Draft

# CASTAIC DAM HIGH INTAKE TOWER BRIDGE RETROFIT PROJECT

## Initial Study/Mitigated Negative Declaration

Prepared for
Department of Water Resources

April 2020

ESA

Draft

# CASTAIC DAM HIGH INTAKE TOWER BRIDGE RETROFIT PROJECT

## Initial Study/Mitigated Negative Declaration

Prepared for
Department of Water Resources

April 2020

626 Wilshire Boulevard
Suite 1100
Los Angeles, CA 90017
213.599.4300
esassoc.com

ESA

| | | |
|---|---|---|
| Bend | Oakland | San Diego |
| Camarillo | Orlando | San Francisco |
| Delray Beach | Pasadena | Santa Monica |
| Destin | Petaluma | Sarasota |
| Irvine | Portland | Seattle |
| Los Angeles | Sacramento | Tampa |

170020.17

**OUR COMMITMENT TO SUSTAINABILITY** | ESA helps a variety of public and private sector clients plan and prepare for climate change and emerging regulations that limit GHG emissions. ESA is a registered assessor with the California Climate Action Registry, a Climate Leader, and founding reporter for the Climate Registry. ESA is also a corporate member of the U.S. Green Building Council and the Business Council on Climate Change (BC3). Internally, ESA has adopted a Sustainability Vision and Policy Statement and a plan to reduce waste and energy within our operations. This document was produced using recycled paper.

# TABLE OF CONTENTS

## Castaic Dam High Intake Tower Bridge Retrofit Project IS/MND


Page

**1.0 Project Description ..... 3**
1.1 Introduction ..... 3
1.2 Project Location ..... 3
1.3 Project Background and Purpose ..... 3
1.4 Project Objectives ..... 8
1.5 Project Description ..... 8
1.6 Project Construction ..... 15
1.7 Operation and Maintenance Characteristics ..... 18
1.8 Project Approvals ..... 18

**2.0 Environmental Factors Potentially Affected ..... 19**
2.1 Aesthetics ..... 20
2.2 Agriculture and Forestry Resources ..... 22
2.3 Air Quality ..... 24
2.4 Biological Resources ..... 36
2.5 Cultural Resources ..... 48
2.6 Energy ..... 57
2.7 Geology and Soils ..... 61
2.8 Greenhouse Gas Emissions ..... 66
2.9 Hazards and Hazardous Materials ..... 73
2.10 Hydrology and Water Quality ..... 76
2.11 Land Use and Planning ..... 80
2.12 Mineral Resources ..... 81
2.13 Noise ..... 82
2.14 Population and Housing ..... 88
2.15 Public Services ..... 89
2.16 Recreation ..... 91
2.17 Transportation ..... 94
2.18 Tribal Cultural Resources ..... 96
2.19 Utilities and Service Systems ..... 100
2.20 Wildfire ..... 102
2.21 Mandatory Findings of Significance ..... 104

Page

## Appendices

A. Air Quality, Greenhouse Gas, and Energy Worksheets
B. Biological Resources Technical Report
C. Cultural Resources Assessment

## List of Figures

1 Regional Location....5
2 Project Location Map....6
3 Tower Bridge and High Tower....7
4 Site Access Map....9
5 Project Detail....11
6 West Boat Launch Ramp Water Elevation Comparison....13
7 Main Boat Launch Ramp Water Elevation Comparison....14
8 Proposed Drawdown Scenario....15

## List of Tables

1-1 Discretionary Permits and Easements Potentially Required....18
2-1 Air Quality Data Summary (2016–2018) for Project Area....25
2-2 South Coast Air Basin Attainment Status (Los Angeles County)....26
2-3 Unmitigated Maximum Daily Regional Construction Emissions (pounds per day)....30
2-4 Mitigated Maximum Daily Regional Construction Emissions (pounds per day)....31
2-5 Proposed Project Unmitigated Localized Daily Construction Emissions....33
2-6 Potentially Occurring Special-Status Wildlife Species within Project Site....38
2-7 Previous Cultural Resources Investigations within a 0.5-Mile Radius of the Project Area....49
2-8 Estimated Project Construction Fuel Consumption....58
2-9 Los Angeles County Presumed Ambient Noise Levels....83
2-10 Los Angeles County Permissible Construction Equipment Noise at Receptor....84
2-11 Construction Equipment Noise Emission Levels....85

# ENVIRONMENTAL CHECKLIST

## Initial Study

1. **Project Title:** Castaic Dam High Intake Tower Bridge Retrofit Project
2. **Lead Agency Name and Address:** California Department of Water Resources 1416 9th Street, Sacramento, CA 95814
3. **Contact Person and Phone Number:** Gina Radieve, Senior Environmental Scientist (916) 651-2458
4. **Project Location:** Castaic Lake State Recreation Area (Figure 1)
5. **Project Sponsor's Name and Address:** Same as Lead Agency
6. **General Plan Designation(s):** Water (OS-W) and Open Space-Parks and Recreation (OS-PR)
7. **Zoning:** Open Space
8. **Description of Project:** (Describe the whole action involved, including but not limited to later phases of the project, and any secondary, support, or off-site features necessary for its implementation. Attach additional sheets if necessary.)

   See Section 1 below.

9. **Surrounding Land Uses and Setting.** (Briefly describe the project's surroundings.)

   The project is surrounded by open space to the west, north, and east. To the south and southwest is the lower lake recreational area and the community of Castaic, respectively.

10. **Other public agencies whose approval is required** (e.g., permits, financing approval, or participation agreement.)

    - U.S Army Corps of Engineers; 404 Nationwide Permit
    - Regional Water Quality Control Board; 401 certification
    - California Department of Fish and Wildlife; 1602 Streambed Alteration Agreement
    - Los Angeles County Department of Parks and Recreation
    - California Department of Parks and Recreation

**11. Have California Native American tribes traditionally and culturally affiliated with the project area requested consultation pursuant to Public Resources Code section 21080.3.1? If so, is there a plan for consultation that includes, for example, the determination of significance of impacts to tribal cultural resources, procedures regarding confidentiality, etc.?**

DWR as the CEQA Lead Agency sent AB 52 consultation notification letters via certified mail on November 12, 2019 to three Native American groups affiliated with the proposed project's geographic area including the Fernandeño Tataviam Band of Mission Indians (FTBMI), the San Manuel Band of Mission Indians (San Manuel), and the Tongva Ancestral Territorial Tribal Nation (Tongva). The FTBMI requested consultation. The San Manuel declined consultation and the Tongva did not respond to the notification letter. Consultation with the FTBMI resulted in the identification of tribal cultural resources, none of which would be directly impacted by project activities. DWR and FTBMI consulted on the development of mitigation measures to reduce potential indirect impacts to such resources. With implementation of the agreed upon mitigation measures, impacts to tribal cultural resources would be less than significant.

# CASTAIC DAM HIGH INTAKE TOWER BRIDGE RETROFIT PROJECT

Initial Study/Mitigated Negative Declaration

## 1.0 Project Description

### 1.1 Introduction

The Department of Water Resources (DWR) is proposing to implement the proposed Castaic Dam High Intake Tower Bridge Retrofit Project (project) to seismically retrofit the high tower bridge at Castaic Lake, the terminal reservoir of the State Water Project's (SWP's) West Branch, located in Los Angeles County. This section describes the location of the proposed project, identifies project objectives, presents the project description, and briefly describes proposed construction methods.

### 1.2 Project Location

Castaic Lake is located approximately 41 miles northeast of downtown Los Angeles within the Sierra Pelona Mountains, north of Santa Clarita along the Interstate 5 (I-5) freeway (**Figure 1**). As shown in **Figure 2**, Castaic Lake consists of two distinct "arms," referred to as the Ski Arm and the Fish Arm, with Castaic Dam located at the southern end of the reservoir. A separate impoundment (Elderberry Forebay) is located at the northern end of the Ski Arm and is segregated by Elderberry Dam. Figure 2 also shows the locations of the West Boat Launch Ramp and the Main Boat Launch Ramp, which provide recreational boating access to the lake. The Castaic Dam High Intake Tower Bridge (tower bridge) and the Castaic Dam High Intake Tower (high tower) are located within the southwestern portion of the lake on Castaic Dam's right abutment.

### 1.3 Project Background and Purpose

The typical summertime surface elevation of Castaic Lake fluctuates around 1,505 feet above mean sea level (amsl), with a surface area of approximately 2,200 acres and a storage capacity of approximately 324,000-acre feet of water. Castaic Lake's earthen dam construction was completed in 1974 in the Castaic Creek Basin as part of the SWP, a water supply and conveyance system operated by DWR that includes 26 dams and reservoirs, 20 pumping plants, 4 pumping-generating plants, 5 hydroelectric power plants, and more than 700 miles of canals and pipelines. Castaic Lake supplies domestic water to Southern California. Water is supplied to Castaic Lake from Elderberry Forebay, via Angeles Tunnel, an approximately 7-mile aqueduct from Pyramid

Lake, located to the north of Castaic Lake. The water supplied through Elderberry Forebay at the northern end of the lake's Ski Arm is operated by the Los Angeles Department of Water and Power (LADWP).

