
Tunnel Excavation, Stage 1 Shotcetre and Invert Concrete	Off-Highway Trucks	3	22.00	300	0.10

Stage 2 Shotcrete	Generator Sets	1	10.00	400	0.74
Stage 2 Shotcrete	Off-Highway Trucks	2	10.00	140	0.50
Stage 2 Shotcrete	Off-Highway Trucks	3	10.00	300	0.10
Tunnel Cleanup	Generator Sets	1	22.00	400	0.74
Tunnel Cleanup	Off-Highway Trucks	3	22.00	220	0.50
Tunnel Cleanup	Rubber Tired Loaders	1	22.00	280	0.30
Excavate Portal Work Area and Concrete Slab	Generator Sets	1	10.00	400	0.74
Excavate Portal Work Area and Concrete Slab	Off-Highway Trucks	6	10.00	300	0.10
Excavate Portal Work Area and Concrete Slab	Rubber Tired Dozers	1	10.00	200	0.50
Excavate Portal Work Area and Concrete Slab	Rubber Tired Loaders	1	10.00	500	0.50
Excavate Portal Work Area and Concrete Slab	Bore/Drill Rigs	2	10.00	200	0.50

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
Excavate Portal Work Area and Concrete Sl	11	20.00	6.00	1,592.00	12.78	6.08	17.78	LD_Mix	MHDT	HHDT
Shotcrete Portal Face	2	20.00	6.00	796.00	12.78	6.08	17.78	LD_Mix	MHDT	HHDT
Excavate First 916LF D + S	9	20.00	0.00	2,388.00	12.78	6.08	17.78	LD_Mix	MHDT	HHDT
Tunnel Excavation, Stage 1 Shotcetre and	17	20.00	6.00	14,857.00	12.78	6.08	17.78	LD_Mix	MHDT	HHDT
Stage 2 Shotcrete	6	20.00	6.00	2,653.00	12.78	6.08	17.78	LD_Mix	MHDT	HHDT
Tunnel Cleanup	5	20.00	0.00	1,061.00	12.78	6.08	17.78	LD_Mix	MHDT	HHDT
Place Concrete Slab D + S	1	20.00	6.00	796.00	12.78	6.06	17.78	LD_Mix	MHDT	HHDT

3.1 Mitigation Measures Construction

3.2 Excavate Portal Work Area and Concrete Slab - 2023

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					0.1295	0.0000	0.1295	0.0639	0.0000	0.0639	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0648	0.5578	0.4115	1.6600e-003		0.0205	0.0205		0.0192	0.0192	0.0000	153.6728	153.6728	0.0346	0.0000	154.5384
Total	**0.0648**	**0.5578**	**0.4115**	**1.6600e-003**	**0.1295**	**0.0205**	**0.1500**	**0.0639**	**0.0192**	**0.0831**	**0.0000**	**153.6728**	**153.6728**	**0.0346**	**0.0000**	**154.5384**

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	1.5700e-003	0.0898	0.0196	4.2000e-004	0.0121	8.2000e-004	0.0129	3.3200e-003	7.8000e-004	4.1100e-003	0.0000	40.2752	40.2752	2.0000e-004	6.3300e-003	42.1678
Vendor	5.0000e-005	2.3800e-003	5.0000e-004	1.0000e-005	5.2000e-004	1.0000e-005	5.3000e-004	1.6000e-004	1.0000e-005	1.7000e-004	0.0000	1.2096	1.2096	0.0000	1.7000e-004	1.2610
Worker	1.0900e-003	7.3000e-004	9.0200e-003	2.0000e-005	2.8400e-003	2.0000e-005	2.8500e-003	7.5000e-004	1.0000e-005	7.7000e-004	0.0000	2.3019	2.3019	7.0000e-005	6.0000e-005	2.3229
Total	**2.7100e-003**	**0.0929**	**0.0291**	**4.5000e-004**	**0.0155**	**8.5000e-004**	**0.0163**	**4.2300e-003**	**8.0000e-004**	**5.0500e-003**	**0.0000**	**43.7867**	**43.7867**	**2.7000e-004**	**6.5600e-003**	**45.7517**

3.2 Excavate Portal Work Area and Concrete Slab - 2023

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					0.1295	0.0000	0.1295	0.0639	0.0000	0.0639	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0648	0.5578	0.4115	1.6600e-003		0.0205	0.0205		0.0192	0.0192	0.0000	153.6726	153.6726	0.0346	0.0000	154.5382
Total	**0.0648**	**0.5578**	**0.4115**	**1.6600e-003**	**0.1295**	**0.0205**	**0.1500**	**0.0639**	**0.0192**	**0.0831**	**0.0000**	**153.6726**	**153.6726**	**0.0346**	**0.0000**	**154.5382**

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	1.5700e-003	0.0898	0.0196	4.2000e-004	0.0121	8.2000e-004	0.0129	3.3200e-003	7.8000e-004	4.1100e-003	0.0000	40.2752	40.2752	2.0000e-004	6.3300e-003	42.1678
Vendor	5.0000e-005	2.3800e-003	5.0000e-004	1.0000e-005	5.2000e-004	1.0000e-005	5.3000e-004	1.6000e-004	1.0000e-005	1.7000e-004	0.0000	1.2096	1.2096	0.0000	1.7000e-004	1.2610
Worker	1.0900e-003	7.3000e-004	9.0200e-003	2.0000e-005	2.8400e-003	2.0000e-005	2.8500e-003	7.5000e-004	1.0000e-005	7.7000e-004	0.0000	2.3019	2.3019	7.0000e-005	6.0000e-005	2.3229
Total	**2.7100e-003**	**0.0929**	**0.0291**	**4.5000e-004**	**0.0155**	**8.5000e-004**	**0.0163**	**4.2300e-003**	**8.0000e-004**	**5.0500e-003**	**0.0000**	**43.7867**	**43.7867**	**2.7000e-004**	**6.5600e-003**	**45.7517**

3.3 Shotcrete Portal Face - 2023

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	0.0138	0.0953	0.0755	3.9000e-004		2.9300e-003	2.9300e-003		2.9300e-003	2.9300e-003	0.0000	38.0192	38.0192	1.0900e-003	0.0000	38.0466
Total	**0.0138**	**0.0953**	**0.0755**	**3.9000e-004**	**0.0000**	**2.9300e-003**	**2.9300e-003**	**0.0000**	**2.9300e-003**	**2.9300e-003**	**0.0000**	**38.0192**	**38.0192**	**1.0900e-003**	**0.0000**	**38.0466**

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	7.9000e-004	0.0449	9.8100e-003	2.1000e-004	6.0400e-003	4.1000e-004	6.4500e-003	1.6600e-003	3.9000e-004	2.0500e-003	0.0000	20.1376	20.1376	1.0000e-004	3.1700e-003	21.0839
Vendor	3.0000e-005	1.1900e-003	2.5000e-004	1.0000e-005	2.6000e-004	0.0000	2.7000e-004	8.0000e-005	0.0000	8.0000e-005	0.0000	0.6048	0.6048	0.0000	9.0000e-005	0.6305
Worker	5.4000e-004	3.6000e-004	4.5100e-003	1.0000e-005	1.4200e-003	1.0000e-005	1.4300e-003	3.8000e-004	1.0000e-005	3.8000e-004	0.0000	1.1510	1.1510	3.0000e-005	3.0000e-005	1.1614
Total	**1.3600e-003**	**0.0464**	**0.0146**	**2.3000e-004**	**7.7200e-003**	**4.2000e-004**	**8.1500e-003**	**2.1200e-003**	**4.0000e-004**	**2.5100e-003**	**0.0000**	**21.8934**	**21.8934**	**1.3000e-004**	**3.2900e-003**	**22.8758**

3.3 Shotcrete Portal Face - 2023

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	0.0138	0.0953	0.0755	3.9000e-004		2.9300e-003	2.9300e-003		2.9300e-003	2.9300e-003	0.0000	38.0192	38.0192	1.0900e-003	0.0000	38.0465
Total	**0.0138**	**0.0953**	**0.0755**	**3.9000e-004**	**0.0000**	**2.9300e-003**	**2.9300e-003**	**0.0000**	**2.9300e-003**	**2.9300e-003**	**0.0000**	**38.0192**	**38.0192**	**1.0900e-003**	**0.0000**	**38.0465**

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	7.9000e-004	0.0449	9.8100e-003	2.1000e-004	6.0400e-003	4.1000e-004	6.4500e-003	1.6600e-003	3.9000e-004	2.0500e-003	0.0000	20.1376	20.1376	1.0000e-004	3.1700e-003	21.0839
Vendor	3.0000e-005	1.1900e-003	2.5000e-004	1.0000e-005	2.6000e-004	0.0000	2.7000e-004	8.0000e-005	0.0000	8.0000e-005	0.0000	0.6048	0.6048	0.0000	9.0000e-005	0.6305
Worker	5.4000e-004	3.6000e-004	4.5100e-003	1.0000e-005	1.4200e-003	1.0000e-005	1.4300e-003	3.8000e-004	1.0000e-005	3.8000e-004	0.0000	1.1510	1.1510	3.0000e-005	3.0000e-005	1.1614
Total	**1.3600e-003**	**0.0464**	**0.0146**	**2.3000e-004**	**7.7200e-003**	**4.2000e-004**	**8.1500e-003**	**2.1200e-003**	**4.0000e-004**	**2.5100e-003**	**0.0000**	**21.8934**	**21.8934**	**1.3000e-004**	**3.2900e-003**	**22.8758**

3.4 Excavate First 916LF D + S - 2023

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	0.1399	1.0434	0.8047	3.7900e-003		0.0340	0.0340		0.0327	0.0327	0.0000	353.6999	353.6999	0.0472	0.0000	354.8794
Total	**0.1399**	**1.0434**	**0.8047**	**3.7900e-003**	**0.0000**	**0.0340**	**0.0340**	**0.0000**	**0.0327**	**0.0327**	**0.0000**	**353.6999**	**353.6999**	**0.0472**	**0.0000**	**354.8794**

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	2.3600e-003	0.1346	0.0294	6.3000e-004	0.0181	1.2300e-003	0.0194	4.9800e-003	1.1700e-003	6.1600e-003	0.0000	60.4128	60.4128	3.0000e-004	9.5000e-003	63.2517
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	1.6300e-003	1.0900e-003	0.0135	4.0000e-005	4.2500e-003	2.0000e-005	4.2800e-003	1.1300e-003	2.0000e-005	1.1500e-003	0.0000	3.4529	3.4529	1.0000e-004	1.0000e-004	3.4843
Total	**3.9900e-003**	**0.1357**	**0.0430**	**6.7000e-004**	**0.0224**	**1.2500e-003**	**0.0236**	**6.1100e-003**	**1.1900e-003**	**7.3100e-003**	**0.0000**	**63.8657**	**63.8657**	**4.0000e-004**	**9.6000e-003**	**66.7360**

3.4 Excavate First 916LF D + S - 2023

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	0.1399	1.0434	0.8047	3.7900e-003		0.0340	0.0340		0.0327	0.0327	0.0000	353.6995	353.6995	0.0472	0.0000	354.8790
Total	**0.1399**	**1.0434**	**0.8047**	**3.7900e-003**	**0.0000**	**0.0340**	**0.0340**	**0.0000**	**0.0327**	**0.0327**	**0.0000**	**353.6995**	**353.6995**	**0.0472**	**0.0000**	**354.8790**

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	2.3600e-003	0.1346	0.0294	6.3000e-004	0.0181	1.2300e-003	0.0194	4.9800e-003	1.1700e-003	6.1600e-003	0.0000	60.4128	60.4128	3.0000e-004	9.5000e-003	63.2517
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	1.6300e-003	1.0900e-003	0.0135	4.0000e-005	4.2500e-003	2.0000e-005	4.2800e-003	1.1300e-003	2.0000e-005	1.1500e-003	0.0000	3.4529	3.4529	1.0000e-004	1.0000e-004	3.4843
Total	**3.9900e-003**	**0.1357**	**0.0430**	**6.7000e-004**	**0.0224**	**1.2500e-003**	**0.0236**	**6.1100e-003**	**1.1900e-003**	**7.3100e-003**	**0.0000**	**63.8657**	**63.8657**	**4.0000e-004**	**9.6000e-003**	**66.7360**

3.5 Place Concrete Slab D + S - 2023

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	0.0155	0.1202	0.0965	4.9000e-004		3.6200e-003	3.6200e-003		3.6200e-003	3.6200e-003	0.0000	50.4650	50.4650	1.2400e-003	0.0000	50.4960
Total	**0.0155**	**0.1202**	**0.0965**	**4.9000e-004**	**0.0000**	**3.6200e-003**	**3.6200e-003**	**0.0000**	**3.6200e-003**	**3.6200e-003**	**0.0000**	**50.4650**	**50.4650**	**1.2400e-003**	**0.0000**	**50.4960**

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	7.9000e-004	0.0449	9.8100e-003	2.1000e-004	6.0400e-003	4.1000e-004	6.4500e-003	1.6600e-003	3.9000e-004	2.0500e-003	0.0000	20.1376	20.1376	1.0000e-004	3.1700e-003	21.0839
Vendor	3.0000e-005	1.1900e-003	2.5000e-004	1.0000e-005	2.6000e-004	0.0000	2.7000e-004	8.0000e-005	0.0000	8.0000e-005	0.0000	0.6029	0.6029	0.0000	9.0000e-005	0.6285
Worker	5.4000e-004	3.6000e-004	4.5100e-003	1.0000e-005	1.4200e-003	1.0000e-005	1.4300e-003	3.8000e-004	1.0000e-005	3.8000e-004	0.0000	1.1510	1.1510	3.0000e-005	3.0000e-005	1.1614
Total	**1.3600e-003**	**0.0464**	**0.0146**	**2.3000e-004**	**7.7200e-003**	**4.2000e-004**	**8.1500e-003**	**2.1200e-003**	**4.0000e-004**	**2.5100e-003**	**0.0000**	**21.8914**	**21.8914**	**1.3000e-004**	**3.2900e-003**	**22.8738**

3.5 Place Concrete Slab D + S - 2023

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	0.0155	0.1202	0.0965	4.9000e-004		3.6200e-003	3.6200e-003		3.6200e-003	3.6200e-003	0.0000	50.4649	50.4649	1.2400e-003	0.0000	50.4960
Total	**0.0155**	**0.1202**	**0.0965**	**4.9000e-004**	**0.0000**	**3.6200e-003**	**3.6200e-003**	**0.0000**	**3.6200e-003**	**3.6200e-003**	**0.0000**	**50.4649**	**50.4649**	**1.2400e-003**	**0.0000**	**50.4960**

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	7.9000e-004	0.0449	9.8100e-003	2.1000e-004	6.0400e-003	4.1000e-004	6.4500e-003	1.6600e-003	3.9000e-004	2.0500e-003	0.0000	20.1376	20.1376	1.0000e-004	3.1700e-003	21.0839
Vendor	3.0000e-005	1.1900e-003	2.5000e-004	1.0000e-005	2.6000e-004	0.0000	2.7000e-004	8.0000e-005	0.0000	8.0000e-005	0.0000	0.6029	0.6029	0.0000	9.0000e-005	0.6285
Worker	5.4000e-004	3.6000e-004	4.5100e-003	1.0000e-005	1.4200e-003	1.0000e-005	1.4300e-003	3.8000e-004	1.0000e-005	3.8000e-004	0.0000	1.1510	1.1510	3.0000e-005	3.0000e-005	1.1614
Total	**1.3600e-003**	**0.0464**	**0.0146**	**2.3000e-004**	**7.7200e-003**	**4.2000e-004**	**8.1500e-003**	**2.1200e-003**	**4.0000e-004**	**2.5100e-003**	**0.0000**	**21.8914**	**21.8914**	**1.3000e-004**	**3.2900e-003**	**22.8738**

3.6 Tunnel Excavation, Stage 1 Shotcetre and Invert Concrete - 2023

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	1.6160	19.5422	9.8848	0.0403		0.4653	0.4653		0.4523	0.4523	0.0000	3,904.6586	3,904.6586	0.4571	0.0000	3,916.0869
Total	**1.6160**	**19.5422**	**9.8848**	**0.0403**	**0.0000**	**0.4653**	**0.4653**	**0.0000**	**0.4523**	**0.4523**	**0.0000**	**3,904.6586**	**3,904.6586**	**0.4571**	**0.0000**	**3,916.0869**

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	7.0800e-003	0.4039	0.0883	1.8800e-003	0.0544	3.6800e-003	0.0581	0.0150	3.5200e-003	0.0185	0.0000	181.2182	181.2182	9.0000e-004	0.0285	189.7339
Vendor	2.3000e-004	0.0107	2.2400e-003	6.0000e-005	2.3600e-003	4.0000e-005	2.4100e-003	7.1000e-004	4.0000e-005	7.5000e-004	0.0000	5.4432	5.4432	1.0000e-005	7.7000e-004	5.6744
Worker	4.9000e-003	3.2800e-003	0.0406	1.1000e-004	0.0128	7.0000e-005	0.0128	3.3900e-003	7.0000e-005	3.4600e-003	0.0000	10.3586	10.3586	3.1000e-004	2.9000e-004	10.4529
Total	**0.0122**	**0.4179**	**0.1311**	**2.0500e-003**	**0.0695**	**3.7900e-003**	**0.0733**	**0.0191**	**3.6300e-003**	**0.0227**	**0.0000**	**197.0200**	**197.0200**	**1.2200e-003**	**0.0296**	**205.8612**

3.6 Tunnel Excavation, Stage 1 Shotcetre and Invert Concrete - 2023

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	1.6159	19.5421	9.8848	0.0403		0.4653	0.4653		0.4523	0.4523	0.0000	3,904.653 9	3,904.653 9	0.4571	0.0000	3,916.082 3
Total	**1.6159**	**19.5421**	**9.8848**	**0.0403**	**0.0000**	**0.4653**	**0.4653**	**0.0000**	**0.4523**	**0.4523**	**0.0000**	**3,904.653 9**	**3,904.653 9**	**0.4571**	**0.0000**	**3,916.082 3**

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	7.0800e-003	0.4039	0.0883	1.8800e-003	0.0544	3.6800e-003	0.0581	0.0150	3.5200e-003	0.0185	0.0000	181.2182	181.2182	9.0000e-004	0.0285	189.7339
Vendor	2.3000e-004	0.0107	2.2400e-003	6.0000e-005	2.3600e-003	4.0000e-005	2.4100e-003	7.1000e-004	4.0000e-005	7.5000e-004	0.0000	5.4432	5.4432	1.0000e-005	7.7000e-004	5.6744
Worker	4.9000e-003	3.2800e-003	0.0406	1.1000e-004	0.0128	7.0000e-005	0.0128	3.3900e-003	7.0000e-005	3.4600e-003	0.0000	10.3586	10.3586	3.1000e-004	2.9000e-004	10.4529
Total	**0.0122**	**0.4179**	**0.1311**	**2.0500e-003**	**0.0695**	**3.7900e-003**	**0.0733**	**0.0191**	**3.6300e-003**	**0.0227**	**0.0000**	**197.0200**	**197.0200**	**1.2200e-003**	**0.0296**	**205.8612**

3.6 Tunnel Excavation, Stage 1 Shotcetre and Invert Concrete - 2024

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	1.6564	19.8848	10.5185	0.0433		0.4494	0.4494		0.4368	0.4368	0.0000	4,193.6938	4,193.6938	0.4857	0.0000	4,205.8371
Total	**1.6564**	**19.8848**	**10.5185**	**0.0433**	**0.0000**	**0.4494**	**0.4494**	**0.0000**	**0.4368**	**0.4368**	**0.0000**	**4,193.6938**	**4,193.6938**	**0.4857**	**0.0000**	**4,205.8371**

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	7.5500e-003	0.4323	0.0946	1.9900e-003	0.0584	3.9700e-003	0.0624	0.0161	3.8000e-003	0.0199	0.0000	191.1400	191.1400	9.3000e-004	0.0301	200.1215
Vendor	2.3000e-004	0.0116	2.2300e-003	6.0000e-005	2.5400e-003	5.0000e-005	2.5800e-003	7.6000e-004	5.0000e-005	8.1000e-004	0.0000	5.7694	5.7694	1.0000e-005	8.2000e-004	6.0144
Worker	4.8500e-003	3.0900e-003	0.0402	1.2000e-004	0.0137	7.0000e-005	0.0138	3.6400e-003	7.0000e-005	3.7100e-003	0.0000	10.8386	10.8386	2.9000e-004	2.9000e-004	10.9316
Total	**0.0126**	**0.4470**	**0.1370**	**2.1700e-003**	**0.0747**	**4.0900e-003**	**0.0787**	**0.0205**	**3.9200e-003**	**0.0244**	**0.0000**	**207.7481**	**207.7481**	**1.2300e-003**	**0.0312**	**217.0675**

3.6 Tunnel Excavation, Stage 1 Shotcetre and Invert Concrete - 2024

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	1.6564	19.8848	10.5185	0.0433		0.4494	0.4494		0.4368	0.4368	0.0000	4,193.688 8	4,193.688 8	0.4857	0.0000	4,205.832 1
Total	**1.6564**	**19.8848**	**10.5185**	**0.0433**	**0.0000**	**0.4494**	**0.4494**	**0.0000**	**0.4368**	**0.4368**	**0.0000**	**4,193.688 8**	**4,193.688 8**	**0.4857**	**0.0000**	**4,205.832 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	tons/yr										MT/yr					
Hauling	7.5500e-003	0.4323	0.0946	1.9900e-003	0.0584	3.9700e-003	0.0624	0.0161	3.8000e-003	0.0199	0.0000	191.1400	191.1400	9.3000e-004	0.0301	200.1215
Vendor	2.3000e-004	0.0116	2.2300e-003	6.0000e-005	2.5400e-003	5.0000e-005	2.5800e-003	7.6000e-004	5.0000e-005	8.1000e-004	0.0000	5.7694	5.7694	1.0000e-005	8.2000e-004	6.0144
Worker	4.8500e-003	3.0900e-003	0.0402	1.2000e-004	0.0137	7.0000e-005	0.0138	3.6400e-003	7.0000e-005	3.7100e-003	0.0000	10.8386	10.8386	2.9000e-004	2.9000e-004	10.9316
Total	**0.0126**	**0.4470**	**0.1370**	**2.1700e-003**	**0.0747**	**4.0900e-003**	**0.0787**	**0.0205**	**3.9200e-003**	**0.0244**	**0.0000**	**207.7481**	**207.7481**	**1.2300e-003**	**0.0312**	**217.0675**

3.7 Stage 2 Shotcrete - 2024

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	0.0511	0.3531	0.4768	1.4300e-003		0.0128	0.0128		0.0122	0.0122	0.0000	138.4118	138.4118	0.0195	0.0000	138.8990
Total	**0.0511**	**0.3531**	**0.4768**	**1.4300e-003**	**0.0000**	**0.0128**	**0.0128**	**0.0000**	**0.0122**	**0.0122**	**0.0000**	**138.4118**	**138.4118**	**0.0195**	**0.0000**	**138.8990**

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	2.6000e-003	0.1491	0.0326	6.8000e-004	0.0201	1.3700e-003	0.0215	5.5400e-003	1.3100e-003	6.8500e-003	0.0000	65.9095	65.9095	3.2000e-004	0.0104	69.0065
Vendor	8.0000e-005	4.0000e-003	7.7000e-004	2.0000e-005	8.7000e-004	2.0000e-005	8.9000e-004	2.6000e-004	2.0000e-005	2.8000e-004	0.0000	1.9895	1.9895	1.0000e-005	2.8000e-004	2.0739
Worker	1.6700e-003	1.0700e-003	0.0139	4.0000e-005	4.7300e-003	3.0000e-005	4.7500e-003	1.2600e-003	2.0000e-005	1.2800e-003	0.0000	3.7375	3.7375	1.0000e-004	1.0000e-004	3.7695
Total	**4.3500e-003**	**0.1541**	**0.0472**	**7.4000e-004**	**0.0257**	**1.4200e-003**	**0.0272**	**7.0600e-003**	**1.3500e-003**	**8.4100e-003**	**0.0000**	**71.6364**	**71.6364**	**4.3000e-004**	**0.0108**	**74.8499**

3.7 Stage 2 Shotcrete - 2024

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	0.0511	0.3531	0.4768	1.4300e-003		0.0128	0.0128		0.0122	0.0122	0.0000	138.4116	138.4116	0.0195	0.0000	138.8988
Total	**0.0511**	**0.3531**	**0.4768**	**1.4300e-003**	**0.0000**	**0.0128**	**0.0128**	**0.0000**	**0.0122**	**0.0122**	**0.0000**	**138.4116**	**138.4116**	**0.0195**	**0.0000**	**138.8988**

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	2.6000e-003	0.1491	0.0326	6.8000e-004	0.0201	1.3700e-003	0.0215	5.5400e-003	1.3100e-003	6.8500e-003	0.0000	65.9095	65.9095	3.2000e-004	0.0104	69.0065
Vendor	8.0000e-005	4.0000e-003	7.7000e-004	2.0000e-005	8.7000e-004	2.0000e-005	8.9000e-004	2.6000e-004	2.0000e-005	2.8000e-004	0.0000	1.9895	1.9895	1.0000e-005	2.8000e-004	2.0739
Worker	1.6700e-003	1.0700e-003	0.0139	4.0000e-005	4.7300e-003	3.0000e-005	4.7500e-003	1.2600e-003	2.0000e-005	1.2800e-003	0.0000	3.7375	3.7375	1.0000e-004	1.0000e-004	3.7695
Total	**4.3500e-003**	**0.1541**	**0.0472**	**7.4000e-004**	**0.0257**	**1.4200e-003**	**0.0272**	**7.0600e-003**	**1.3500e-003**	**8.4100e-003**	**0.0000**	**71.6364**	**71.6364**	**4.3000e-004**	**0.0108**	**74.8499**

3.8 Tunnel Cleanup - 2024

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	0.0625	0.4416	0.3977	1.6900e-003		0.0158	0.0158		0.0149	0.0149	0.0000	159.4468	159.4468	0.0293	0.0000	160.1799
Total	**0.0625**	**0.4416**	**0.3977**	**1.6900e-003**	**0.0000**	**0.0158**	**0.0158**	**0.0000**	**0.0149**	**0.0149**	**0.0000**	**159.4468**	**159.4468**	**0.0293**	**0.0000**	**160.1799**

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	1.0400e-003	0.0596	0.0130	2.7000e-004	8.0500e-003	5.5000e-004	8.6000e-003	2.2100e-003	5.2000e-004	2.7400e-003	0.0000	26.3588	26.3588	1.3000e-004	4.1500e-003	27.5974
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	6.7000e-004	4.3000e-004	5.5500e-003	2.0000e-005	1.8900e-003	1.0000e-005	1.9000e-003	5.0000e-004	1.0000e-005	5.1000e-004	0.0000	1.4950	1.4950	4.0000e-005	4.0000e-005	1.5078
Total	**1.7100e-003**	**0.0601**	**0.0186**	**2.9000e-004**	**9.9400e-003**	**5.6000e-004**	**0.0105**	**2.7100e-003**	**5.3000e-004**	**3.2500e-003**	**0.0000**	**27.8538**	**27.8538**	**1.7000e-004**	**4.1900e-003**	**29.1052**

3.8 Tunnel Cleanup - 2024

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	0.0625	0.4416	0.3977	1.6900e-003		0.0158	0.0158		0.0149	0.0149	0.0000	159.4466	159.4466	0.0293	0.0000	160.1797
Total	**0.0625**	**0.4416**	**0.3977**	**1.6900e-003**	**0.0000**	**0.0158**	**0.0158**	**0.0000**	**0.0149**	**0.0149**	**0.0000**	**159.4466**	**159.4466**	**0.0293**	**0.0000**	**160.1797**

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	1.0400e-003	0.0596	0.0130	2.7000e-004	8.0500e-003	5.5000e-004	8.6000e-003	2.2100e-003	5.2000e-004	2.7400e-003	0.0000	26.3588	26.3588	1.3000e-004	4.1500e-003	27.5974
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	6.7000e-004	4.3000e-004	5.5500e-003	2.0000e-005	1.8900e-003	1.0000e-005	1.9000e-003	5.0000e-004	1.0000e-005	5.1000e-004	0.0000	1.4950	1.4950	4.0000e-005	4.0000e-005	1.5078
Total	**1.7100e-003**	**0.0601**	**0.0186**	**2.9000e-004**	**9.9400e-003**	**5.6000e-004**	**0.0105**	**2.7100e-003**	**5.3000e-004**	**3.2500e-003**	**0.0000**	**27.8538**	**27.8538**	**1.7000e-004**	**4.1900e-003**	**29.1052**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	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					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Other Non-Asphalt Surfaces	14.70	6.60	6.60	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Other Non-Asphalt Surfaces	0.530702	0.051956	0.166139	0.152700	0.030655	0.007634	0.013363	0.016357	0.000829	0.000302	0.024359	0.001347	0.003656

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	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					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	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

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	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**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	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					
Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	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**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	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**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Other Non-Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Other Non-Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Appendix B: Biological Evaluation

Biological Evaluation

SOUTH SAN JOAQUIN IRRIGATION DISTRICT

CANYON TUNNEL PROJECT

JANUARY 2023

Jacob A. Rogers, Biologist
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I. Introduction

The following technical report, prepared by Provost & Pritchard Consulting Group, in compliance with the California Environmental Quality Act (CEQA) includes a description of the biological resources present or with potential to occur within the proposed Canyon Tunnel Project (Project) and surrounding areas, and evaluates potential Project-related impacts to those resources.

Project Description

South San Joaquin Irrigation District (SSJID) is interested in constructing a new water conveyance tunnel to bypass approximately 12,200 lineal feet of existing canal and tunnels, referred to as the Joint Supply Canal (JSC). The objective is to improve long-term reliability of this critical water supply system. The existing canal segments along this bypass reach are extremely vulnerable to catastrophic failure, primarily due to unstable rock slopes that are present along the canyon wall. The existing JSC is located along the north bank of the Stanislaus River in Calaveras and Tuolumne Counties, California, near the town of Knights Ferry. As illustrated in **Figure 3** and **Figure 4**, the Area of Potential Effect (APE) includes approximately 770 total acres, however the majority of the APE is underground, with approximately 8.5 total acres of ground disturbance.

The work will include 4-acres of temporary construction access, 3-acres of laydown and staging areas, a 0.5-acre permanent downstream tunnel portal and tie-in to the existing canal, approximately 12,000 lineal feet of new tunnel, a 0.3-acre permanent upstream tunnel portal and tie-in to the existing Goodwin Reservoir, an upgrade to an existing dock on the south shore of Goodwin Reservoir, a 0.4-acre permanent barge landing area, and 0.3-acres of permanent access improvements leading to the existing Goodwin Dam right abutment. Tree removal activities are not anticipated as part of the Project and existing roads would be utilized for construction purposes.

Report Objectives

Construction activities such as that proposed by the Project could potentially damage biological resources or modify habitats that are crucial for sensitive plant and wildlife species. In cases such as these, development may be regulated by State or federal agencies, and/or addressed by local regulatory agencies.

This report addresses issues related to the following:

1. The presence of sensitive biological resources onsite, or with the potential to occur onsite.
2. The federal, State, and local regulations regarding these resources.
3. Mitigation measures that may be required to reduce the magnitude of anticipated impacts and/or comply with permit requirements of state and federal resource agencies.

Therefore, the objectives of this report are:

1. Summarize all site-specific information related to existing biological resources.
2. Make reasonable inferences about the biological resources that could occur onsite based on habitat suitability and the proximity of the site to a species' known range.
3. Summarize all State and federal natural resource protection laws that may be relevant to the APE.
4. Identify and discuss Project impacts to biological resources likely to occur onsite within the context of CEQA and/or State or federal laws.
5. Identify and publish a set of avoidance and mitigation measures that would reduce impacts to a less-than-significant level (as identified by CEQA) and are generally consistent with recommendations of the resource agencies for affected biological resources.

Study Methodology

A reconnaissance-level field survey of the APE was conducted on September 16 and 17, 2021 by Provost & Pritchard biologist, Jacob Rogers. The survey consisted of walking and driving thoroughly through the APE while identifying and noting land uses, biological habitats and communities, plant and animal species encountered and assessed for suitable habitats of various wildlife species.

The biologist conducted an analysis of potential Project-related impacts to biological resources based on the resources known to exist or with potential to exist within the APE. Sources of information used in preparation of this analysis included: the California Department of Fish and Wildlife (CDFW) California Natural Diversity Database (CNDDB); the California Native Plant Society (CNPS) Online Inventory of Rare and Endangered Vascular Plants of California; CalFlora's online database of California native plants; the Jepson Herbarium online database (Jepson eFlora); United States Fish and Wildlife Service (USFWS) Environmental Conservation Online System (ECOS); Information for Planning and Consultation (IPaC) system; the NatureServe Explorer online database; the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Plants Database; CDFW California Wildlife Habitat Relationships (CWHR) database; the California Herps online database; and various manuals, reports, and references related to plants and animals of the Sierra Foothills region.

The reconnaissance-level field survey did include one focused survey for special status bat species and was conducted during the dusk hours of the two-day reconnaissance survey. The results of the focused survey can be found in Appendix D at the end of this document.

The field survey conducted included the appropriate level of detail to assess the significance of potential impacts to sensitive biological resources resulting from the Project. Furthermore, the field survey was sufficient to generally describe those features of the Project that could be subject to the jurisdiction of federal and/or State agencies, such as the United States Army Corps of Engineers (USACE), CDFW, Regional Water Quality Control Board (RWQCB) and State Water Resources Control Board (SWRCB) and used to support CEQA documents.