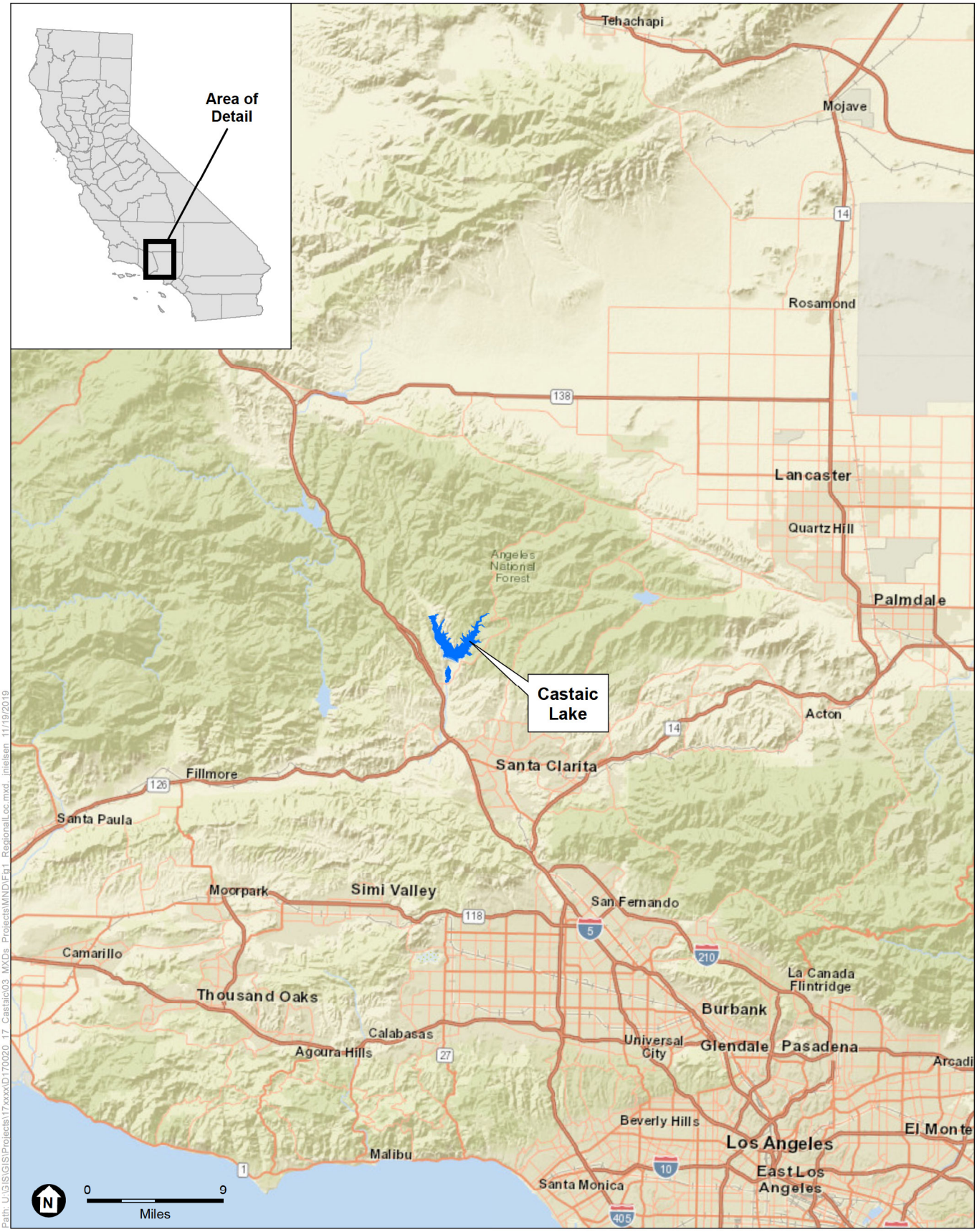
Located on the right side of Castaic Dam, the high tower allows for water from various depth elevations to be discharged in a controlled manner from Castaic Lake. Water from the high tower discharges through the outlet tunnel to the Castaic Lagoon downstream of the lake, or primarily for water deliveries to the State Water Contractors (SWC). To prevent potential clogging of the outlet tunnel in the event the high tower collapses, a large debris screen—commonly called "grizzly"—is proposed to be installed on the interior of the intake tower.

The tower bridge allows for maintenance and operations crews to access the high tower and ensure that the tower continues to function as intended. The high tower and tower bridge were designed in the 1960s and constructed in the late 1960s through the early 1970s. The tower bridge is elevated from the lake bottom by the high tower (Abutment 1), three piers (Piers 2, 3, and 4), and the lakeshore abutment (Abutment 5), as shown on **Figure 3**.

During the 1994 Northridge earthquake, the tower bridge experienced a permanent longitudinal displacement of 2.5 inches. As a result of this damage, the tower bridge required repairs and was retrofitted in 1998. The retrofit measures were implemented to ensure the tower bridge would withstand future earthquake events. However, even with the previous retrofits, it has been determined that the tower bridge requires additional retrofits to make it more robust to handle larger earthquake events. Piers 2 through 4 and Abutment 5 require the footings to be jacketed and strengthened. This would require temporarily lowering the lake level to access the bridge's pier footings.

Castaic Lake is one of the SWP's largest recreational lakes and provides emergency storage in the event of a shutdown of the SWP in Northern California. The lake is within the Castaic Lake State Park Recreation Area, which is currently operated by the County of Los Angeles Parks and Recreation. The lake is a popular recreation area with recreational uses, including swimming, boating, water skiing, and fishing. Numerous public and private fishing competition events are held at the lake each year, with a sport fishery that includes rainbow trout, large-mouthed bass, and bluegill. The lake is regularly stocked with rainbow trout by the California Department of Fish and Wildlife (CDFW).

The annual water level at Castaic Lake fluctuates seasonally, with the highest lake surface elevations occurring in the summer and fall, dropping during the winter and spring by approximately 20 feet to 1,485 feet amsl. The shorelines are generally steep with a few small coves. Aquatic vegetation is generally lacking due to water level fluctuations.

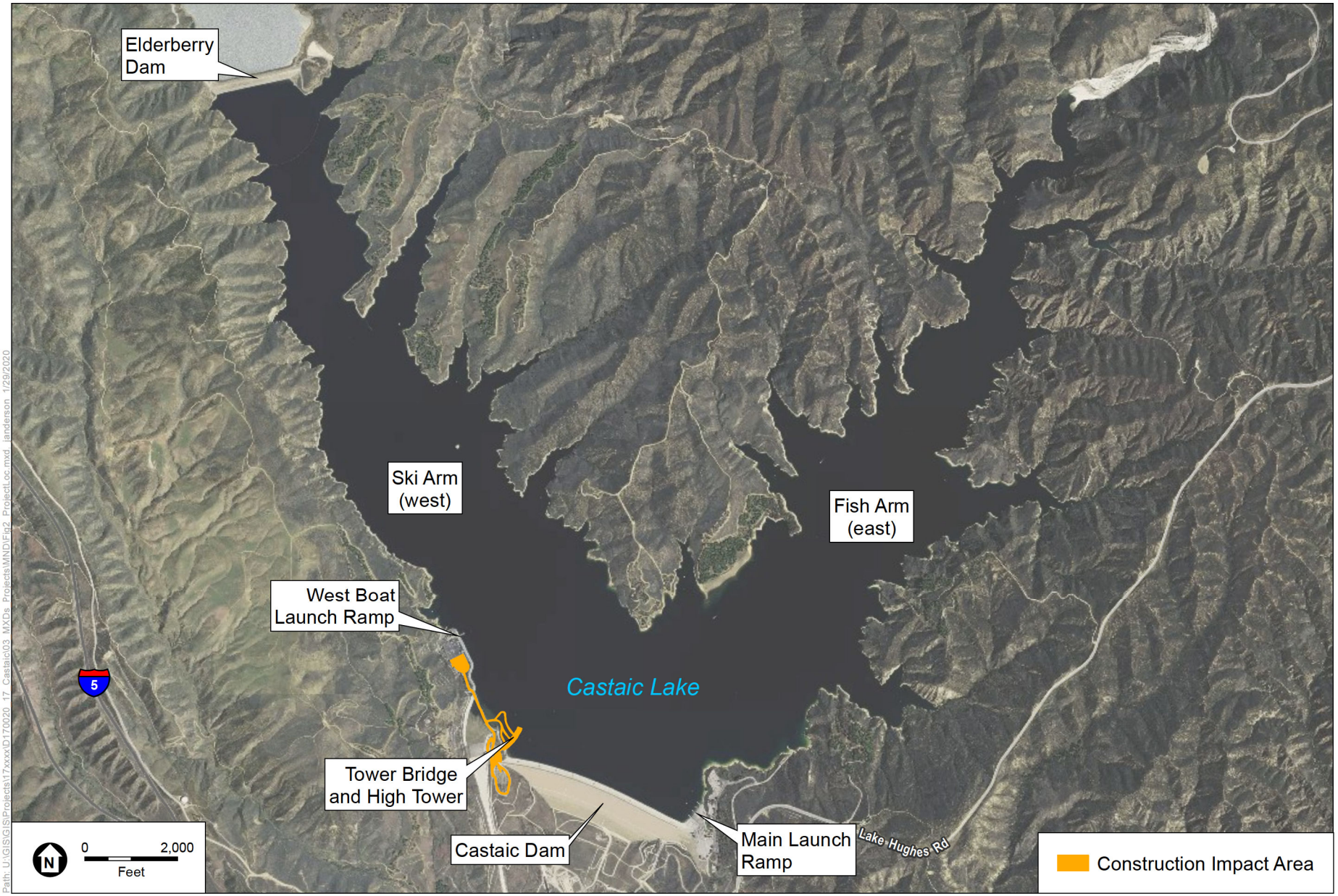



SOURCE: ESRI

Castaic Dam High Intake Tower Bridge Retrofit Project

**Figure 1**
Regional Location

ESA



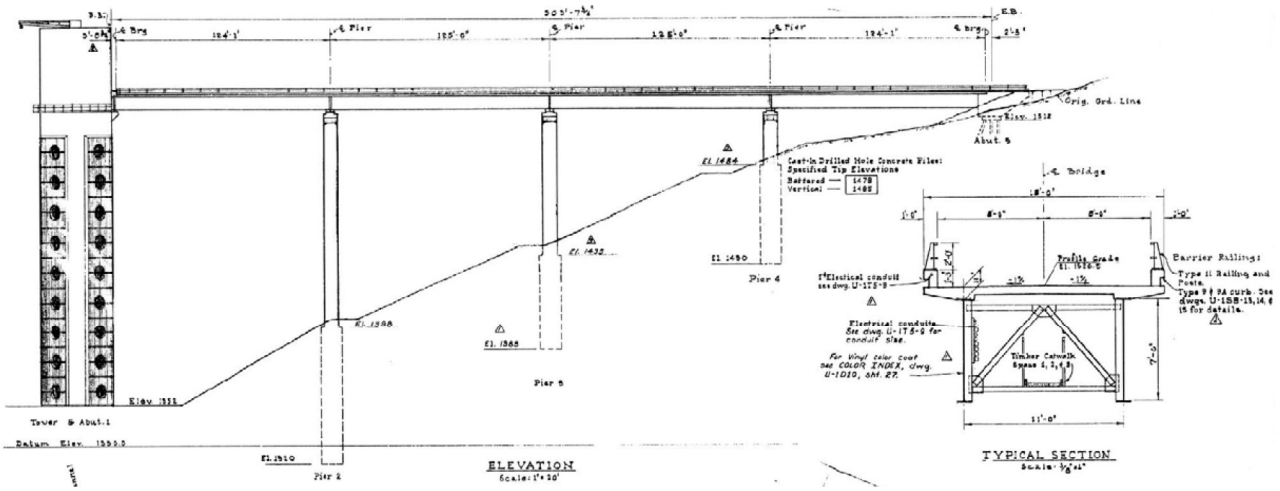

SOURCE: Mapbox

Castaic Dam High Intake Tower Bridge Retrofit Project

**Figure 2**
Project Location Map

ESA

Castaic Dam High Tower Bridge




High Tower Bridge Elevation

SOURCE: Department of Water Resources, 2019

Castaic Dam High Intake Tower Bridge Retrofit Project

**Figure 3**
High Tower Bridge

ESA

LAX\17xxxx\D170020.00 - DWR SoCal On-Call for Env Services\01 Active Contract Tasks\D170020.17_Castaic\05 Graphics-GIS-Modeling\Illustrator

## 1.4 Project Objectives

The objectives of the proposed project are to retrofit the tower bridge to make it more seismically safe for continued use after a significant seismic event (up to 200-year return period) and to screen out large debris from potentially clogging the high tower outlet tunnel.