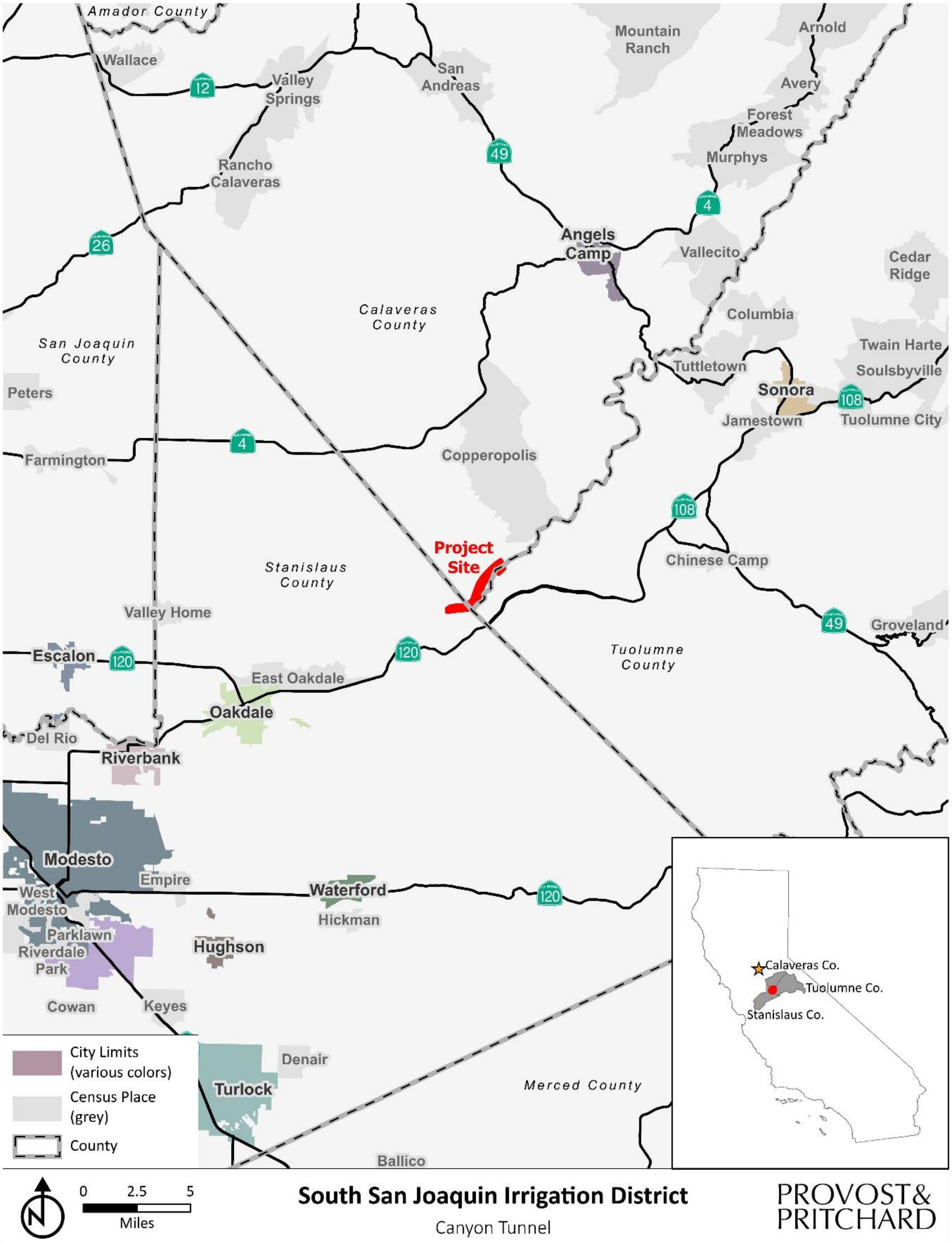

Figure 1. Regional Location Map

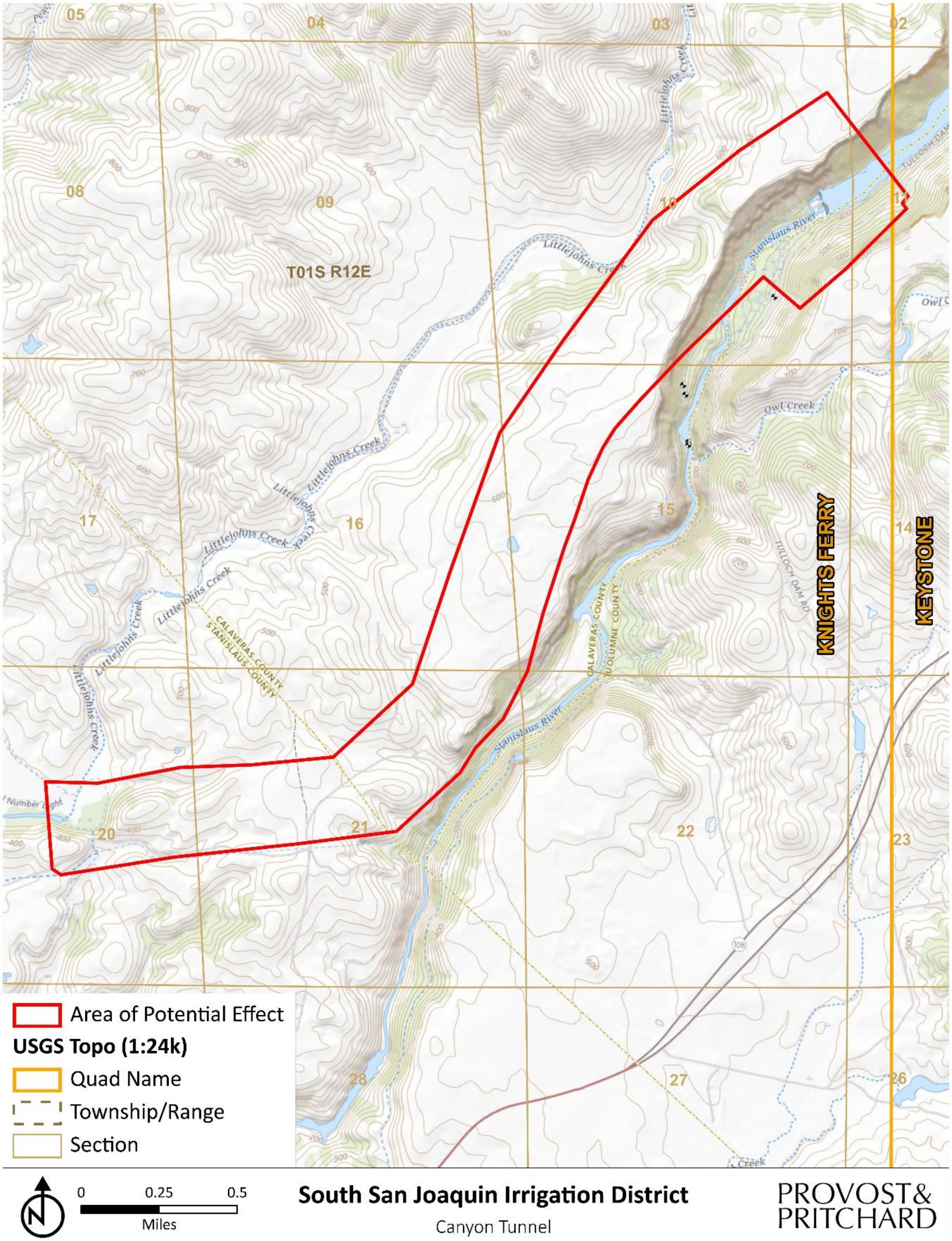

Figure 2. Topographic Quadrangle Map

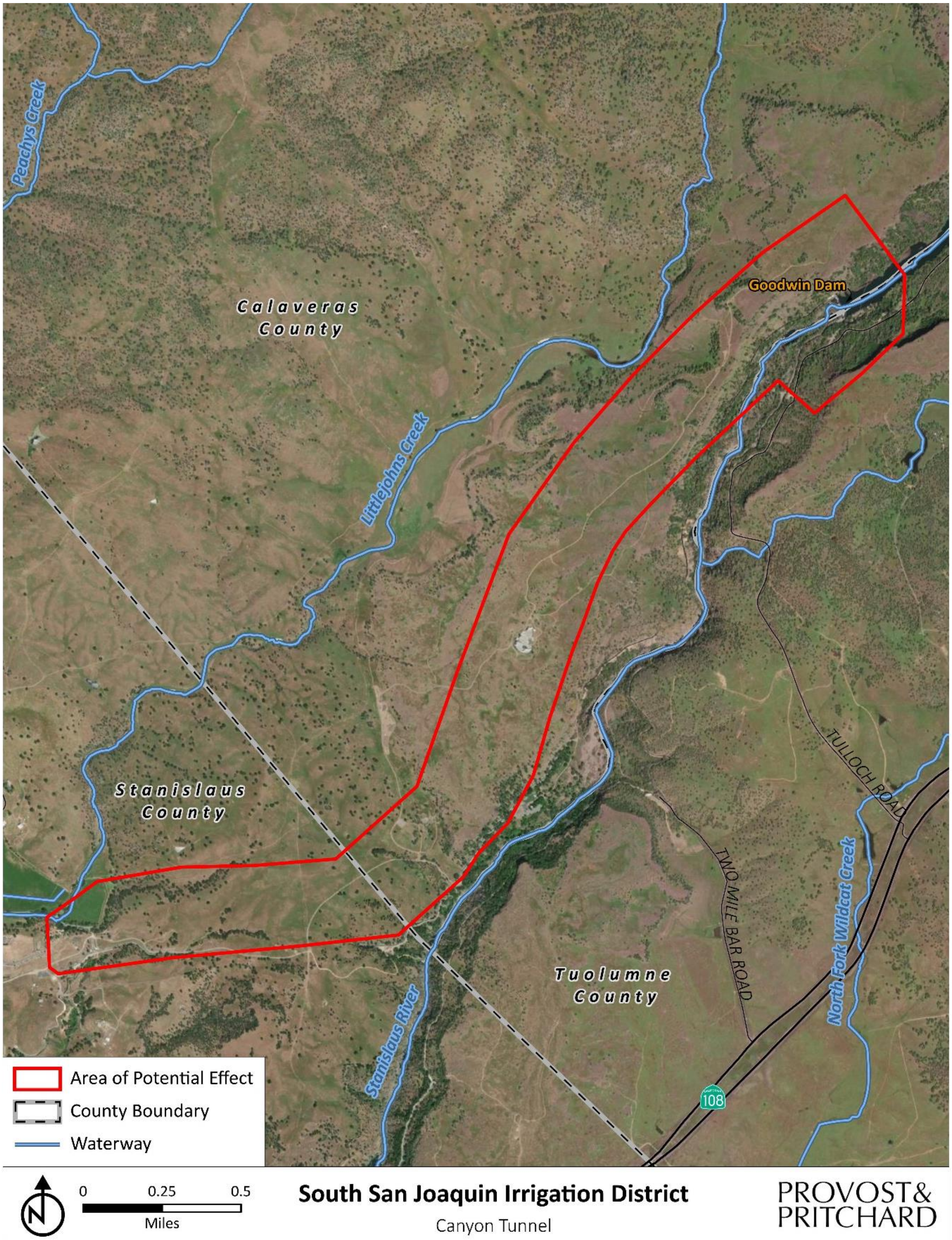

Figure 3. Area of Potential Effect Map

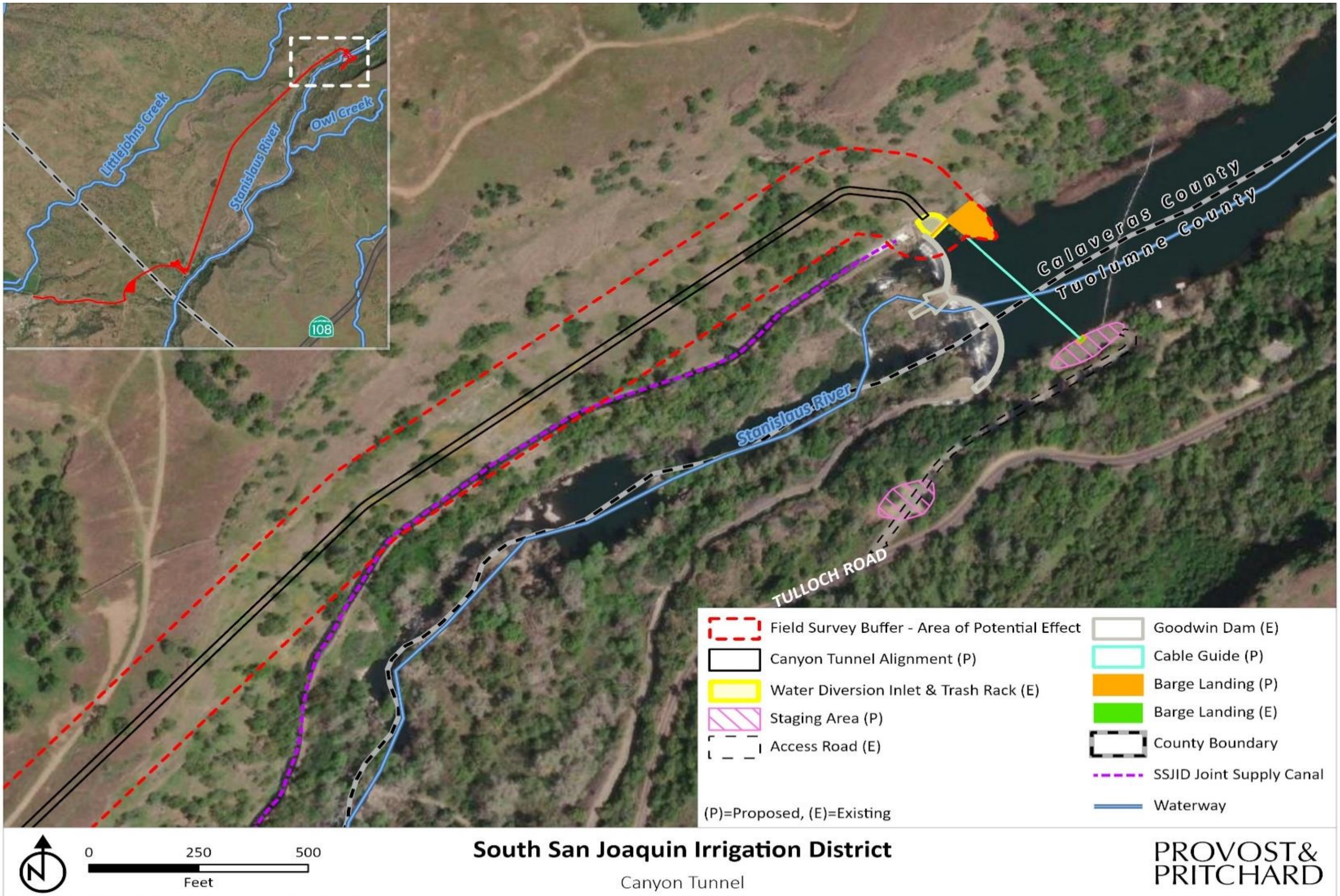

Figure 4. Barge Landing Map

II. Existing Conditions

Regional Setting

The APE is located within Calaveras, Stanislaus, and Tuolumne Counties, north of the unincorporated community of Knights Ferry, California (see **Figure 1** and **Figure 2**). This area lies within the foothills of the Sierra Nevada Mountain Range adjacent to the San Joaquin Valley. The topography is rolling with elevations ranging from approximately 300 to 700 ft, with underlying rock formations of basalt and sandstone.

Like most of California, the APE experiences a Mediterranean climate. Warm, dry summers are followed by cool, moist winters. Summer temperatures range between 70- and 80-degrees Fahrenheit (˚F), but often exceeds 90˚F in the upper reaches of the counties. Winter minimum temperatures are near 40˚F. The average annual precipitation is approximately 13 inches, falling mainly from October to April.

The APE lies within two watersheds, the Lower Stanislaus River and Littlejohns Creek; Hydrologic Unit Codes (HUC): 1804001007 and 1804005102, respectively; and encompasses two subwatersheds: Peachys Creek-Littlejohns Creek and Wildcat Creek-Stanislaus River; HUCs: 180400510203 and 180400100701, respectively.

The principal drainage comes from the mainstem of the Stanislaus River. The watersheds begin as rainfall events from the west slopes of the Sierra Nevada Mountain Range, which collect into the Stanislaus River and feed into New Melones Lake, where the Stanisluas River is intercepted by New Melones Dam. Downstream of New Melones Lake, the river flows west into the Tulloch Resovoir and again into the Goodwin Dam Reservoir near the town of Knights Ferry. The river then continues along the northern edge of the Modesto metro area, until it joins the San Joaquin River near Vernalis, California.

Within the APE sits Goodwin Dam and the JSC. The JSC provides water supplies to the cities of Manteca, Lathrop, and Tracy, California, as well as 52,000 acres within the SSJID. Primarily, the JSC is diverted to serve two districts: SSJID and Oakdale Irrigation District.

Photographs of the APE and vicinity are available in **Appendix A** at the end of this document.

Project Site

Oak Savanna

The APE is primarily located on private property used for cattle grazing. The APE is dominated by widely spaced interior live oak *(Quercus wislizeni*) and blue oak (*Quercus doulasii*) trees and annual grasslands. Herbaceous vegetation was dominated by oats (*Avena* spp.), pitgland tarweed (*Holocarpha virgata*), bromes (*Bromus* spp.) and lavender (*Lavandula* spp.). Representative photographs of the site at the time of the survey are presented in **Appendix A** at the end of this document.

The survey of the APE resulted in the identification of numerus bird species including Acorn Woodpecker (*Melanerpes formicivorus*), Common Raven (*Corvus corax*), European Starling (*Sturnus vulgaris*), Mourning Dove (*Zenaida macroura*), Northern Mockingbird (*Mimus polyglottos*), Rock Wren (*Salpinctes obsoletus*), Red-tailed Hawk (*Buteo jamaicensis*), Say's Phoebe (*Sayornis saya*), Tree Swallow (*Tachycineta bicolor*), Turkey Vulture (*Cathartes aura*), White-tailed Kite (*Elanus leucurus*), and Western Meadowlark (*Sturnella neglecta*). California ground squirrel (*Otospermophilus beecheyi*), coyote (*Canis latrans*), mule deer (*Odocoileus hemionus*) and a small unidentified snake in the grasp of a Red-tailed Hawk were also observed.

The only stagnant water within the APE, at the time of the survey, included a cluster of artificial cattle ponds near the center of the APE. Three of the nine ponds held water, from 2 to 4 inches deep. The ponds were scanned for aquatic species, and none were observed. Given that herpetofauna often uses wetted areas as habitat, the cattle ponds were surveyed at night, when some herpetofauna are more active; however, wildlife was not heard or observed in or near the cattle ponds. The area is heavily disturbed by high density traffic from cattle and likely provides little value to wildlife.

The oak savanna habitat within the APE is moderately disturbed by cattle grazing but provides expansive high-quality habitat to a variety of wildlife, year-round. The APE serves foraging birds, including raptors, during the day, as well as bats, coyotes, and other nocturnal animals at night. Mitigation measures designed to avoid impacts to special status species are discussed in Section 3 of this report.

Riverine/Reservoir

The riverine and reservoir habitats include the area surrounding the Goodwin Dam and a 0.7-mile section of the Stanislaus River, approximately 40 acres of the 770-acre APE. The Goodwin Dam acts as a barrier for aquatic wildlife migration and is more likely to be used for wildlife foraging. The riparian habitat within the APE is dominated by Fremont cottonwood (*Populus fremontii*), willows (*Salix* sp.), tree of heaven (*Ailanthus altissima*), irises (*Iris* spp.) and rushes (*Juncus* spp.). The survey of the riverine habitat resulted in the identification of Canada Goose (*Branta canadensis*) and Double-crested Cormorant (*Phalacrocorax auratus*).

Soils

Nine soil mapping units representing nine soil types were identified within the APE are listed in Table 1. The soils are displayed with their core properties in the table above, according to the Major Land Resource Area of California (MLRA) 19 map area. All nine soils are primarily used for grazing, wildlife habitat, and watershed areas.

Table 1. List of Soils Located Onsite and Their Basic Properties.

Soil	*Soil Map Unit*	*Percent of APE*	*Hydric Unit*	*Hydric Minor Units*	*Drainage*	*Permeability*	*Runoff*
Archerdale-Hicksville	Association, 0 to 2 percent slopes	1.3%	No	No	Well drained	Moderately slow	Very slow to slow
Amador	Sandy loam, 2 to 15 percent slopes	7.9%	No	No	Well drained	Moderately high to high	Negligible runoff
Bonanza-Loafercreek	Complex, 3 to15 percent slopes	2.7%	No	No	Well drained	Moderate permeability	Low runoff
	Gopheridge complex, 15 to 30 percent slopes	7.3%	No	No	Well drained	Moderate permeability	Low runoff
Goldwall-Toomes-Rock	Outcrop complex, 1 to 8 percent slopes	42.8%	No	Yes	Moderately well drained	Moderate permeability	Negligible runoff
Jasperpeak-Gopheridge	Complex, 30 to 60 percent slopes	0.5%	No	No	Well drained	Moderately high to high	Low runoff
Miltonhills-Amador	Complex, 15 to 45 percent slopes	9.8%	No	No	Well drained	Moderately high to high	Negligible runoff
Psammentic Haploxerolls-Mollic Fluvaquents-Riverwash	Complex, 0 to 8 percent slopes	1.9%	No	Yes	Well drained	Moderate permeability	Negligible runoff
Shawsflat-Anglescreek	Complex, 25 to 60 percent slopes	17.9%	No	No	Well drained	Moderately slow	Very slow to slow
Ultic Haploxeralfs	Moderately deep complex, 10 to	6.7%	No	No	Well drained	Moderate permeability	Low runoff

Soil	*Soil Map Unit*	*Percent of APE*	*Hydric Unit*	*Hydric Minor Units*	*Drainage*	*Permeability*	*Runoff*
	35 percent slopes						
Water	-	1.1%	-	-	-	-	-

None of the major soil mapping units were identified as hydric, but two of the nine minor soil mapping units are considered hydric. Hydric soils are defined as soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions such that under sufficiently wet conditions, hydrophytic vegetation can be supported.

Natural Communities of Special Concern

Natural communities of special concern are those that are of limited distribution, distinguished by significant biological diversity, or home to special status species. CDFW is responsible for the classification and mapping of all-natural communities in California. Just as the special status plant and animal species, these natural communities of special concern can be found within the CNDDB.

According to CNDDB, there are no recorded observations of natural communities of special concern with potential to occur within the APE or vicinity. Additionally, no natural communities of special concern were observed during the biological survey.

Designated Critical Habitat of the APE

The USFWS often designates areas of “Critical Habitat” when it lists species as threatened or endangered. Critical Habitat is a specific geographic area that contains features essential for the conservation of a threatened or endangered species and that may require special management and protection. According to CNDDB and IPaC, designated critical habitat is absent from the APE and vicinity.

Wildlife Movement Corridors

Wildlife movement corridors are routes that animals regularly and predictably follow during seasonal migration, dispersal from native ranges, daily travel within home ranges, and inter-population movements. Movement corridors in California are typically associated with valleys, ridgelines, and rivers and creeks supporting riparian vegetation.

The oak savanna habitat of the APE and surrounding areas consists of expansive open grassland that are likely to function as wildlife movement corridors. Numerous game trails and abundant wildlife were observed during the field survey, including mule deer. The Stanislaus River and riverine habitat within the APE likely does not act as a corridor because of the multiple dams acting as a barrier to aquatic wildlife movement.

Special Status Plants and Animals

California contains several “rare” plant and animal species. In this context, rare is defined as species known to have low populations or limited distributions. As the human population grows, urban expansion encroaches on the already-limited suitable habitat. This results in sensitive species becoming increasingly more vulnerable to extirpation. State and federal regulations have provided the CDFW and the USFWS with a mechanism for conserving and protecting the diversity of plant and animal species native to California. Numerous native plants and animals have been formally designated as “threatened” or “endangered” under State and federal endangered species legislation. Other formal designations include “candidate” for listing or “species of special concern” by CDFW. The CNPS has its list of native plants considered rare, threatened, or endangered. Collectively these plants and animals are referred to as “special status species.” This survey was conducted outside of the blooming season for most plants. Further investigation of special status plants is recommended to occur inside the plants' blooming seasons.

A thorough search of the CNDDB for published accounts of special status plant and animal species was conducted for the *Knights Ferry* and *Keystone* 7.5-minute quadrangles that contain the APE, and for the 10 surrounding quadrangles: *Bachelor Valley*, *Copperopolis, New Melones Dam*, *Sonora, Chinese Camp, La Grange, Cooperstown, Paulsell, Waterford*, and *Oakdale*. These species, and their potential to occur within the APE, are listed in **Table 2** and **Table 3** on the following pages. Raw data obtained from CNDDB is available in **Appendix B** at the end of this document. All relevant sources of information, as discussed in the **Study Methodology** section of this report (above), were used to determine if any special status species are known to be within the APE. **Figure 2** shows the Project's 7.5-minute quadrangle, according to United States Geological Survey Topographic Maps.

Table 2. List of Special Status Animals with Potential to Occur Onsite and/or in the Vicinity.

Species	*Status*	*Habitat*	*Occurrence on Project Site*
American badger (*Taxidea taxus*)	CSC	Grasslands, savannas, and mountain meadows near timberline are preferred. Most abundant in drier open spaces of shrub and grassland. Burrows in soil.	**Unlikely.** The APE provides potentially suitable habitat for this species, but disturbance from grazing may prevent this species from burrowing. There has only been one historical sighting in the region, over 15 miles from the APE.
Bald Eagle (*Haliaeetus leucocephalus*)	CE, CFP	Resides in old growth forests as well as lower montane coniferous forests. Nests are generally found in large, old-growth trees within a mile of water. Nests and winters along ocean shores, lake margins, and rivers.	**Possible.** Although many trees are present within the APE, no old-growth forest habitat exists. This species could potentially use the Stanislaus River and open areas of the APE for foraging. Bald Eagles are known to forage around dams, where fish concentrate. A flyover is possible, but nesting is unlikely. The last regional observation of this species was a breeding pair was observed in 2004, 10 miles east of the APE.
Burrowing Owl (*Athene cunicularia*)	CSC	Resides in open, dry annual or perennial grasslands, deserts, and scrublands with low growing vegetation. Nests underground in existing burrows created by mammals, most often ground squirrels.	**Unlikely.** The habitat within the APE is unsuitable for this species. Many raptors utilize the APE as foraging habitat, which would deter this species. The only historical observation in the region occurred 11 miles southwest of the APE in 1991.
California Horned Lark (*Eremophila alpestris actia*)	CWL	Frequents open habitats, including short-grass prairie, mountain meadows, open coastal plains, fallow grain fields, and alkali flats. Found primarily in coastal regions, including Sonoma and San Diego Counties.	**Unlikely.** The habitat within the APE is unsuitable for this species. Many raptors utilize the APE as foraging habitat, which would deter this species. The only historical observation in the region occurred 10 miles south of the APE in 1996.
California red-legged frog (*Rana draytonii*)	FT, CSC	Inhabits perennial rivers, creeks, and stock ponds with vegetative cover within the Coast Range and northern Sierra foothills.	**Absent**. The APE does not provide suitable habitat for this species. The riverine habitat of the APE is surrounded by tall cliff faces which would not support this species. There have been no recorded observations of this species within 10 miles of the APE.
California tiger salamander (*Ambystoma californiense*)	FT, CT, CWL	Requires vernal pools or seasonal ponds for breeding and small mammal burrows for aestivation. Generally found in grassland and oak savannah plant communities in central California from sea level to 1500 feet in elevation.	**Unlikely**. Water appears too deep and moves too fast to support this species. Vernal pools and seasonal ponds are absent from the APE. The riverine habitat of the APE is surrounded by tall cliff faces which would not support this species. This species was last observed in the region in 1993 over 3.5 miles from the APE.

Species	*Status*	*Habitat*	*Occurrence on Project Site*
Central California roach (*Hesperoleucus symmetricus symmetricus*)	CSC	Generally found in small streams of the Sierra Nevada foothills flowing into the Central Valley and are particularly well adapted to life in intermittent watercourses; dense populations are frequently observed in isolated pools.	**Unlikely**. Water appears too deep and moves too fast to support this species. This species was last observed in the region in 1998 over 11 miles from the APE.
Coast horned lizard (*Phrynosoma blainvillii*)	CSC	Found in grasslands, coniferous forests, woodlands, and chaparral, primarily in open areas with patches of loose, sandy soil and low-lying vegetation in valleys, foothills, and semi-arid mountains. Frequently found near ant hills and along dirt roads in lowlands along sandy washes with scattered shrubs.	**Unlikely.** The APE provides open areas for this species, but lacks prey resources, as no ant hills were observed. The single regional observation of this species occurred in 2001, 8 miles east of the APE.
Conservancy fairy shrimp	FE	Endemic to the grasslands of the northern two-thirds of the Central Valley; found in large, turbid pools.	**Absent.** Vernal pools are absent from the APE. Based on topography and soils of the APE, water cannot naturally pool, and vernal pools cannot be present. There are no recorded observations of this species on CNDDB within the regional vicinity of the Project.
Crotch bumble bee (*Bombus crotchii*)	CCE	Occurs throughout coastal California, as well as east to the Sierra-Cascade crest, and south into Mexico. Food plant genera include *Antirrhinum, Phacelia, Clarkia, Dendromecon, Eschscholzia*, and *Eriogonum*.	**Absent.** The APE does not provide suitable habitat to support this species. It has not been observed in the region in over 100 years.
Delta smelt (*Hypomesus transpacificus*)	FT, CE	This pelagic and euryhaline species is Endemic to the Sacramento-San Joaquin River Delta, upstream through Contra Costa, Sacramento, San Joaquin, and Solano Counties.	**Absent.** The APE is outside the known range for this species. The multiple dams on the Stanislaus River block the ability for this species to occur within the APE. There are no recorded observations of this species on CNDDB within the regional vicinity of the Project.
Foothill yellow-legged frog (*Rana boylii*)	CCT, CSC	Frequents rocky streams and rivers with rocky substrate and open, sunny banks in forests, chaparral, and woodlands. Occasionally found in isolated pools, vegetated backwaters, and deep, shaded, spring-fed pools.	**Unlikely.** Water appears too deep and moves too fast to support this species. Although small pools of standing water are present in the APE, it is heavily disturbed by grazing and unshaded. This species was last observed in the region in 2018 over 15 miles from the APE.
Green sturgeon (*Acipenser medirostris*)	FT	Spawns in the Sacramento, Feather and Yuba Rivers. The presence in upper Stanislaus and San Joaquin Rivers may indicate spawning. Non-spawning adults occupy marine/ estuarine waters. Delta Estuary is important for rearing juveniles. Spawning occurs primarily in cool (11-15 C) sections of mainstem rivers in deep pools (8-9 meters) with substrate containing small to medium sized sand, gravel, cobble, or boulder.	**Unlikely.** This species has only been observed below the Goodwin Dam in 2017. This species would not be able to enter the APE due to the dam.
Hardhead (*Mylopharodon conocephalus*)	CSC	Occurs in low- to mid-elevation streams in the Sacramento-San Joaquin drainage. Clear, deep pools with sand-gravel-boulder bottoms and slow-moving water is required. This species is often sympatric with Sacramento pikeminnow and Sacramento sucker. Hardhead are typically absent form streams occupied	**Absent.** The multiple dams on the Stanislaus River block the ability for this species to migrate upstream. This species has only been observed in the Stanislaus River 15 miles downstream of the APE.

Species	Status	Habitat	Occurrence on Project Site
		by centrarchids and from heavily altered habitats.	
Least Bell's Vireo (*Vireo bellii pusillus*)	FE, CE	This migratory species breeds in southern California. Breeding habitat consists of dense, low, shrubby, riparian vegetation in the vicinity of water or dry river bottoms. By the early 1980s, this species was extirpated from most of its historic range in California, including the Central Valley. This species now occurs almost exclusively along the coast of southern California (USFWS, 1998).	**Absent.** The APE does not provide suitable habitat to support this species. It has not been observed in the region in over 100 years.
Monarch Butterfly (*Danaus plexippus*)	FC	Roosts located in wind-protected tree groves (eucalyptus, Monterey pine, cypress), with nectar and water sources nearby. Larval host plants consist of milkweeds (*Asclepias* sp.). Winter roost sites extend along the coast from northern Mendocino to Baja California, Mexico.	**Absent.** The APE does not provide suitable habitat to support this species. There are no recorded observations of this species on CNDDB within the regional vicinity of the Project.
Pallid bat (*Antrozous pallidus*)	CSC	Found in grasslands, chaparral, and woodlands, where it feeds on ground- and vegetation-dwelling arthropods, and occasionally takes insects in flight. Prefers to roost in rock crevices, but may also use tree cavities, caves, bridges, and other man-made structures.	**Likely**. The APE provides suitable roosting and foraging habitat to support this species. There have been many regional observations of this species, including within 2 miles of the APE.
Prairie Falcon (*Falco mexicanus*)	CWL	Inhabits dry, open terrain, either level or hilly, in a variety of scrublands and grasslands. Breeding sites located on cliffs. Forages far afield, even to marshlands and ocean shores.	**Possible.** The APE provides suitable habitat to support this species foraging, and nearby cliffs may support roosting. However, there has only been one regional observation of this species, over 25 years ago, and location information is unavailable for the observation.
San Joaquin kit fox (*Vulpes macrotis mutica*)	FE, CT	Found in underground dens with multiple entrances in alkali sink, valley grassland, and woodland in valleys and adjacent foothills.	**Unlikely**. The APE provides marginally suitable habitat to support this species. Grazing has disturbed potential denning sites. Only one historical observation of this species was recorded in the region, in 1973, over 15 miles from the APE.
Swainson's Hawk (*Buteo swainsoni*)	CT	Nests in large trees in open areas adjacent to grasslands, grain or alfalfa fields, or livestock pastures suitable for supporting rodent populations.	**Unlikely.** The APE provides high quality foraging and nesting habitat for this species. However, only one regional observation has ever been recorded, 15 miles southeast of the APE over 100 years ago.
Steelhead – Central Valley DPS (*Oncorhynchus mykiss irideus pop.11*)	FT	This winter-run fish begins migration to fresh water during peak flows during December and February. Spawning season is typically from February to April. After hatching, fry move to deeper, mid-channel habitats in late summer and fall. In general, both juveniles and adults prefer complex habitat boulders, submerged clay and undercut banks, and large woody debris.	**Absent**. Steelhead are present in the lower segments of the Stanislaus River below Goodwin Dam. There have only been two recorded observations of this species approximately 20 miles downstream of Goodwin Dam. Both observations were recorded in 2014.
Townsend's big-eared bat (*Corynorhinus townsendii*)	CSC	Occurs in a variety of habitats, but prefers cool, dark roost sites, and are often found in caves and mines. They roost in the open, hanging from walls	**Possible.** This species has been documented roosting within the APE in basalt cliffs over Goodwin Dam. Available

Species	Status	Habitat	Occurrence on Project Site
		and ceilings. Western populations typically forage on moths in areas of dense foliage.	water, roosting habitat, and foraging habitat are all present within the APE.
Tricolored Blackbird (*Agelaius tricolor*)	CT, CSC	Nests colonially near fresh water in dense cattails or tules, or in thickets of riparian shrubs. Forages in grassland and cropland. Large colonies are often found on dairy farm forage fields.	**Unlikely.** The APE provides some riparian habitat to support this species both upstream and downstream of the dam. This species was not observed during the field surveys. Although there are many regional occurrences of this species, as recent as 2015, none have occurred within 5 miles of the APE.
Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*)	FT	Lives in mature elderberry shrubs of the Central Valley and foothills. Adults are active March to June.	**Unlikely.** Elderberry shrubs were not observed within the APE. However, within 5 miles of the APE this species has been recorded as recently as 2009.
Vernal pool fairy shrimp (*Branchinecta lynchi*)	FT	Occupies vernal pools, clear to tea-colored water, in grass or mud-bottomed swales, and basalt depression pools.	**Absent.** Vernal pools are absent from the APE. Based on topography and soils of the APE, water cannot naturally pool, and vernal pools cannot be present. This species has never been observed within 8 miles of the APE.
Vernal pool tadpole shrimp (*Lepidurus packardi*)	FE	Occurs in vernal pools, clear to tea-colored water, in grass or mud-bottomed swales, and basalt depression pools.	**Absent.** Vernal pools are absent from the APE. This species has not been observed within 8 miles of the APE.
Western mastiff bat (*Eumops perotis californicus*)	CSC	Found in open, arid to semi-arid habitats, including dry desert washes, flood plains, chaparral, oak woodland, open ponderosa pine forest, grassland, and agricultural areas, where it feeds on insects in flight. Roosts most commonly in crevices in cliff faces but may also use high buildings and tunnels.	**Present**. This species has been documented roosting within the APE in basalt cliffs over Goodwin Dam. Available water, roosting habitat, and foraging habitat are all present within the APE.
Western red bat (*Lasiurus blossevillii*)	CSC	Roosts primarily in trees, 2–40 ft above ground, from sea level up through mixed conifer forests. Prefers habitat edges and mosaics with trees that are protected from above and open below with open areas for foraging.	**Likely**. Trees throughout the APE provide an abundance of high-quality roosting habitat for this species. Open grasslands also provide foraging habitat. This species has been observed 8 times in the region as close as 5 miles to the APE.
Western spadefoot (*Spea hammondii*)	CSC	Prefers open areas with sandy or gravelly soils, in a variety of habitats including mixed woodlands, grasslands, coastal sage scrub, chaparral, sandy washes, lowlands, river floodplains, alluvial fans, playas, alkali flats, foothills, and mountains. Vernal pools or temporary wetlands, lasting a minimum of three weeks, which do not contain bullfrogs, fish, or crayfish are necessary for breeding.	**Absent.** Vernal pools for breeding are absent from the APE. Limited standing water exists within the APE. This species has never been observed within 10 miles of the APE.
Yellow-breasted Chat (*Icteria virens*)	CSC	Summer resident; inhabits riparian thickets of willow and other brushy tangles near watercourses.	**Possible.** Riparian habitat is present, and the APE is within the range of this species.

Table 3. List of Special Status Plants with Potential to Occur Onsite and/or in the Vicinity.

Species	Status	Habitat	Occurrence on Project Site
Beaked clarkia (*Clarkia rostrata*)	CNPS 1B	Found in woodlands and valley foothill grasslands on the west slope of the Sierra Nevada range, around 1,640 feet in elevation. Blooms April – May.	**Unlikely.** The APE is outside the known elevational range of this species.
Big-scale balsamroot (*Balsamorhiza macrolepis*)	CNPS 1B	Found in chaparral, valley and foothill grassland, cismontane woodland, sometimes found on serpentine at 115–4800 feet.	**Unlikely.** The APE provides suitable habitat for this species, but it has not been observed in the region since 1925.
Chinese Camp brodiaea (*Brodiaea pallida*)	CNPS 1B	Found in valley and foothill grassland, cismontane woodland. Often in rocky, intermittent streambeds, sometimes on serpentine at 540–1260 feet.	**Possible**. The APE includes cismontane woodland and is adjacent to the Stanislaus River. This species was observed 4 miles north of the APE in 2008.
Colusa grass (*Neostapfia colusana*)	FT, CE, CNPS 1B	Found in vernal pools in the San Joaquin Valley at elevations below 410 feet. Blooms May – August.	**Unlikely.** Vernal pool habitat is absent from the APE. However, area designated as critical habitat for this species is located within 2 miles of the APE, south of the Stanislaus River.
Congdon's lomatium (*Lomatium congdonii*)	CNPS 1B	Found in Cismontane woodland, chaparral. Serpentine soils with serpentine chaparral plants and grey pines at 1100–2050 feet.	**Absent.** The APE is outside the known elevational range of this species and there are no serpentine soils located within the APE.
Delicate bluecup (*Githopsis tenella*)	CNPS 1B	Found in chaparral, cismontane woodland, mesic sites, and sometimes on serpentine at 1500–6000 feet.	**Absent.** The APE is outside the known elevational range of this species and disturbance from grazing would deter its presence.
Dwarf downingia (*Downingia pusilla*)	CNPS 2B	Found in vernal pools in valley and foothill grassland communities at elevations below 1600 feet. Blooms March – May.	**Absent.** Vernal pool habitats required by this species are absent from the APE. This species has not been observed in the region in over 40 years and never within 10 miles of the APE.
Forked hare-leaf (*Lagophylla dichotoma*)	CNPS 1B	Found in cismontane woodland, and valley and foothill grassland communities at elevations between 600 and 1100 feet.	**Possible.** Habitat for this species is present within the APE. This species was recorded in the region 1 mile from the APE in 1938.
Greene's tuctoria (*Tuctoria greenei*)	FE, CR, CNPS 1B	Found in the San Joaquin Valley and other parts of California in vernal pools within valley grassland, wetland, and riparian communities at elevations below 3500 feet. Blooms May – September.	**Possible.** Vernal pool habitats required by this species are absent from the APE. However, area designated as critical habitat for this species is located 2 miles outside of the APE, south of the Stanislaus River.
Hairy Orcutt grass (*Orcuttia pilosa*)	FE, CE, CNPS 1B	Found in vernal pools in valley grassland, wetland, and riparian communities at elevations below 650 feet. Blooms May – September.	**Absent.** Vernal pool habitats required by this species are absent from the APE. This species has not been observed in the region since 1938 and that population is considered extirpated.
Hartweg's golden sunburst (*Pseudobahia bahifolia*)	FE, CE, CNPS 1B	Found in valley and foothill grassland and cismontane woodland communities in clay soils that are often acidic. Occurs predominantly on northern slopes, but also along shady creeks and near vernal pools at elevations between 300 feet and 650 feet. Blooms March – May.	**Unlikely.** Foothill grassland and cismontane woodland habitat are present within the APE, but vernal pools and shady creeks are not. This species was last observed in 2010, 12 miles south of the APE.
Henderson's bent grass (*Agrostis hendersonii*)	CNPS 3.2	Found in valley and foothill moist grasslands and vernal pools at 210–3380 feet.	**Absent.** Vernal pool habitats required by this species are absent from the APE. This species was last observed in the region in 1936.
Hoover's calycadenia (*Calycadenia hooveri*)	CNPS 1B	Found in valley and foothill grassland and cismontane woodland communities on exposed, rocky, barren soil at elevations between 300	**Possible.** Foothill grassland and cismontane woodland habitat are present within the APE. This species was last observed 5 miles southeast of the APE in 2016.

Species	Status	Habitat	Occurrence on Project Site
		feet and 1300 feet. Blooms June – September.	
Hoover's cryptantha (*Cryptantha hooveri*)	CNPS 1A	Presumed extirpated in California. Found in valley and foothill grassland and inland dunes in coarse sand at elevations below 250 feet. Blooms Mar – May.	**Absent.** The APE is outside the known elevational range of this species and is presumed extirpated in California.
Hoover's spurge (*Euphorbia hooveri*)	FT, CNPS 1B	Found in the San Joaquin Valley and Sacramento Valley in vernal pools within valley grassland, freshwater wetland, and riparian communities at elevations below 800 feet. Blooms July – September.	**Absent.** Vernal pool habitats required by this species are absent from the APE. This species was last observed in the region 12 miles south of the APE in 1986.
Jepson's onion (*Allium jepsonii*)	CNPS 1B.2	Found in chapparal, cismontane woodland, and lower montane coniferous forest. Often on serpentine soils, volcanic soils, slopes and flats, usually in an open area at 1150–3700 feet.	**Absent.** The APE is outside the known elevational range of this species. This species was last observed in the region in 1991, 11 miles north of the APE.
Layne's ragwort (*Packera layneae*)	CNPS 1B.2	Found in chaparral and cismontane woodland. Ultramafic soil (serpentine or gabbro); occasionally along streams at 650–3500 feet.	**Absent.** The APE is outside the known elevational range of this species and there are no ultramafic soils within the APE.
Mariposa clarkia (*Clarkia biloba ssp. Australis*)	CNPS 1B.2	Found in chaparral, cismontane woodland on serpentine. Especially within foothill woodland/riparian ecotone at 400–4850 feet.	**Possible.** Cismontane woodland habitat is present within the APE. This species was last observed 8 miles east of the APE in 2018. However, the APE is on the lower elevational boundary of this species range.
Mariposa cryptantha (*Cryptantha mariposae*)	CNPS 1B.3	Found in chaparral on serpentine outcrops at 300–2700 feet.	**Absent.** Habitats required by this species are absent from the APE. Serpentine soils are not present.
Merced monardella (*Monardella leucocephala*)	CNPS 1A	Found in the San Joaquin Valley, associated with valley and foothill grasslands. Grows along rivers in moist, sandy soils at elevations between 164 feet and 328 feet. Blooms May – July.	**Possible.** Cismontane woodland habitat is present within the APE, as well as the Stanislaus River, and proper elevational range. The single regional observation of this species was recorded 10 miles east of the APE in 1998.
Nissenan manzanita (*Arctostaphylos nissenana*)	CNPS 1B.2	Found in closed-cone coniferous forest and chaparral. Usually on metamorphics, associated with other chaparral species at 1600–3300 feet.	**Absent.** Habitats required by this species are absent from the APE, the APE is also outside the elevational range of this species.
Patterson's navarretia (*Navarretia paradoxiclara*)	CNPS 1B	Found in meadows and seeps. This species is serpentinite, prefers openings, is vernally mesic, and often found drainages at 500–1450 feet.	**Absent.** Habitats required by this species are absent from the APE, the APE is also outside the elevational range of this species.
Rawhide Hill onion (*Allium tuolumnense*)	CNPS 1B	Found in cismontane woodland. Restricted to serpentine soil, usually in grey pine chaparral. steep, rocky, south-facing slopes or small drainages. 700–1650 feet.	**Absent.** Soils required by this species are absent from the APE, the APE is also outside the elevational range of this species.
Red Hills cryptantha (*Cryptantha spithamaea*)	CNPS 1B	Found in chaparral, cismontane woodland. This species is serpentinite, sometimes found in streambeds and openings at 900–1800 feet.	**Absent.** Habitats required by this species are absent from the APE, the APE is also outside the elevational range of this species.
Red Hills ragwort (*Senecio clevelandii var. heterophyllus*)	CNPS 1B	Found in cismontane woodland, on drying serpentine soils, often along streams at 850–1300 feet.	**Absent.** Habitats required by this species are absent from the APE, the APE is also outside the elevational range of this species.
Red Hills soaproot (*Chlorogalum grandiflorum*)	CNPS 1B	Found in cismontane woodland, chaparral, and lower montane coniferous forest. Occurs frequently on serpentine or gabbro, but also on non-ultramafic substrates; often on	**Absent.** Habitats required by this species are absent from the APE, the APE is also outside the elevational range of this species.

Species	Status	Habitat	Occurrence on Project Site
		"historically disturbed" sites at 870–5561 feet.	
Red Hills vervain (*Verbena californica*)	CNPS 1B	Found in cismontane woodland, valley and foothill grassland, and mesic sites on serpentine, usually serpentine seeps or creeks at 2625–3770 feet.	**Absent.** The APE is outside the known elevational range of this species, the APE also lacks serpentine soils required by this species.
San Joaquin Valley Orcutt grass (*Orcuttia inaequalis*)	FT, CE, CNPS 1B	Found in the eastern San Joaquin Valley and the Sierra Nevada foothills in vernal pools within valley grassland, freshwater wetland, and wetland-riparian communities at elevations below 2600 feet. Blooms April – September.	**Absent.** Vernal pool habitats required by this species are absent from the APE. There are no considered extant populations of this species within the region.
Shaggyhair lupine (*Lupinus spectabilis*)	CNPS 1B	Found in chaparral, cismontane woodland. Mostly on open rocky slopes of serpentine chaparral surrounded by grey pine woodland. 980–2700 feet.	**Absent.** The APE is outside the known elevational range of this species and the APE lacks serpentine chaparral habitat.
Spiny-sepaled button-celery (*Eryngium spinosepalum*)	CNPS 1B	Found in the Sierra Nevada Foothills and the San Joaquin Valley. Occurs in vernal pools, swales, and roadside ditches. Often associated with clay soils in vernal pools within grassland communities. Occurs at elevations between 50–4160 feet. Blooms April–July.	**Absent.** Vernal pool habitats required by this species are absent from the APE. This species has not been observed in the region in over 20 years.
Stanislaus monkeyflower (*Erythranthe marmorata*)	CNPS 1B	Found in cismontane woodland and lower montane coniferous forest at 980–4700 feet.	**Absent.** The APE is outside the known elevational range of this species and lacks woodland or forest habitat required by this species.
Stinkbells (*Fritillaria agrestis*)	CNPS 1B	Found in cismontane woodland, chaparral, valley and foothill grassland, pinyon and juniper woodland. This species is sometimes found on serpentine; but generally in nonnative grassland or in grassy openings in clay soil at 30–5100 feet.	**Unlikely.** Cismontane woodland habitat is present within the APE and proper elevational range. The most recent regional observation of this species was recorded 10 miles east of the APE in 1992.
Succulent owl's-clover (*Castilleja campestris var. succulenta*)	CNPS 1B.2	Found in vernal pools and moist places, often in acidic soils at 65–2300 feet.	**Absent.** Vernal pool habitats required by this species are absent from the APE. This species was last observed in the region in 1978, 10 miles south of the APE.
Tongue-leaf copper moss (*Scopelophila cataractae*)	CNPS 2B	Found in cismontane woodland, on moss on metamorphic substrate at elevations around 1300 feet.	**Absent.** The APE is outside the known elevational range of this species and lacks required woodland habitat.
Tuolumne button-celery (*Eryngium pinnatisectum*)	CNPS 1B	Found in vernal pools in cismontane woodland and lower montane coniferous forest at 200-3000 feet.	**Absent.** Vernal pool habitats required by this species are absent from the APE and lacks required woodland and forest habitat.
Veiny monardella (*Monardella venosa*)	CNPS 1B.1	Found in valley and foothill grassland and cismontane woodland in heavy clay at 100–1300 feet.	**Unlikely.** Habitat is present, but soils required by this species are absent from the APE.

EXPLANATION OF OCCURRENCE DESIGNATIONS AND STATUS CODES

Present:	Species observed on the site at time of field surveys or during recent past.
Likely:	Species not observed on the site, but it may reasonably be expected to occur there on a regular basis.
Possible:	Species not observed on the site, but it could occur there from time to time.
Unlikely:	Species not observed on the site, and would not be expected to occur there except, perhaps, as a transient.
Absent:	Species not observed on the site and precluded from occurring there due to absence of suitable habitat.

STATUS CODES

FE	Federally Endangered
FT	Federally Threatened
FC	Federal Candidate
CE	California Endangered
CT	California Threatened
CCT	California Threatened (Candidate)
CFP	California Fully Protected
CSC	California Species of Concern
CWL	California Watch List
CCE	California Endangered (Candidate)
CR	California Rare

CNPS LISTING

1A	Plants Presumed Extinct in California.
1B	Plants Rare, Threatened, or Endangered in California and elsewhere.
2B	Plants Rare, Threatened, or Endangered in California, but more common elsewhere.

III. Impacts and Mitigation

Significance Criteria

CEQA

General plans, area plans, and specific projects are subject to the provisions of CEQA. The purpose of CEQA is to assess the impacts of proposed projects on the environment prior to project implementation. Impacts to biological resources are just one type of environmental impact assessed under CEQA and vary from project to project in terms of scope and magnitude. Projects requiring removal of vegetation may result in the mortality or displacement of animals associated with this vegetation. Animals adapted to humans, roads, buildings, and pets may replace those species formerly occurring on a site. Plants and animals that are State and/or federally listed as threatened or endangered may be destroyed or displaced. Sensitive habitats such as wetlands and riparian woodlands may be altered or destroyed. Such impacts may be considered either "significant" or "less than significant" under CEQA. According to CEQA, Statute and Guidelines (AEP 2012), "significant effect on the environment" means a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic interest. Specific project impacts to biological resources may be considered "significant" if they would:

- 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;
- 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;
- 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;
- 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.
- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; or
- Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or State habitat conservation plan.

Furthermore, CEQA Guidelines Section 15065(a) states that a project may trigger the requirement to make a "mandatory finding of significance" if the project has the potential to:

> "Substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of an endangered, rare or threatened species, or eliminate important examples of the major periods of California history or prehistory."

Relevant Goals, Policies, and Laws

The APE falls within three counties: Calaveras, Stanislaus, and Tuolumne. Tuolumne County is the only county with current applicable goals, policies, and laws.

Tuolumne County Ordinance

The County of Tuolumne has an ordinance preventing the premature removal of native oak trees. The APE hosts oak woodland habitat with interior live oak and blue oak as dominant vegetation. If oak trees plan to be removed, it must be in cooperation with the county ordinance below.

Code Chapter 9.24 of the County's Ordinance Code, Premature Removal of Native Oak Trees, provides requirements intended to discourage the premature removal of oak trees.

Chapter 9.24 stipulates that the removal of native oak trees from a project site within the five (5) years preceding the submittal of an application for a discretionary entitlement from the County of Tuolumne for a land development project on that site is deemed premature removal and sets forth penalties and requirements for mitigation. Chapter 9.24 specifies that removals that qualify include:

This report addresses issues related to the following:

a) Removal of native oak trees resulting in a 10 percent or more (>10 percent) average decrease in native oak canopy cover within an oak woodland;
b) Removal of any old growth oak trees, defined as any native oak tree that is 24" or greater in diameter at breast height (dbh);
c) Removal of any Valley Oak (*Quercus lobata*) measuring 5" or greater dbh.

The premature removal of native oak trees is subject to penalties, including withholding approval of an application for a discretionary entitlement on the site for a period of up to five years, and monetary penalties as high as three times the in-lieu fee established by the Board of Supervisors.

Threatened and Endangered Species

Permits may be required from the USFWS and/or CDFW if activities associated with a project have the potential to result in the "take" of a species listed as threatened or endangered under the federal and/or state Endangered Species Acts. Take is defined by the State of California as "to hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture or kill" (California Fish and Game Code, Section 86). Take is more broadly defined by the federal Endangered Species Act to include "harm" (16 USC, Section 1532(19), 50 CFR, Section 17.3). CDFW and USFWS are responsible agencies under CEQA and National Environmental Policy Act (NEPA). Both agencies review CEQA and NEPA documents in order to determine the adequacy of their treatment of endangered species issues and to make project-specific recommendations for their conservation.

Designated Critical Habitat

When species are listed as threatened or endangered, the USFWS often designates areas of "Critical Habitat" as defined by section 3(5)(A) of the federal Endangered Species Act (ESA). Critical Habitat is a term defined in the ESA as a specific geographic area that contains features essential for the conservation of a threatened or endangered species and that may require special management and protection. Critical Habitat is a tool that supports the continued conservation of imperiled species by guiding cooperation with the federal government. Designations only affect federal agency actions or federally funded or permitted activities. Critical Habitat does not prevent activities that occur within the designated area. Only activities that involve a federal permit, license, or funding and are likely to destroy or adversely modify Critical Habitat will be affected.

Migratory Birds

The Federal Migratory Bird Treaty Act (MBTA: 16 USC 703-712) prohibits killing, possessing, or trading in any bird species covered in one of four international conventions to which the U.S. is a party, except in accordance with regulations prescribed by the Secretary of the Interior. The name of the act is misleading, as it actually covers almost all bird's native to the U.S., even those that are non-migratory. The MBTA encompasses whole birds, parts of birds, and bird nests and eggs. Additionally, California Fish and Game Code makes it unlawful to take or possess any non-game bird covered by the MBTA (Section 3513), as well as any other native non-game bird (Section 3800).

Birds of Prey

Birds of prey are protected in California under provisions of Fish and Game Code (Section 3503.5), which states that it is unlawful to take, possess, or destroy any birds in the order Falconiformes (hawks and eagles) or Strigiformes (owls), as well as their nests and eggs. The bald eagle and golden eagle are afforded additional protection under the federal Bald and Golden Eagle Protection Act (16 USC 668), which makes it unlawful to kill birds or their eggs.

Nesting Birds

In California, protection is afforded to the nests and eggs of all birds. California Fish and Game Code (Section 3503) states that it is "unlawful to take, possess, or needlessly destroy the nest or eggs of any bird except as otherwise provided by this code or any regulation adopted pursuant thereto." Breeding-season disturbance that causes nest abandonment and/or loss of reproductive effort is considered a form of "take" by the CDFW.

Wetlands and other "Jurisdictional Waters"

Natural drainage channels and adjacent wetlands may be considered "waters of the U.S." or "jurisdictional waters" subject to the jurisdiction of the USACE. The extent of jurisdiction has been defined in the Code of Federal Regulations but has also been subject to interpretation of the federal courts. Jurisdictional waters generally include:

- All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
- All interstate waters including interstate wetlands;
- All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce;
- All impoundments of waters otherwise defined as waters of the U.S. under the definition;
- Tributaries of waters identified in paragraphs (a)(1)-(4) (i.e. the bulleted items above).

As determined by the U.S. Supreme Court in its 2001 *Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers* (*SWANCC*) decision, channels and wetlands isolated from other jurisdictional waters cannot be considered jurisdictional on the basis of their use, hypothetical or observed, by migratory birds. Similarly, in its 2006 consolidated *Carabell/Rapanos* decision, the Supreme Court ruled that a significant nexus between a wetland and other navigable waters must exist for the wetland itself to be considered a navigable and therefore jurisdictional water. Furthermore, the Supreme Court clarified that the U.S. Environmental Protection Agency (EPA) and the USACE will not assert jurisdiction over ditches excavated wholly in and draining only uplands and that do not carry a relatively permanent flow of water.

The USACE regulates the filling or grading of Waters of the United States. under the authority of Section 404 of the Clean Water Act. The extent of jurisdiction within drainage channels is defined by "ordinary high-water marks" on opposing channel banks. All activities that involve the discharge of dredge or fill material into Waters of the United States are subject to the permit requirements of the USACE. Such permits are typically issued on the condition that the applicant agrees to provide mitigation that results in no net loss of wetland functions or values. No permit can be issued until the RWQCB issues a Section 401 Water Quality Certification (or waiver of such certification) verifying that the proposed activity will meet State water quality standards.

Under the Porter-Cologne Water Quality Control Act of 1969, the SWRCB has regulatory authority to protect the water quality of all surface water and groundwater in the State of California ("Waters of the State"). Nine RWQCBs oversee water quality at the local and regional level. The RWQCB for a given region regulates discharges of fill or pollutants into Waters of the State through the issuance of various permits and orders. Discharges into Waters of the State that are also Waters of the United States require a Section 401 Water Quality Certification from the RWQCB as a prerequisite to obtaining certain federal permits, such as a Section 404 Clean Water Act permit. Discharges into all Waters of the State, even those that are not also Waters of the United States., require Waste Discharge Requirements (WDRs), or waivers of WDRs, from the RWQCB. The RWQCB also administers the Construction Storm Water Program and the federal National Pollution Discharge Elimination System (NPDES) program. Projects that disturb one acre or more of soil must obtain a Construction General Permit under the Construction Storm Water Program. A prerequisite for this permit is the development of a Storm Water Pollution Prevention Plan (SWPPP) by a certified Qualified SWPPP Developer. Projects that discharge wastewater, storm water, or other pollutants into a Water of the United States. may require a NPDES permit.

CDFW has jurisdiction over the bed and bank of natural drainages and lakes according to provisions of Section 1601 and 1602 of the California Fish and Game Code. Activities that may substantially modify such waters through the diversion or obstruction of their natural flow, change or use of any material from their bed or bank, or the deposition of debris require a notification of a Lake or Streambed Alteration. If CDFW determines that the activity may adversely affect fish and wildlife resources, a Lake or Streambed Alteration Agreement will be prepared. Such an agreement typically stipulates that certain measures will be implemented to protect the habitat values of the lake or drainage in question.

Potentially Significant Project-Related Impacts and Mitigation

Species identified as candidate, sensitive, or special status species in local or regional plans, policies, or regulations by CDFW or USFWS that have the potential to be impacted by the Project include Bald Eagle, pallid bat, Prairie Falcon, Townsend's big-eared bat, western mastiff bat, western red bat, and Yellow-breasted Chat and are explained further below with corresponding mitigation measures.

General Mitigation Measures

Prior to the start of construction, all personnel associated with construction of the Project will be trained to be able to identify these candidate, sensitive, or special status species in order to prevent impacts to sensitive resources; therefore, the following general mitigation measures will be implemented:

> ***Mitigation Measure BIO-1a (WEAP Training):*** Prior to initiating construction activities (including staging and mobilization), all personnel associated with Project construction will attend mandatory Worker Environmental Awareness Program (WEAP) training, conducted by a qualified biologist, to aid workers in identifying special status resources that may occur in the APE. The specifics of this program will include identification of the sensitive species and suitable habitats, a description of the regulatory status and general ecological characteristics of sensitive resources, and review of the limits of construction and mitigation measures required to reduce impacts to biological resources within the work area. This training will discuss special status species, describe the laws and regulations in place to provide protection of these species, identify the penalties for violation of applicable environmental laws and regulations, and a list of required protective measures to avoid "take." A fact sheet conveying this information, along with photographs or illustrations of sensitive species with potential to occur onsite, will also be prepared for distribution to all contractors, their employees, and all other personnel involved

with construction of the Project. All employees will sign a form documenting that they have attended WEAP training and understand the information presented to them.

Mitigation Measure BIO-1b (BMPs): The Project proponent will ensure that all workers employ the following best management practices (BMPs) in order to avoid and minimize potential impacts to special status species:

- Vehicles will observe a 15-mph speed limit while on unpaved access routes.
- Workers will inspect areas beneath parked vehicles prior to mobilization. If special status species are detected beneath vehicles, the individual will either be allowed to leave of its own volition or will be captured by the qualified biologist (must possess appropriate collecting/handling permits) and relocated out of harm's way to the nearest suitable habitat beyond the influence of the Project work area. "Take" of a listed (rare, threatened, or endangered) species is prohibited.
- The presence of any special status species and/or any wildlife mortalities will be reported to the Project's designated biologist and the appropriate regulatory agencies.

Project-Related Mortality and/or Disturbance of Nesting Raptors, Migratory Birds, and Special Status Birds.

The APE contains suitable nesting and/or foraging habitat for a variety of avian species. The survey was conducted outside nesting bird season, so no active nests were observed. It is anticipated that during nesting bird season, numerous species of birds will use the APE for nesting, as abundant high-quality habitat is present. Bald Eagles, Prairie Falcons, and Yellow-breasted Chat were deemed the only special status species likely to occur within the APE. Birds nesting within the APE during construction have the potential to be injured or killed by Project-related activities. In addition to the direct "take" of nesting birds, nesting birds within the APE or adjacent areas could be disturbed by Project-related activities resulting in nest abandonment. Projects that adversely affect the nesting success of raptors and migratory birds or result in the mortality of individual birds is considered a violation of State and federal laws and are considered a potentially significant impact under CEQA.

Implementation of the following measures will reduce potential impacts to nesting raptors, migratory birds, and special status birds to a less than significant level under CEQA and NEPA and will ensure compliance with State and federal laws protecting these avian species.

Mitigation. The following measures would be implemented prior to the start of construction:

Mitigation Measure BIO-2a (Avoidance): The Project's construction activities will occur, if feasible, between September 16 and January 31 (outside of nesting bird season) in an effort to avoid impacts to nesting birds.

Mitigation Measure BIO-2b (Pre-construction Surveys): If activities must occur within nesting bird season (February 1 to September 15), a qualified biologist will conduct pre-construction surveys for active nests within ten (10) days prior to the start of construction. The survey will include the proposed work area and surrounding lands within 50 feet. If no active nests are observed, no further mitigation is required. Raptor nests are considered "active" upon the nest-building stage.

Mitigation Measure BIO-2c (Establish Buffers): On discovery of any active nests or breeding colonies near work areas, the biologist will determine appropriate construction setback distances based on applicable CDFW and/or USFWS guidelines and/or the biology of the species in question. Construction buffers will be identified with flagging, fencing, or other easily visible means, and will be maintained until the biologist has determined that the nestlings have fledged.

Project-Related Mortality and/or Disturbance of Bats

In reviewing the CNDDB, the following special status bat species were identified to occur within or adjacent to the APE: pallid bats, Townsend's big eared bats, and western mastiff bats, all of which are designated as California Species of Special Concern (CSC). Additionally, many oak trees in the area are likely to support tree-roosting species of bats like western red bats, also a CSC. Roosting habitat becomes especially sensitive to bat populations during the maternity season (March 1 to September 30) while pups are maturing.

A focused survey for bats was determined to be necessary to identify if proposed Project activities would impact existing bat habitat, presence of high-quality roosting habitat, and/or foraging areas surrounding Goodwin Dam. The area above and around Goodwin Dam contains small caves, rocky outcroppings, and oak woodlands all of which are considered potential bat roosting habitat. The Goodwin Dam area and Stanislaus River are typical drinking and foraging habitat for many bat species, as the artificial lights around Goodwin Dam attract insects which often increase bat activity. Greater abundance of insects, access to a large and open body of freshwater, and roosting habitat are often driving forces for bat activity.

On September 16 and 17, 2021, a focused survey was performed by P&P bat biologist Jacob Rogers. The goals of this survey were to identify the presence or absence of potential bat roosts within the APE and provide appropriate mitigation measures to protect bat species and associated habitat. The methods and results of the focused survey can be found in **Appendix D** of this document.

Mitigation. The following measures will be implemented prior to the start of construction:

> ***Mitigation Measure BIO-3a (Pre-Construction Survey):*** A pre-construction survey will be performed if construction activities fall between March 1 and September 30 (bat maternity season) to identify current bat roosting locations in oak trees near the dam and around the tunnel outlet prior to the start of construction. A qualified biologist will conduct the survey 7 days or less prior to construction.
>
> ***Mitigation Measure BIO-3b (Avoidance):*** Impacts and interactions with bat species are to be avoided whenever possible through timing of work, method selections, and retention of feature that provide naturalized habitat.
>
> ***Mitigation Measure BIO-3c (Establish Buffers):*** On discovery of any bat roosts near work, the dam, or tunnel outlet, a qualified biologist will determine appropriate construction setback distances (buffer zones) to minimize disturbance and avoid take. Construction buffers will be identified with flagging, fencing, or other easily visible means, and will be maintained until the biologist has determined that the roost will no longer be impacted by construction.
>
> ***Mitigation Measure BIO-3e (Disturbance to Trees):*** If a tree or trees must be removed a qualified biologist will inspect the tree prior to removal to verify that the tree is not active roosting habitat. Once the tree is deemed clear of bats, the tree will be removed within two days.

Project-Related Impacts to Special Status Plant Species

In reviewing the CNDDB, the following special status plant species were identified to occur within or adjacent to the APE: Chinese Camp brodiaea, Greene's tuctoria, forked hare-leaf, Hoover's calycadenia, Mariposa clarkia, and Merced monardella. The survey of the APE was conducted outside the blooming season for these plants. It is recommended a more detailed survey be conducted within the blooming season.

Projects that adversely affect special status plants or result in the mortality of special status plants is considered a violation of State and federal laws and are considered a potentially significant impact under CEQA.

Implementation of the following measures will reduce potential impacts to special status plants to a less than significant level under CEQA and will ensure compliance with State and Federal laws protecting these plant species.

Mitigation. The following measures will be implemented prior to the start of construction:

> ***Mitigation Measure BIO-4a (Pre-Construction Survey):*** A qualified botanist/biologist will conduct focused botanical surveys for Chinese Camp brodiaea, Greene's tuctoria, forked hare-leaf, Hoover's calycadenia, Mariposa clarkia, and Merced monardella, according to CDFW's *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities* (2018) for areas where ground disturbance will occur and prior to the start of construction.
>
> ***Mitigation Measure BIO-4b (Avoidance):*** If special status plants are identified during a survey, a disturbance-free buffer and use of exclusion fencing will be placed around the area as not to disturb the plants or its root system.
>
> ***Mitigation Measure BIO-4c (Formal Consultation):*** If rare plant individuals or populations or sensitive natural communities are detected within Project work areas during the focused botanical survey, and the plants cannot be avoided, the Project proponent will initiate consultation with CDFW and/or USFWS to determine next steps for relocation or to obtain an Incidental Take Permit (ITP).

Project-Related Impacts to Riparian Habitat and Natural Communities of Special Concern

There are no CNDDB-designated "natural communities of special concern" recorded within the APE or surrounding lands. Portions of riparian habitat were identified during the survey, specifically along the edges of the river leading up to the dam. Riparian habitats fall under the jurisdiction of CDFW and therefore any work occurring within these areas will require regulatory permitting through this agency.

Project-Related Impacts to Regulated Waters, Wetlands, and Water Quality.

The Project involves constructing barge landings within Goodwin Dam Reservoir. An Aquatic Resources Delineation was conducted on October 17, 2022, to delineate potential jurisdictional boundaries of these features. The investigation and delineation were conducted in accordance with the 1987 *Corps of Engineers Wetland Delineation Manual*, the *Arid West Regional Supplement* (United States Army Corps of Engineers, 1987), *the State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State* (State Water Resources Control Board, 2021), and the United States Fish and Wildlife Service National Wetlands Inventory Map was consulted for known wetlands in the area.

The Goodwin Dam Reservoir located within the APE is regulated by USACE and RWQCB as jurisdictional waters. Construction activities in this area would be subject to USACE permit requirements pursuant to Section 404 of the CWA. This Project may be authorized under a Nationwide Permit but could require an individual permit if Nationwide Permit limits are exceeded. In addition, Section 401 of the CWA Water Quality Certification from the RWQCB is required for dredge and fill of waters of the State and activities must meet State water quality standards. Compliance with each permit requires avoidance, minimization, and mitigation measures to ensure that Project-related impacts to these potentially jurisdictional waters are less-than-significant in nature or are fully mitigated.