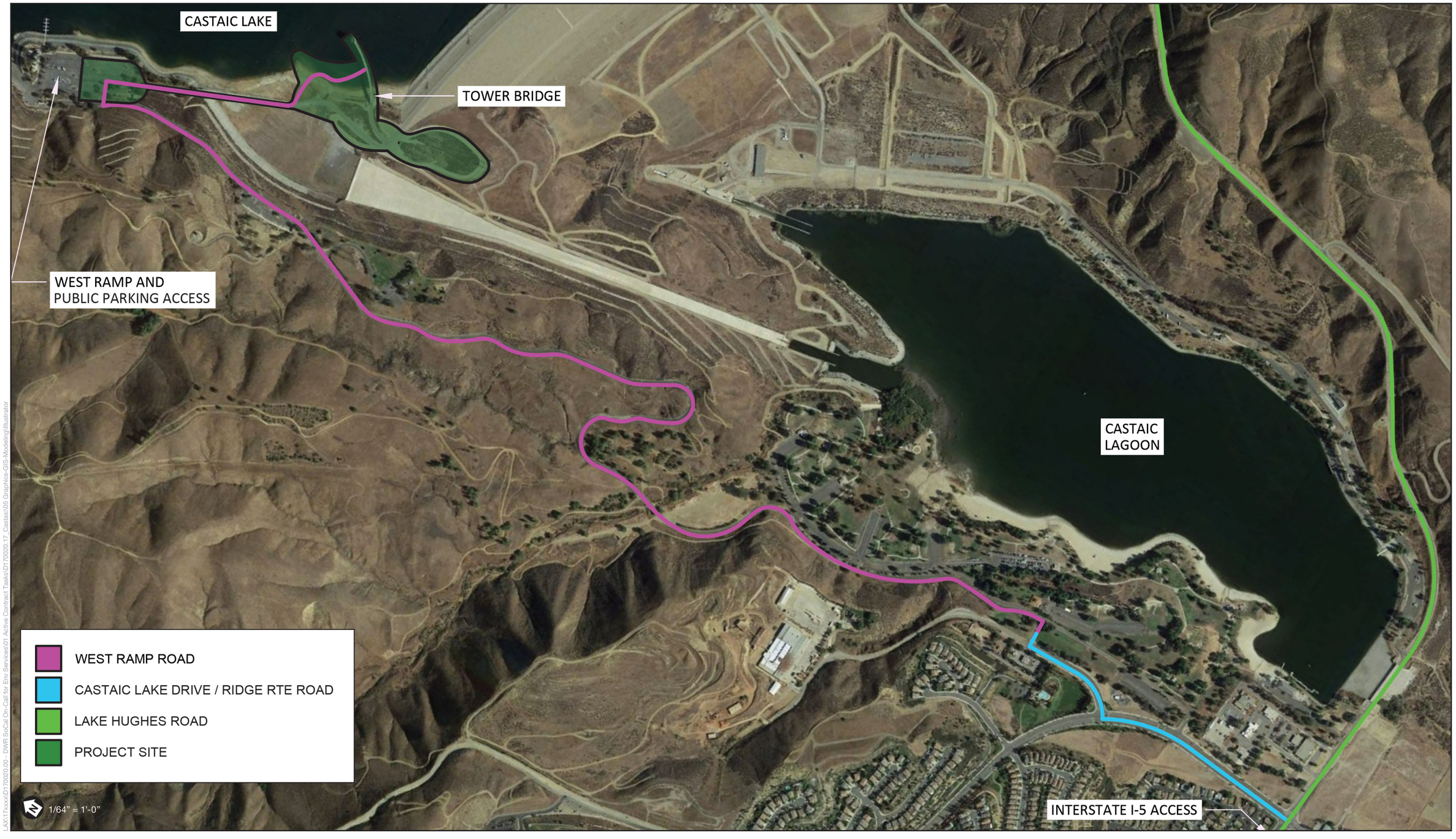
## 1.5 Project Description

Construction would occur at the tower bridge, high tower abutment, Piers 2 through 4, and Abutment 5. The tower bridge retrofits include installing restrainer cables to transfer longitudinal seismic forces to the adjacent spans or frames, retainer and catcher blocks of the tower bridge, and carbon fiber reinforcement jacketing of the piers. Carbon fiber reinforcement is an extremely strong and lightweight carbon-fiber-reinforced plastic. Each pier jacket would strengthen the pier structure to further withstand a large seismic event. It is anticipated that construction activities would take approximately 6 weeks to retrofit each pier. Once retrofitting of the piers are complete, the lake water level would return to normal conditions. The work on the tower bridge is independent of the pier work and would not be dependent on the lake drawdown schedule (described below).

In addition, a large screen, or grizzly, is proposed to be installed inside the high tower. These screens are intended to prevent large debris from blocking the outlet tunnel in the event that the tower collapses during a large seismic event. The grizzly is a preventative measure recommended by the state dam regulator, Division of Safety of Dams (DSOD).

The project work area would be accessed from I-5 along Lake Hughes Road to Ridge Route Road to Castaic Lake Drive to West Ramp Road, which ends at the West Boat Launch Ramp parking lot (**Figure 4**). Access to each pier would be provided by new access roads with spurs to each pier within the exposed lake bed. Access roads would be composed of native material and may be surfaced with gravel; they would not require concrete or asphalt surfacing. See **Figure 5** for a depiction of staging areas and proposed temporary access roads.

The West Boat Launch Ramp extends to an elevation of 1,435 feet at the lowest point, and as a result would be closed during a portion of the proposed lake level drawdown during project activities (**Figure 6**). During the construction period, portions of the West Boat Launch Ramp parking area would be closed to the public to accommodate haul traffic and staging. The Main Boat Launch Ramp would continue to operate throughout the project, but at a limited capacity at lower levels in Castaic Lake, as shown in **Figure 7**. DWR would coordinate regularly with Los Angeles County to communicate the lake level fluctuation schedule and to implement and monitor the parking area and boat ramp access restrictions. The water level fluctuation is not expected to disrupt operations at the Castaic Lake Power Plant. DWR would communicate the proposed schedule of the lake lowering to LADWP in advance.




LAX\17xxxx\D170020.00 - DWR SoCal On-Call for Env Services\01 Active Contract Tasks\D1 700020.17_Castaic\05 Graphics-GIS-Modeling\Illustrator

SOURCE: Stantec, 2020

Castaic Dam High Intake Tower Bridge Retrofit Project

**Figure 4**
Site Access Map

ESA

This page intentionally left blank

SOURCE: Google Earth, 2018

Castaic Dam High Intake Tower Bridge Retrofit Project

**Figure 5**
Project Detail

ESA

This page intentionally left blank

Path: U:\GIS\GIS\Projects\17xxxx\D170020_17 Castaic\03_MXDs Projects\MND\Fig6 West Ramp Compare.mxd jnielsen 1/28/2020

SOURCE: ESRI, 2019, ESA, 2019.

Castaic Dam High Intake Tower Bridge Retrofit Project

**Figure 6**
West Boat Launch Ramp Water Elevation Comparison

ESA

Path: U:\GIS\GIS\Projects\17xxxx\D170020_17_Castaic\03_MXDs_Projects\MND\Fig7_East_Ramp_Compare.mxd, jnielsen, 1/28/2020

SOURCE: ESRI, 2019, ESA, 2019.

Castaic Dam High Intake Tower Bridge Retrofit Project

**Figure 7**
Main Boat Launch Ramp Water Elevation Comparison

ESA

To access the pier footings, the lake's surface elevation would be lowered from the normal operation elevation of approximately 1,505 feet amsl to 1,380 feet amsl. Pier 2 is the largest of the three piers and is located in the deepest portion of the lake of any of the piers being worked on during this project (Figure 3). The drawdown would take approximately 5 months to lower the water surface elevation to 1,380 feet amsl, beginning around June 2021 and reaching the elevation of 1,380 feet amsl by November 1, 2021. The lake would remain at the lowered level through December 15, 2021, at which time refilling of the lake would begin. The lake would return to its normal operating elevation (1,505 feet) around April 2022. The duration of the drawdown and refilling of the lake would encompass approximately 10 months. **Figure 8** illustrates the proposed lake elevation over the course of the drawdown/refilling of the lake.

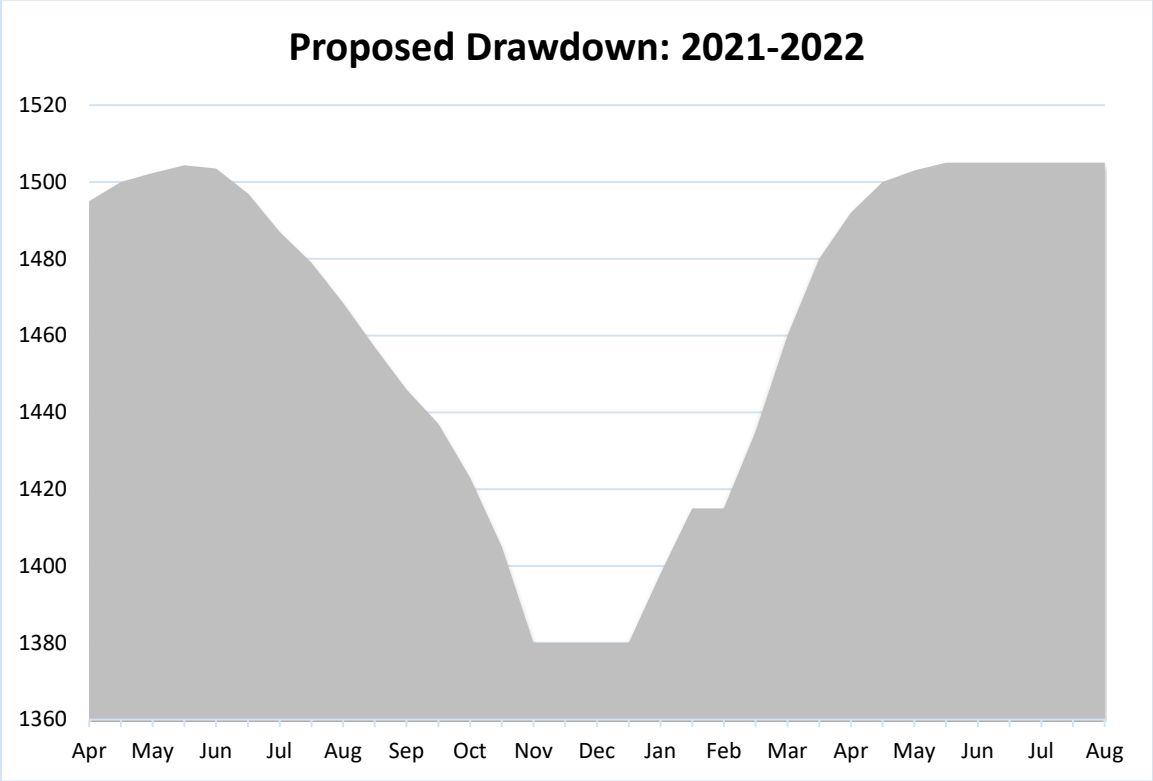



**Figure 8**
Proposed Drawdown Scenario

## 1.6 Project Construction

### Tower Bridge Modifications

Structural modifications and replacements would be required to retrofit the abutment, piers, and tower bridge. Modification or replacement of the steel diaphragm braces between the girders at each end of all four spans would occur. The work on the steel diaphragm braces would involve removing the existing braces by unbolting the existing connections and replacing them with new, shop-fabricated steel braces installed by bolting into place. Minor amounts of field welding and/or touch-up painting at the connections may be required. Bearing pad replacement at the top of the columns would require jacking and shoring of the tower bridge to lift it off the existing

steel bridge bearings, removal of the existing bearings, minor concrete demolition using hand-held jackhammers, placement of formwork, reinforcing steel, steel dowels, and concrete. Work at the top of the columns to retrofit the support bearings and steel braces would require the installation of temporary scaffolding and/or the use of floating work platforms to gain access for the work. Temporary scaffolding would be attached to the existing column cap and/or suspended from the existing concrete deck of the tower bridge. Similar scaffolding would also be required at the high tower end of the tower bridge for work on the support bearings at the high tower abutment seat. Work on the support bearings at the land-side abutment would be performed from the existing ground, and would not require the use of scaffolding. Retrofit of the existing bearings would involve removal and replacement of the existing steel roller bearings with elastomeric pads designed to safely accommodate the anticipated large seismic movements. Concrete shear keys would be constructed to prevent unseating of the tower bridge in the transverse direction, and concrete catcher blocks would be constructed to support the tower bridge in the event of excessive longitudinal movement.

## Pier Modifications

The tower bridge retrofit work would occur while the lake is being drawn down. Work on Piers 2 through Pier 4, and high tower abutment, would commence as the water level drops, ultimately reaching 1,380 feet amsl, the level required to complete work on Pier 2. Once the soils have dried sufficiently, access roads would be constructed and soils around each pier would be excavated to the top of the pile shaft. Approximately 2,750 cubic yards of soil would be removed and temporarily stored at a nearby staging area. Light (30-pound) jackhammers would be used to roughen the surface of existing concrete on abutments where new concrete would be placed. Power washing on piers could be conducted one of two ways, with a hydroblasting wall tool providing a necessary surface profile to collect all the debris and/or sponge blasting where all the debris is collected in a sponge. Debris and water would be contained and would not enter the lake with both power-washing methods.

Once the surface of the piers are primed, carbon-fiber fabric saturated with epoxy would be wrapped around the piers and allowed to cure completely. The piers would be jacketed to their full height by wrapping them with carbon-fiber reinforced polymer by specialty contractors trained in the process of carbon fiber application. Wrapping the concrete columns may involve the use of a manlift to access the full height of the columns, or may be done by semi-automated machinery which is self-supporting, either from the ground, or by being suspended from the top of the columns. Work on the columns may require the contractor to construct temporary roads down the sloped side of the reservoir to access the bottom of each column. At the base of each column, a level work area would be benched into the slope for setting up tools, material and equipment necessary for the column wrapping work. Upon completion of the column work, the benched work areas and temporary access roads would be backfilled and graded to re-establish the original slope of the reservoir. Construction of the access roads may be accomplished by either excavating the roads into the hillside (benching), placing fill, or a combination of both. This may require hauling and temporarily stockpiling of spoils from excavating the roads and work area benches, and/or hauling temporary fill materials into and back out of the work area (temporary import and removal at the end of construction). This would depend on the capabilities

and equipment of the specific contractor who performs the work. Once the carbon fiber jackets have been applied and the epoxy has cured, the excavated soil would be backfilled. No soil would be exported off-site.

Once the retrofit is completed, the Castaic Lake would be re-filled to normal operating levels, and the retrofitted piers would be partially submerged. The tower bridge, high tower, existing roadways, temporary roadways and staging areas would be returned to pre-project conditions.

## Staging Areas and Preliminary Activities

While the site preparation and staging areas would be developed surrounding the tower bridge and high tower. Construction staging areas would only be located in unvegetated areas. These construction areas may require clearing of debris and/or large rocks using bulldozers and other ground-clearing equipment. Existing paved and dirt roads would be used for hauling and transporting materials within the project area (Figure 5).

During construction, several staging areas would be located around the project site. As shown in Figure 5, staging areas would likely be located within or near the West Boat Launch Ramp parking lot within previously disturbed, unvegetated areas. Ingress and egress areas would be delineated, fenced, or marked so that the surrounding areas would not be impacted.

Typical construction-related activities within the staging areas include the following:

- Stockpiling material
- Storage/staging of carbon fiber application product and materials
- Storage/staging of other products and materials for the tower bridge retrofit
- Delivery of fuel and fueling/maintenance of construction equipment (daily)
- Construction administration and meetings (project trailers) (daily)
- Worker restrooms
- Visitor parking and sign-in area
- Temporary storage for other equipment and materials (scaffolding, etc.) (daily)

The retrofit work would generally involve the use of portable generators, air compressors, welding machines, and manlifts; one or more cranes, forklifts, and trucks to deliver and move materials on-site; ready-mix concrete trucks and a trailer-mounted or boom-equipped concrete pump to deliver and place concrete for the work at the top of the columns and at the high tower abutment seat. Construction and restoration of the benched work areas and temporary access roads may involve the use of tracked bulldozers and excavators, loaders, compactors, motor graders, water trucks, and/or dump trucks.

## Construction Schedule

Overall project construction is anticipated to take approximately 15 months. Construction work on the tower bridge and abutment would last approximately 6 months, and work at each pier

would last up to 6 weeks each, and approximately 4 months' duration for the installation of the grizzly inside the high tower. The proposed drawdown schedule is shown on Figure 8, and would last approximately 10 months. Construction work hours would generally range between 7:00 a.m. to 7:00 p.m., Monday through Friday. Nighttime construction is not anticipated.

## 1.7 Operation and Maintenance Characteristics

Once constructed, existing staff would operate and maintain the high tower by utilizing the tower bridge similar to existing conditions. Routine inspection of the tower bridge piers would be conducted periodically.

## 1.8 Project Approvals

**Table 1-1** presents a preliminary list of the agencies and entities, in addition to DWR, that would use this Draft Initial Study/Mitigated Negative Declaration (IS/MND) in their consideration of specific permits and other discretionary approvals that may apply to the proposed project. This Draft IS/MND is intended to provide these agencies with information to support their decision-making processes. The table also lists the types of activities that would be subject to these requirements.

**TABLE 1-1**
**DISCRETIONARY PERMITS AND EASEMENTS POTENTIALLY REQUIRED**

| Agency | Permits and Authorizations Required | Activities Subject to Regulations |
|---|---|---|
| Regional Water Quality Control Board | Construction General Permit, NPDES Permit Storm Water Pollution Prevention Plan | Control runoff from construction sites |
| | 401 Water Quality Certification | Discharge of dredge or fill material into waters of the U.S. |
| U.S Army Corps of Engineers | Section 404 Permit | Discharge of dredge or fill material into waters of the U.S. |
| California Department of Fish and Wildlife | Lake or Streambed Alteration Agreement (Section 1602 of Fish and Game Code) | Any activity that may substantially modify a river, stream, or lake |
| Los Angeles County Department of Parks and Recreation | Right-of-Entry Permit | Access through, or use of, LA County property. |

DocuSign Envelope ID: 1B360BC6-BDE8-4D29-8FA5-37D57016E49B



# 2.0 Environmental Factors Potentially Affected

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

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

## DETERMINATION: (To be completed by the Lead Agency)

On the basis of this initial study:

☐ 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.

Jeanette Kuttel — 4/9/2020

Signature Chief, DOE — Date

Signature — Date

# 2.1 Aesthetics

| *Issues (and Supporting Information Sources):* | *Potentially Significant Impact* | *Less Than Significant with Mitigation Incorporated* | *Less Than Significant Impact* | *No Impact* |
|---|---|---|---|---|
| **AESTHETICS —** Except as provided in Public Resources Code Section 21099, would the project: | | | | |
| a) Have a 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 daytime or nighttime views in the area? | ☐ | ☐ | ☐ | ☒ |

## Discussion

a) **Less than Significant Impact.** The Santa Clarita Valley Area Plan (SCVA Plan) Conservation and Open Space Element lists Castaic Lake as one of the Plan Area's scenic resources (LACDRP, 2012). Several scenic viewpoints, characterized by unpaved turnouts along the southbound shoulder of Lake Hughes Road, provide cars, bikers, and hikers with elevated views of the Upper Lake, Lower Lake, and National Forest lands surrounding the Castaic Lake State Recreation Area (SRA). Lake Hughes Road is the road primarily used by the public to access the SRA; it extends east from U.S. Highway 5, wraps around the southern end of the Lower Lake, and climbs a ridge on the east side of the Upper Lake. Although scenic viewpoints would not be altered or otherwise directly impacted by the proposed project, the quality of scenic views typically enjoyed by recreational visitors from these viewpoints would be temporarily diminished during retrofitting of the tower bridge due to reduced water levels. As project activity progresses, views of the lake would begin to show a reduced water surface, an exposed lakebed, dry or wet dirt where shorelines have receded, excavated soil, and construction vehicles, equipment, and staging areas. However, the drawdown of the lake would occur gradually. During the peak drawdown, the lake would look similar to past drought conditions that have occurred in the last 10 years. Views of the lake during the peak drawdown would still be available but would include a smaller surface water footprint for approximately 10 months. Construction staging areas would be confined to the West Boat Launch Ramp parking lot and on the west dam abutment (Figure 4). Once the rehabilitation of Pier 2 is completed, the lake would be slowly refilled. The conditions in the lake would gradually return to normal operating conditions as each pier is retrofitted. The temporary lowering of the lake would not eliminate or remove views, but rather it would change the appearance of the lake similar to past drought conditions. Once

construction is completed the lake would be returned to existing conditions. Therefore, impacts to scenic vistas in the SRA would be less than significant.

b) **No Impact.** Construction for the proposed project would include seismic upgrades to an existing tower bridge and would not impact any scenic resources, including trees, rock outcropping, or historic buildings. In addition, there are no state designated scenic highway within the vicinity of the project. No impacts would occur.

c) **Less than Significant Impact.** Proposed construction activities include the tower bridge retrofit, lake drawdown, lakebed excavation, tower bridge pier retrofitting, and construction equipment/vehicle staging. Construction activities associated with the proposed project would result in short-term impacts to the visual character and quality of the project area. Construction activities would require the use of construction equipment and storage of materials within the project sites. Excavated areas, stockpiled soils, and other materials generated during construction could impact the visual character of the surrounding environment. During the drawdown period, there would be a visual ring around the lake where the newly exposed lakebed would differ in color than the current dry lakeshore. In addition, the lake's surface area would be smaller. However, these visual changes would be similar to the lake conditions during past drought years. These impacts would be temporary, occurring over the 15.5-month construction period, and would not permanently affect the existing visual character of the lake or surrounding area. Once construction is completed, all project areas would return to pre-project conditions and water levels would return to normal operating levels. Therefore, impacts to the visual character and quality of public views of the project area would be less than significant.

d) **No Impact.** Construction work hours for the proposed project would generally range from 7:00 A.M. to 7:00 P.M., Monday through Friday, and no nighttime construction is anticipated. Once retrofitted, the proposed project would not add reflective materials to the tower bridge or piers and no new security or nighttime lighting would be required. Therefore, no new sources of light or glare would be introduced to the project area and no impact would occur.