Project activities with potential to alter the Goodwin Dam Reservoir including the bed, bank, floodplain and associated riparian habitat, would be within CDFWs jurisdiction, pursuant to Section 1602 of the California Fish and Game Code. The Project proponent would be required to notify CDFW if the Project's activities have potential to impact rivers, streams, or the riparian corridor of any aquatic features onsite that may be beneficial to fish or wildlife resources. If CDFW determines that the Project could potentially adversely affect fish and wildlife resources and/or riparian habitat, an LSA Agreement would be issued prior to construction. LSA Agreements are typically issued with mandatory avoidance and minimization measures, protective measures for special status species, and required compensatory mitigation for removal of riparian trees, shrubs, and herbaceous cover along the banks. Compliance with measures of the LSA Agreement would ensure that the Project's impacts to aquatic species, features, and riparian habitat within CDFW's jurisdiction remain less-than-significant or are fully mitigated.

There are no designated wild and scenic rivers within the APE; therefore, the Project would not result in direct impacts to wild and scenic rivers. Compliance with USACE, RWQCB, and CDFW permits, certifications, and agreements would ensure there are no indirect downstream effects to jurisdictional waters.

Since construction will involve ground disturbance over an area greater than one acre, the Project will also be required to obtain a Construction General Permit under the Construction Storm Water Program administered by the RWQCB. A prerequisite for this permit is the development of a Storm Water Pollution Prevention Plan (SWPPP) to ensure construction activities do not adversely affect water quality.

Less Than Significant Project-Related Impacts

Project-Related Impacts to Special Status Animal Species Absent From, or Unlikely to Occur on, the Project Site

Of the 30 regionally occurring special status animal species, 23 are considered absent from or unlikely to occur within the APE due to past or ongoing disturbance and/or the absence of suitable habitat. These species include: American badger, Burrowing Owl, California Horned Lark, California red-legged frog, California tiger salamander, central California roach, coast horned lizard, conservancy fairy shrimp, Crotch bumble bee, Delta smelt, foothill yellow-legged frog, green sturgeon, hardhead, Least Bell's Vireo, monarch butterfly, San Joaquin kit fox, Swainson's Hawk, steelhead, Tricolored Blackbird, Valley elderberry longhorn beetle, vernal pool fairy shrimp, vernal pool tadpole shrimp, and western spadefoot.

Since it is unlikely these species would occur onsite, implementation of the Project should have no impact on these 23 special status species through construction mortality, disturbance, or loss of habitat. Mitigation measures are not warranted.

Project-Related Impacts to Special Status Plant Species Absent From, or Unlikely to Occur on, the Project Site

Of the 36 regionally occurring special status plant species, 30 are considered absent from or unlikely to occur within the APE due to past or ongoing disturbance and/or the absence of suitable habitat. These species include: beaked clarkia, big-scale balsamroot, Colusa grass, Congdon's lomatium, delicate bluecup, dwarf downingia, hairy orcutt grass, Hartweg's golden sunburst, Henderson's bent grass, Hoover's cryptantha, Hoover's spurge, Jepson's onion, Layne's ragwort, Mariposa Cryptantha, Nissenan manzanita, Patterson's navarretia, Rawhide Hill onion, Red Hills cryptantha, Red Hills ragwort, Red Hills soaproot, Red Hills vervain, San Joaquin Valley Orcutt grass, shaggyhair lupine, spiny-sepaled button-celery, Stanislaus monkeyflower, stinkbells, succulent owl's-clover, tongue-leaf copper moss, Tuolumne button-celery, and veiny monardella.

Since it is unlikely these species would occur onsite, implementation of the Project should have no impact on these 30 special status species through construction mortality, disturbance, or loss of habitat. Mitigation measures are not warranted.

Project-Related Impacts to Special Status Fishes Absent From, or Unlikely to Occur on, the Project Site

Historically, steelhead distribution extended into the headwaters of the Stanislaus River. Dam construction and water diversion for mining and irrigation purposes first began during the Gold Rush (mid-1800s). Goodwin Dam, constructed in 1913, was probably the first permanent barrier to significantly affect salmonid access to upstream habitat. Goodwin Dam historically had a fishway which allowed salmonids to access the reach of Stanislaus River up to the Melones Dam. Historical records note, however, that salmonoids could seldom pass Goodwin Dam, even when the fishway existed (United States Department of Interior, Bureau of Reclamation, 2007). The fishway was destroyed by falling boulders in the early- to mid-1900s, therefore no access upstream has existed for some time.

None of the fish expected to occur to occur upstream of Goodwin Dam and in Goodwin Reservoir are protected under the ESA or the CESA. Rainbow trout that may occur in the reservoir would be of hatchery origin and are not protected under the ESA. Further, migratory fish occurring in the lower Stanislaus River below Goodwin Dam would not be affected by the Project, as Project activities would not alter the existing flows or annual diversion limits.

The current fish community has been highly altered through historical changes to the flow regime and species introductions. The existing water diversion has remained unscreened since construction. Special status fishes are not considered present or likely to occur within the APE. Mitigation measures identified in consultation with CDFW, those identified within the Lake or Streambed Alteration (LSA) Agreement, BMPs, and a Fish Rescue and Relocation Plan has been developed by a qualified biologist and approved by CDFW as a preventative measure in the event that any existing fish become entrained during installation of stoplog dam activities. Therefore, additional mitigation measures are not warranted.

Project-Related Impacts to Wildlife Movement Corridors and Native Wildlife Nursery Sites.

The APE does contain features that would be likely to function as wildlife movement corridors. However, the APE and surrounding lands are very open and expansive, that it is unlikely construction will affect animal dispersion. Furthermore, the Project is located in a region often disturbed by human activities related to cattle grazing which may discourage dispersal and migration. Therefore, the Project will have no impact on wildlife movement corridors, and no additional mitigation measures are warranted.

Project-Related Impacts to Critical Habitat.

Designated critical habitat is absent from the APE and surrounding lands. Therefore, there will be no impact to critical habitat, and mitigation is not warranted.

Local Policies or Habitat Conservation Plans.

The Project appears to be consistent with the goals and policies of the Calaveras, Stanislaus, and Tuolumne County General Plans. Tuolumne County is the only county with current applicable goals, policies, and laws. The Project does not intend to remove or disturb any trees. If trees were to be disturbed appropriate tree removal permits will be required based on the Tuolumne County Chapter 9.24 Ordinance. There are no known habitat conservation plans or a Natural Community Conservation Plans in the APE.

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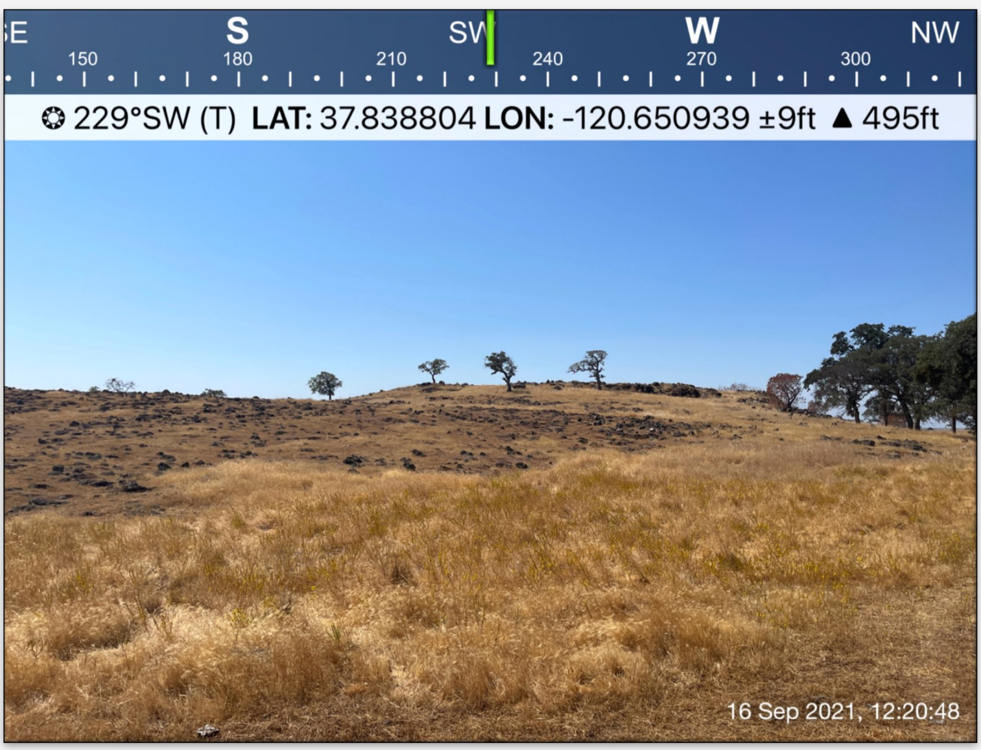
Appendix A: Photos of the Project Area

SOUTH SAN JOAQUIN IRRIGATION DISTRICT

CANYON TUNNEL PROJECT

Photograph 1

The overall landscape of rolling hills, grasslands, and oak trees of the APE.



Photograph 2

Overview of oak savanna landscape that dominates the APE.

Photograph 3

Rolling grasslands of the oak savanna landscape.

Photograph 4

A road cutting through the oak savanna habitat.

Photograph 5

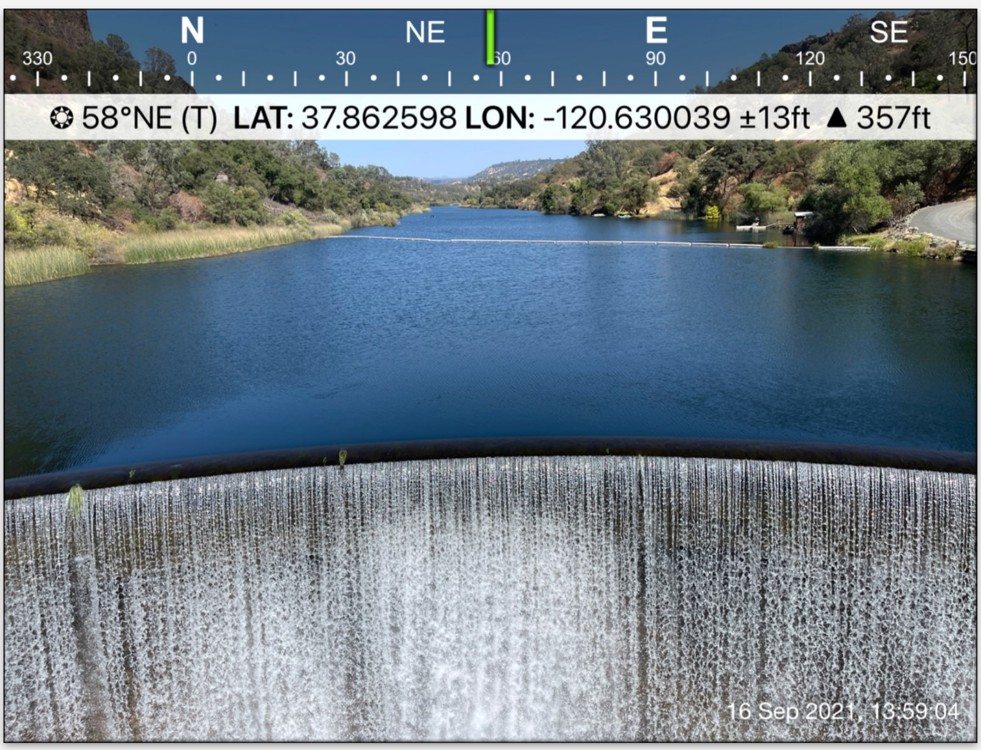
An example of an oak tree within the APE.

Photograph 6

The only standing water within the APE in the form of artificial cattle ponds.

Photograph 7

A view of the riverine habitat downstream of Goodwin Dam. Photograph was taken from the center of the dam.

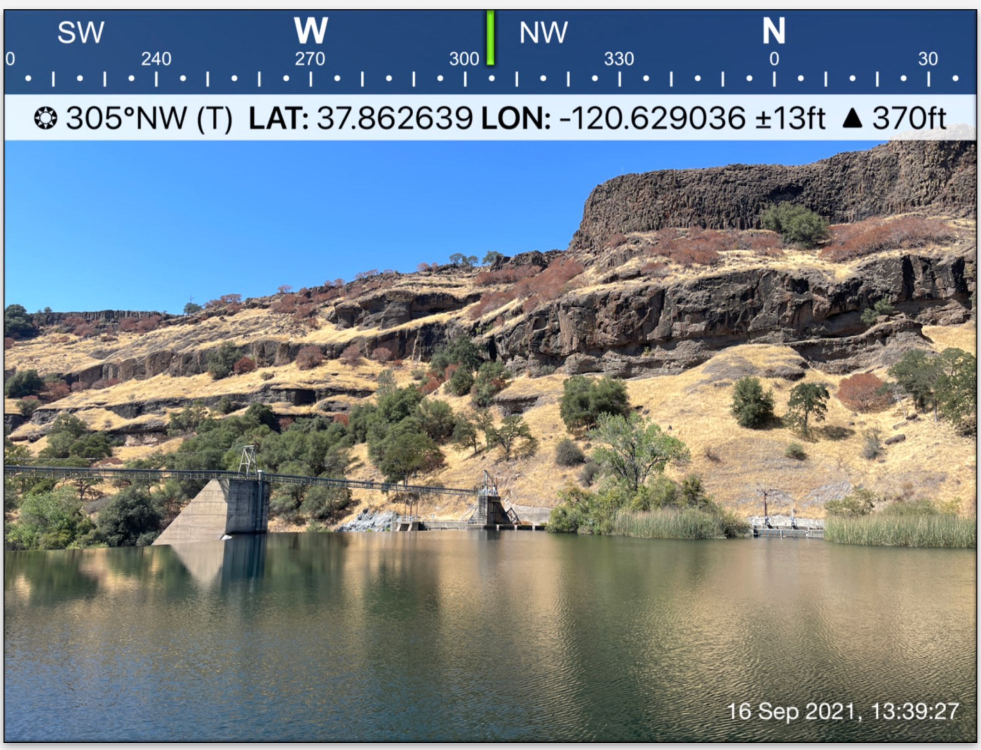


Photograph 8

A view of the riverine habitat upstream of Goodwin Dam. Photograph was taken from the center of the dam.

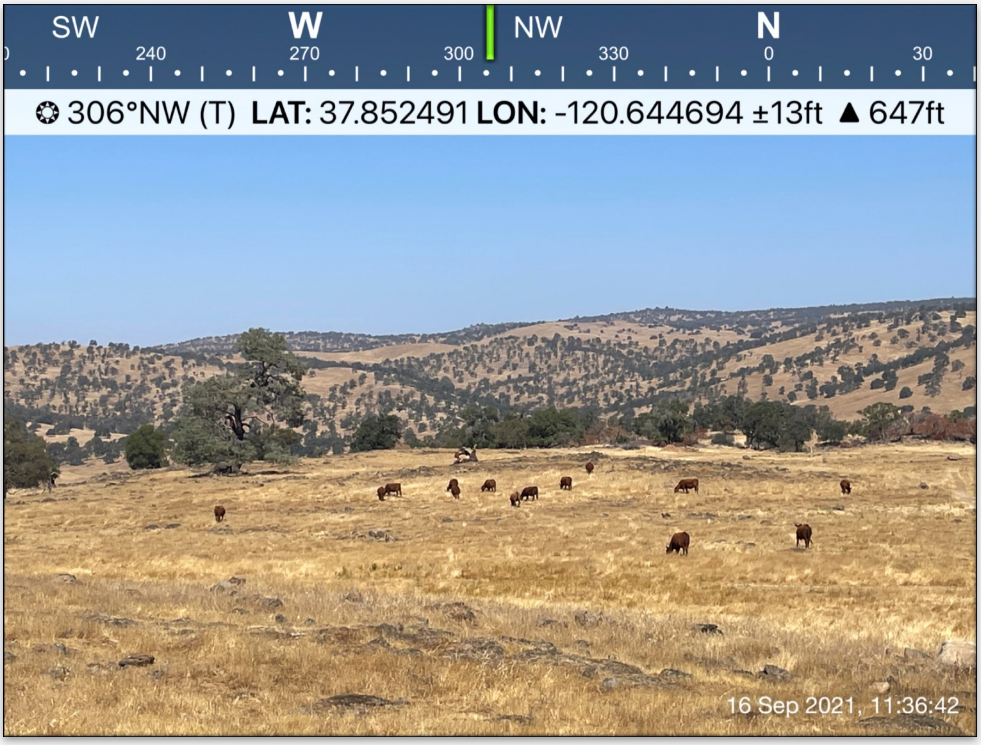
Photograph 9

Riverine habitat upstream from Goodwin Dam, looking upstream the Stanislaus River.



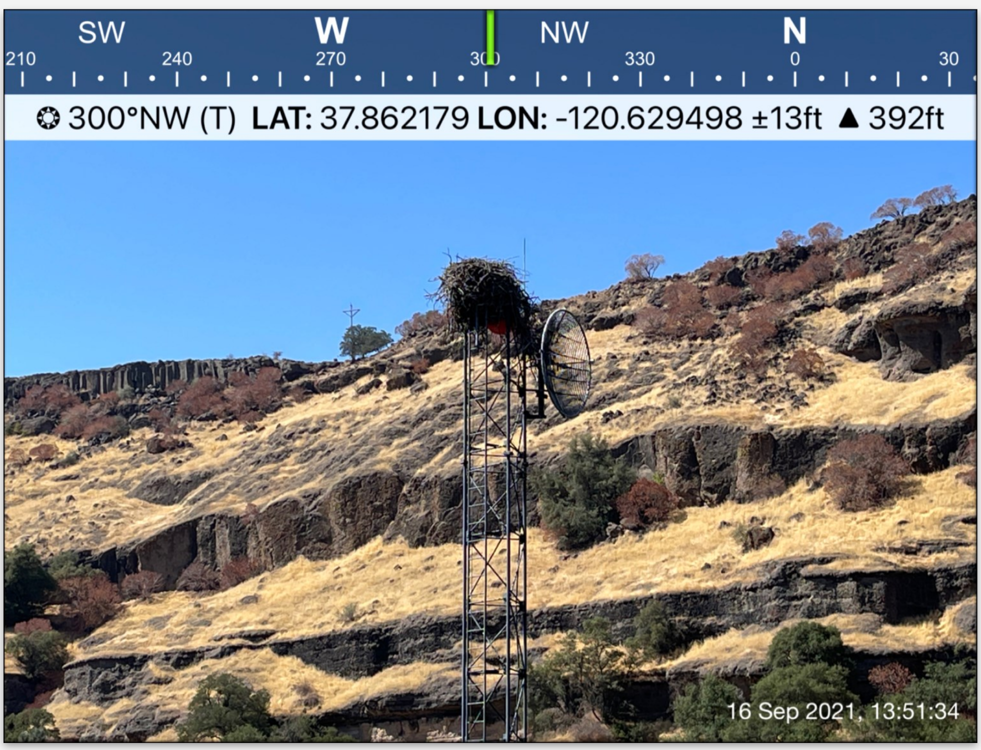
Photograph 10

Riverine habitat upstream from Goodwin Dam, looking downstream the Stanislaus River.



Photograph 11

Photograph of active cattle grazing within APE, the primary cause of disturbance.



Photograph 12

Historic Osprey nest monitored and determined inactive.

Photograph 13

Bat roost located and confirmed active on Stanislaus River north bank.

Photograph 14

A coyote observed foraging on roads during survey.

Photograph 15

Three mule deer, an adult male (right), an adult female (left) and a fawn (center) observed within the APE.

Photograph 16

Another adult female mule deer (left) and her fawn (right).

Appendix B: CNDDB 12-Quad Search

Selected Elements by Common Name

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Quad IS (Knights Ferry (3712076) OR Keystone (3712075) OR Bachelor Valley (3712087) OR Copperopolis (3712086) OR New Melones Dam (3712085) OR Sonora (3712084) OR Chinese Camp (3712074) OR La Grange (3712064) OR Cooperstown (3712065) OR Paulsell (3712066) OR Waterford (3712067) OR Oakdale (3712077))

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
American badger *Taxidea taxus*	AMAJF04010	None	None	G5	S3	SSC
bald eagle *Haliaeetus leucocephalus*	ABNKC10010	Delisted	Endangered	G5	S3	FP
beaked clarkia *Clarkia rostrata*	PDONA050Y0	None	None	G2G3	S2S3	1B.3
big-scale balsamroot *Balsamorhiza macrolepis*	PDAST11061	None	None	G2	S2	1B.2
burrowing owl *Athene cunicularia*	ABNSB10010	None	None	G4	S3	SSC
Button's Sierra sideband *Monadenia mormonum buttoni*	IMGASC7071	None	None	G2T1	S1S2	
California floater *Anodonta californiensis*	IMBIV04220	None	None	G3Q	S2?	
California horned lark *Eremophila alpestris actia*	ABPAT02011	None	None	G5T4Q	S4	WL
California linderiella *Linderiella occidentalis*	ICBRA06010	None	None	G2G3	S2S3	
California red-legged frog *Rana draytonii*	AAABH01022	Threatened	None	G2G3	S2S3	SSC
California tiger salamander - central California DPS *Ambystoma californiense pop. 1*	AAAAA01181	Threatened	Threatened	G2G3T3	S3	WL
central California roach *Hesperoleucus symmetricus symmetricus*	AFCJB19021	None	None	GNRT3	S3	SSC
Chinese Camp brodiaea *Brodiaea pallida*	PMLIL0C0C0	Threatened	Endangered	G1	S1	1B.1
coast horned lizard *Phrynosoma blainvillii*	ARACF12100	None	None	G3G4	S4	SSC
Colusa grass *Neostapfia colusana*	PMPOA4C010	Threatened	Endangered	G1	S1	1B.1
Congdon's lomatium *Lomatium congdonii*	PDAPI1B0B0	None	None	G2	S2	1B.2
Crotch bumble bee *Bombus crotchii*	IIHYM24480	None	Candidate Endangered	G2	S2	
delicate bluecup *Githopsis tenella*	PDCAM07070	None	None	G2	S2	1B.3

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
dwarf downingia *Downingia pusilla*	PDCAM060C0	None	None	GU	S2	2B.2
foothill yellow-legged frog - south Sierra DPS *Rana boylii pop. 5*	AAABH01055	Proposed Endangered	Endangered	G3T2	S2	
forked hare-leaf *Lagophylla dichotoma*	PDAST5J070	None	None	G2	S2	1B.1
Grady's Cave amphipod *Stygobromus gradyi*	ICMAL05460	None	None	G1	S1	
green sturgeon - southern DPS *Acipenser medirostris pop. 1*	AFCAA01031	Threatened	None	G2T1	S1	
Greene's tuctoria *Tuctoria greenei*	PMPOA6N010	Endangered	Rare	G1	S1	1B.1
hairy Orcutt grass *Orcuttia pilosa*	PMPOA4G040	Endangered	Endangered	G1	S1	1B.1
hardhead *Mylopharodon conocephalus*	AFCJB25010	None	None	G3	S3	SSC
Hartweg's golden sunburst *Pseudobahia bahiifolia*	PDAST7P010	Endangered	Endangered	G1	S1	1B.1
Henderson's bent grass *Agrostis hendersonii*	PMPOA040K0	None	None	G2Q	S2	3.2
hirsute Sierra sideband *Monadenia mormonum hirsuta*	IMGASC7072	None	None	G2T1	S1	
hoary bat *Lasiurus cinereus*	AMACC05032	None	None	G3G4	S4	
Hoover's calycadenia *Calycadenia hooveri*	PDAST1P040	None	None	G2	S2	1B.3
Hoover's cryptantha *Cryptantha hooveri*	PDBOR0A190	None	None	GH	SH	1A
Hoover's spurge *Euphorbia hooveri*	PDEUP0D150	Threatened	None	G1	S1	1B.2
Jepson's onion *Allium jepsonii*	PMLIL022V0	None	None	G2	S2	1B.2
Layne's ragwort *Packera layneae*	PDAST8H1V0	Threatened	Rare	G2	S2	1B.2
least Bell's vireo *Vireo bellii pusillus*	ABPBW01114	Endangered	Endangered	G5T2	S2	
Mariposa clarkia *Clarkia biloba ssp. australis*	PDONA05051	None	None	G4G5T3	S3	1B.2
Mariposa cryptantha *Cryptantha mariposae*	PDBOR0A1Q0	None	None	G2G3	S2S3	1B.3
Merced kangaroo rat *Dipodomys heermanni dixoni*	AMAFD03062	None	None	G4T2T3	S2	

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Merced monardella *Monardella leucocephala*	PDLAM180C0	None	None	GX	SX	1A
Morrison bumble bee *Bombus morrisoni*	IIHYM24460	None	None	G3	S1S2	
Nissenan manzanita *Arctostaphylos nissenana*	PDERI040V0	None	None	G1	S1	1B.2
North American porcupine *Erethizon dorsatum*	AMAFJ01010	None	None	G5	S3	
Northern Hardpan Vernal Pool *Northern Hardpan Vernal Pool*	CTT44110CA	None	None	G3	S3.1	
osprey *Pandion haliaetus*	ABNKC01010	None	None	G5	S4	WL
pallid bat *Antrozous pallidus*	AMACC10010	None	None	G4	S3	SSC
Patterson's navarretia *Navarretia paradoxiclara*	PDPLM0C150	None	None	G2	S2	1B.3
prairie falcon *Falco mexicanus*	ABNKD06090	None	None	G5	S4	WL
Rawhide Hill onion *Allium tuolumnense*	PMLIL022W0	None	None	G2	S2	1B.2
Red Hills cryptantha *Cryptantha spithamaea*	PDBOR0A2M2	None	None	G2	S2	1B.3
Red Hills ragwort *Senecio clevelandii var. heterophyllus*	PDAST8H0R2	None	None	G4?T2Q	S2	1B.2
Red Hills roach *Hesperoleucus symmetricus serpentinus*	AFCJB19028	None	None	GNRT1	S1	SSC
Red Hills soaproot *Chlorogalum grandiflorum*	PMLIL0G020	None	None	G3	S3	1B.2
Red Hills vervain *Verbena californica*	PDVER0N050	Threatened	Threatened	G2	S2	1B.1
San Joaquin kit fox *Vulpes macrotis mutica*	AMAJA03041	Endangered	Threatened	G4T2	S2	
San Joaquin Valley giant flower-loving fly *Rhaphiomidas trochilus*	IIDIP05010	None	None	G1	S1	
San Joaquin Valley Orcutt grass *Orcuttia inaequalis*	PMPOA4G060	Threatened	Endangered	G1	S1	1B.1
shaggyhair lupine *Lupinus spectabilis*	PDFAB2B3P0	None	None	G2	S2	1B.2
silver-haired bat *Lasionycteris noctivagans*	AMACC02010	None	None	G3G4	S3S4	
spiny-sepaled button-celery *Eryngium spinosepalum*	PDAPI0Z0Y0	None	None	G2	S2	1B.2

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Stanislaus harvestman *Calicina breva*	ILARAU8020	None	None	G1	S1	
Stanislaus monkeyflower *Erythranthe marmorata*	PDPHR01130	None	None	G2?	S2?	1B.1
steelhead - Central Valley DPS *Oncorhynchus mykiss irideus pop. 11*	AFCHA0209K	Threatened	None	G5T2Q	S2	
stinkbells *Fritillaria agrestis*	PMLIL0V010	None	None	G3	S3	4.2
succulent owl's-clover *Castilleja campestris var. succulenta*	PDSCR0D3Z1	Threatened	Endangered	G4?T2T3	S2S3	1B.2
Swainson's hawk *Buteo swainsoni*	ABNKC19070	None	Threatened	G5	S3	
tongue-leaf copper moss *Scopelophila cataractae*	NBMUS6U010	None	None	G3G4	S1	2B.2
Townsend's big-eared bat *Corynorhinus townsendii*	AMACC08010	None	None	G4	S2	SSC
tricolored blackbird *Agelaius tricolor*	ABPBXB0020	None	Threatened	G1G2	S1S2	SSC
Tuolumne button-celery *Eryngium pinnatisectum*	PDAPI0Z0P0	None	None	G2	S2	1B.2
valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	IICOL48011	Threatened	None	G3T2T3	S3	
veiny monardella *Monardella venosa*	PDLAM18082	None	None	G1	S1	1B.1
vernal pool fairy shrimp *Branchinecta lynchi*	ICBRA03030	Threatened	None	G3	S3	
vernal pool tadpole shrimp *Lepidurus packardi*	ICBRA10010	Endangered	None	G4	S3	
western mastiff bat *Eumops perotis californicus*	AMACD02011	None	None	G4G5T4	S3S4	SSC
western pond turtle *Emys marmorata*	ARAAD02030	None	None	G3G4	S3	SSC
western red bat *Lasiurus frantzii*	AMACC05080	None	None	G4	S3	SSC
western spadefoot *Spea hammondii*	AAABF02020	None	None	G2G3	S3S4	SSC
yellow-breasted chat *Icteria virens*	ABPBX24010	None	None	G5	S3	SSC
Yuma myotis *Myotis yumanensis*	AMACC01020	None	None	G5	S4	

Record Count: 80

Appendix C: IPaC Search

SOUTH SAN JOAQUIN IRRIGATION DISTRICT

CANYON TUNNEL PROJECT

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish And Wildlife Office
Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846
Phone: (916) 414-6600 Fax: (916) 414-6713

In Reply Refer To: January 06, 2023
Project Code: 2023-0031374
Project Name: Canyon Tunnel Project

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2) (c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts see https://www.fws.gov/birds/policies-and-regulations.php.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures see https://www.fws.gov/birds/bird-enthusiasts/threats-to-birds.php.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit https://www.fws.gov/birds/policies-and-regulations/executive-orders/e0-13186.php.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Sacramento Fish And Wildlife Office
Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846
(916) 414-6600

Project Summary

Project Code:	2023-0031374
Project Name:	Canyon Tunnel Project
Project Type:	Water Supply Pipeline - New Constr - Below Ground
Project Description:	South San Joaquin Irrigation District (SSJID) is interested in constructing a new water conveyance tunnel to bypass approximately 12,200 lineal feet of existing canal and tunnels, referred to as the Joint Supply Canal (JSC). The objective is to improve long-term reliability of this critical water supply system. The existing canal segments along this bypass reach are extremely vulnerable to catastrophic failure, primarily due to unstable rock slopes that are present along the canyon wall. The existing JSC is located along the north bank of the Stanislaus River in Calaveras and Tuolumne Counties, California, near the town of Knights Ferry. The Area of Potential Effect (APE) includes approximately 770 total acres, however the majority of the APE is underground, with approximately 8.5 total acres of ground disturbance. The work will include 4-acres of temporary construction access, 3-acres of laydown and staging areas, a 0.5-acre permanent downstream tunnel portal and tie-in to the existing canal, approximately 12,000 lineal feet of new tunnel, a 0.3-acre permanent upstream tunnel portal and tie-in to the existing Goodwin Reservoir, an upgrade to an existing dock on the south shore of Goodwin Reservoir, a 0.4-acre permanent barge landing area, and 0.3-acres of permanent access improvements leading to the existing Goodwin Dam right abutment. Tree removal activities are not anticipated as part of the Project and existing roads would be utilized for construction purposes.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@37.84976,-120.64700963696916,14z

Counties: Calaveras , Stanislaus , and Tuolumne counties, California

Endangered Species Act Species

There is a total of 11 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
San Joaquin Kit Fox *Vulpes macrotis mutica* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/2873	Endangered

Amphibians

NAME	STATUS
California Red-legged Frog *Rana draytonii* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2891	Threatened
California Tiger Salamander *Ambystoma californiense* Population: U.S.A. (Central CA DPS) There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2076	Threatened

Fishes

NAME	STATUS
Delta Smelt *Hypomesus transpacificus* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/321	Threatened

Insects

NAME	STATUS
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate
Valley Elderberry Longhorn Beetle *Desmocerus californicus dimorphus* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/7850	Threatened

Crustaceans

NAME	STATUS
Conservancy Fairy Shrimp *Branchinecta conservatio* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/8246	Endangered
Vernal Pool Fairy Shrimp *Branchinecta lynchi* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/498	Threatened
Vernal Pool Tadpole Shrimp *Lepidurus packardi* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2246	Endangered

Flowering Plants

NAME	STATUS
Colusa Grass *Neostapfia colusana* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5690	Threatened
Hartweg's Golden Sunburst *Pseudobahia bahiifolia* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1704	Endangered

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

IPaC User Contact Information

Agency: Provost & Pritchard Consulting
Name: Shaylea Stark
Address: 455 W Fir Ave
City: Clovis
State: CA
Zip: 93612
Email sstark@ppeng.com
Phone: 5594492700

Appendix D: NRCS Soils Report

SOUTH SAN JOAQUIN IRRIGATION DISTRICT

CANYON TUNNEL PROJECT

United States Department of Agriculture

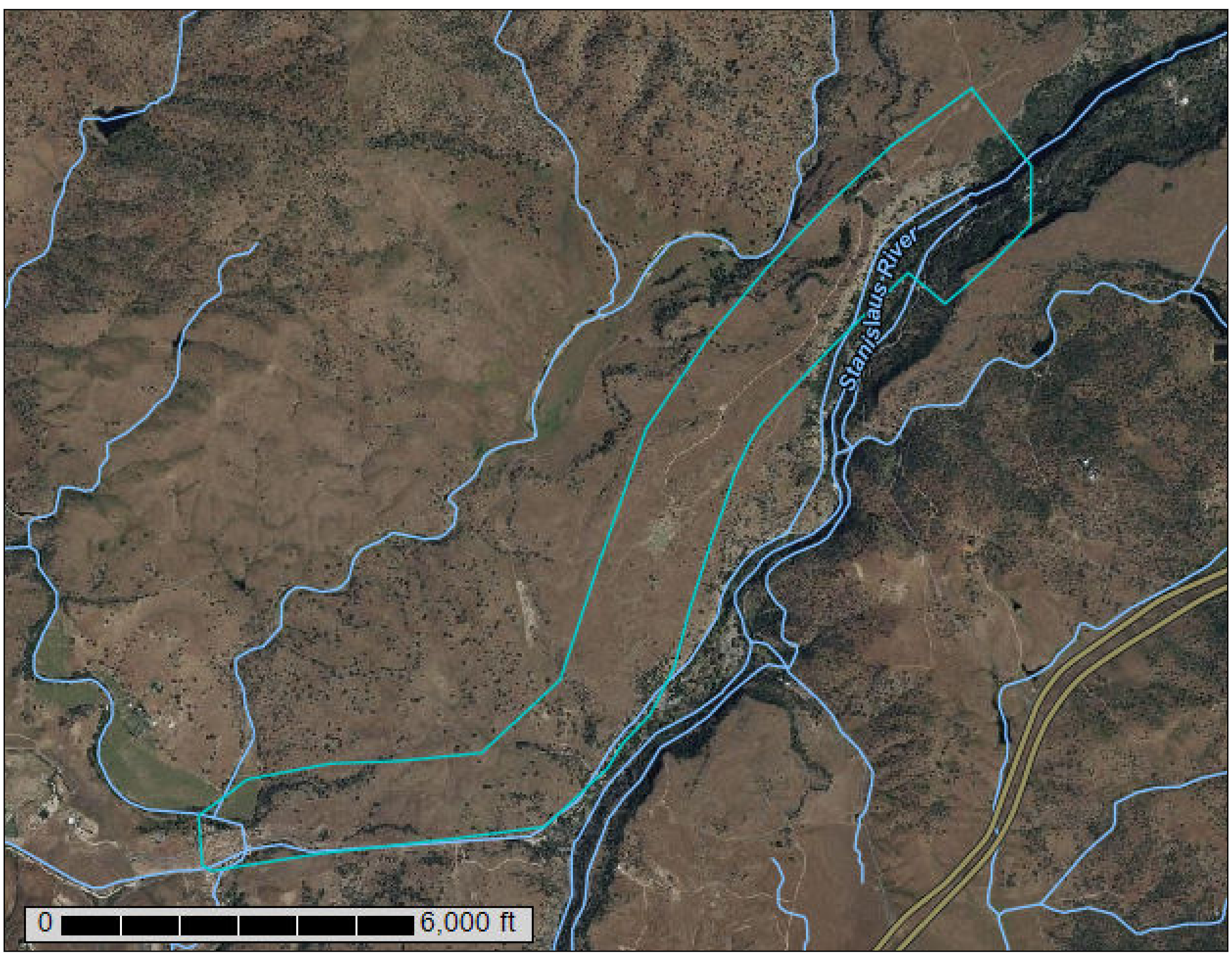
NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Central Sierra Foothills Area, California, Parts of Calaveras and Tuolumne Counties; and Stanislaus County, California, Northern Part