## References

Castaic Lake Main Reservoir Trails Map. Castaic Lake Web Site. Available at: http://www.castaiclake.com/map_trails.html. Accessed October 16, 2019.

Los Angeles County Department of Regional Planning, 2012. *Santa Clarita Valley Area Plan: One Valley Vision 2012*. Available at: http://planning.lacounty.gov/assets/upl/project/ovov_2012-fulldoc.pdf. Accessed October 10, 2019.

# 2.2 Agriculture and Forestry Resources

| *Issues (and Supporting Information Sources):* | *Potentially Significant Impact* | *Less Than Significant with Mitigation Incorporated* | *Less Than Significant Impact* | *No Impact* |
|---|---|---|---|---|
| **AGRICULTURE AND FORESTRY RESOURCES —** In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. Would the project: | | | | |
| 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? | ☐ | ☐ | ☐ | ☒ |

## Discussion

a) **No Impact.** According to the California Department of Conservation (DOC), Prime Farmland is land which has the best combination of physical and chemical features able to sustain long term agricultural production. This land has the soil quality, growing season, and moisture supply needed to produce sustained high yields. Land must have been used for irrigated agricultural production at some time during the four years prior to the mapping date (DOC, 2019).

The proposed project is not located within an area designated as Prime Farmland, Unique Farmland, or Farmland of Statewide importance according to Farmland Mapping and Monitoring Program maps prepared for Los Angeles County by the DOC. According to DOC, the project area includes Water and Urban and Built-Up Land, and lands surrounding the project area include Grazing Land, Urban and Built-Up Land, and the Angeles National Forest (DOC, 2017). Therefore, the proposed project would not result in conversion of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance. No impact would occur.

b) **No Impact.** The SCVA Plan zones the Castaic Lake SRA, which includes the proposed project area, as Open Space (LACDRP, 2012). There are no lands within the project area that are zoned for agricultural use, and the proposed project would not be implemented on lands protected by a California Land Conservation Act (Williamson Act) Contract. No impacts to agricultural use, agricultural use zoning, or lands protected by the Williamson Act would occur.

c,d,e) **No Impact.** There are no lands within the project area that are zoned for agricultural use, forest land, timberland, or timberland zoned for timberland production. The drawdown and construction activity for the proposed project would not require or involve construction of any new facilities on nearby Angeles National Forest lands which border the Castaic Lake Fish Arm. Therefore, the proposed project would not result in changes to the existing environment that could result in conversion or rezoning of agricultural land, forest land, timberland, or timberland zoned for timberland production. No impact would occur.

## References

California Department of Conservation (DOC), 2017. *Los Angeles County Important Farmland 2016* Map. Available at: ftp://ftp.consrv.ca.gov/pub/dlrp/FMMP/pdf/2016/los16.pdf. Accessed October 10, 2019

DOC, 2019. Important Farmland Categories. Available at: https://www.conservation.ca.gov/dlrp/fmmp/Pages/Important-Farmland-Categories.aspx. Accessed October 10, 2019.

Los Angeles County Department of Regional Planning (LACDRP), 2012. *Santa Clarita Valley Area Plan: One Valley One Vision 2012*. Available at: http://planning.lacounty.gov/assets/upl/project/ovov_2012-fulldoc.pdf. Accessed October 10, 2019.

# 2.3 Air Quality

| Issues (and Supporting Information Sources): | Potentially Significant Impact | Less Than Significant with Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| **AIR QUALITY —** Where available, the significance criteria established by the applicable air quality management district or air pollution control district may be relied upon to make the following determinations. Would the project: | | | | |
| 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? | ☐ | ☐ | ☒ | ☐ |

## Discussion

The project area is located in Castaic Lake approximately 41 miles northeast of downtown Los Angeles within the Sierra Pelona Mountains near Castaic, which is an unincorporated community and census-designated place located in the northern part of Los Angeles County and within the South Coast Air Basin (SCAB). The SCAB is under the jurisdiction of the South Coast Air Quality Management District (SCAQMD). The SCAB is a 6,600-square-mile coastal plain bounded by the Pacific Ocean to the southwest and the San Gabriel, San Bernardino, and San Jacinto Mountains to the north and east. The SCAB includes the non-desert portions of Los Angeles, Riverside, and San Bernardino Counties, and all of Orange County.

The ambient concentrations of air pollutants are determined by the amount of emissions released by sources and the atmosphere's ability to transport and dilute such emissions. Natural factors that affect transport and dilution include terrain, wind, atmospheric stability, and sunlight. Therefore, existing air quality conditions in the area are determined by such natural factors as topography, meteorology, and climate, in addition to the amount of emissions released by existing air pollutant sources.

### *Existing Air Quality*

The proposed project area is located in the San Gabriel Mountains Air Monitoring Subregions. Currently, the nearest monitoring station to the project site is the Santa Clarita Station (22224 Placerita Canyon Rd Santa Clarita, CA 91321), which is located approximately 11 miles southwest of the project area. This station monitors ambient concentrations of carbon monoxide (CO), ozone ($O_3$), nitrogen dioxide ($NO_2$), and respirable particulate matter (PM10), but does not monitor sulfur dioxide ($SO_2$), or fine particulate matter (PM2.5).

The nearest monitoring station that monitors PM2.5 is the West San Fernando Station located at 18330 Gault St in the City of Reseda, which is approximately 23 miles south of the proposed project area. The nearest monitoring station that monitors ambient concentrations of $SO_2$ is the

Central Los Angeles Station located at 1630 North Main Street in the City of Los Angeles, which is approximately 38 miles southwest of the proposed project. Historical data of ambient ozone, $NO_2$, $SO_2$, CO, and PM10 and PM2.5 concentrations from the applicable monitoring stations for the most recent 3 years of available data (2016–2018) are shown in **Table 2-1**.

Both the California Air Resources Board (CARB) and United States Environmental Protection Agency (USEPA) use this type of monitoring data to designate areas according to their attainment status for criteria air pollutants. The purpose of these designations is to identify the areas with air quality problems and thereby initiate planning efforts for improvement. The three basic designation categories are nonattainment, attainment, and unclassified. Unclassified is used in an area that cannot be classified on the basis of available information as meeting or not meeting the standards. In addition, the California designations include a subcategory of nonattainment-transitional, which is given to nonattainment areas that are progressing and nearing attainment. The current attainment status for the Los Angeles County portion of the SCAB is provided in **Table 2-2**.

**TABLE 2-1**
**AIR QUALITY DATA SUMMARY (2016–2018) FOR PROJECT AREA**

| | | Monitoring Data by Year | | |
|---|---|---|---|---|
| **Pollutant** | **Standard[a]** | **2016** | **2017** | **2018** |
| **Ozone – Santa Clarita Valley** | | | | |
| Highest 1 Hour Average (ppm) | | 0.130 | 0.151 | 0.132 |
| Days over State Standard | 0.09 ppm | 29 | 45 | 21 |
| Highest 8 Hour Average (ppm) | | 0.115 | 0.128 | 0.106 |
| Days over National Standard | 0.070 ppm | 57 | 73 | 42 |
| Days over State Standard | 0.070 ppm | 59 | 73 | 42 |
| **Carbon Monoxide – Santa Clarita Valley** | | | | |
| Highest 8 Hour Average (ppm) | | 1.1 | 0.8 | 0.8 |
| Days over National Standard | 9.0 ppm | 0 | 0 | 0 |
| Days over State Standard | 9.0 ppm | 0 | 0 | 0 |
| **Nitrogen Dioxide – Santa Clarita Valley** | | | | |
| Highest 1 Hour Average (ppm) | | 0.0464 | 0.0576 | 0.0589 |
| Days over National Standard | 0.100 ppm | 0 | 0 | 0 |
| Days over State Standard | 0.18 ppm | 0 | 0 | 0 |
| Annual Average (ppm) | | 0.0102 | 0.0105 | 0.0109 |
| Days over National Standard | 0.053 ppm | 0 | 0 | 0 |
| Days over State Standard | 0.030 ppm | 0 | 0 | 0 |
| **Sulfur Dioxide – Central LA** | | | | |
| Highest 1-Hour Average (ppm) | | 0.0134 | 0.0057 | 0.0179 |
| Days over State Standard | 0.25 ppm | 0 | 0 | 0 |

| Pollutant | Standard[a] | Monitoring Data by Year 2016 | 2017 | 2018 |
|---|---|---|---|---|
| **Particulate Matter (PM10) – Santa Clarita Valley** | | | | |
| Highest 24 Hour Average ($\mu g/m^3$)[b] | | 96 | 66 | 49 |
| Days over National Standard (measured)[c] | 150 $\mu g/m^3$ | 0 | 0 | 0 |
| Days over State Standard (measured)[c] | 50 $\mu g/m^3$ | 1 | 2 | 0 |
| Annual Average ($\mu g/m^3$)[b] | 20 $\mu g/m^3$ | 23.4 | 23.6 | 23.4 |
| **Particulate Matter (PM2.5) – West San Fernando Valley** | | | | |
| Highest 24 Hour Average ($\mu g/m^3$)[b] | | 30.1 | 35.2 | 31.0 |
| Days over National Standard (measured)[c] | 35 $\mu g/m^3$ | 0 | 0 | 0 |
| Annual Average ($\mu g/m^3$)[b] | 12 $\mu g/m^3$ | 9.23 | 9.70 | 10.32 |

NOTES:

ppm = parts per million; $\mu g/m^3$ = micrograms per cubic meter.
* = Insufficient data available to determine the value.

[a] Generally, state standards and national standards are not to be exceeded more than once per year.

[b] Concentrations and averages represent federal statistics. State and federal statistics may differ because of different sampling methods.

[c] Measurements are usually collected every 6 days. Days over the standard represent the measured number of days that the standard has been exceeded.

SOURCE: SCAQMD 2019a.

**TABLE 2-2**
**SOUTH COAST AIR BASIN ATTAINMENT STATUS (LOS ANGELES COUNTY)**

| Pollutant | National Standards (NAAQS) | California Standards (CAAQS) |
|---|---|---|
| $O_3$ (1-hour standard) | N/A [a] | Non-attainment – Extreme |
| $O_3$ (8-hour standard) | Non-attainment – Extreme | Non-attainment |
| CO | Attainment | Attainment |
| $NO_2$ | Attainment | Attainment |
| $SO_2$ | Attainment | Attainment |
| PM10 | Attainment | Non-attainment |
| PM2.5 | Non-attainment – Serious | Non-attainment |
| Lead (Pb) | Non-attainment (Partial) [b] | Attainment |

N/A = not applicable

[a] The NAAQS for 1-hour ozone was revoked on June 15, 2005, for all areas except Early Action Compact areas.

[b] Partial Non-attainment designation – Los Angeles County portion of the Air Basin only for near-source monitors.