Canyon Tunnel Project



January 6, 2023

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

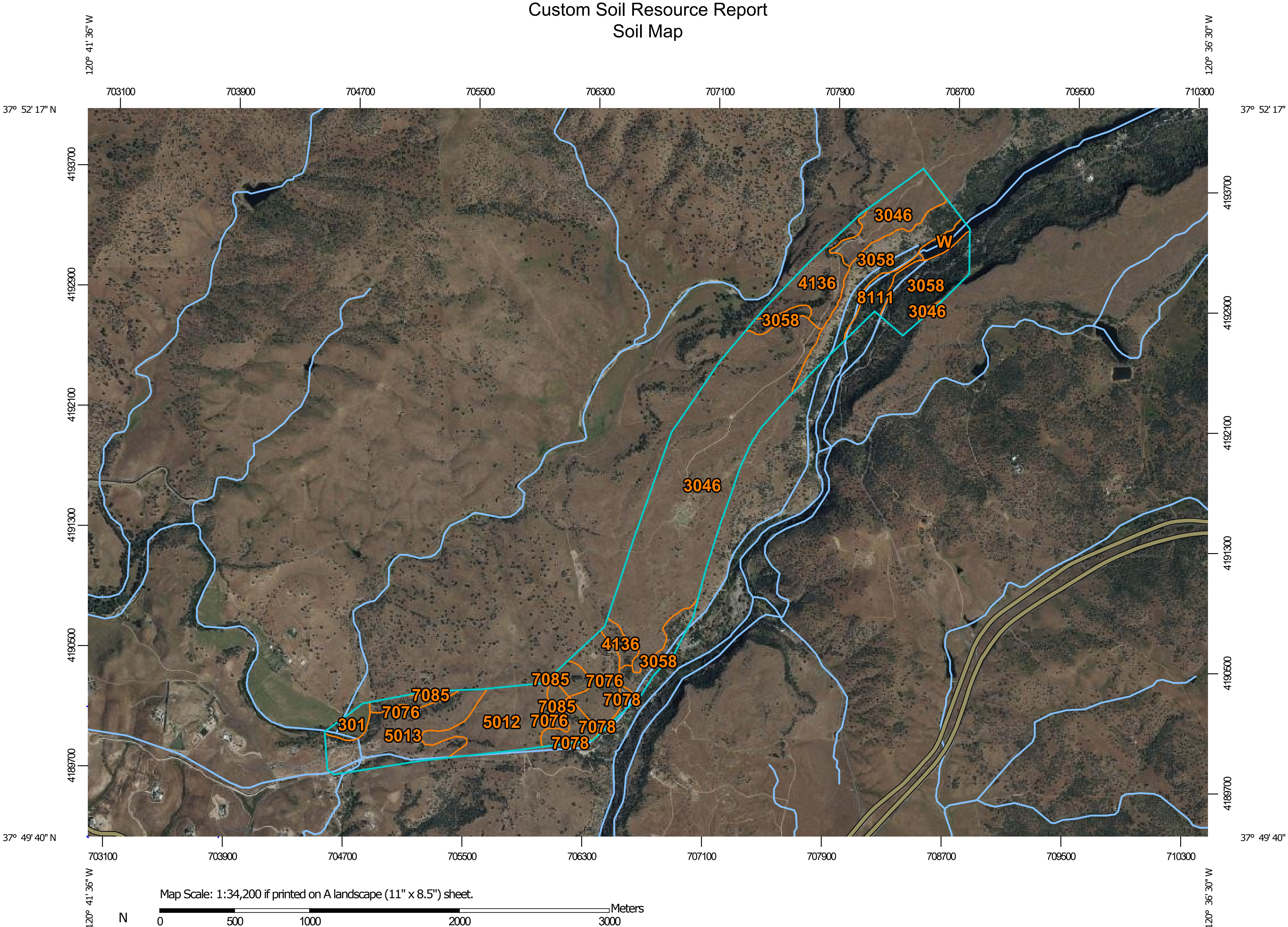
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Soil Map



Map Scale: 1:34,200 if printed on A landscape (11" x 8.5") sheet.

Meters: 0, 500, 1000, 2000, 3000

Feet: 0, 1500, 3000, 6000, 9000

N

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Central Sierra Foothills Area, California, Parts of Calaveras and Tuolumne Counties
Survey Area Data: Version 7, Sep 1, 2022

Soil Survey Area: Stanislaus County, California, Northern Part
Survey Area Data: Version 14, Sep 14, 2022

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 11, 2022—May 30, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND	MAP INFORMATION
	imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
3046	Goldwall-Toomes-Rock outcrop complex, 1 to 8 percent slopes	329.4	42.8%
3058	Shawsflat-Angelscreek complex, 25 to 60 percent slopes	138.1	17.9%
4136	Ultic Haploxeralfs, shallow-Ultic Haploxeralfs, moderately deep complex, 10 to 35 percent slopes	51.3	6.7%
7076	Bonanza-Loafercreek-Gopheridge complex, 15 to 30 percent slopes	34.5	4.5%
7078	Jasperpeak-Gopheridge complex, 30 to 60 percent slopes	4.0	0.5%
7085	Bonanza-Loafercreek complex, 3 to 15 percent slopes	9.5	1.2%
8111	Psammentic Haploxerolls-Mollic Fluvaquents-Riverwash-complex, 0 to 8 percent slopes	14.4	1.9%
W	Water	8.6	1.1%
Subtotals for Soil Survey Area		**590.0**	**76.6%**
Totals for Area of Interest		**770.2**	**100.0%**

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
301	Archerdale-Hicksville association, 0 to 2 percent slopes	10.4	1.3%
5012	Amador sandy loam, 2 to 15 percent slopes	61.2	7.9%
5013	Miltonhills-Amador complex, 15 to 45 percent slopes	75.1	9.8%
7076	Bonanza-Loafercreek-Gopheridge complex, 15 to 30 percent slopes	21.9	2.8%
7078	Jasperpeak-Gopheridge complex, 30 to 60 percent slopes	0.3	0.0%
7085	Bonanza-Loafercreek complex, 3 to 15 percent slopes	11.4	1.5%
Subtotals for Soil Survey Area		**180.3**	**23.4%**
Totals for Area of Interest		**770.2**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Central Sierra Foothills Area, California, Parts of Calaveras and Tuolumne Counties

3046—Goldwall-Toomes-Rock outcrop complex, 1 to 8 percent slopes

Map Unit Setting

National map unit symbol: 20mmx
Elevation: 390 to 2,150 feet
Mean annual precipitation: 20 to 36 inches
Mean annual air temperature: 59 to 63 degrees F
Frost-free period: 230 to 325 days
Farmland classification: Not prime farmland

Map Unit Composition

Goldwall and similar soils: 45 percent
Toomes and similar soils: 28 percent
Rock outcrop, latite: 20 percent
Minor components: 7 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Goldwall

Setting

Landform: Lava plateaus
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Microfeatures of landform position: Open depressions
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Residuum weathered from latite

Typical profile

A - 0 to 6 inches: loam
R - 6 to 79 inches: bedrock

Properties and qualities

Slope: 1 to 8 percent
Surface area covered with cobbles, stones or boulders: 2.0 percent
Depth to restrictive feature: 1 to 10 inches to lithic bedrock
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to low (0.00 to 0.01 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 1.2 inches)

Interpretive groups

Land capability classification (irrigated): 7s
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: R018XI101CA - Shallow Latite Ridgetops
Hydric soil rating: No

Description of Toomes

Setting

Landform: Lava plateaus
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Microfeatures of landform position: Mounds
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from latite

Typical profile

A - 0 to 1 inches: loam
Bw - 1 to 13 inches: sandy loam
R - 13 to 79 inches: bedrock

Properties and qualities

Slope: 1 to 8 percent
Surface area covered with cobbles, stones or boulders: 2.0 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to low (0.00 to 0.01 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 1.6 inches)

Interpretive groups

Land capability classification (irrigated): 7e
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: R018XI101CA - Shallow Latite Ridgetops
Hydric soil rating: No

Description of Rock Outcrop, Latite

Setting

Landform: Lava plateaus

Minor Components

Ultic argixerolls

Percent of map unit: 5 percent
Landform: Lava plateaus
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F018XI207CA - Deep Volcanic Plateaus and Hills
Hydric soil rating: No

Aquic haploxeralfs

Percent of map unit: 2 percent
Landform: Lava plateaus
Landform position (two-dimensional): Summit

Landform position (three-dimensional): Interfluve
Microfeatures of landform position: Vernal pools
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: R018XI101CA - Shallow Latite Ridgetops
Hydric soil rating: Yes

3058—Shawsflat-Angelscreek complex, 25 to 60 percent slopes

Map Unit Setting

National map unit symbol: 2n89j
Elevation: 460 to 2,260 feet
Mean annual precipitation: 20 to 36 inches
Mean annual air temperature: 59 to 63 degrees F
Frost-free period: 230 to 315 days
Farmland classification: Not prime farmland

Map Unit Composition

Shawsflat and similar soils: 65 percent
Angelscreek and similar soils: 15 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Shawsflat

Setting

Landform: Lava plateaus
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Colluvium derived from latite over residuum weathered from volcanic rock

Typical profile

A - 0 to 17 inches: very stony loam
Bw - 17 to 29 inches: very stony loam
2Cr - 29 to 39 inches: bedrock

Properties and qualities

Slope: 25 to 60 percent
Surface area covered with cobbles, stones or boulders: 20.0 percent
Depth to restrictive feature: 20 to 39 inches to paralithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None

Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.3 inches)

Interpretive groups

Land capability classification (irrigated): 7e
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Ecological site: F018XI207CA - Deep Volcanic Plateaus and Hills
Hydric soil rating: No

Description of Angelscreek

Setting

Landform: Lava plateaus
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Colluvium derived from latite

Typical profile

Oi - 0 to 0 inches: slightly decomposed plant material
A1 - 0 to 5 inches: loam
A2 - 5 to 11 inches: loam
Bt1 - 11 to 31 inches: clay loam
Bt2 - 31 to 37 inches: extremely cobbly clay loam
Bt3 - 37 to 60 inches: very cobbly clay

Properties and qualities

Slope: 25 to 60 percent
Surface area covered with cobbles, stones or boulders: 2.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.03 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.0 inches)

Interpretive groups

Land capability classification (irrigated): 7e
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Ecological site: F018XI207CA - Deep Volcanic Plateaus and Hills
Hydric soil rating: No

Minor Components

Miltonhills

Percent of map unit: 5 percent
Landform: Lava plateaus
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear

Across-slope shape: Convex
Ecological site: F018XI207CA - Deep Volcanic Plateaus and Hills
Hydric soil rating: No

Pentz

Percent of map unit: 5 percent
Landform: Lava plateaus
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: R018XI107CA - Shallow, Undulating Volcanic Hills
Hydric soil rating: No

Rock outcrop

Percent of map unit: 5 percent
Landform: Free faces on lava plateaus
Hydric soil rating: No

Rubbleland

Percent of map unit: 5 percent
Landform: Rockfalls on lava plateaus
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Hydric soil rating: No

4136—Ultic Haploxeralfs, shallow-Ultic Haploxeralfs, moderately deep complex, 10 to 35 percent slopes

Map Unit Setting

National map unit symbol: 2kq0n
Elevation: 480 to 1,710 feet
Mean annual precipitation: 20 to 33 inches
Mean annual air temperature: 59 to 63 degrees F
Frost-free period: 230 to 315 days
Farmland classification: Not prime farmland

Map Unit Composition

Ultic haploxeralfs, shallow, and similar soils: 55 percent
Ultic haploxeralfs, moderately deep, and similar soils: 45 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ultic Haploxeralfs, Shallow

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear

Across-slope shape: Convex
Parent material: Colluvium derived from latite over residuum weathered from volcanic or metamorphic rock

Typical profile

A - 0 to 2 inches: loam
Bt1 - 2 to 8 inches: loam
Bt2 - 8 to 18 inches: very cobbly loam
2Cr - 18 to 31 inches: bedrock
2R - 31 to 79 inches: bedrock

Properties and qualities

Slope: 10 to 35 percent
Surface area covered with cobbles, stones or boulders: 4.0 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock; 20 to 39 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to low (0.00 to 0.01 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 2.6 inches)

Interpretive groups

Land capability classification (irrigated): 6e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: R018XI107CA - Shallow, Undulating Volcanic Hills
Hydric soil rating: No

Description of Ultic Haploxeralfs, Moderately Deep

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Colluvium derived from latite over residuum weathered from volcanic or metamorphic rock

Typical profile

A1 - 0 to 2 inches: loam
A2 - 2 to 5 inches: very stony sandy loam
Bt1 - 5 to 20 inches: extremely stony sandy clay loam
2Bt2 - 20 to 32 inches: clay loam
2Cr - 32 to 42 inches: bedrock

Properties and qualities

Slope: 10 to 35 percent
Depth to restrictive feature: 20 to 39 inches to paralithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches

Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): 6e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: F018XI201CA - Moderately Deep Thermic Foothills
Hydric soil rating: No

7076—Bonanza-Loafercreek-Gopheridge complex, 15 to 30 percent slopes

Map Unit Setting

National map unit symbol: 2x294
Elevation: 390 to 1,250 feet
Mean annual precipitation: 16 to 24 inches
Mean annual air temperature: 61 to 63 degrees F
Frost-free period: 290 to 330 days
Farmland classification: Not prime farmland

Map Unit Composition

Bonanza and similar soils: 40 percent
Loafercreek and similar soils: 31 percent
Gopheridge and similar soils: 20 percent
Minor components: 9 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bonanza

Setting

Landform: Hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Colluvium over residuum derived from metavolcanics

Typical profile

A - 0 to 2 inches: loam
Bt1 - 2 to 8 inches: loam
Bt2 - 8 to 18 inches: gravelly loam
Cr - 18 to 22 inches: bedrock
R - 22 to 79 inches: bedrock

Properties and qualities

Slope: 15 to 30 percent
Surface area covered with cobbles, stones or boulders: 1.0 percent

Depth to restrictive feature: 10 to 20 inches to paralithic bedrock; 14 to 30 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 2.9 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Ecological site: F018XI200CA - Low Elevation Foothills
Hydric soil rating: No

Description of Loafercreek

Setting

Landform: Hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Nose slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Colluvium over residuum derived from metavolcanics

Typical profile

A - 0 to 4 inches: loam
Bt1 - 4 to 10 inches: loam
Bt2 - 10 to 19 inches: loam
Bt3 - 19 to 26 inches: paragravelly clay loam
Cr - 26 to 35 inches: bedrock
R - 35 to 79 inches: bedrock

Properties and qualities

Slope: 15 to 30 percent
Surface area covered with cobbles, stones or boulders: 0.0 percent
Depth to restrictive feature: 20 to 39 inches to paralithic bedrock; 20 to 49 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.4 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: F018XI201CA - Moderately Deep Thermic Foothills
Hydric soil rating: No

Description of Gopheridge

Setting

Landform: Hills
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Colluvium over residuum derived from metavolcanics

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
A1 - 2 to 4 inches: loam
A2 - 4 to 7 inches: loam
Bt1 - 7 to 14 inches: extremely gravelly loam
Bt2 - 14 to 21 inches: very stony clay loam
Bt3 - 21 to 32 inches: extremely stony clay
R - 32 to 79 inches: bedrock

Properties and qualities

Slope: 15 to 30 percent
Surface area covered with cobbles, stones or boulders: 0.0 percent
Depth to restrictive feature: 20 to 39 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.01 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.7 inches)

Interpretive groups

Land capability classification (irrigated): 6e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: F018XI201CA - Moderately Deep Thermic Foothills
Hydric soil rating: No

Minor Components

Motherlode

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F018XI201CA - Moderately Deep Thermic Foothills
Hydric soil rating: No

Auburn

Percent of map unit: 3 percent
Landform: Hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Nose slope

Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: F018XI200CA - Low Elevation Foothills
Hydric soil rating: No

Rock outcrop, metavolcanic

Percent of map unit: 1 percent
Landform: Hills
Hydric soil rating: No

7078—Jasperpeak-Gopheridge complex, 30 to 60 percent slopes

Map Unit Setting

National map unit symbol: 2x295
Elevation: 360 to 1,300 feet
Mean annual precipitation: 17 to 25 inches
Mean annual air temperature: 61 to 63 degrees F
Frost-free period: 295 to 340 days
Farmland classification: Not prime farmland

Map Unit Composition

Jasperpeak and similar soils: 49 percent
Gopheridge and similar soils: 25 percent
Minor components: 26 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Jasperpeak

Setting

Landform: Hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Colluvium over residuum derived from metavolcanics

Typical profile

A - 0 to 1 inches: loam
Bt1 - 1 to 3 inches: very gravelly loam
Bt2 - 3 to 6 inches: very gravelly loam
Bt3 - 6 to 10 inches: very cobbly loam
R - 10 to 79 inches: bedrock

Properties and qualities

Slope: 30 to 60 percent
Surface area covered with cobbles, stones or boulders: 3.0 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 1.2 inches)

Interpretive groups

Land capability classification (irrigated): 7e
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: F018XI200CA - Low Elevation Foothills
Hydric soil rating: No

Description of Gopheridge

Setting

Landform: Hills
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Colluvium over residuum derived from metavolcanics

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
A - 2 to 6 inches: silt loam
Bt1 - 6 to 13 inches: gravelly silt loam
Bt2 - 13 to 25 inches: extremely gravelly clay
Bt3 - 25 to 34 inches: extremely gravelly clay
R - 34 to 79 inches: bedrock

Properties and qualities

Slope: 30 to 60 percent
Surface area covered with cobbles, stones or boulders: 0.0 percent
Depth to restrictive feature: 20 to 39 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.8 inches)

Interpretive groups

Land capability classification (irrigated): 8
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Ecological site: F018XI201CA - Moderately Deep Thermic Foothills
Hydric soil rating: No

Minor Components

Motherlode

Percent of map unit: 10 percent

Landform: Hills
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F018XI201CA - Moderately Deep Thermic Foothills
Hydric soil rating: No

Loafercreek

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: F018XI201CA - Moderately Deep Thermic Foothills
Hydric soil rating: No

Gardellones

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F018XI201CA - Moderately Deep Thermic Foothills
Hydric soil rating: No

Rock outcrop, metavolcanic

Percent of map unit: 5 percent
Landform: Hills
Hydric soil rating: No

Mined land

Percent of map unit: 1 percent
Landform: Hills
Down-slope shape: Concave, convex
Across-slope shape: Linear, convex
Hydric soil rating: No

7085—Bonanza-Loafercreek complex, 3 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2mywp
Elevation: 430 to 1,260 feet
Mean annual precipitation: 16 to 25 inches
Mean annual air temperature: 61 to 63 degrees F
Frost-free period: 275 to 335 days
Farmland classification: Not prime farmland

Map Unit Composition

Bonanza and similar soils: 54 percent
Loafercreek and similar soils: 32 percent
Minor components: 14 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bonanza

Setting

Landform: Hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Nose slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Residuum weathered from metavolcanics

Typical profile

A - 0 to 1 inches: loam
Bt1 - 1 to 5 inches: loam
Bt2 - 5 to 15 inches: very paragravelly clay loam
Cr - 15 to 24 inches: bedrock
R - 24 to 79 inches: bedrock

Properties and qualities

Slope: 3 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.0 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock; 14 to 30 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 1.8 inches)

Interpretive groups

Land capability classification (irrigated): 7e
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: F018XI200CA - Low Elevation Foothills
Hydric soil rating: No

Description of Loafercreek

Setting

Landform: Hills
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Nose slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Colluvium over residuum derived from metavolcanics

Typical profile

A - 0 to 1 inches: loam

Bt1 - 1 to 7 inches: loam
Bt2 - 7 to 15 inches: clay loam
CBt - 15 to 26 inches: very paragravelly clay loam
Crt - 26 to 38 inches: bedrock
R - 38 to 79 inches: bedrock

Properties and qualities

Slope: 3 to 15 percent
Depth to restrictive feature: 20 to 39 inches to paralithic bedrock; 20 to 49 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.5 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: F018XI201CA - Moderately Deep Thermic Foothills
Hydric soil rating: No

Minor Components

Gopheridge

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: F018XI201CA - Moderately Deep Thermic Foothills
Hydric soil rating: No

Auburn

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: F018XI200CA - Low Elevation Foothills
Hydric soil rating: No

Mined land

Percent of map unit: 2 percent
Landform: Hills
Down-slope shape: Concave, convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Rock outcrop, metavolcanic

Percent of map unit: 2 percent

Landform: Hills
Hydric soil rating: No

8111—Psammentic Haploxerolls-Mollic Fluvaquents-Riverwash-complex, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2x4d2
Elevation: 110 to 1,050 feet
Mean annual precipitation: 14 to 26 inches
Mean annual air temperature: 61 to 63 degrees F
Frost-free period: 275 to 350 days
Farmland classification: Not prime farmland

Map Unit Composition

Psammentic haploxerolls and similar soils: 40 percent
Mollic fluvaquents, cobbly, and similar soils: 20 percent
Riverwash: 15 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Psammentic Haploxerolls

Setting

Landform: Flood-plain steps
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium

Typical profile

A - 0 to 14 inches: loamy sand
C - 14 to 49 inches: loamy sand
Bw - 49 to 63 inches: sandy loam
C' - 63 to 79 inches: sand

Properties and qualities

Slope: 0 to 8 percent
Surface area covered with cobbles, stones or boulders: 0.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: RareNone
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A
Ecological site: R018XX101CA - Mid Gradient Riparian Complex, 4Th Order Stream
Hydric soil rating: No

Description of Mollic Fluvaquents, Cobbly

Setting

Landform: Flood-plain steps
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium over residuum weathered from metamorphic rock

Typical profile

A - 0 to 2 inches: cobbly loam
Bg - 2 to 6 inches: very gravelly sandy clay loam
C - 6 to 15 inches: very gravelly sandy clay loam
R - 15 to 79 inches: bedrock

Properties and qualities

Slope: 0 to 8 percent
Surface area covered with cobbles, stones or boulders: 1.0 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to low (0.00 to 0.01 in/hr)
Depth to water table: About 1 to 4 inches
Frequency of flooding: OccasionalNone
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 1.4 inches)

Interpretive groups

Land capability classification (irrigated): 7w
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: D
Ecological site: R018XX101CA - Mid Gradient Riparian Complex, 4Th Order Stream
Hydric soil rating: Yes

Description of Riverwash

Setting

Landform: Channels

Properties and qualities

Slope: 0 to 3 percent
Frequency of flooding: Very frequent

Minor Components

Anthraltic xerorthents

Percent of map unit: 13 percent

Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Ultic haploxerolls

Percent of map unit: 7 percent
Landform: Meander scars on flood-plain steps
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R018XX101CA - Mid Gradient Riparian Complex, 4Th Order Stream
Hydric soil rating: No

Water

Percent of map unit: 5 percent
Landform: Streams
Hydric soil rating: No

W—Water

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Stanislaus County, California, Northern Part

301—Archerdale-Hicksville association, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2x8ld
Elevation: 200 to 740 feet
Mean annual precipitation: 17 to 24 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 320 to 350 days
Farmland classification: Not prime farmland

Map Unit Composition

Archerdale, clay loam, and similar soils: 65 percent
Hicksville, gravelly loam, and similar soils: 20 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Archerdale, Clay Loam

Setting

Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium

Typical profile

Ap - 0 to 10 inches: clay loam
A - 10 to 30 inches: clay
Bw - 30 to 60 inches: clay

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: NoneRare
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 9.5 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: C
Ecological site: F018XI208CA - Deep Low Rolling Hills and Terraces
Hydric soil rating: No

Description of Hicksville, Gravelly Loam

Setting

Landform: Stream terraces
Landform position (three-dimensional): Tread

Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium

Typical profile
A - 0 to 10 inches: gravelly loam
Bt - 10 to 45 inches: gravelly sandy clay loam
2Bt - 45 to 60 inches: very gravelly sandy clay loam

Properties and qualities
Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 9.2 inches)

Interpretive groups
Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: C
Ecological site: F018XI208CA - Deep Low Rolling Hills and Terraces
Hydric soil rating: No

Minor Components

Hollenbeck, silty clay
Percent of map unit: 7 percent
Landform: Swales, backswamps on flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Concave, linear
Hydric soil rating: No

Ultic haploxerolls, sandy loam
Percent of map unit: 5 percent
Landform: Meander scars on stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Nord, loam
Percent of map unit: 1 percent
Landform: Fan remnants
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Capay, clay
Percent of map unit: 1 percent
Landform: Basin floors

Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Finrod, clay

Percent of map unit: 1 percent
Landform: Alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

5012—Amador sandy loam, 2 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2rx24
Elevation: 210 to 480 feet
Mean annual precipitation: 17 to 21 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 325 to 350 days
Farmland classification: Not prime farmland

Map Unit Composition

Amador and similar soils: 76 percent
Minor components: 24 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Amador

Setting

Landform: Low hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from acidic tuff

Typical profile

A - 0 to 2 inches: sandy loam
Bw - 2 to 15 inches: sandy loam
Cr - 15 to 25 inches: bedrock

Properties and qualities

Slope: 2 to 15 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches

Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 1.8 inches)

Interpretive groups

Land capability classification (irrigated): 7e
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: R018XI107CA - Shallow, Undulating Volcanic Hills
Hydric soil rating: No

Minor Components

Gillender

Percent of map unit: 9 percent
Landform: Low hills, swales
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: R018XI163CA - Thermic Low Rolling Hills
Hydric soil rating: No

Pardee

Percent of map unit: 5 percent
Landform: Ridges on eroded fan remnants
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R018XI107CA - Shallow, Undulating Volcanic Hills
Hydric soil rating: No

Miltonhills

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: F018XI207CA - Deep Volcanic Plateaus and Hills
Hydric soil rating: No

Redding

Percent of map unit: 2 percent
Landform: Eroded fan remnants
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F018XI200CA - Low Elevation Foothills
Hydric soil rating: No

Mined land

Percent of map unit: 2 percent
Landform: Low hills

Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Rock outcrop, acidic tuff
Percent of map unit: 1 percent
Landform: Low hills
Hydric soil rating: No

5013—Miltonhills-Amador complex, 15 to 45 percent slopes

Map Unit Setting
National map unit symbol: 2rx18
Elevation: 250 to 670 feet
Mean annual precipitation: 17 to 22 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 325 to 350 days
Farmland classification: Not prime farmland

Map Unit Composition
Miltonhills and similar soils: 50 percent
Amador and similar soils: 30 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Miltonhills

Setting
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Colluvium over residuum derived from acidic tuff

Typical profile
A - 0 to 10 inches: fine sandy loam
Bw - 10 to 16 inches: fine sandy loam
C - 16 to 24 inches: gravelly fine sandy loam
Cr - 24 to 33 inches: bedrock

Properties and qualities
Slope: 15 to 45 percent
Depth to restrictive feature: 20 to 39 inches to paralithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water supply, 0 to 60 inches: Low (about 3.3 inches)

Interpretive groups

Land capability classification (irrigated): 6e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: F018XI207CA - Deep Volcanic Plateaus and Hills
Hydric soil rating: No

Description of Amador

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Residuum weathered from acidic tuff

Typical profile

A - 0 to 3 inches: loam
Bw - 3 to 12 inches: fine sandy loam
Cr - 12 to 22 inches: bedrock

Properties and qualities

Slope: 15 to 45 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 1.8 inches)

Interpretive groups

Land capability classification (irrigated): 7e
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: R018XI107CA - Shallow, Undulating Volcanic Hills
Hydric soil rating: No

Minor Components

Ultic argixerolls

Percent of map unit: 10 percent
Landform: Hills
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Ecological site: F018XI207CA - Deep Volcanic Plateaus and Hills
Hydric soil rating: No

Rock outcrop, acidic tuff

Percent of map unit: 5 percent
Landform: Hills

Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Pardee

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R018XI107CA - Shallow, Undulating Volcanic Hills
Hydric soil rating: No

7076—Bonanza-Loafercreek-Gopheridge complex, 15 to 30 percent slopes

Map Unit Setting

National map unit symbol: 2x294
Elevation: 390 to 1,250 feet
Mean annual precipitation: 16 to 24 inches
Mean annual air temperature: 61 to 63 degrees F
Frost-free period: 290 to 330 days
Farmland classification: Not prime farmland

Map Unit Composition

Bonanza and similar soils: 40 percent
Loafercreek and similar soils: 31 percent
Gopheridge and similar soils: 20 percent
Minor components: 9 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bonanza

Setting

Landform: Hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Colluvium over residuum derived from metavolcanics

Typical profile

A - 0 to 2 inches: loam
Bt1 - 2 to 8 inches: loam
Bt2 - 8 to 18 inches: gravelly loam
Cr - 18 to 22 inches: bedrock

R - 22 to 79 inches: bedrock

Properties and qualities

Slope: 15 to 30 percent
Surface area covered with cobbles, stones or boulders: 1.0 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock; 14 to 30 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 2.9 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Ecological site: F018XI200CA - Low Elevation Foothills
Hydric soil rating: No

Description of Loafercreek

Setting

Landform: Hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Nose slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Colluvium over residuum derived from metavolcanics

Typical profile

A - 0 to 4 inches: loam
Bt1 - 4 to 10 inches: loam
Bt2 - 10 to 19 inches: loam
Bt3 - 19 to 26 inches: paragravelly clay loam
Cr - 26 to 35 inches: bedrock
R - 35 to 79 inches: bedrock

Properties and qualities

Slope: 15 to 30 percent
Surface area covered with cobbles, stones or boulders: 0.0 percent
Depth to restrictive feature: 20 to 39 inches to paralithic bedrock; 20 to 49 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.4 inches)

Interpretive groups

Land capability classification (irrigated): 4e

Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: F018XI201CA - Moderately Deep Thermic Foothills
Hydric soil rating: No

Description of Gopheridge

Setting

Landform: Hills
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Colluvium over residuum derived from metavolcanics

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
A1 - 2 to 4 inches: loam
A2 - 4 to 7 inches: loam
Bt1 - 7 to 14 inches: extremely gravelly loam
Bt2 - 14 to 21 inches: very stony clay loam
Bt3 - 21 to 32 inches: extremely stony clay
R - 32 to 79 inches: bedrock

Properties and qualities

Slope: 15 to 30 percent
Surface area covered with cobbles, stones or boulders: 0.0 percent
Depth to restrictive feature: 20 to 39 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.01 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.7 inches)

Interpretive groups

Land capability classification (irrigated): 6e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: F018XI201CA - Moderately Deep Thermic Foothills
Hydric soil rating: No

Minor Components

Motherlode

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F018XI201CA - Moderately Deep Thermic Foothills
Hydric soil rating: No

Auburn

Percent of map unit: 3 percent
Landform: Hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Nose slope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: F018XI200CA - Low Elevation Foothills
Hydric soil rating: No

Rock outcrop, metavolcanic

Percent of map unit: 1 percent
Landform: Hills
Hydric soil rating: No

7078—Jasperpeak-Gopheridge complex, 30 to 60 percent slopes

Map Unit Setting

National map unit symbol: 2x295
Elevation: 360 to 1,300 feet
Mean annual precipitation: 17 to 25 inches
Mean annual air temperature: 61 to 63 degrees F
Frost-free period: 295 to 340 days
Farmland classification: Not prime farmland

Map Unit Composition

Jasperpeak and similar soils: 49 percent
Gopheridge and similar soils: 25 percent
Minor components: 26 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Jasperpeak

Setting

Landform: Hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Colluvium over residuum derived from metavolcanics

Typical profile

A - 0 to 1 inches: loam
Bt1 - 1 to 3 inches: very gravelly loam
Bt2 - 3 to 6 inches: very gravelly loam
Bt3 - 6 to 10 inches: very cobbly loam
R - 10 to 79 inches: bedrock

Properties and qualities

Slope: 30 to 60 percent
Surface area covered with cobbles, stones or boulders: 3.0 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 1.2 inches)

Interpretive groups

Land capability classification (irrigated): 7e
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: F018XI200CA - Low Elevation Foothills
Hydric soil rating: No

Description of Gopheridge

Setting

Landform: Hills
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Colluvium over residuum derived from metavolcanics

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
A - 2 to 6 inches: silt loam
Bt1 - 6 to 13 inches: gravelly silt loam
Bt2 - 13 to 25 inches: extremely gravelly clay
Bt3 - 25 to 34 inches: extremely gravelly clay
R - 34 to 79 inches: bedrock

Properties and qualities

Slope: 30 to 60 percent
Surface area covered with cobbles, stones or boulders: 0.0 percent
Depth to restrictive feature: 20 to 39 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.8 inches)

Interpretive groups

Land capability classification (irrigated): 8
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Ecological site: F018XI201CA - Moderately Deep Thermic Foothills

Hydric soil rating: No

Minor Components

Motherlode

Percent of map unit: 10 percent
Landform: Hills
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F018XI201CA - Moderately Deep Thermic Foothills
Hydric soil rating: No

Loafercreek

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: F018XI201CA - Moderately Deep Thermic Foothills
Hydric soil rating: No

Gardellones

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F018XI201CA - Moderately Deep Thermic Foothills
Hydric soil rating: No

Rock outcrop, metavolcanic

Percent of map unit: 5 percent
Landform: Hills
Hydric soil rating: No

Mined land

Percent of map unit: 1 percent
Landform: Hills
Down-slope shape: Concave, convex
Across-slope shape: Linear, convex
Hydric soil rating: No

7085—Bonanza-Loafercreek complex, 3 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2mywp

Elevation: 430 to 1,260 feet
Mean annual precipitation: 16 to 25 inches
Mean annual air temperature: 61 to 63 degrees F
Frost-free period: 275 to 335 days
Farmland classification: Not prime farmland

Map Unit Composition

Bonanza and similar soils: 54 percent
Loafercreek and similar soils: 32 percent
Minor components: 14 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bonanza

Setting

Landform: Hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Nose slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Residuum weathered from metavolcanics

Typical profile

A - 0 to 1 inches: loam
Bt1 - 1 to 5 inches: loam
Bt2 - 5 to 15 inches: very paragravelly clay loam
Cr - 15 to 24 inches: bedrock
R - 24 to 79 inches: bedrock

Properties and qualities

Slope: 3 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.0 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock; 14 to 30 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 1.8 inches)

Interpretive groups

Land capability classification (irrigated): 7e
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: F018XI200CA - Low Elevation Foothills
Hydric soil rating: No

Description of Loafercreek

Setting

Landform: Hills
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Nose slope
Down-slope shape: Linear

Across-slope shape: Linear
Parent material: Colluvium over residuum derived from metavolcanics

Typical profile

A - 0 to 1 inches: loam
Bt1 - 1 to 7 inches: loam
Bt2 - 7 to 15 inches: clay loam
CBt - 15 to 26 inches: very paragravelly clay loam
Crt - 26 to 38 inches: bedrock
R - 38 to 79 inches: bedrock

Properties and qualities

Slope: 3 to 15 percent
Depth to restrictive feature: 20 to 39 inches to paralithic bedrock; 20 to 49 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.5 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: F018XI201CA - Moderately Deep Thermic Foothills
Hydric soil rating: No

Minor Components

Auburn

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: F018XI200CA - Low Elevation Foothills
Hydric soil rating: No

Gopheridge

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: F018XI201CA - Moderately Deep Thermic Foothills
Hydric soil rating: No

Rock outcrop, metavolcanic

Percent of map unit: 2 percent
Landform: Hills
Hydric soil rating: No

Mined land

Percent of map unit: 2 percent
Landform: Hills
Down-slope shape: Concave, convex
Across-slope shape: Linear, convex
Hydric soil rating: No

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Appendix C: Focused Bat Survey Report

EST. 1968
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September 29, 2021

South San Joaquin Irrigation District
Forrest Killingsworth
11011 E. Highway 120
Manteca, CA 95336

RE: Results of Biological Bat Focused Survey, Canyon Tunnel Project, Knights Ferry, California

Dear Mr. Killingsworth:

As requested, Provost & Pritchard (P&P) conducted a Biological Focus Survey for Bats (Focus Survey) for the South San Joaquin Irrigation District (SSJID) within and adjacent to the proposed Canyon Tunnel Project (Project). The Project's area of potential effect (APE) is a 770-acre parcel located along the north bank of Stanislaus River in Calaveras, Stanislaus, and Tuolumne Counties, California, and near the town of Knights Ferry. Representative locations of the APE are presented in **Attachment A** at the end of this document.

P&P's biologist conducted an analysis of potential Project-related impacts to biological resources based on the resources known to exist or with potential to exist within the APE. Sources of information used in preparation of this analysis included: the California Department of Fish and Wildlife (CDFW) California Natural Diversity Database (CNDDB); the California Native Plant Society (CNPS) Online Inventory of Rare and Endangered Vascular Plants of California; CalFlora's online database of California native plants; the Jepson Herbarium online database (Jepson eFlora); United States Fish and Wildlife Service (USFWS) Environmental Conservation Online System (ECOS) and the Information for Planning and Consultation (IPaC) system; the NatureServe Explorer online database; the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Plants Database; CDFW California Wildlife Habitat Relationships (CWHR) database; the California Herps online database; and various manuals, reports, and references related to plants and animals of the region.

In reviewing the CNDDB, the following special status bat species were identified to occur within or adjacent to the APE: pallid bats (*Antrozus pallidus*), Townsend's big eared bats (*Corynorhinus townsendii*), and western mastiff bats (*Eumops perotis californicus*), all of which are designated as California Species of Special Concern (CSC). Additionally, many oak trees (*Quercus spp.*) in the area are likely to support tree-roosting species of bats like western red bats (*Lasiurus blossevillii*), also a CSC. Roosting habitat becomes especially sensitive to bat populations during the maternity season and while pups are maturing.

A focused survey for bats was determined to be necessary to identify if proposed Project activities would impact existing bat habitat, presence of ideal roosting areas, and/or foraging areas surrounding Goodwin Reservoir. The area above and around Goodwin Dam contains small caves, rocky outcroppings, and oak woodlands all of which are considered potential bat roosting habitat. Goodwin Dam Reservoir and the Stanislaus River are typical drinking and foraging habitat for many bat species, as the artificial lights around Goodwin Dam attract insects which often increase bat activity. Greater abundance of insects, access to a large and open body of freshwater, and roosting habitat are often driving forces for bat activity. Bat maternity season occurs from March 1 to September 30.

A focus survey was performed to identify the presence or absence of potential bat roosts within the APE and provide appropriate mitigation measures to protect bat species and associated habitat.

Survey Methodology

At sunset on September 17 and 18, 2021, P&P biologist Jacob Rogers conducted roost emergence surveys within the Goodwin Dam, surrounding oak woodlands and the cliff side above the dam within the APE. Roost emergence surveys allow biologists to locate active bat roosts by identifying exit points as colonies of bats leave for nightly foraging. Key locations were identified prior to dusk to provide the largest range of viewing potential for bat emergence. The entire area was scanned for emerging bats using a silhouette focusing technique. The focus survey concentrated on the emergent points from two different vantage points, over the course of both nights.

The weather conditions on both nights were similar and optimal for bat activity. The temperature was approximately 71 degrees Fahrenheit at sunset with winds approximately three miles per hour. Civil twilight (sunset) occurred at 7:10 pm on the first night and 7:09 pm on the last night, Pacific Standard Time. The moon phase was waxing gibbous.

On September 17, 2021, the biologist was positioned in the center of the Goodwin Dam and scanned for bats on the north and south sides, and upstream and downstream of the Stanislaus River. On September 18, 2021, the biologist was positioned on the top of the north cliff face above the river and downstream of the dam. The locations for observation and identified roosts are shown in **Attachment B** of this document.

Representative photographs and at the time of the survey are presented in **Attachments C** of this document.

Results & Discussion

A bat roost was discovered within the APE, on the north bank of the Stanislaus River. Early observations of bats during the first survey night indicated bats may be roosting within cliffs north of the Goodwin Dam area. On the second survey night, the roost location was confirmed.

On evening one of the study, September 17, 2021, a single bat was first observed in the Goodwin Dam area seven minutes after sunset, foraging over the river. At eight minutes after sunset, a cluster of approximately 20 bats were observed emerging high from bluffs on the north bank of the Stanislaus River, approximately 260 degrees west of the observation point. Bat activity continued to increase around the dam until it became too dark to continue active observations. Bats were not seen emerging from other locations from this vantage point.

Evening two of the study, September 18, 2021, a second observation vantage point area was used and located on top of the Stanislaus River north bank bluff. This location provided an alternative viewpoint to build on the previous observations and to focus on the single identified emergence area. At 1 minute after sunset, approximately 40 bats were observed emerging from the roost. The roost location was determined to be a group of large boulders protected by an oak tree, with multiple crevices and small openings. The roost was inaccessible and therefore, the study of this area was limited to observations only.

Oak trees within the APE provide adequate foliage and cavities for tree-roosting bats. There are hundreds of trees within the APE that meet the criteria for potential habitat. Therefore, the study observations for this type of habitat were confined oak trees near the dam and around the proposed tunnel outlet.

Overall, bat impact may occur during three potential situations: indirect impacts due to vibration levels; daytime disturbances causing roost abandonment in oak trees; and potential for inhabitance of the newly excavated tunnel during times when construction is stalled for a period of time. Tree roosting bats are possible throughout the APE, as oak trees dominate the open landscape. However, bats using these trees are unlikely to be affected by construction if removal or disturbance of trees will not occur a part of Project activities. The identified roost is located several hundred feet above the existing canal. Current construction plans place the tunnel approximately 350 feet underground, away from the cliff face. The roost would most likely not be directly impacted by construction but may be disturbed by lighting changes and/or vibration of the boring machine as it moves through the hillside.

Recommendations

The Goodwin Dam area is high quality habitat for bats. It is highly likely that bats from the area commute to Goodwin Dam Reservoir throughout the night to utilize resources provided by the area. If construction activities occur during nighttime hours, the use of artificial lights could potentially attract more bats to the area. As observed, the cliffs above the existing canal and Stanislaus River provide an abundance of potential roosting habitat for bats. Therefore, the following mitigation measures are recommended to avoid and minimize potential impacts to bat species.

Mitigation. The following measures will be implemented prior to the start of construction:

> ***Mitigation Measure BIO-1 (Pre-Construction Survey):*** A pre-construction survey shall be performed if construction activities fall between March 1st and September 30th (bat maternity season) to identify current bat roosting locations in oak trees near the dam and around the tunnel outlet prior to the start of construction. A qualified biologist shall conduct the survey 7 days or less prior to construction.
>
> ***Mitigation Measure BIO-2 (Avoidance):*** Impacts and interactions with bat species are to be avoided whenever possible through timing of work, method selections, and retention of feature that provide naturalized habitat.
>
> ***Mitigation Measure BIO-3 (Establish Buffers):*** On discovery of any bat roosts near work, the dam, or tunnel outlet, a qualified biologist will determine appropriate construction setback distances (buffer zones) based on applicable CDFW and/or USFWS guidelines, if appropriate.to minimize disturbance and avoid take. Construction buffers will be identified with flagging, fencing, or other easily visible means, and will be maintained until the biologist has determined that the roost will no longer be impacted by construction.
>
> ***Mitigation Measure BIO-4 (Disturbance to trees):*** If a tree or trees must be removed a qualified biologist shall inspect the tree prior to removal to verify that the tree is not active roosting habitat. Once the tree is deemed clear of bats, the tree shall be removed within two days.

Identification of each specific bat species is difficult from emergence surveys and can lead to inaccurate data. Bats must be captured to be reliably identified. Based on the survey findings and Project activities, it is not anticipated that a bat capture/identification survey is warranted at this time.

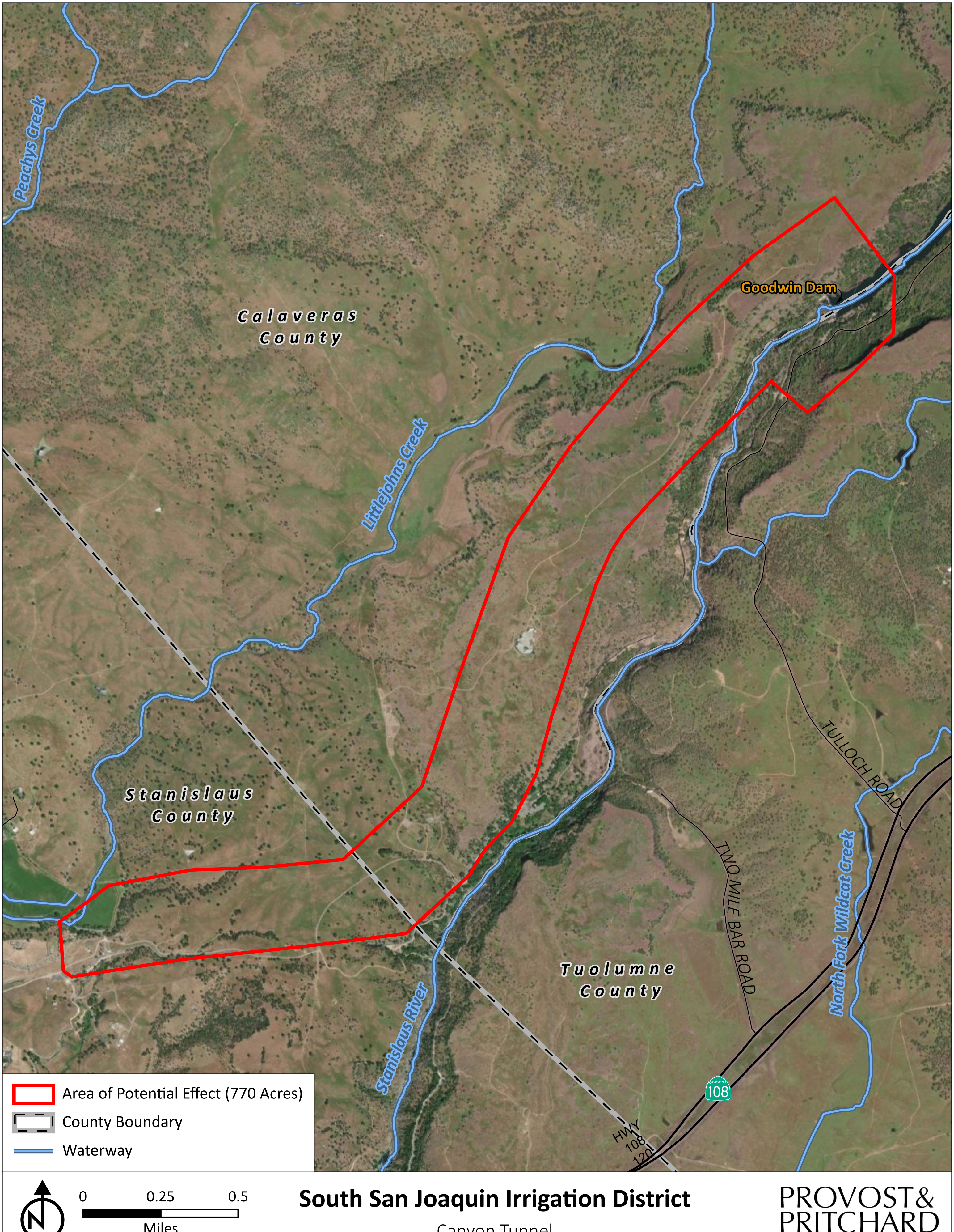
If you have any questions or need further information, please feel free to contact me at (989) 305-1803 or JRogers@ppeng.com.

Respectfully,

Jacob A. Rogers
Biologist

Attachment A – Area of Potential Effect Map
Attachment B – Focused Survey Results
Attachment C – Representative Photographs

Attachment A - Area of Potential Effect Map



South San Joaquin Irrigation District

Canyon Tunnel

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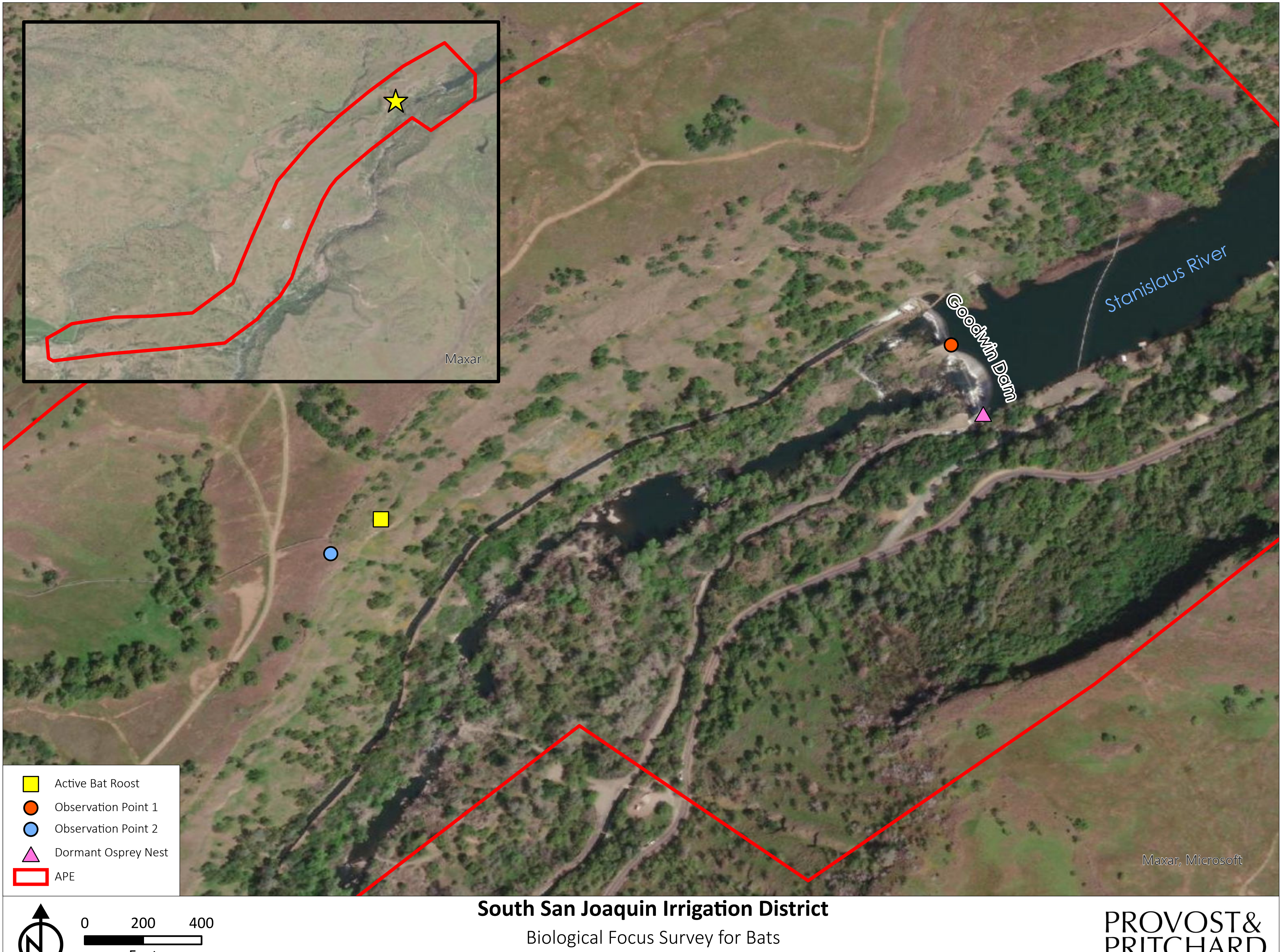
Attachment B - Focused Survey Results



South San Joaquin Irrigation District

Biological Focus Survey for Bats

Canyon Tunnel

PROVOST& PRITCHARD

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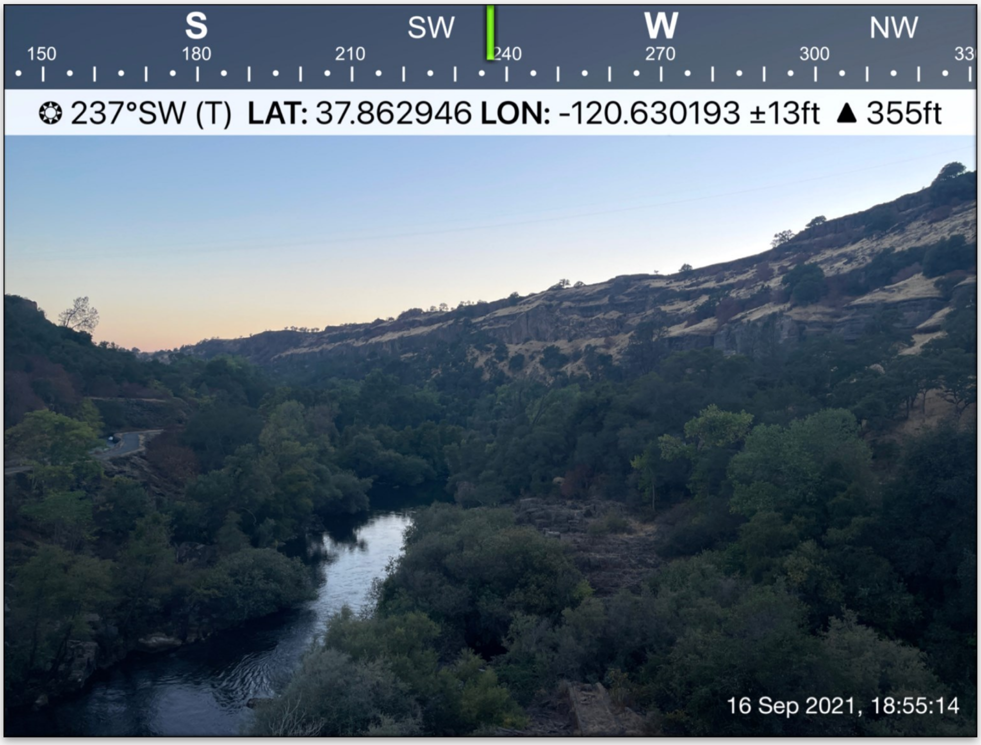
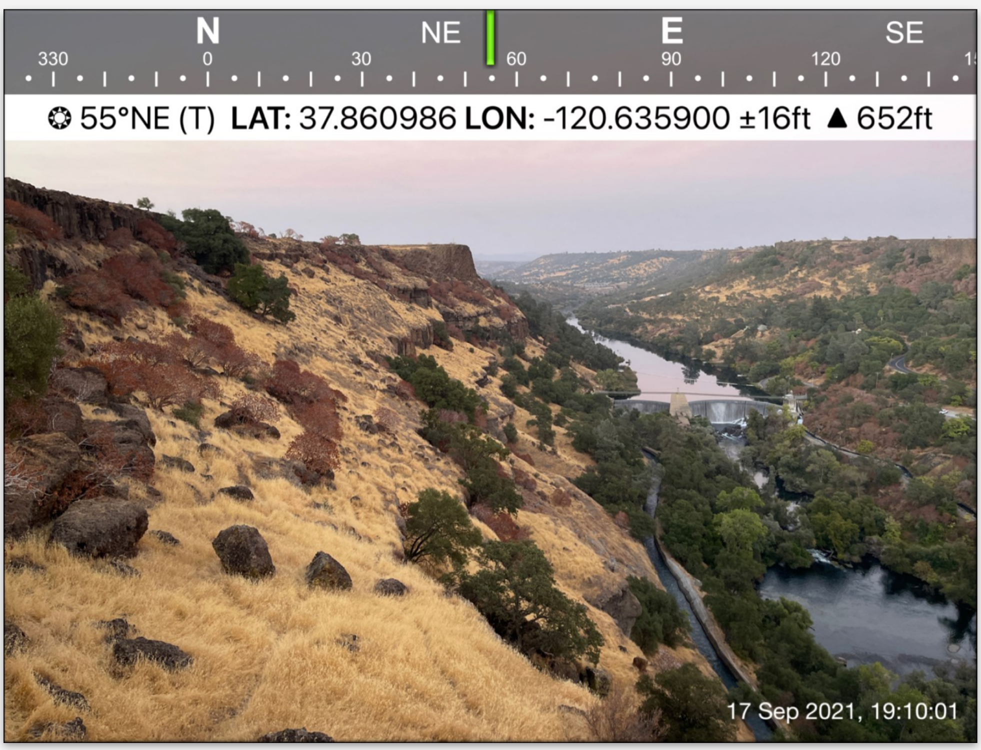
Attachment C - Representative Photographs



Photograph 1

Photograph was taken facing from night 1 observation point, in center of Goodwin Dam. Survey scanned all cliffsides area around the dam to determine bat activity.



Photograph 2

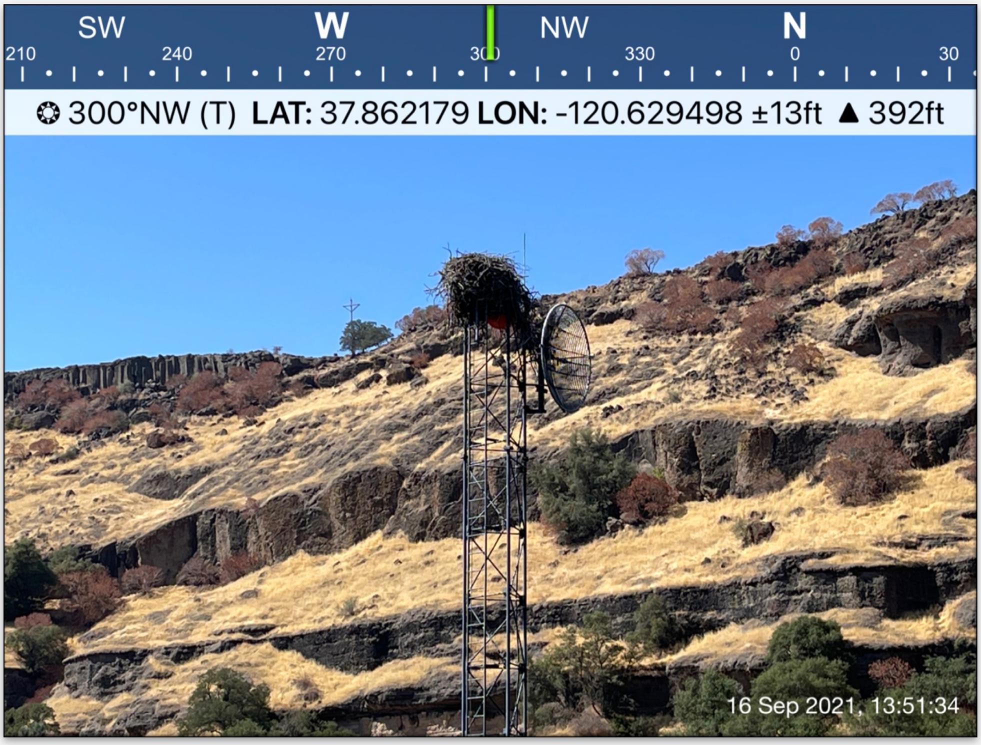
Photograph was taken facing from night 2 observation point, on bluff of north bank overlooking Goodwin Dam. This survey focused only on the north bank.

Photograph 3

Bat roost located and confirmed active on Stanislaus River north bank.

Photograph 4

Enhanced and marked photograph of confirmed bat roost, from same angle as Photograph 3.



Photograph 5

Historic Osprey nest monitored simultaneously with bat surveys and determined inactive.

Photograph 6

An example of tree-roosting habitat for bats. Oak trees dominate the APE and provide plenty of high quality tree-roosting habitat.

Appendix D: Class III Cultural Resources Inventory/Phase I Survey

CLASS III INVENTORY/PHASE I SURVEY, SOUTH SAN JOAQUIN IRRIGATION DISTRICT CANAL TUNNEL PROJECT, TUOLOMNE, STANISLAUS AND CALAVERAS COUNTIES, CALIFORNIA

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MANAGEMENT SUMMARY

An intensive Class III cultural resources inventory/Phase I survey was conducted for the South San Joaquin Irrigation District Canal Tunnel Project (Project), Tuolomne, Calaveras and Stanislaus counties, California. The Project is located along the Stanislaus River approximately 20 kilometers upstream/northeast of the City of Oakdale. ASM Affiliates, Inc., conducted this study, with David S. Whitley, Ph.D., RPA, serving as principal investigator. The study was undertaken to assist with compliance with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, and the California Environmental Quality Act (CEQA).

The Project consists of the replacement of an existing segment of the South San Joaquin Main Canal with an underground canal tunnel bored through bedrock. The horizontal area of potential effect (APE) was defined as the area of potential ground surface disturbance including access, staging, work, lay-down, spoils piles and construction areas. This includes an upstream/eastern APE which itself consists of two locations on either side of the Stanislaus River. The Tuolomne County/southeast side of the river would include an existing barge landing and related improvements and an existing access road which may need to be widened. The Calaveras/northwest side includes an area for a new barge landing and the upstream portal for the tunnel. The combined eastern APE totals approximately 0.98 acres (ac). The western/downstream APE also includes two locations, both on the northwest side of the river: a downstream tunnel portal and staging area in Calaveras County and, in Stanislaus County, a temporary construction staging, spoils pile area and connecting road, which will be reclaimed. The combined horizontal APE for the downstream/western portion is approximately 4.6-ac. The eastern and western areas result in a combined APE of about 5.58-ac. The vertical APE is the maximum limit of ground surface excavation, extending to the maximum depth of the tunnel, estimated at 20-ft. Note that no ground surface disturbance will occur to the intervening area between the upstream/entry and downstream/exit tunnel/canal portals, and this area is excluded from the APE.

A records search of site files and maps was conducted at the Central California Archaeological Information Center (IC), California State University, Stanislaus. A Sacred Lands File (SLF) search request was also submitted to the Native American Heritage Commission (NAHC). The IC records search indicated that a segment of one cultural resource, P-5-000769/P-50-002109, the San Joaquin Canal, is present within the APE while 11 resources are located within a half-mile radius. Five previous studies had covered portions of the APE, with four additional studies within a half-mile radius.

A record search of the NAHC Sacred Lands Files was also obtained. This indicated that no known tribal cultural resources or sacred sites were within or near the Project. Outreach letters and follow-up emails were sent to tribal organizations using the NAHC contact list to further identify Native American interests and concerns in the Project area. Responses were received from The Wilton Rancheria, Cultural Preservation Department, the tribe inquired whether the Table Mountain Rancheria was requesting consultation (no such request has been received). The Chicken Ranch Rancheria of Me-Wuk Indians of California, stating that they are aware of archaeological sites and traditional cultural properties in or in the vicinity of the Project, and requesting involvement in it. In follow up emails from the Chicken Ranch Rancheria of Me-Wuk Indians of California, the tribe expressed interest and concern regarding the project area and requested informal consultation. The Nototomne Cultural Preservation/Northern Valley Yokuts stated that the Project is in a sensitive area and it should be monitored by tribal and archaeological monitors. The Calaveras Miwuk Tribe stated that the Project is not within their area of concern. Recommendations based Native American Heritage outreach are as follows:

TCR-1: (Cultural Awareness Training): Prior to construction, a Cultural Awareness Training Program is recommended to be provided to all construction managers and construction personnel prior to commencing ground disturbance work at the project site. The training shall be prepared and conducted by a qualified archaeologist to the satisfaction of the District. The training shall be a length of time adequate to explain applicable statues, regulations, enforcement provisions; the prehistoric and historic environmental setting and context, local tribal groups; show sample artifacts; and what prehistoric and historic archaeological deposits look like at the surface and when exposed during construction. The training may be discontinued to new workers to the site when ground disturbance is completed. Construction personnel shall not be permitted to operate equipment within the construction area unless they have attended the training. A list of the names of all personnel who attended the training and copies of the signed acknowledgement forms shall be submitted to the District for their review and approval.

TCR-2: (Inadvertent Discoveries): In the case of any inadvertent discoveries at any time during the duration of construction or implementation, it is recommended that SSJID contact Calaveras Band of Mi-Wuk Indians for further information, investigation, and guidance on the process for handling such discoveries.

TCR-3: (Monitoring): The District will continue to collaborate with the Chicken Ranch Tribe to identify areas that may require tribal monitoring during ground disturbing activities. Once areas have been identified within the cultural area of potential effect (APE) and agreed upon by both parties, a qualified representative will monitor for tribal resources during ground disturbing activities, as needed. Tribal monitoring will end at the conclusion of the ground disturbance activities, including project site grading and ground excavation/trenching activities.

The Class III inventory/Phase I survey fieldwork was conducted in January 2022 with parallel transects spaced at 15-meter (m) intervals walked across the different segments of the APE. One cultural resource is present within the Project APE, P-5000739/P-50-002109, the San Joaquin Canal, within the western/downstream Project portal. This resource was determined not eligible for National Register of Historic Places (NRHP) listing by consensus through the Section 106 process in 2011 (FWHA 10207A). We recommend it as similarly not eligible for the California Register of Historical Resources (CRHR). We further recommend a determination of no significant impact to historical resources under CEQA, and a determination of no effect under Section 106 of the NHPA.

1. INTRODUCTION AND REGULATORY CONTEXT

ASM Affiliates, Inc., was retained by the Provost and Pritchard Consulting Group to conduct an intensive Class III inventory/Phase I cultural resources survey for the South San Joaquin Irrigation District Canal Tunnel Project, Tuolomne, Calaveras and Stanislaus counties, California. The study was undertaken to assist with compliance with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, and the California Environmental Protection Act (CEQA). The investigation was conducted, specifically, to ensure that significant impacts or adverse effects to historical resources or historic properties do not occur as a result of Project construction.

This current study included:

- A background records search and literature review to determine if any known cultural resources were present in the project area and/or whether the area had been previously and systematically studied by archaeologists;
- An on-foot, intensive inventory of the Project APE to identify and record previously undiscovered cultural resources and to examine known sites; and
- A preliminary assessment of any such resources found within the APWE.

David S. Whitley, Ph.D., RPA, served as principal investigator and Robert Azpitarte, B.A., ASM Associate Archaeologist, conducted the fieldwork for this study.

This document constitutes a report on the Class III inventory/Phase I survey. Subsequent chapters provide background to the investigation, including historic context studies; the findings of the archival records search; Native American outreach; a summary of the field surveying techniques employed; and the results of the fieldwork. We conclude with management recommendations for the study area.

1.1 PROJECT LOCATION

The Project is located along the Stanislaus River about 20-km northeast and upstream from Oakdale, California (Figure 1). With the exception of an access road and barge landing on the south side of the river (in Tuolumne County), the Project will occur north of the Stanislaus with the upstream tunnel entrance portal and the downstream outlet portal both in Calaveras County. An additional temporary staging and spoils area will be located nearby in Stanislaus County, also on the north side of the river. The upstream portal is immediately upstream of the Goodwin Dam, which is outside of the APE.

1.2 PROJECT DESCRIPTION AND APE

The Joint Supply Canal (JSC; historical name South San Joaquin Canal) provides water for both the South San Joaquin Irrigation District (SSJID) and the Oakdale Irrigation District (OID). The Project consists of a new water conveyance tunnel to bypass approximately 12,200 linear feet (ft) of existing JSC canal and tunnels. Existing canal segments along this reach are extremely vulnerable to catastrophic failure, primarily due to unstable rock slopes that are present along the canyon wall. The Project would improve long-term reliability of this critical water supply system. SSJID maintains the JSC and is the lead agency for this project.

The JSC is located along the north bank of the Stanislaus River in Calaveras County, near the town of Knights Ferry. Water is diverted into the JSC above Goodwin Dam, which was constructed circa 1913, with the dam modified and the spillway elevated in 1958. Goodwin Dam is operated by the Tri-Dam Project, a partnership between SSJID and OID. The maximum capacity of the existing JSC is approximately 1,100 cubic feet per second (cfs). The existing annual diversion limits would not be modified as a part of this Project; the tunnel however would be designed for 1,250 cfs.