SOURCE: USEPA, 2018. CARB, 2018.

a) **Less than Significant Impact.** The proposed project is located within the SCAB, which is under the jurisdiction of the SCAQMD. As such, SCAQMD's 2016 AQMP is the applicable air quality plan for the proposed project. Projects that are consistent with the regional population, housing, and employment forecasts identified by Southern California Association of Governments (SCAG) are considered to be consistent with the AQMP growth projections, since the forecast assumptions by SCAG forms the basis of the land

use and transportation control portions of the AQMP. Additionally, because SCAG's regional growth forecasts are based upon, among other things, land uses designated in general plans, a project that is consistent with the land use designated in a general plan would also be consistent with the SCAG's regional forecast projections, and thus also with the AQMP growth projections. The proposed project would not result in long-term residential or employment growth within the region.

Construction of the proposed project would result in an increase in short-term employment compared to existing conditions. Construction employees are typically employees of the construction firm and are not hired specifically for any one construction job. Being relatively small in number and temporary in nature, construction jobs under the project would not conflict with the long-term employment projections upon which the AQMP is based. Control strategies in the AQMP with potential applicability to short-term emissions from construction activities include strategies denoted in the 2016 AQMP as MOB-08 and MOB-10 and are intended to reduce emissions from on-road and off-road heavy-duty vehicles and equipment by accelerating replacement of older, emissions-prone engines with newer engines meeting more stringent emission standards. Construction contractors would be required to comply with the CARB Air Toxic Control Measure that limits heavy duty diesel motor vehicle idling to no more than five minutes at any given location. In addition, contractors would be required to comply with required and applicable Best Available Control Technology (BACT) and the CARB In-Use Off-Road Diesel Vehicle Regulation to use lower emitting equipment in accordance with the phased-in compliance schedule for equipment fleet operators. The project would not conflict with implementation of these strategies. In addition, as described in Section 1, *Project Description,* of this MND, project construction includes seismic retrofits of the tower bridge and of Piers 2 through 4, and Abutment 5, which would require the application of VOC-containing epoxy and coatings. The project would use commercially available epoxy and coatings that comply with applicable SCAQMD rules for VOC content. The project would also comply with SCAQMD regulations for controlling fugitive dust pursuant to SCAQMD Rule 403 (Fugitive Dust). Compliance with these requirements is consistent with and meets or exceeds the AQMP requirements for control strategies intended to reduce emissions from construction equipment and activities. Because the project would not conflict with the control strategies intended to reduce emissions from construction equipment, the project would not conflict with or obstruct implementation of the AQMP, and impacts would be less than significant with respect to construction activities.

The 2016 AQMP was prepared to accommodate growth, reduce the levels of pollutants within the areas under the jurisdiction of the SCAQMD, return clean air to the region, and minimize the impact on the economy. Projects that are considered consistent with the AQMP would not interfere with attainment because this growth is included in the projections used in the formulation of the AQMP. The proposed project represents an infrastructure project that would have no effect on long-term population and employment growth. The proposed project does not include residential or commercial development and its implementation is not forecasted to induce any additional growth within the

service area. As discussed in Section 1, *Project Description,* the proposed project is a bridge deck strengthening and seismic retrofitting project of the tower bridge to Castaic Lake's high tower. Therefore, the project would not conflict with growth projections in the AQMP. The project would not conflict with the growth projections in the AQMP, and impacts would be less than significant.

b) **Less than Significant with Mitigation.** A cumulative impact arises when two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts. Cumulative impacts can result from individually minor but collectively significant impacts, meaning that the proposed project's incremental effects must be viewed in connection with the effects of past, current, and probable future projects.

The project area is located within the SCAB, which is considered the cumulative study area for air quality. Because the SCAB is currently classified as a state nonattainment area for ozone, PM10, and PM2.5, cumulative developments consisting of the proposed project along with other past, present, and reasonably foreseeable future projects in the SCAB as a whole could violate an air quality standard or contribute to an existing or projected air quality violation. Based on SCAQMD's cumulative air quality impact methodology, SCAQMD recommends that if an individual project results in air emissions of criteria pollutants (volatile organic compounds [VOC], nitrogen oxides [$NO_X$], CO, $SO_X$, PM10, and PM2.5) that exceed the SCAQMD's recommended daily thresholds for project-specific impacts, then it would also result in a cumulatively considerable net increase of these criteria pollutants for which the proposed project region is in non-attainment under an applicable federal or state ambient air quality standard.

### *Construction*

Construction emissions are considered short term and temporary, but have the potential to represent a significant impact with respect to air quality. Particulate matter (i.e., PM10 and PM2.5) are among the pollutants of greatest localized concern with respect to construction activities. Particulate emissions from construction activities can lead to adverse health effects and nuisance concerns, such as reduced visibility and soiling of exposed surfaces. Particulate emissions can result from a variety of construction activities, including excavation, grading, demolition, vehicle travel on paved and unpaved surfaces, and vehicle and equipment exhaust. Construction emissions of PM10 and PM2.5 can vary greatly depending on the level of activity, the specific operations taking place, the number and types of equipment operated, local soil conditions, weather conditions, and the amount of earth disturbance.

Emissions of ozone precursors of VOC and $NO_X$ are primarily generated from mobile sources and vary as a function of vehicle trips per day associated with delivery of construction materials, the importing and exporting of soil, vendor trips, worker commute trips, and the types and number of heavy-duty, off-road equipment used and the intensity and frequency of their operation.

The maximum daily construction emissions for the proposed project were estimated using the California Emissions Estimator Model (CalEEMod) Version 2016.3.2, which is designed to model construction emissions for land use development projects based on building size, land use and type, and disturbed acreage, and allows for the input of project-specific information. proposed project-generated emissions of criteria air pollutants (i.e., CO, $SO_2$, PM10, and PM2.5) and ozone precursors (i.e., VOC and $NO_X$) were modeled based on project specific information provided in the proposed project description by the applicant, and default SCAQMD-recommended settings and parameters attributable to the proposed land use types and site location.

It is mandatory for all construction projects in the Basin to comply with SCAQMD Rule 403 for controlling fugitive dust. Incorporating Rule 403 into the proposed project would reduce regional PM10 and PM2.5 fugitive dust emissions from the geotechnical activities. Specific Rule 403 control requirements include, but are not limited to, applying water in sufficient quantities to prevent the generation of visible dust plumes, applying soil binders to uncovered areas, reestablishing ground cover as quickly as possible, utilizing a wheel washing system to remove bulk material from tires and vehicle undercarriages before vehicles exit the project area, covering all trucks hauling soil with a fabric cover and maintaining a freeboard height of 12 inches, and maintaining effective cover over exposed areas. Compliance with Rule 403 was accounted for in the construction emissions modeling.[1] Site watering and application of soil binders would reduce the particulate matter from becoming airborne, while washing of transport vehicle tires and undercarriages would reduce re-entrainment of construction dust onto the local roadway network.

Lake drawdown activities would begin in the third quarter of 2021 and active construction and seismic retrofitting activities beginning in Winter 2020, occurring in phases over approximately 15.5 months. As stated in Section 1, *Project Description*, of this MND, construction activities would begin with site preparation of staging areas surrounding the tower bridge and high tower that require clearing of debris and/or large rocks using bulldozers and other ground-clearing equipment. Existing paved and dirt roads would be used for hauling and transporting materials within the project area. In addition, temporary roads would be created along the lake bed (Figure 4) to access the piers during construction. Once the pier retrofit is completed the access roads would be removed and the lake bed would be restored to preconstruction conditions. After site preparation of the staging areas is completed, construction of on the tower bridge and Abutment 5 would occur simultaneously as the lake is being drawn down. Work on Abutment 5 would begin once the footings are exposed and surrounding soils have dried sufficiently. As the lake is drawn down to where the piers are exposed enough, construction and retrofitting activities on Piers 2, 3, and 4 would occur, sequentially without overlap as the water level drops. The lake is to be refilled as the construction and seismic retrofitting activities are completed. Approximately 2,750 cubic yards of soil may

[1] Note that the way CalEEMod is designed, fugitive dust controls pursuant to Rule 403 are incorporated in the model as "mitigation." Therefore, the "mitigated" fugitive dust emissions in CalEEMod represent the unmitigated conditions with the application of Rule 403 compliance.

be removed and temporarily stored at a nearby staging area. The carbon fiber reinforcement jackets would be spray- or roller-applied on the piers and Abutment 5 by specialty contractors trained in the process of carbon fiber application and would require approximately 1,505 gallons of epoxy applications. Each structure to be retrofitted would require approximately 30 workers on-site at one time. Once the carbon fiber jackets have been applied and allowed to cure, the excavated soil would be backfilled. No soil would be exported off-site. The seismic retrofitting work at the tower bridge and abutment would last approximately 6 months and work at each pier lasting up to 6 weeks. Therefore, construction of the proposed project assumed following phases: a site preparation for the preparation of the staging areas, a building construction phase encompassing the seismic retrofits of the tower bridge and Abutment 5, and a building construction phase for seismic retrofits for Piers 2, 3, and 4. The VOC emissions as a result of the epoxy application on the piers and Abutment 5 required for the carbon fiber reinforcement jackets were calculated outside of CalEEMod based on the VOC content contained in the safety data sheets (SDS) for the products that would be used for the project, which range from 3 to 7 grams of VOC per liter of epoxy or coating.

**Table 2-3** summarizes the daily emissions of criteria air pollutants and ozone precursors associated with each individual phase (refer to **Appendix A** for a detailed summary of the modeling assumptions, CalEEMod inputs, and CalEEMod outputs). The estimated unmitigated maximum daily construction emissions are summarized on Table 2-3. Under the maximum evaluated scenario, emissions resulting from the project construction would exceed the criteria pollutant threshold for $NO_X$ established by the SCAQMD.

**TABLE 2-3**
**UNMITIGATED MAXIMUM DAILY REGIONAL CONSTRUCTION EMISSIONS (POUNDS PER DAY) [A]**

| | Estimated Maximum Daily Emissions (lbs/day) [a] | | | | | |
|---|---|---|---|---|---|---|
| **Construction Activity** | **VOC** | **$NO_X$** | **CO** | **$SO_2$** | **PM10** | **PM2.5** |
| **Unmitigated** | | | | | | |
| Site Preparation | 1 | 8 | 13 | <1 | 3 | 1 |
| Building Construction-Tower Bridge /Abutment[b] | 45 | 125 | 89 | <1 | 8 | 6 |
| Building Construction-Piers[b] | 45 | 111 | 85 | <1 | 7 | 4 |
| Maximum Day | 45 | 125 | 89 | <1 | 8 | 6 |
| *Regional Significance Threshold* | *75* | *100* | *550* | *150* | *150* | *55* |
| **Significant Impact?** | **No** | **Yes** | **No** | **No** | **No** | **No** |

[a] Totals may not add up exactly due to rounding of the modeling calculation results.

[b] VOC emissions from epoxy application on the piers and Abutment 5 required for the carbon fiber reinforcement added to these phases.

SOURCE: Refer to Appendix A

Implementation of **Mitigation Measure AQ-1** would require equipment greater than 175 horsepower to meet Tier 3 emission standards and would reduce emissions to less than the $NO_X$ significance threshold. The estimated mitigated maximum daily construction emissions are summarized in **Table 2-4**. Under the mitigated scenario, emissions resulting from the project construction would not exceed any criteria pollutant thresholds

established by the SCAQMD. As such, a less than significant impact would occur with mitigation incorporated.