The Project will involve:

- Construction of 12,012-ft tunnel;
- Permanent access road via existing roads, permanent barge;
- Augment existing barbed wire fence;
- Tunnel inlet upstream of Goodwin Dam;
- Control gates at tunnel inlet;
- Ram pump replacement;
- Rockfall protection consisting of concrete cap at inlet;
- New gate/stop log;
- Tunnel size approximately 16-20-ft in diameter;
- East canal gates at Dam remain for side-spill;
- East canal inlet gates abandoned; and
- Abandonment of existing canal features between inlet and outlet portals.

The Project APE was defined as the area of potential ground surface disturbance including access, staging, work, lay-down, spoils piles and construction areas. This includes an upstream/eastern APE which itself consists of two locations on either side of the Stanislaus River. The Tuolomne County/southeast side of the river would include an existing barge landing and related improvements and an existing access road which may need to be widened. The Calaveras/northwest side includes an area for a new barge landing and the upstream portal for the tunnel. The combined eastern APE totals approximately 0.98 acres (ac). The western/downstream APE also includes two locations, both on the northwest side of the river: a downstream tunnel portal and staging area in Calaveras County and, in Stanislaus County, a temporary construction staging, spoils pile area and connecting road, which will be reclaimed. The combined horizontal APE for the downstream/western portion is approximately 4.6-ac. The eastern and western areas result in a combined APE of about 5.58-ac. The vertical APE is the maximum limit of ground surface excavation, extending to the maximum depth of the tunnel, estimated at 20-ft. Note that no ground surface disturbance will occur to the intervening area between the upstream/entry and downstream/exit tunnel/canal portals, and this area is excluded from the APE.

1.3 REGULATORY CONTEXT

1.3.1 CEQA

CEQA is applicable to discretionary actions by state or local lead agencies. Under CEQA, lead agencies must analyze impacts to cultural resources. Significant impacts under CEQA occur when "historically significant" or "unique" cultural resources are adversely affected, which occurs when such resources could be altered or destroyed through project implementation. Historically significant cultural resources are defined by eligibility for or by listing in the California Register of Historical Resources (CRHR). In practice, the federal NRHP criteria (below) for significance applied under Section 106 are generally (although not entirely) consistent with CRHR criteria (see PRC § 5024.1, Title 14 CCR, Section 4852 and § 15064.5(a)(3)).

Significant cultural resources are those archaeological resources and historical properties that:

(A) Are associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;

(B) Are associated with the lives of persons important in our past;

(C) Embody the distinctive characteristics of a type, period, region, or method of construction, or represent the work of an important creative individual, or possess high artistic values; or

(D) Have yielded, or may be likely to yield, information important in prehistory or history.

Unique resources under CEQA, in slight contrast, are those that represent:

> An archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:
>
> (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 (PRC § 21083.2(g)).

Preservation in place is the preferred approach under CEQA to mitigating adverse impacts to significant or unique cultural resources.

1.3.2 NHPA Section 106

NHPA Section 106 is applicable to federal undertakings, including projects financed or permitted by federal agencies regardless of whether the activities occur on federally managed or privately-owned land. Its purpose is to determine whether adverse effects will occur to significant cultural resources, defined as "historical properties" that are listed in or determined eligible for listing in the National Register of Historic Places (NRHP). The criteria for NRHP eligibility are defined at 36 CFR § 60.4 as follows:

> The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and that:
>
> (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.

There are, however, restrictions on the kinds of historical properties that can be NRHP listed. These have been identified by the Advisory Council on Historic Preservation (ACHP), as follows:

> Ordinarily cemeteries, birthplaces, or graves of historical figures, properties owned by religious institutions or used for religious purposes, structures that have been moved from their original locations, reconstructed historic buildings, properties primarily commemorative in nature, and properties that have achieved significance within the past 50 years shall not be considered eligible for the National Register. However, such properties will qualify if they are integral parts of districts that do meet the criteria or if they fall within the following categories:
>
> (a) A religious property deriving primary significance from architectural or artistic distinction or historical importance; or
>
> (b) A building or structure removed from its original location but which is significant primarily for architectural value, or which is the surviving structure most importantly associated with a historic person or event; or
>
> (c) A birthplace or grave of a historical figure of outstanding importance if there is no appropriate site or building directly associated with his productive life.
>
> (d) A cemetery which derives its primary significance from graves of persons of transcendent importance, from age, from distinctive design features, or from association with historic events; or
>
> (e) A reconstructed building when accurately executed in a suitable environment and presented in a dignified manner as part of a restoration master plan, and when no other building or structure with the same association has survived; or
>
> (f) A property primarily commemorative in intent if design, age, tradition, or symbolic value has invested it with its own exceptional significance; or

(g) A property achieving significance within the past 50 years if it is of exceptional importance. (http://www.achp.gov/nrcriteria.html)

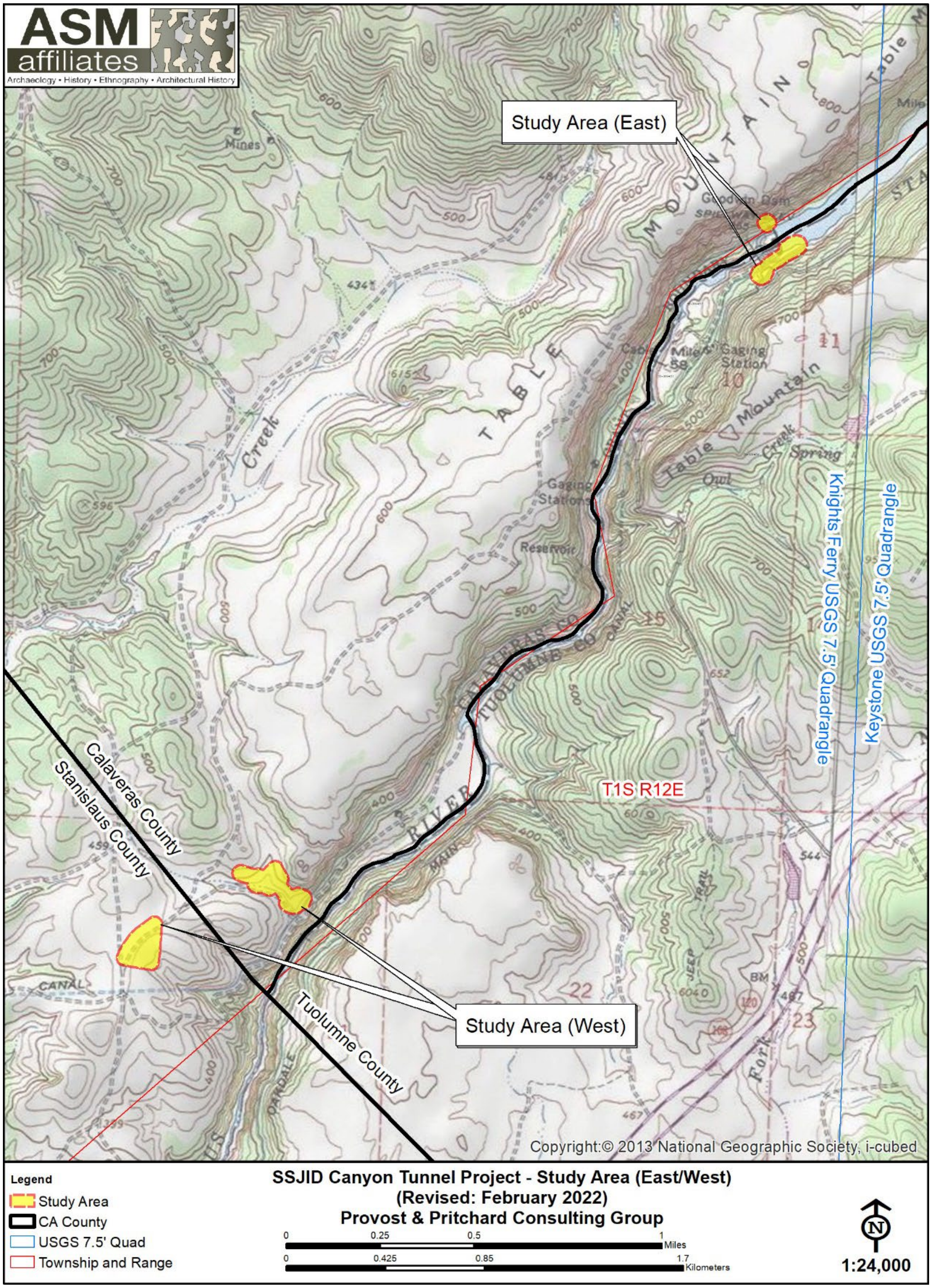

Figure 1. Location of the SSID Project APE, straddling three counties in California.

2. ENVIRONMENTAL AND CULTURAL BACKGROUND

2.1 ENVIRONMENTAL BACKGROUND AND GEOARCHAEOLOGICAL SENSITIVITY

The Project location, along the Stanislaus River, is in Tuolomne, Calaveras and Stanislaus counties, in the western foothills of the Sierra Nevada. Elevation ranges from roughly 230-ft above mean sea level (amsl), at the western/outlet APE area, to about 500-ft amsl at the eastern/inlet end. Topography consists of a steeply-sided canyon on the east with canyon sides and rolling hills on the west. With the exception of the westernmost component of the APE (spoils pile area), which has been grazed, the Project falls within the Oak Woodland biotic communities (cf. Schoenherr 1992). It would have been characterized by a variety of species of bunch grasses within a low cover canopy of live oak.

The Project will require grading inlet and outlet canal facilities and boring a canal tunnel through grano-diorite bedrock. These areas consist of bedrock and the periodically flood-scoured sides of the Stanislaus River Canyon, neither of which could result in the preservation of archaeological deposits. The Project is considered to have a very low sensitivity for a subsurface archaeological deposit.

2.2 ETHNOGRAPHIC BACKGROUND

The Project is located within the general territory of the central and southern Sierra Miwoks (alternatively Me-Wuk or Miwuk). The Sierra Miwok, members of the Penutian language family (Levy 1978), occupied the territory between the Mokelumne and Fresno rivers, as well as the full width of the west slope of the Sierra Nevadas, from the edge of the Central valley to the Sierra crest (Moratto 1984:290).

The socio-political structure of the Central Sierra Miwoks is based on the patrilineal joint family acting as an independent autonomous political unit (Kroeber 1925; Levy 1978). The men of the lineage remained at their ancestral home, bringing their wives to live with them, and sending their daughters and sisters to their husbands' homes. The patriarch, as head of the unit, was chief. Chieftainship was normally passed down directly from father to eldest son. As a land-owning group, the lineage-maintained lands to be shared in common by all members of the family unit.

The Sierra Miwok lived in permanent settlements of "10 or 15 to several hundred people," usually on the southern exposure of ridges or knolls and close to water sources (Moratto 1984:290). The larger, main villages generally consisted of family dwellings, acorn granaries, bedrock mortars, a sweat house, a headman's house, and a ceremonial structure. The main villages were usually surrounded by smaller settlements related by kinship and economic ties to the primary village.

Dwellings were conical, ranging from 8 to 15 feet in diameter, and covered by slabs of cedar bark, or bark from other conifers (Levy 1978). Each dwelling had a shallow dirt fireplace in its center for warmth and light. Most cooking was done in the earth oven located next to the fire. The oven was often a simple pit, 12 to 18 inches deep by as many inches wide. Food was cooked, baked, or steamed by placing hot stones among the cooking items; acorn bread, greens, bulbs, corms (short, thick, solid, food-storing underground stems), meat, and fish.

Subsistence was obtained by harvesting plants, hunting, and fishing (Moratto 1984:290). Important staple items included black and golden oak acorns, buckeye nuts, and pine nuts. Additionally, snares, traps, nets, and bow and arrows were used to hunt mule deer, pronghorn, black bear, rabbits, quail, and pigeons. Salmon, trout, suckers, whitefish, and sturgeon were caught by hook, net, trap, poison, and captured by hand.

According to Levy (1978:400), a series of lineage settlements were located a short distance east of Knight's Ferry, and thus in the general Project area. These included *Tuyiwunua*,, *Keweno*, *Tulanachi* and *Olokoito*, from west to east respectively. It has been suggested that the site of P-55-002286 may be the village of *Keweno* (D. Hartshorn, site record update for P-55-002286, 2021). This site is located on the south side of the Stanislaus River roughly midway between the east and west segments of the Project, and thus outside of the Project APE.

The influx of outsiders to the central Sierra region during the Gold Rush period resulted in a major disruption for the Miwoks and their way of life. Within a decade, introduced diseases, environmental damage, and cultural conflicts with the outsiders had decimated much of the population. Despite this calamity, some tribal members managed to survive and have continued their cultural traditions.

2.3 PRE-CONTACT ARCHAEOLOGICAL BACKGROUND

The prehistory of the Sierra Nevada Mountains has been described in detail by Moratto (1984) who places the Project location in the central Sierran archaeological subregion, encompassing the watersheds of the Cosumnes, Mokelumne, Calaveras, Stanislaus, Tuolumne, Merced, Chowchilla, and Fresno rivers (1984:288). Evidence indicates that Yosemite Valley, to the south, has been inhabited for as long as 4,000 to 6,000 years before present (YBP). In addition, archaeological sites in the vicinity of El Portal indicate that the Merced River canyon may have been inhabited as early as 9,500 years ago (NPS 2000). Substantial additional evidence of early occupation is found in the central valley, especially to the southwest around Tulare Lake, where a number of sites are known to date to the *Paleoindian Period*, circa 12,500 to 9,000 YBP.

Less evidence for early occupation has then been found at higher elevations, off the valley floor, a circumstance which may be due to preservational issues or potentially the changing nature of land-use during early pre-contact times. In general terms at least occasional use of the Sierras and foothills occurred during the *Early* and *Middle Archaic*, circa 9,000 to 4,000 YBP, as signaled by discoveries of characteristic projectile points or spear points. Substantial occupation had occurred by the *Late Archaic* (4000 to 1500 YBP) and *Late Prehistoric* (1500-150 YBP) periods, however. Moratto (1984) has defined a cultural sequence for these periods at the Buchanan Reservoir/Eastman Lake that is pertinent to the Project location.

Moratto's *Chowchilla Phase* (300 BC to AD 300) is characterized by a few relatively large villages near rivers, with a corresponding large population size. Subsistence appears to have followed a generalized hunting and gathering pattern with little specialization. Trade occurred both with Great Basin groups to the east, and the lowland populations in the Central Valley to the west. This phase appears to represent a widespread expansion of populations across many California environments and an increase in population size which occurred during the Late Archaic period in many parts of the state (Whitley 2000). At least initially, this was associated with (and may have been at least partly influenced by) favorable climatic conditions at the beginning of this period, known as the Mid-Holocene Optimum.

The *Raymond Phase* (AD 300 – 1500) experienced a diminution in villages and population sizes and a fall-off in trade, but an increasing reliance on acorn processing in subsistence practices. This phase appears to correlate with sub-optimal climatic conditions that started with the so-called Medieval Climatic Anomaly, which was a period of drought, followed by the Little Ice Age, characterized by colder temperatures.

The *Madera Phase* (AD 1500 – 1850) represents the lifeways recorded for the Miwok ethnographically. It was marked large villages near rivers with smaller settlements dispersed in the hinterlands, large population size, intensive exploitation of the acorn, and the appearance of Brownware ceramics.

2.4 HISTORICAL BACKGROUND

Spanish explorers first visited the San Joaquin Valley in 1772, but its lengthy distance from the missions and presidios along the Pacific Coast delayed permanent settlement for many years, including during the Mexican period of control over the Californian region. In the 1840s, Mexican rancho owners along the Pacific Coast allowed their cattle to wander and graze in the San Joaquin Valley (JRP Historical Consulting 2009). The Mexican government granted the first ranchos in the southern part of the San Joaquin Valley in the early 1840s, but these did not result in permanent settlement. It was not until the annexation of California in 1848 that the exploitation of the southern San Joaquin Valley began (Pacific Legacy 2006).

The discovery of gold in northern California in 1848 resulted in a dramatic increase of population, consisting in good part of fortune seekers and gold miners, who began to scour other parts of the state. One such area was the Stanislaus River drainage, which was placer-mined during the gold rush. This location was named the Knights Ferry District after the nearby small town of that name. The town was named for William Knight who created a ferry that crossed the Stanislaus at this location, and it became an important staging and supply center for the southern Mother Lode region. The town was the seat of Stanislaus County from 1862 to 1872 (Clark 1963). The larger town of Oakdale was created in 1871 when the Stockton – Visalia Railroad reached the town (https://knightsferry.com/about/history/, accessed 1/30/22).

There is no estimate for the amount of gold removed from the Stanislaus River during the gold rush. But numerous Chinese placer-miners re-worked the tailings and small overlooked deposits from the 1870s to the 1890s. Drag-line placer-mining also occurred on the river during the Depression (Clark 1963).

Some new immigrants began ranching in the San Joaquin Valley to supply the miners and mining towns. Ranchers grazed cattle and sheep, and farmers dry-farmed or used limited irrigation to grow grain crops, leading to the creation of small agricultural communities throughout the valley (JRP Historical Consulting 2009).

After the American annexation of California, the San Joaquin Valley became significant as a center of food production for this new influx of people in California. The expansive unfenced and principally public foothill spaces were well suited for grazing both sheep and cattle (Boyd 1997). As the Sierra Nevada gold rush presented extensive financial opportunities, ranchers introduced new breeds of livestock, consisting of cattle, sheep and pig (Boyd 1997).

With the increase of ranching in the San Joaquin Valley came the dramatic change in the landscape, as non-native grasses more beneficial for grazing and pasture replaced native flora (Preston 1981). After the passing of the Arkansas Act in 1850, efforts were made to reclaim small tracts of land in order to create more usable spaces for ranching. Eventually, as farming supplanted ranching as a more profitable enterprise, large tracts of land began to be reclaimed for agricultural use, aided in part by the extension of the railroad in the 1870s (Pacific Legacy 2006).

Following the passage of state wide 'No-Fence' laws in 1874, ranching practices began to decline, while farming expanded in the San Joaquin Valley in both large land holdings and smaller, subdivided properties. As the farming population grew, so did the demand for irrigation. Settlers began reclamation of swampland in 1866, building small dams across the rivers to divert water for agricultural purposes.

Three competing partnerships developed during this period which had a great impact on control of water, land reclamation and ultimately agricultural development in the San Joaquin Valley: Livermore and Chester, Haggin and Carr, and Miller and Lux, perhaps the most famous of the enterprises. Livermore and Chester were responsible, among other things, for developing the large Hollister plow (three feet wide by two feet deep), pulled by a 40-mule team, which was used for ditch digging. Miller and Lux ultimately became one of the biggest private property holders in the country, controlling the rights to over 22,000 square miles. Miller and Lux recognized early-on that control of water would have important economic implications, and they played a major role in the water development of the state.

The SSJID and OID were both founded in 1909. The purpose of the SSJID was to provide a more reliable and economical water source for the Escalon, Manteca and Ripon area, San Joaquin County, while the OID goal was the same though addressing portions of Stanislaus and San Joaquin counties, including the city of Oakdale. In 1913 the SSJID and OID constructed the Goodwin Dam above Knights Ferry, named after SSJID Board President Benjamin A. Goodwin. They replaced an older ditch, originally called the Knights Ferry flume, which may have been built as early as 1849, and which subsequently became known as the Tulloch Ditch (resource P-50-002019). The Tulloch Ditch, re-named when it and the water rights were purchased by Charles H. Tulloch in the 1880s, was used to provide water to a 600-kV power plant in Knights Ferry, providing the first electrical power to the region (https://www.ssjid.com; https://www.oakdaleirrigation.com/history-of-oid; accessed 1/28/2022).

The SSJID and OID replaced the Tulloch Ditch with the newly constructed South San Joaquin Canal, which extended from the new dam to the southwest, by-passing portions of the earlier ditch, including a hanging flume segment. A segment of the new canal was also constructed as an underground tunnel. It diverted entirelyfrom the original ditch, heading west away from the river, at the approximate location of the southern terminus of the current Project, abandoning the remainder of the Tulloch Ditch which followed the river course (ibid).

The SSJID and OID jointly built the Melones Reservoir in 1926 to increase their water supply and, in 1948, initiated the Tri-Dam Project, to further improve their supply and obtain hydroelectric power. This project created three dams, the Donnells, Beardsley and Tulloch. Construction began in 1955 and was completed in 1957 (ibid). The Tolluch Dam and resulting lake are located a short distance upstream of the Goodwin Dam along the Stanislaus River.

2.5 RESEARCH DESIGN

2.5.1 Pre-Contact Archaeology

Previous research and the nature of the pre-contact archaeological record suggest two significant NRHP themes, both of which fall under the general Pre-Contact Archaeology area of significance. These are the Expansion of Pre-Contact Populations and Their Adaptation to New Environments; and Adaptation to Changing Environmental Conditions.

The Expansion of Pre-Contact Populations and Their Adaptation to New Environments theme primarily concerns the Middle Horizon/Holocene Maximum. Its period of significance runs from about 4,000 to 1,500 YBP. It involves a period during which the prehistoric population appears to have expanded into a variety of new regions, developing new adaptive strategies in the process.

The Adaptation to Changing Environmental Conditions theme is partly related to the Holocene Maximum, but especially to the Medieval Climatic Anomaly. The period of significance for this theme, accordingly, extends from about 4,000 to 800 YBP. This theme involves the apparent collapse of many inland populations, presumably with population movements to better environments such as the coast. It is not yet known whether the southern San Joaquin Valley, with its system of lakes, sloughs and swamps, experienced population decline or, more likely, population increase due to the relatively favorable conditions of this region during this period of environmental stress.

The range of site types that are present in this region include:

- Villages, primarily located on or near permanent water sources, occupied by large groups during the winter aggregation season;
- Seasonal camps, again typically located at water sources, occupied during other parts of the year tied to locally and seasonally available food sources;

- Special activity areas, especially plant processing locations containing bedrock mortars (BRMs), commonly (though not exclusively) near existing oak woodlands, and invariably at bedrock outcrops or exposed boulders;
- Stone quarries and tool workshops, occurring in two general contexts: at or below naturally occurring chert exposures on the eastern front of the Temblor Range; and at quartzite cobble exposures, often on hills or ridges;
- Ritual sites, most commonly pictographs (rock art) found at rockshelters or large exposed boulders, and cemeteries, both commonly associated with villages; and
- A variety of small lithic scatters (low density surface scatters of stone tools).

The first requisites in any research design are the definition of site age/chronology and site function. The ability to determine either of these basic kinds of information may vary between survey and test excavation projects, and due to the nature of the sites themselves. BRM sites without associated artifacts, for example, may not be datable beyond the assumption that they post-date the Early Horizon and are thus less than roughly 4,000 years old.

A second fundamental issue involves the place of site in the settlement system, especially with respect to water sources. Because the locations of the water sources have sometimes changed over time, villages and camps are not exclusively associated with existing (or known historical) water sources (W&S Consultants 2006). The size and locations of the region's lakes, sloughs and delta channels, to cite the most obvious example, changed significantly during the last 12,000 years due to major paleoclimatic shifts. This altered the area's hydrology and thus prehistoric settlement patterns. The western shoreline of Tulare Lake was relatively stable, because it abutted the Kettleman Hills. But the northern, southern and eastern shorelines comprised the near-flat valley floor. Relatively minor fluctuations up or down in the lake level resulted in very significant changes in the areal expression of the lake on these three sides, and therefore the locations of villages and camps. Although perhaps not as systematic, similar changes occurred with respect to stream channels and sloughs, and potential site locations associated with them. This circumstance has implications for predicting site locations and archaeological sensitivity. Site sensitivity is then hardest to predict in the open valley floor, where changes in stream courses and lake levels occurred on numerous occasions.

Nonetheless, the position of San Joaquin Valley prehistory relative to the changing settlement and demographic patterns seen in surrounding areas is still somewhat unknown (cf. Siefkin 1999), including to the two NRHP themes identified above. The presence of large lake systems in the valley bottoms can be expected to have mediated some of the effects of desiccation seen elsewhere. But, as the reconstruction of Soda Lake in the nearby Carrizo Plain demonstrates (see Whitley et al. 2007), environmental perturbations had serious impacts on lake systems too. Identifying certain of the prehistoric demographic trends for the San Joaquin Valley, and determining how these trends (if present) correlate with those seen elsewhere, is another primary regional research objective.

The period of significance for pre-contact sites would be from approximately 12,000 YBP to AD 11772, when Euro-Americans arrived in California. Archaeological sites would primarily be evaluated for NRHP eligibility under Criterion D, research potential.

2.5.2 Historical Archaeology: Native American

Less research has been conducted on the regional historical archaeological record, both Native American and Euro-American. For Native American historical sites, the ethnographic and ethnohistoric periods in the southern San Joaquin Valley extended from first Euro-American contact, in AD 1772, to circa 1900, when tribal populations were first consolidated on reservations. The major significant historic NRHP themes during this period of significance involve the related topics of Historic-Aboriginal Archaeology, and Native American Ethnic Heritage. More specifically, these concern the Adaptation of the Indigenous Population to Euro-American Encroachment and Settlement, and their Acculturation to Western Society. These processes included the impact of missionization on the San Joaquin Valley (circa 1800 to about 1845); the introduction of the horse and the development of a San Joaquin Valley “horse culture,” including raiding onto the coast and Los Angeles Basin (after about 1810); the use of the region as a refuge for mission neophyte escapees (after 1820); responses to epidemics from introduced diseases (especially in the 1830s); armed resistance to Euro-American encroachment (in the 1840s and early 1850s); the origins of the reservation system and the development of new tribal organizations and ethnic identities; and, ultimately, the adoption of the Euro-American society’s economic system and subsistence practices, and acculturation into that society.

Site types that have been identified in the region dating to the ethnographic/ethnohistoric period of significance primarily include villages and habitations, some of which contain cemeteries and rock art (including pictographs and cupules). Dispersed farmsteads, dating specifically from the reservation period or post-1853, would also be expected. The different social processes associated with this historical theme may be manifest in the material cultural record in terms of changing settlement patterns and village organization (from traditional nucleated villages to single family dispersed farmsteads); the breakdown of traditional trading networks with their replacement by new economic relationships; changing subsistence practices, especially the introduction of agriculture initially via escaped mission neophytes; the use of Euro-American artifacts and materials rather than traditional tools and materials; and, possibly, changing mortuary practices.

Inasmuch as culture change is a primary intellectual interest in archaeology, ethnographic villages and habitations may be NRHP eligible under Criterion D, research potential. Rock art sites, especially pictographs, may be eligible under Criterion C as examples of artistic mastery. They may also be eligible under Criterion A, association with events contributing to broad patterns of history. Ethnographic sites, further, may be NRHP eligible as Traditional Cultural Properties due to potential continued connections to tribal descendants, and their resulting importance in traditional practices and beliefs, including their significance for historical memory, tribal- and self-identity formation, and tribal education.

For Criteria A, C and D, eligibility requires site integrity (including the ability to convey historical association for Criterion A). These may include intact archaeological deposits for Criterion D, as well as setting and feel for Criteria C and A. Historical properties may lack physical integrity, as normally understood in heritage management, but still retain their significance to Native American tribes as Traditional Cultural Properties if they retain their tribal associations and uses.

2.5.3 Historical Archaeology: Euro-American

Approaches to historical Euro-American archaeological research relevant to the region have been summarized by Caltrans (1999, 2000, 2007, 2008). These concern the general topics of historical landscapes, agriculture and farming, irrigation (water conveyance systems), and mining. Caltrans has also identified an evaluation matrix aiding determinations of eligibility. The identified research issues include site structure and land-use (lay-out, land use, feature function); economics (self-sufficiency, consumer behavior, wealth indicators); technology and science (innovations, methods); ethnicity and cultural diversity (religion, race); household composition and lifeways (gender, children); and labor relations. Principles useful for determining the research potential of an individual site or feature are conceptualized in terms of the mnemonic AIMS-R, as follows:

> 1. *Association* refers to the ability to link an assemblage of artifacts, ecofacts, and other cultural remains with an individual household, an ethnic or socioeconomic group, or a specific activity or property use.
>
> 2. *Integrit*y addresses the physical condition of the deposit, referring to the intact nature of the archaeological remains. In order for a feature to be most useful, it should be in much the same state as when it was deposited. However, even disturbed deposits can yield important information (e.g., a tightly dated deposit with an unequivocal association).
>
> 3. *Materials* refers to the number and variety of artifacts present. Large assemblages provide more secure interpretations as there are more datable items to determine when the deposit was made, and the collection will be more representative of the household, or activity. Likewise, the interpretive potential of a deposit is generally increased with the diversity of its contents, although the lack of diversity in certain assemblages also may signal important behavioral or consumer patterns.
>
> 4. *Stratigraphy* refers to the vertically or horizontally discrete depositional units that are distinguishable. Remains from an archaeological feature with a complex stratigraphic sequence representative of several events over time can have the added advantage of providing an independent chronological check on artifact diagnosis and the interpretation of the sequence of environmental or sociocultural events.
>
> 5. *Rarity* refers to remains linked to household types or activities that are uncommon. Because they are scarce, they may have importance even in cases where they otherwise fail to meet other thresholds of importance (Caltrans 2007:209).

For agricultural sites, Caltrans (2007) has identified six themes to guide research: Site Structure and Land Use Pattern; Economic Strategies; Ethnicity and Cultural Adaptation; Agricultural Technology and Science; Household Composition and Lifeways; and Labor History. Expected site types would include farm and ranch homesteads and facilities, line camps, and refuse dumps. The period of significance for these sites could extend from the initial settlement of Knights Ferry, in 1849, to World War II.

Given the history of placer-mining along the Stanislaus River, mine camps, water control structures (such as flumes and ditches) and tailings piles might also be present. The period of significance for mining sites would be from 1849 to 1940, encompassing the gold rush, late-nineteenth century Chinese re-mining period and then the Depression era second re-working of the Knights Ferry District.

In general terms, historical Euro-American archaeological sites would be evaluated for NRHP eligibility under Criterion D, research potential. However, they also potentially could be eligible under Criteria A and B for their associate values with major historical trends or individuals. Historical landscapes might also be considered. Historical structures are typically evaluated for NRHP eligibility under Criteria A and/or B, for their associative values with major historical trends or individuals, and C for potential design or engineering importance.

Water conveyance systems are also likely resources that might be associated with the current Project. As identified by Caltrans in the *Water Conveyance Systems in California Historic Context Development and Evaluation Procedures,* the "Development of Irrigated Agriculture" is a historically significant theme or event in the history of California and the Central Valley region. In the years following California's statehood and the gold rush, increasing population created an increasing market for agricultural products. The total irrigated acreage in the state grew from 60,000 acres in 1860 to nearly 400,000 acres by 1880, an increase of more than 650 percent, and the San Joaquin Valley contained the highest percentage of that land (approximately 47 percent) (Caltrans 2000). Private water companies, land colonies, mutual water companies, and irrigation districts were established in the mid- to late nineteenth century to build irrigation systems to further develop the state's agriculture industry. Irrigation districts became the most influential of these organizations, especially after state legislation—the Wright Act of 1887—causing irrigation districts to grow in number, power, as well as the actual amount of irrigated land throughout the state. Forty-nine irrigation districts were organized between 1887 and 1896, most of them located between Stockton and Bakersfield. However, by the late 1920s, only seven of the original districts were still in existence, among them the Modesto, Turlock, and Tulare irrigation districts (Caltrans 2000). Under the impetus of increased demand during World War I, agricultural production reached a new peak in 1920. Companies like Pacific Gas & Electric and San Joaquin Valley Light and Power helped finance large irrigation reservoirs to feed district canals in return for the power generated. By 1930, there were 94 active districts in California, and the land watered by these agencies mushroomed to 1.6 million acres (Caltrans 2000). Irrigation districts provided more than 90 percent of the surface water used for irrigation in the San Joaquin Valley before the Central Valley Project came on line in the 1940s (Caltrans 2000). Most were located in the San Joaquin Valley, with the most successful in Modesto, Turlock, Merced, and Fresno.

The period of significance for this theme begins with the earliest developments of irrigated agriculture in the San Joaquin Valley, with the construction of the earliest earthen ditches in Visalia in 1852. Irrigated agriculture continues to be an important industry and influence in the Valley. The period of significance ends in 1964 following recommended guidance for closing a period of significance 50 years ago when activities continued to have importance, but no more specific date can be defined to end the historic period, and there is no justification for exceptional significance to extend the period of significance to an end date within the last 50 years (National Register of

Historic Places 1997). Associated property types would include water conveyance systems, pump stations, canals, laterals and ditches, and related structures and facilities.

3. ARCHIVAL RECORDS SEARCH

3.1 ARCHIVAL RECORDS SEARCH

In order to determine whether the Project APE had been previously surveyed for cultural resources, and/or whether any such resources were known to exist on any of them, an archival records search was conducted by the staff of the Central California Information Center (IC) on 6 December 2021. The records search was completed to determine: (i) if prehistoric or historical archaeological sites had previously been recorded within the study areas; (ii) if the project area had been systematically surveyed by archaeologists prior to the initiation of this field study; and/or (iii) whether the region of the field project was known to contain archaeological sites and to thereby be archaeologically sensitive. Records examined included archaeological site files and maps, the NRHP, Historic Property Data File, California Inventory of Historic Resources, and the California Points of Historic Interest.

According to the ICs record search, the APE had been partly surveyed, with five studies covering portions of it (Table 1). One cultural resource had been identified within the APE, P-05-000739/P-50-2109. Four studies had been completed within 0.5-mi of the APE (Table 2), resulting in the recording of 11 cultural resources within that radius (Table 3). Details of the records search and a map of previous reports and recorded cultural resources in and around the APE are provided in Confidential Appendix A.