**TABLE 2-4**
**MITIGATED MAXIMUM DAILY REGIONAL CONSTRUCTION EMISSIONS (POUNDS PER DAY) [A]**

| | Estimated Maximum Daily Emissions (lbs/day) [a] | | | | | |
|---|---|---|---|---|---|---|
| **Construction Activity** | **VOC** | **$NO_X$** | **CO** | **$SO_2$** | **PM10** | **PM2.5** |
| **Mitigated** | | | | | | |
| Site Preparation | 1 | 7 | 13 | <1 | 3 | 1 |
| Building Construction-Tower Bridge /Abutment[b] | 8 | 96 | 103 | <1 | 7 | 5 |
| Building Construction-Piers[b] | 41 | 92 | 102 | <1 | 7 | 5 |
| Maximum Day | 41 | 96 | 103 | <1 | 7 | 5 |
| *Regional Significance Threshold* | *75* | *100* | *550* | *150* | *150* | *55* |
| **Significant Impact?** | **No** | **No** | **No** | **No** | **No** | **No** |

[a] Totals may not add up exactly due to rounding of the modeling calculation results.

[b] VOC emissions from epoxy application on the piers and Abutment 5 required for the carbon fiber reinforcement added to these phases.

SOURCE: Refer to Appendix A

### *Operation*

As the proposed project is a bridge deck strengthening and seismic retrofitting project of the tower bridge to the lake's high tower, operation of the project would not result in a net increase in operational emissions. The project would require periodic maintenance activities which would involve a few trucks or vehicles per month, similar to existing conditions. Mobile emissions from the few vehicles for periodic maintenance would result in minimal emissions well below the SCAQMD operational thresholds and would not change from current conditions. Overall, given the sporadic usage of maintenance vehicles, project operational-source emissions would not exceed applicable SCAQMD regional thresholds of significance. As such, operation of the project would result in a less than significant impact.

### *Mitigation Measures*

**AQ-1**: The project shall utilize off-road diesel-powered construction equipment that meets or exceeds the CARB and USEPA Tier 3 off-road emissions standards for equipment rated at 175 horsepower or greater during project construction. These requirements shall be included in applicable bid documents and successful contractor(s) must demonstrate the ability to supply such equipment. A copy of each unit's certified tier specification or model year specification and CARB or SCAQMD operating permit (if applicable) shall be available upon request at the time of mobilization of each applicable unit of equipment.

c) **Less than Significant Impact.** Sensitive receptors at nearby residences would be exposed to criteria and Toxic Air Contaminants (TAC) pollutants during construction and operational activities, but not to a significant level, as discussed below.

### *Carbon Monoxide Hotspots*

CO hotspots are primarily a concern during the operational period of a project where the project increases local daily traffic on congested roadways for the foreseeable future. For the proposed project, daily traffic volumes to the proposed project would be minimal as operation of the proposed project would not require the addition of new employees and would only require periodic inspection of the tower bridge and piers. As such, the proposed project would not substantially contribute to an increase in traffic volumes on the roadway network compared to existing conditions. Therefore, the proposed project's emissions would not result in a CO hotspot. As a result, impacts would be less than significant.

### *Localized Significance Thresholds*

#### Construction

The daily on-site construction emissions generated by the proposed project were evaluated against SCAQMD's localized significance thresholds (LSTs) for a 1-acre site located in SCAQMD Source Receptor Area 15 to determine whether the emissions would cause or contribute to adverse localized air quality impacts (SCAQMD, 2019b). The nearest sensitive receptor would be the 7 Acres recreational picnic area located approximately 700 feet (210 meters) south of the project site. The closest residential development is located approximately one-mile south of the project site along Pine Crest Place. The 7 Acres recreational picnic area sensitive receptors would have the greatest potential for exposure to air pollutants from project construction. Therefore, the SCAQMD localized significance threshold (LST) screening criteria for a 1-acre site in Source Receptor Area 15 with sensitive receptors conservatively assumed to be located within 200 meters to the project site were used.

**Table 2-5** shows the impacts from each individual construction activity. As shown, the daily unmitigated emissions generated on-site by the construction would not exceed the applicable SCAQMD screening LSTs during construction.

Implementation of **Mitigation Measure AQ-1** described above would not only reduce regional construction emissions, but would also substantially reduce the less than significant localized emissions. With implementation of **Mitigation Measure AQ-1**, localized emissions near sensitive receptor locations would be less than shown in Table 2-5.

**TABLE 2-5**
**PROPOSED PROJECT UNMITIGATED LOCALIZED DAILY CONSTRUCTION EMISSIONS**

| | Estimated Maximum Daily On-site Emissions (lbs/day) [a] | | | |
|---|---|---|---|---|
| **Construction Phase** | **$NO_X$** | **CO** | **PM10 [b]** | **PM2.5 [b]** |
| Site Preparation | 6 | 10 | <1 | <1 |
| Building Construction-Tower Bridge /Abutment | 93 | 10 | 5 | 4 |
| Building Construction-Piers | 90 | 4 | 4 | 4 |
| Maximum Daily Emissions | 93 | 39 | 4 | 4 |
| **SCAQMD Threshold (25 meters)** | **173** | **2,500** | **51** | **18** |
| **Significant Impact?** | **No** | **No** | **No** | **No** |

[a] According to SCAQMD's LST methodology, LSTs are only applicable to the on-site construction emissions that are generated by a project and do not apply to emissions generated off-site such as mobile emissions on roadways from worker, vendor, and haul truck trips. Totals may not add up exactly due to rounding of the modeling calculation results.

[b] Emissions account for implementation of dust control measures as required by SCAQMD Rule 403 (Fugitive Dust).

SOURCE: Refer to Appendix A

### Operational

According to SCAQMD LST methodology, LSTs would apply to the operational phase of a project if the project includes stationary sources, or attracts mobile sources that may spend long periods queuing and idling at the site (e.g., warehouse or transfer facilities). As the proposed project is a strengthening and seismic retrofitting project of the tower bridge to the lake's high tower, no new stationary emission sources would be required. Overall, given the small scale and sporadic usage of maintenance vehicles, localized project operational-source emissions would not exceed applicable SCAQMD localized thresholds of significance and operational impacts would be less than significant.

## *Toxic Air Contaminants*

Concentrations of toxic air contaminants (TACs) are also used as indicators of ambient air quality conditions. A TAC is defined as an air pollutant that may cause or contribute to an increase in mortality or in serious illness, or that may pose a hazard to human health. TACs are usually present in minute quantities in the ambient air; however, their high toxicity or health risk may pose a threat to public health even at low concentrations.

### Construction

Construction activities associated with the project would result in temporary and short-term emissions of diesel particulate matter, which the State has identified as a TAC. During construction, the exhaust of off-road heavy-duty diesel equipment would emit diesel particulate matter during general construction activities, such as site preparation excavation.

Diesel particulate matter poses a carcinogenic health risk. The nearest sensitive receptor would be the 7 Acres recreational picnic area located approximately 700 feet south of the project site; as described above, localized diesel particulate matter emissions (strongly

correlated with PM2.5 emissions) would be minimal and would be below localized thresholds as presented in Table 2-5 (and further reduced below the already less than significant localized levels with implementation of **Mitigation Measure AQ-1**). Although the localized analysis does not directly measure health risk impacts, it does provide data that can be used to evaluate the potential to cause health risk impacts. Furthermore, construction activity would occur for a temporary and short-term duration. The low level of PM2.5 emissions coupled with the very short-term duration of construction activity at any one location, and the relatively small-scale of the project would result in an overall low level of diesel particulate matter concentrations at sensitive receptor locations. Furthermore, compliance with the CARB anti-idling Air Toxics Control Measure, which limits idling to no more than five minutes at any location for diesel-fueled commercial vehicles, would further minimize diesel particulate matter emissions in the construction area. The project would also utilize a construction contractor(s) that complies with required and applicable BACT and the In-Use Off-Road Diesel Vehicle Regulation. Thus, it is expected that sensitive receptors would be exposed to emissions below thresholds and construction TAC impacts would be less than significant.

### Operations

The project would not require new stationary equipment. The project would not result in any other substantial sources of operational TAC emissions. Therefore, the project would not expose surrounding sensitive receptors to net new long-term TAC emissions and impacts would be less than significant.

d) **Less than Significant Impact.** Potential sources that may emit odors during construction activities include the use of architectural coatings and solvents and vehicle exhaust. SCAQMD Rule 1113 limits the allowable amount of VOCs from architectural coatings and solvents, and CARB's regulations on idling limit unnecessary emissions from idling equipment. Since compliance with CARB and SCAQMD Rules governing these compounds is mandatory, no construction activities or materials are proposed that would create objectionable odors. While construction equipment exhaust and application of carbon fiber coatings would temporarily generate odors, the proposed project activities are typically confined to the immediate vicinity of the equipment and would only be discernable off-site for brief instances depending on wind strength and direction. Therefore, impacts would be less than significant.

According to the SCAQMD California Environmental Quality Act (CEQA) Air Quality Handbook, land uses associated with odor complaints typically include agricultural uses, wastewater treatment plants, chemical plants, composting, refineries, landfills, dairies, and fiberglass molding. The proposed project does not include any uses identified by the SCAQMD as being typically associated with objectionable or nuisance odors. In addition, potential odors generated by new and existing non-residential land uses are required to be in compliance with SCAQMD Rule 402 (Nuisance) to prevent odor nuisances on sensitive land uses (i.e., residents near the project site). Therefore, impacts would be less than significant.

## References

California Air Resources Board (CARB), 2016. California Ambient Air Quality Standards. Available at: https://ww2.arb.ca.gov/resources/california-ambient-air-quality-standards. Accessed October 2019.

CARB, 2018. Air Quality Standards and Area Designations. Available at: https://ww3.arb.ca.gov/desig/desig.htm Accessed October 2019.

South Coast Air Quality Management District (SCAQMD), 2015. SCAQMD Air Quality Significance Threshold*s*. Available at: http://www.aqmd.gov/home/rules-compliance/ceqa/air-quality-analysis-handbook/localized-significance-thresholds. Accessed October 2019.

SCAQMD, 2019. Historical Air Quality Data By Year. Available at: http://www.aqmd.gov/home/air-quality/historical-air-quality-data/historical-data-by-year. Accessed October 2019.

SCAQMD, 2019b. Localized Significance Thresholds. Available at: http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf?sfvrsn=2. Accessed October 2019.

United States Environmental Protection Agency (USEPA), 2018. Nonattainment Areas for Criteria Pollutants (Green Book). Available at: https://www.epa.gov/green-book. Accessed October 2019.

# 2.4 Biological Resources

| *Issues (and Supporting Information Sources):* | *Potentially Significant Impact* | *Less Than Significant with Mitigation Incorporated* | *Less Than Significant Impact* | *No Impact* |
|---|---|---|---|---|
| **BIOLOGICAL RESOURCES —** Would the project: | | | | |
| 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 Game 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 Game or U.S. Fish and Wildlife Service? | ☐ | ☐ | ☐ | ☒ |
| c) Have a substantial adverse effect on state or federally protected wetlands (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? | ☐ | ☐ | ☐ | ☒ |

## Discussion

On September 27, 2019, ESA's biologist a conducted a biological resource assessment of the proposed project and surrounding area to characterize and map existing conditions, most notably vegetation communities, habitats, disturbed/developed areas, and to determine the potential for special-status species and sensitive habitats to occur.