Table 1. Previous Surveys Within APE

REPORT ID	DATE	AUTHOR	TITLE
CA-00193	1975	Moratto & Riley	Evaluation of Archaeological Resources On & Near Bostwick Mountain, Calaveras County
CA-7714	2012	Williams, Dunay & Fogerty	Cultural Resource Inventory & Finding of Effect, Two Mile Bar Salmonoid Restoration Project
TO-921	1977	Orlins	Cultural Resources Survey of Fee Lands for Public Access, Lower Stanislaus River
TO-1070	1982	Decater	Archaeological Survey for the Proposed Goodwin Dam Hydroelectric Project
T0-1670	1981	True & Slaymaker	Archaeological Investigations for the Oakdale Irrigation District

Table 2. Survey Reports within the 0.5-mi of the APE

REPORT ID	DATE	AUTHOR	TITLE
CA-369/TO-369	1982	Swernoff	Archaeological Investigations at the Lower Stanislaus River Recreation Areas
ST-921/TO-921	1977	Orlins	Cultural Resources Survey of Fee Lands for Public Access, Lower Stanislaus River
ST-1670/TO-1670	1982	Decater	Archaeological Survey for the Proposed Goodwin Dam Hydroelectric Project
ST-7714/CA-7714	2012	Williams, Dunay & Fogerty	Cultural Resource Inventory & Finding of Effect, Two Mile Bar Salmonoid Restoration Project

Table 3. Resources within 0.5-mi of the APE

PRIMARY #	DATE RECORDED	SITE TYPE
P-05-1144/55-2286	1979	Historic: Two Mile Bar mining camp; Native American: Possible Keweno village
P-05-3601	2015	Prehistoric: Bedrock mortars
P-50-203	1959	Prehistoric: Cave w/ habitation
P-50-2003	2007	Historic: Oakdale South Main Canal
P-50-2109/05-739	2001	Historic: South San Joaquin Main Canal
P-50-2303	2014	Historic: Oakdale Irrigation District
P-55-1711	1982	Historic: Mine tailings; Prehistoric: Bedrock mortars
P-55-1269	1939	Prehistoric (no information)
P-55-2289	1982	Historic: Canal & retaining wall
P-55-2302	1982	Historic: Mine camp
P-55-9480	2016	Prehistoric: Bedrock mortars, possible village of Tulanachi
P-55-9497	2017	Prehistoric: Bedrock mortars, possible house-pit

Site P-05-000739/50-2109, within the APE, is the South San Joaquin Canal. As noted above, its origins are in the Knights Bridge flume, dating to the gold rush era. This flume was replaced/reconstructed as the Tulloch Ditch in the 1880s. The SSJID and OID rebuilt this ditch again in 1913 as the South San Joaquin Canal.

The hanging flume segment of the Knights Ferry ditch has been determined eligible for the NRHP. The South San Joaquin Canal portion was determined not eligible for listing by consensus through the Section 106 process in 2011 (FWHA 10207A).

3.2 TRIBAL OUTREACH

A record search of the Sacred Lands Files was obtained on 14 July 2021 (Confidential Appendix A). This indicated that no known tribal cultural resources or sacred sites were within or near the Project. Outreach letters and follow-up emails were sent to tribal organizations using the NAHC contact list to further identify Native American interests and concerns in the Project area (see Confidential Appendix A). Multiple responses were received:

The Wilton Rancheria, Cultural Preservation Department, the tribe inquired whether the Table Mountain Rancheria was requesting consultation (no such request has been received).

The Chicken Ranch Rancheria of Me-Wuk Indians of California, stating that they are aware of archaeological sites and traditional cultural properties in or in the vicinity of the Project, and requesting involvement in it. In follow up emails from the Chicken Ranch Rancheria of Me-Wuk Indians of California, the tribe expressed interest and concern regarding the project area and requested informal consultation.

The Nototomne Cultural Preservation/Northern Valley Yokuts stated that the Project is in a sensitive area and it should be monitored by tribal and archaeological monitors.

The Calaveras Miwuk Tribe stated that the Project is not within their area of concern; however, a recommendation to contact the North Valley Yokuts Tribe was made.

The North Valley Yokuts Tribe stated that the Project is in a sensitive area and it should be monitored by tribal and archaeological monitors.

Recommendations based Native American Heritage Commission outreach and ongoing tribal coordination are as follows:

TCR-1: (Cultural Awareness Training): Prior to construction, a Cultural Awareness Training Program is recommended to be provided to all construction managers and construction personnel prior to commencing ground disturbance work at the project site. The training shall be prepared and conducted by a qualified archaeologist to the satisfaction of the District. The training shall be a length of time adequate to explain applicable statues, regulations, enforcement provisions; the prehistoric and historic environmental setting and context, local tribal groups; show sample artifacts; and what prehistoric and historic archaeological deposits look like at the surface and when exposed during construction. The training may be discontinued to new workers to the site when ground disturbance is completed. Construction personnel shall not be permitted to operate equipment within the construction area unless they have attended the training. A list of the names of all personnel who attended the training and copies of the signed acknowledgement forms shall be submitted to the District for their review and approval.

TCR-2: (Inadvertent Discoveries): In the case of any inadvertent discoveries at any time during the duration of construction or implementation, it is recommended that SSJID contact Calaveras Band of Mi-Wuk Indians for further information, investigation, and guidance on the process for handling such discoveries.

TCR-3: (Monitoring): The District will continue to collaborate with the Chicken Ranch Tribe to identify areas that may require tribal monitoring during ground disturbing activities. Once areas have been identified within the cultural area of potential effect (APE) and agreed upon by both parties, a qualified representative will monitor for tribal resources during ground disturbing activities, as needed. Tribal monitoring will end at the conclusion of the ground disturbance activities, including project site grading and ground excavation/trenching activities.

No other responses were received.

4. METHODS AND RESULTS

4.1 FIELD METHODS

An intensive Class III inventor/Phase I survey of the Project APE was conducted by Robert Azpitarte, B.A., ASM Associate Archaeologist/Crew Chief, on 12 January 2022. The field methods employed included intensive pedestrian examination of the ground surface for evidence of archaeological sites in the form of artifacts, surface features (such as bedrock mortars, historical mining equipment), and archaeological indicators (e.g., organically enriched midden soil, burnt animal bone); the identification and location of any discovered sites, should they be present; tabulation and recording of surface diagnostic artifacts; site sketch mapping; preliminary evaluation of site integrity; and site recording, following the California Office of Historic Preservation Instructions for Recording Historic Resources, using DPR 523 forms. Parallel survey transects spaced at 15-m apart were employed for the inventory. These covered the entirety of the dispersed segments of the approximately 5.58-ac APE.

4.2 SURVEY RESULTS

One cultural resource was identified within the Project APE (Figure 2), a segment of P-5-000739/P-50-002109, the previously recorded South San Joaquin Canal. This segment of the canal consists of an open-air, almost vertical, concrete-sided canal structure (Appendix B). The existing site record was updated to reflect this addition.

Again, as noted above, the origin of this canal is in the Knights Bridge flume, dating to the gold rush era. This flume/ditch was replaced/reconstructed as the Tulloch Ditch in the 1880s. The SSJID and OID rebuilt the ditch in 1910 - 1913 as the South San Joaquin Canal (now called the JSC). The west/exit portal of the proposed canal tunnel will require a tie-in to the existing canal wall. This portion of the canal measures 112-ft long by 5-ft wide by 10-ft deep and is situated at an elevation of approximately 340-ft amsl.

This resource was originally recorded in 1975 (M.J. Moratto and L.M. Riley) as a possible gold rush era flume cut and trail that originated from Bean Gulch (to the north). The flume was modified for water conveyance in the early 20th century as part of the Goodwin Dam project with later modifications occurring in the 1950s (Forrest Killingsorth, SSJID Engineer, personal communication 1/12/2022). The canal is as last described by previous records and of similar construction. It consists of rebar reinforced, concrete lined channel walls that are approximately 10-ft tall and 5-in thick in construction. In certain places, the channel retaining walls extend up to 1-ft above the adjacent road. A 15-ft wide graveled road follows the canal segment in its entirety. No additional historical features were noted along this portion of the canal. No evidence of stacked rock retaining walls were seen along the bottom portion of the canal segment, as has been found in other recorded segments.

Although the South San Joaquin Main Canal segment recorded during the survey is still in operation, is has been altered significantly since first constructed. Alterations include the addition of concrete cast water control and diversion structures, road/bridge crossings, and intermittent concrete wall repairs. The South San Joaquin Main Canal thus lacks integrity of setting, materials, design and workmanship. The hanging flume segment of the Knights Ferry ditch has been determined eligible for the NRHP. The South San Joaquin Canal portion was determined not eligible for listing by consensus through the Section 106 process in 2011 (FWHA 10207A).

Figure 2. Recorded segment of P-5-000739/P-50-002109, looking south/southwest.

5. SUMMARY AND RECOMMENDATIONS

An intensive Phase I survey/ Class III archaeological inventory was conducted for the South San Joaquin Irrigation District Canal Tunnel Project (Project), Tuolomne, Calaveras and Stanislaus counties, California. A records search was conducted at the Central California Archaeological Information Center, California State University, Stanislaus. A Sacred Lands File search request was also submitted to the Native American Heritage Commission NAHC. The IC records search indicated that a segment of one cultural resource, P-5-000769/P-50-002109, the San Joaquin Canal, is present within the APE. The NAHC response was negative, with no known tribal cultural resources or sacred sites in or near the APE. Contact letters were sent to tribal organizations on the NAHC contact list. Three responses were received: the Cultural Preservation Department, Wilton Rancheria, inquired whether the Table Mountain Rancheria was requesting consultation (no such request has been received); the Chicken Ranch Rancheria of Me-Wuk Indians of California, stated that they are aware of archaeological sites and traditional cultural properties in or in the vicinity of the Project, and requested involvement in it; and the Nototomne Cultural Preservation/Northern Valley Yokuts stated that the Project is in a sensitive area and it should be monitored by tribal and archaeological monitors. No other responses were received.

The Phase I survey fieldwork was conducted with parallel transects spaced at 15-meter intervals across the approximately 5.58-ac Project APE. A segment of the South San Joaquin Canal, P-5-000739/P-50-002109, was identified and recorded within the western/exit portal portion of he Project APE.

5.1 RECOMMENDATIONS

The intensive Phase I survey/Class III inventory of the SSJID Project APE resulted in the identification of a segment of the previously recorded South San Joaquin Canal, P-5-000769/P-50-002109. This resource was determined not eligible for listing in the NRHP by consensus through the Section 106 process in 2011 (FWHA 10207A). This resource has been altered to include the addition of concrete cast water control and diversion structures, road/bridge crossings, and intermittent concrete wall repairs. The South San Joaquin Main Canal thus lacks integrity of setting, materials, design and workmanship, and is recommended as not CRHR eligible.

Based on these facts and circumstances, we recommend a determination of no significant impact to historical resources under CEQA, and a determination of no effect under Section 106 of the NHPA. We further recommend that the Chicken Ranch Rancheria of Me-Wuk Indians of California be kept in contact to participate in and/or consult on the Project. Finally, and in the unlikely event that cultural resources are discovered during the construction and operation of the proposed Project, it is recommended that an archaeologist be contacted to evaluate the find and to assist with the development of a treatment plan, if warranted.

As previously stated, recommendations based Native American Heritage Commission outreach and ongoing tribal coordination are as follows:

TCR-1: (Cultural Awareness Training): Prior to construction, a Cultural Awareness Training Program is recommended to be provided to all construction managers and construction personnel prior to commencing ground disturbance work at the project site. The training shall be prepared and conducted by a qualified archaeologist to the satisfaction of the District. The training shall be a length of time adequate to explain applicable statues, regulations, enforcement provisions; the prehistoric and historic environmental setting and context, local tribal groups; show sample artifacts; and what prehistoric and historic archaeological deposits look like at the surface and when exposed during construction. The training may be discontinued to new workers to the site when ground disturbance is completed. Construction personnel shall not be permitted to operate equipment within the construction area unless they have attended the training. A list of the names of all personnel who attended the training and copies of the signed acknowledgement forms shall be submitted to the District for their review and approval.

TCR-2: (Inadvertent Discoveries): In the case of any inadvertent discoveries at any time during the duration of construction or implementation, it is recommended that SSJID contact Calaveras Band of Mi-Wuk Indians for further information, investigation, and guidance on the process for handling such discoveries.

TCR-3: (Monitoring): The District will continue to collaborate with the Chicken Ranch Tribe to identify areas that may require tribal monitoring during ground disturbing activities. Once areas have been identified within the cultural area of potential effect (APE) and agreed upon by both parties, a qualified representative will monitor for tribal resources during ground disturbing activities, as needed. Tribal monitoring will end at the conclusion of the ground disturbance activities, including project site grading and ground excavation/trenching activities.

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CONFIDENTIAL APPENDICES

Appendix E: Construction-Related Vehicle Miles Traveled Analysis

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Memorandum

To:	Briza Sholars, Senior Planner
From:	Jarred Olsen, AICP, Associate Planner
Through:	Matt Hamilton, PE
Subject:	Construction-related Vehicle Miles Traveled Analysis for SSJID/OID Canyon Tunnel Project
Date:	December 17, 2021

South San Joaquin Irrigation District (SSJID) and Oakdale Irrigation District (OID) intends to construct an approximately 12,000 linear-foot tunnel ("Canyon Tunnel") for water conveyance purposes. Construction of the Canyon Tunnel is expected to take approximately 24 months to complete with a five-day workweek, plus a weekly visit for maintenance of construction equipment. It is anticipated that 169,000 cubic yards (CY) of spoils and 10,900 CY of concrete will be transported during this approximately two-year period. As a result, an analysis of Vehicle Miles Traveled (VMT) was requested for purposes of the California Environmental Quality Act (CEQA).

CEQA Guidelines Section 15064.3(b) indicates that for construction-related *automobile* vehicle miles traveled (VMT) impacts, a qualitative analysis may be appropriate. However, given the large scale of this project, it was deemed appropriate to provide a quantitative analysis of VMT for the construction-related traffic. We include heavy duty truck vehicle miles traveled in this analysis, not for transportation-related impacts, but other impacts that are influenced by these truck trips (e.g. air quality, greenhouse gas emissions, noise).

The construction crew, anticipated to comprise of 20 individuals staying at local hotels in Oakdale, will travel to the site each construction day in two (2) separate shifts, each with approximately ten (10) workers each. One phase of the project will require two (2) shifts for approximately 325 days, followed by a phase requiring one (1) shift for approximately 195 days. Equipment maintenance visits are anticipated to occur weekly by two (2) individuals. For purposes of determining distance, from a centralized location of hotels (37°46'06.9" N, 120°50'31.3" W). This distance is approximately 12.78 miles from the construction site. It is conservatively assumed that each automobile would be single-occupancy.

$$Worker\,VMT = Workers_{Count} * Days_{Construction} * 2(Distance_{One-Way})$$

Approximately 169,000 CY of spoils will be excavated and transported to a nearby location at 16643 State Highway 120, Oakdale, CA, located approximately 6.08 miles away from the construction site. It is assumed that each truck can haul away approximately 14 CY of spoils. Spoils excavation is expected to occur over a course of 450 days.

Concrete will be delivered to the site from a batch plant located at 5695 O'Byrnes Ferry Road, Jamestown, CA, approximately 17.78 miles away from the construction site. Based on the client-provided Operational Statement, concrete delivery will involve six (6) one-way trips per day. Concrete delivery is expected to occur over a course of 350 days.

These locations and their distances can be found in the attached exhibit.

The formula for calculating Concrete and Spoils VMT is as follows:

$$Daily\ Trips_{One-Way} = \frac{\left(\frac{Volume_{Material}}{Days_{Construction}}\right)}{Volume_{Truck}}$$

$$Truck\ VMT = Daily\ Trips_{One-Way} * Days_{Construction} * 2(Distance_{One-Way})$$

Given these assumptions, the following VMT data can be produced:

Trip Type	One-Way Trips per Day	Workdays	One-Way Distance (miles)	Project VMT
Worker	20	325	12.78	166,140
	10	195		49,842
	2	104		5,316
	Subtotal			221,298
Concrete	6	350	17.78	74,676
Spoils	27	450	6.08	147,744

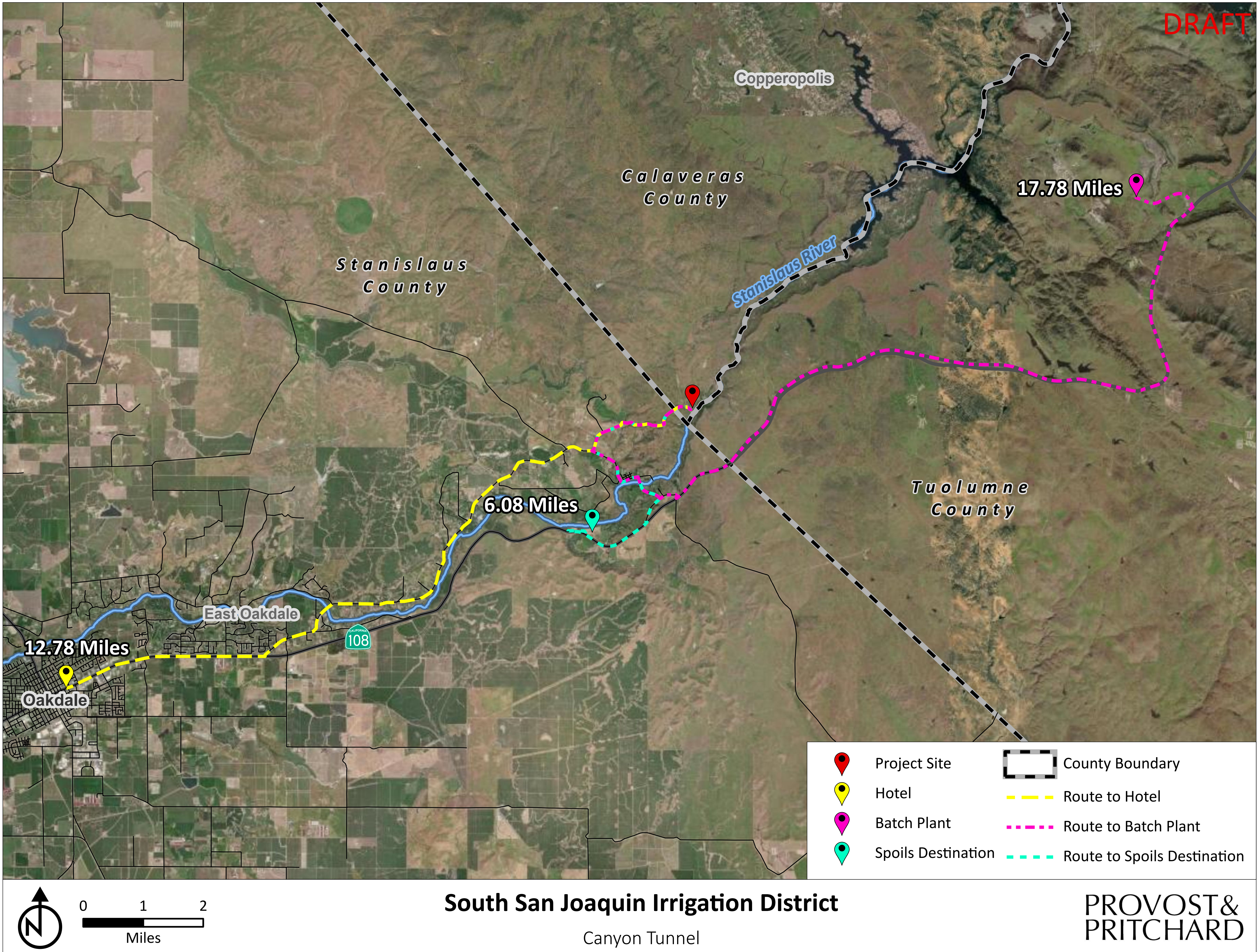
SSJID, the lead agency for this project, has not established a construction-related automobile VMT threshold of significance, nor has any other jurisdiction known to Provost & Pritchard. As construction of the project is temporary, we anticipate that the impact of this project is less than significant. However, should SSJID request a list of methods to further reduce automobile VMT, we propose considering the following measures:

- Carpool / Vanpool. Passenger vans (vanpooling) typically accommodate up to 15 passengers and could theoretically reduce Worker VMT by nearly 87%.

If you need additional information, please do not hesitate to contact me at (559) 636-1166 or jolsen@ppeng.com.

Respectfully,

Jarred Olsen, AICP
Associate Planner



South San Joaquin Irrigation District

Canyon Tunnel

PROVOST& PRITCHARD

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Appendix F: Responsible Agency Correspondence

Summer Rooks

From:	Kearns, Zachary@Wildlife <Zachary.Kearns@Wildlife.ca.gov>
Sent:	Thursday, June 16, 2022 3:48 PM
To:	Jackie Lancaster; Kira McCall; Wildlife R2 LSA
Cc:	Alex Collins; Summer Rooks
Subject:	RE: Canyon Tunnel Project

Hi Jackie and Kira,

Apologies for the delay. Based on my conversation with fisheries, we have no intention to ask for a fish screen along the full portion of the channel. Over the course of the agreement drafting, I may include a measure for fisheries consultation and relocation assistance, but you will have the opportunity to comment on that once it's submitted as well.

Regarding the window, yes, we have passed the 30 day completeness review period. While we cannot finalize an Agreement until CEQA is finalized, I will be able to submit draft agreements to you before that time so once CEQA is approved, we will be able to sign.

I have some availability to morrow afternoon between 2 and 4 if you would like to have another call to talk through the notification.

Sincerely,

Zach Kearns
Environmental Scientist
(916) 358-1134
1701 Nimbus Rd.
Rancho Cordova, CA 95670
CALIFORNIA DEPARTMENT OF FISH and WILDLIFE

From: Jackie Lancaster <JLancaster@ppeng.com>
Sent: Monday, June 13, 2022 3:54 PM
To: Kira McCall <KMcCall@ppeng.com>; Kearns, Zachary@Wildlife <Zachary.Kearns@Wildlife.ca.gov>; Wildlife R2 LSA <R2LSA@wildlife.ca.gov>
Cc: Alex Collins <acollins@ppeng.com>; Summer Rooks <SRooks@ppeng.com>
Subject: RE: Canyon Tunnel Project

Hello Zach,

I just wanted to follow upon the LSA in the EPIMS portal. We paid fees on May 4th submitted on May 5th. From my calculations we are passed the 30-day initial review for completeness. Do you have any updates on the application? Thank you in advance for your time and attention to this matter, you are very much appreciated! We look forward to moving this along through the process.

Thank you!
Jackie Lancaster
Provost & Pritchard Consulting Group
Office: (559) 636-1166
Fax: (559) 636-1177
E-mail: jlancaster@ppeng.com
Website: http://provostandpritchard.com

From: Kira McCall <KMcCall@ppeng.com>
Sent: Wednesday, June 8, 2022 10:57 PM
To: Kearns, Zachary@Wildlife <Zachary.Kearns@Wildlife.ca.gov>; Wildlife R2 LSA <R2LSA@wildlife.ca.gov>
Cc: Jackie Lancaster <JLancaster@ppeng.com>; Alex Collins <acollins@ppeng.com>; Summer Rooks <SRooks@ppeng.com>
Subject: RE: Canyon Tunnel Project

Hi Zach!

I hope you're having a great week! I'm just following up on your last email about not needing a fish screen at this point. Does that mean we could be asked to install one in the future? I'd love to have a quick chat so we can be on the same page! Any time on Friday June 10 would be great if you have time!

Thank you!

Kira McCall, Environmental Specialist – Regulatory Permitting
Provost & Pritchard Consulting Group
1800 30th Street, Suite 280, Bakersfield, CA 93301-1918
Office: (661) 616-5900 | Fax: (661) 616-5890 | Ext: 753
E-mail: kmccall@ppeng.com | Website: provostandpritchard.com

From: Kearns, Zachary@Wildlife <Zachary.Kearns@Wildlife.ca.gov>
Sent: Tuesday, May 31, 2022 2:00 PM
To: Kira McCall <KMcCall@ppeng.com>; Wildlife R2 LSA <R2LSA@wildlife.ca.gov>
Cc: Jackie Lancaster <JLancaster@ppeng.com>
Subject: RE: Canyon Tunnel Project

Hi Kira,

Apologies for the delay. Our fisheries biologist, Ben Ewing was able to review the plans and has no overarching concerns with the proposed structure at this point, and didn't foresee needing to require a fish screen. However, he asked if he could be included in the fish relocation surveys. His contact is ben.ewing@wildlife.ca.gov, but we can all coordinate once we get closer to that point in the process.

Let me know if you want to have a quick follow up chat this week unless this is enough to let you move forward. I'll send out an email for the mutual extension this week, I just want to make sure I've given the full completeness review, first.

Zach

From: Monica Gutierrez - NOAA Federal <monica.gutierrez@noaa.gov>
Sent: Friday, July 9, 2021 10:04 AM
To: Mary Beth Bourne <MBourne@ppeng.com>
Cc: Dena Giacomini <DGiacomini@ppeng.com>
Subject: Re: Fish Screen Inquiry - Above Goodwin Dam

Hi Mary Beth,

It was nice chatting with you today. Thank you for your follow up email. Since the project area is located above Goodwin Dam, which is the upper extent of anadromy for listed fish species, there is no requirement to fish screen the project. If you have any further questions, please let me know. Have a great day!

On Fri, Jul 9, 2021 at 9:30 AM Mary Beth Bourne <MBourne@ppeng.com> wrote:

> Good Morning Monica,
>
> I appreciate you taking the time to answer my fish screen questions.
>
> The potential project will occur within the Stanislaus River above Goodwin Dam, an area salmonids are unable to access. We would like to confirm that the project will not require a fish screen in this area due to the absence of salmonids.
>
> Thank you,
>
> **Mary Beth Bourne**
> **PROVOST & PRITCHARD CONSULTING GROUP**
> 130 North Garden Street
> Visalia, CA 93291
> Phone: (559) 636-1166, Ext. 522
> Fax: (559) 636-1177
> e-mail: mbourne@ppeng.com
> website: http://www.provostandpritchard.com
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>

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Monica Gutierrez | Acting San Joaquin River Branch Chief
San Joaquin River Branch
California Central Valley
NOAA Fisheries | West Coast Region
U.S. Department of Commerce
650 Capitol Mall, Suite 5-100, Sacramento, CA 95814
916-930-3657 (Office) | 916-201-3259 (Cell)
Monica.Gutierrez@noaa.gov

NOAA FISHERIES
West Coast Region

**During the COVID-19 pandemic, I am on mandatory telework. I may be working flexible hours to balance family and personal needs. I appreciate your patience if my response time is delayed. If you have a request, please specify important time frames or deadlines. I will do my best to respond accordingly. Because I have

Appendix G: Canyon Tunnel Diversion Memo – Kleinfelder/ Garcia and Associates

Kleinfelder/Garcia and Associates
1512 Franklin St., Suite 100
Oakland, CA 94612
Phone: (510) 891-0024

27 January 2022

To: Dena Giacomini, Provost & Pritchard

From: Rob Aramayo

RE: Canyon Tunnel Project

The South San Joaquin Irrigation District (SSJID) and the Oakdale Irrigation District (OID) are planning modifications to the Joint Supply Canal (JSC) to improve the long-term reliability of the water supply system. The JSC diverts approximately 1200 cubic feet per second (cfs) of water from the north side of the Stanislaus River, just upstream of Goodwin Dam. Goodwin Dam was initially built circa 1913, and was raised in 1958.

The canal in its current alignment is at risk of catastrophic failure due to rockslides from unstable rock slopes along the alignment. Therefore, SSJID and OID are preparing to bypass a portion of the canal with a tunnel to reduce this threat. The proposed alternative includes building a new intake approximately 20 feet upstream of Goodwin Dam, rotated approximately 90 degrees clockwise from the existing intake. The new intake will keep the existing footprint as the current intake as defined by the pool of water between the intake and the trash rack. This scope of this project is limited to modifying the intake structure of the JSC and does not affect Goodwin Dam or the release of water past Goodwin Dam.

This memo is to evaluate the necessity of a fish screen at the new diversion from both ecological and legal perspectives.

ECOLOGICAL SETTING

Goodwin Dam is located on the Stanislaus River approximately 35 miles upstream of its confluence with the San Joaquin River at a river elevation of approximately 325 feet, in Calaveras County, California. Goodwin Dam is the lowest of three consecutive dams that collectively inundate more than 20 miles of riverine habitat, and is the upstream limit of anadromy in the Stanislaus River.

The native fish assemblages in California rivers draining into the Great Valley correlate with elevation, starting with the Rainbow Trout assemblage in the upper reaches of watersheds, to the

Pikeminnow-hardhead-sucker assemblage in the foothills, to the Deep-bodied fish assemblage on the valley floor (Moyle 2002). Goodwin Dam is situated at the overlap of the Pikeminnow-hardhead-sucker zone and the Deep-bodied fish zone. Historically, this section of the Stanislaus River would have had members of both fish assemblages, plus anadromous species (salmon, sturgeon, and lamprey) migrating through. The actual species composition would have varied with the seasons and drought conditions.

Construction of Goodwin Dam, Tulloch Dam, and Melones Dam in the early 1900s (and later New Melones Dam), effectively changed the flow regime of the project area, and blocked anadromous fish from accessing the upper reaches of the Stanislaus River. These dams changed the impounded waters behind them from riverine to lacustrine habitats. Consequently, the expected fish assemblage has also changed over time. In addition to the change in physical habitat characteristics, the introduction of myriad fish species for sporting purposes has dramatically changed the fish community, to the point where current species assemblages are largely driven by the history of introductions (Moyle 2002). These low- and mid-elevation reservoirs typically support warmwater fishes (basses) in the surface and edge waters, and hatchery-origin rainbow and brown trout in the deeper, cooler waters. Nonetheless, some native minnows (cyprinids) often persist (Moyle 2002).

Fish communities in California's water supply reservoirs are poorly studied and change frequently with water conditions (e.g., drought) and introductions of non-native species. Native fish species that may occur in Goodwin Reservoir include: rainbow trout (hatchery origin *Oncorhynchus mykiss*), Sacramento sucker (*Catostomus occidentalis*), hitch (*Lavinia exilicauda*), California roach (*Lavinia symmetricus*), Sacramento blackfish (*Orthodon microlepidotus*), hardhead (*Mylopharodon conocephalus*), Sacramento pikeminnow (*Ptychocheilus grandis*), Sacramento perch (*Archoplites interruptus*), and threespine stickleback (*Gasterosteus aculeatus*). Non-native fish that may occur in Goodwin Reservoir include: threadfin shad (*Dorosoma petenense*), golden shiner (*Notemigonus crysoleucas*), goldfish (*Carassius auratus*), common carp (*Cypronus carpio*), brown bullhead (*Ameiurus nebulosus*), white catfish (*Ameiurus catus*), bluegill (*Lepomis macrochirus*), redear sunfish (*Lepomis microlophus*), green sunfish (*Lepomis cyanellus*), warmouth (*Lepomis gulosus*), white crappie (*Pomoxis annularis*), black crappie (*Pomoxis nigromaculatus*), largemouth bass (*Micropterus salmoides*), smallmouth bass (*Micropterus dolomieu*), spotted bass (*Micropterus punctulatus*), and redeye bass (*Micropterus coosae*). None of the fish expected to occur in Goodwin Reservoir are protected under the Endangered Species Act or the California Endangered Species Act (CDFW 2022). Rainbow trout that may occur in the reservoir will be of hatchery origin, and are not protected under the ESA. Migratory fish occurring in the lower Stanislaus River below Goodwin Dam will not be affected by the project since the project does not alter the flow releases through the dam.

LEGAL FRAMEWORK

California Fish and Game Code has several protections for fish when developing water diversion structures. Many of these provisions, initially enacted in 1957, are focused on providing migratory fish species' passage and sufficient water discharge through the dam to support the downstream fish community. For example, Sections 5901 and 5931 require fishways to allow passage of migratory fish to pass the dam, and Section 5937 requires sufficient water to pass the dam in order to keep in good condition any fish that may be planted or exist below the dam.

The proposed tunnel project relocates the diversion intake, but does not alter the diversion regime and will not alter the downstream water deliveries to maintain fish. Therefore, these sections of the Fish and Game Code do not apply to the project. Section 6100 enacted in 1972, requires new diversions that may affect salmon be screened. It is not applicable to this project since the project does not constitute a new diversion and salmon are not present at or upstream of the diversion.

Fish and Game Code, Division 6, Part 1, Chapter 3, Article 3, Sections 5980-5993 recognizes that large conduits, diverting more than 250 cubic feet per second of water, "tend to destroy fish in a greater degree than conduits of smaller size" (CFGC 2022). Under Section 5981, CDFW has the right to order the owner of a conduit to install a screen to protect fishes from entrainment. Since the JSC is for water supply and not hydropower, CDFW would be responsible for one half of the cost of the fish screen if ordered (CFGC Sections 5981 and 5987: See full code text below).

SUMMARY

California's Fish and Game Code gives the Department of Fish and Wildlife the responsibility to inspect diversion conduits and require fish screens where the Department deems fish screens necessary to protect the ecological health of the fish community.

In the specific case of the diversion for the JSC, construction of a fish screen sufficient to protect fish from entrainment into the 1200 cfs tunnel diversion would dramatically increase the footprint of the project and extend well into the reservoir, while having little, if any, effect on the existing fish community in Goodwin Reservoir, a fish community that has been highly altered through changes to the flow regime and species introductions. There are no indications that the JSC diversion, unscreened since construction, is causing harm to the fish community in Goodwin Reservoir. Therefore, the cost of designing and constructing a fish screen over the JSC diversion far exceed the benefit that a fish screen would provide.

FISH AND GAME CODE TEXT

FISH AND GAME CODE – FGC (FGC 2022)

DIVISION 6. FISH [5500 - 9101]

(Division 6 enacted by Stats. 1957, Ch. 456.)

PART 1. GENERALLY [5500 - 6930]

(Part 1 enacted by Stats. 1957, Ch. 456.)

CHAPTER 3. Dams, Conduits, and Screens [5900 - 6100]

(Chapter 3 enacted by Stats. 1957, Ch. 456.)

ARTICLE 3. Conduits and Screens: Diversions Over 250 Cubic Feet per Second [5980 - 5993]

(Article 3 enacted by Stats. 1957, Ch. 456.)

5981.

The department shall examine all conduits; and order the owner of a conduit to install, and it is the duty of such an owner to install, a screen on the conduit when, in the opinion of the department, a screen is necessary to prevent fish from passing into the conduit.

Except as provided in Sections 5987, 5988 and 5989, one-half of the expense of constructing or installing a screen shall be paid by the owner of a conduit and **one-half by the department**.
(Enacted by Stats. 1957, Ch. 456.)

5987.

The department shall not pay one-half of the expense of the construction and installation of any screen as provided in Sections 5981, 5983, and 5984 to any person engaged in producing, generating, transmitting, delivering, or furnishing electricity for light, heat or power.

If this section is for any reason held to be unconstitutional, the decision shall not affect the validity of Section 5981, 5983 or 5984, and the Legislature hereby declares that the persons mentioned in this section shall be subject to the provisions of Sections 5981, 5983 and 5984.
(Enacted by Stats. 1957, Ch. 456.)

REFERENCES

California Department of Fish and Wildlife 2022. State and Federally Listed Endangered and Threatened Animals of California. January 2022. https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=109405&inline

California Fish and Game Code (FGC). 2022. https://leginfo.legislature.ca.gov/faces/codes_displayText.xhtml?division=8.&chapter=1.&lawCode=FGC

Moyle, P.B. 2002. Inland Fishes of California, revised and expanded. University of California Press. 502 p