The analysis presented in this section is based on the *Biological Resources Technical Report for the Castaic Dam High Intake Tower Bridge Retrofit Project, Los Angeles County, Californi*a, included as **Appendix B** (ESA, 2019a).

a) **Less than Significant with Mitigation.** During the biological resource assessment, plant communities were mapped and characterized, including disturbed/developed areas, and observations of plants and wildlife species were recorded. A thorough discussion of the existing biological conditions, including potentially occurring special-status species and sensitive natural vegetation communities, can be found in the Biological Resources Technical Report (BRTR) provided in Appendix B (ESA, 2019a).

According to the CNDDB and CNPS database search results, 46 special-status wildlife species and 42 special-status plant species have been previously recorded within the Warm Springs Mountain USGS quadrangle and the eight surrounding quadrangles. The potential for special-status wildlife and plant species to occur within the project site is based on the proximity to these previously recorded occurrences and the habitat conditions capable of supporting these species, such as existing vegetation communities and habitats, topography, elevation, soils, surrounding land uses, habitat preferences, and geographic ranges. The "Potential for Occurrence" category included in **Table 2-6** is defined as follows:

- **Low Potential:** The project site only provides limited habitat for a particular species, such as, but not limited to, submergence much of the year by reservoir water, habitats that are subjected to substantial disturbances from previous grading activities or developments (e.g., roads, buildings, parking lots, etc.), fragmented habitat, and/or certain habitat requirements are absent while others are present. For example, suitable vegetation is present, but soil substrate is inadequate. In addition, low potential would be assumed if the known range or habitat requirements for a particular species is outside of the project area.
- **Medium Potential:** The project site provides marginal habitat for a particular species. For example, the habitat characteristics are suitable for a particular species (e.g., vegetation, soils, elevation) and the site is within the known range of the species, but the habitat is moderately disturbed by past human activities and therefore/or may not support all stages of a species life cycle.
- **High Potential**: The Project site provides suitable habitat conditions for a particular species and/or known populations occur in the immediate area.
- **Present**: The species has been observed or previously recorded within the Project site.

Due to the high level of disturbance and development that has occurred at or adjacent to the tower bridge, it was determined that none of the special-status plant species have the potential to occur within the project site or vicinity. Of the 46 special-status wildlife species, 18 were determined to have varying levels of potential to occur within the project site or vicinity and are listed in Table 2-6.

Based on the vegetation and habitats that were characterized during the field survey, three special-status wildlife species have a medium to high potential to occur: prairie falcon (*Falco mexicanus*), loggerhead shrike (*Lanius ludovicianus*), and yellow warbler (*Setophaga petechial*).

The remaining 15 species have a low potential to occur due to the current disturbed conditions and absence of suitable habitat. These species include pallid bat (*Antrozous pallidus*), Yuma myotis (Myotis yumanensis), Cooper's hawk (*Accipiter cooperii*), southern California rufous-crowned sparrow (*Aimophila ruficeps canescens*), grasshopper sparrow (*Ammodramus savannarum*), Bell's sage sparrow (*Artemisiospiza belli*), burrowing owl (*Athene cunicularia*), white-tailed kite (*Elanus leucurus*), California horned lark (*Eremophila alpestris actia*), bald eagle (Haliaeetus leucocephalus),

California glossy snake (Arizona elegans occidentalis), coast horned lizard (Phrynosoma coronatum), coastal whiptail (*Aspidoscelis tigris stejnegeri*), western pond turtle (*Actinemys marmorata*), and two-striped garter snake (*Thamnophis hammondii*).

Table 2-6 also includes the federal and state regulatory status of each species and their preferred habitat.

**TABLE 2-6**
**POTENTIALLY OCCURRING SPECIAL-STATUS WILDLIFE SPECIES WITHIN PROJECT SITE**

| Common Name | Scientific Name | Status (Federal/State) | Habitat | Potential to Occur |
|---|---|---|---|---|
| **Birds** | | | | |
| Cooper's hawk | *Accipiter cooperii* | None/WL | Mature forest, open woodlands, wood edges, river groves. Nests in coniferous, deciduous, and mixed woods, typically those with tall trees and with openings or edge habitat nearby. Also found among trees along rivers through open country, and increasingly in suburbs and cities where some tall trees exist for nest sites. In winter may be in fairly open country, especially in west. | **Low**. The tower bridge and surrounding vegetation does not provide suitable nesting habitat; however, this species could forage in the area. |
| Southern California rufous-crowned sparrow | *Aimophila ruficeps* | None/WL | Grassy or rocky slopes with sparse low bushes; open pine-oak woods. Habitat varies in different parts of range, but always in brushy areas. In Southwest, usually in rocky areas of foothills and lower canyons, in understory of pine-oak woods, or in chaparral or coastal scrub. | **Low.** The tower bridge and surrounding vegetation does not provide suitable nesting habitat; however, this species could forage in the area. |
| Grasshopper sparrow | *Ammodramus savannarum* | None/SSC | Grassland, hayfields, prairies. Breeds in rather dry fields and prairies, especially those with fairly tall grass and weeds and a few scattered shrubs. Also nests in overgrown pastures and hayfields, and sometimes in fields of other crops. | **Low.** The tower bridge and surrounding vegetation does not provide suitable nesting habitat; however, this species could forage in the area. |

| Common Name | Scientific Name | Status (Federal/State) | Habitat | Potential to Occur |
|---|---|---|---|---|
| Bell's sage sparrow | *Artemisiospiza belli belli* | None/WL | Coastal sage scrub, chaparral; in winter, also deserts. Found year-round in unique sage scrub habitat on the California coastal slope and foothills. In the interior, also breeds in saltbush, chamise, and other low shrubs of arid flats. In winter some spread eastward into open flats and deserts with scattered brush. | **Low**. The tower bridge and surrounding vegetation does not provide suitable nesting habitat; however, this species could forage in the area. |
| Burrowing owl | *Athene cunicularia* | None/SSC | Open, dry annual and perennial grasslands, deserts, and scrublands with low-grading vegetation | **Low**. Suitable habitat is present in the vicinity of the project site; however, no suitable burrows that can be used for nesting or wintering are present. |
| White-tailed kite | *Elanus leucurus* | None/FP | Open groves, river valleys, marshes, and grasslands | **Low**. The tower bridge and surrounding vegetation does not provide suitable nesting habitat; however, this species could forage in the area. |
| California horned lark | *Eremophila alpestris* | None/WL | Prairies, fields, airports, shores, tundra. Inhabits open ground, generally avoiding areas with trees or even bushes. May occur in a wide variety of situations that are sufficiently open: short-grass prairies, extensive lawns (as on airports or golf courses), plowed fields, stubble fields, beaches, lake flats, dry tundra of far north or high mountains. | **Low**. The tower bridge and surrounding vegetation does not provide suitable nesting habitat; however, this species could forage in the area. |
| Prairie falcon | *Falco mexicanus* | None/WL | Open hills, plains, prairies, deserts. Typically found in fairly dry open country, including grassland and desert. Also in open country above treeline in high mountains. In winter, often found in farmland and around lakes and reservoirs. | **High (foraging only)**. The tower bridge and surrounding vegetation does not provide suitable nesting habitat; however, this species could forage in the area. However, this species was observed in 2015 adjacent to Castaic Lagoon, approximately one mile south of tower bridge . |

| Common Name | Scientific Name | Status (Federal/State) | Habitat | Potential to Occur |
|---|---|---|---|---|
| Bald eagle | *Haliaeetus leucocephalus* | None/FE/FP | Coasts, rivers, large lakes; in migration, also mountains, open country. Typically, close to water, also locally in open dry country. Occurs in a variety of waterside settings where prey is abundant. | **Low**. The tower bridge and surrounding vegetation does not provide suitable nesting habitat; however, this species could forage in the area. |
| Loggerhead shrike | *Lanius ludovicianus* | None/SSC | Semi-open country with lookout posts; wires, trees, scrub. Breeds in any kind of semi-open terrain, from large clearings in wooded regions to open grassland or desert with a few scattered trees or large shrubs | **High (foraging only)**. Suitable foraging habitat is present that includes California buckwheat-California sagebrush. Species was observed in 2015 in Castaic Lagoon, approximately 0.7 miles south of tower bridge . This species is not expected to nest in the vicinity of the project. |
| Yellow warbler | *Setophaga petechial* | None/SSC | Widespread in any wet brushy habitat. | **Medium (foraging only)**. Suitable habitat for foraging is available adjacent to tower bridge and lake in the California buckwheat-California sagebrush approximately 200 feet away; however, this species is not expected to nest in the vicinity of the project. |
| **Mammals** | | | | |
| Pallid bat | *Antrozous pallidus* | None/SSC | Grasslands, shrublands, woodlands, and coniferous forests; most common in open, dry habitat with rocky areas for roosting, as well as abandon buildings and medal clad structures. | **Low.** Sign or evidence (guano) of species was not detected during field reconnaissance; however, marginal habitat exists underneath the tower bridge for roosting (metal beams). |
| Yuma myotis | *Myotis yumanensis* | None/SSC | Found in a variety of habitats, ranging from juniper and riparian woodlands to desert regions near open water Species found wherever there are rivers, streams, ponds, lakes, etc. When not near water over which to forage, can be found roosting in caves, attics, buildings, mines, underneath bridges, and other similar structures. | **Low.** Sign or evidence (guano) of species was not detected during field reconnaissance; however, marginal habitat exists underneath the tower bridge for roosting (metal beams). |

| Common Name | Scientific Name | Status (Federal/State) | Habitat | Potential to Occur |
|---|---|---|---|---|
| **Reptiles** | | | | |
| California glossy snake | *Arizona elegans occidentalis* | None/SSC | Most common in desert habitats but also occur in chaparral, sagebrush, valley-foothill hardwood, pine-juniper, and annual grass. | **Low**. California buckwheat-California sagebrush provides suitable habitat adjacent to project site; however, species is not expected to forage within project site due to previously disturbed/developed conditions. |
| Coastal western whiptail | *Aspidoscelis tigris* ssp. *Stejnegeri* | None/SSC | Deserts and semiarid areas with sparse vegetation and open areas, woodland and riparian areas. | **Low**. California buckwheat-California sagebrush provides suitable habitat adjacent to project site; however, species is not expected to forage within project site due to previously disturbed/developed conditions. |
| Western pond turtle | *Emys marmorata* | None/SSC | Aquatic habitats with exposed areas for basking, with aquatic vegetation, such as algae and other water plants | **Low**. Castaic Lake provides suitable habitat; however, the project site itself does not provide suitable habitat. Areas for basking opportunities (logs, rocks and boulders) are absent from the project site. |
| Coast horned lizard | *Phrynosoma blainvillii* | None/SSC | Various habitats throughout the foothills of California including coast live oak woodland and the herbaceous cover and friable soils. | **Low**. California buckwheat-California sagebrush provides suitable habitat adjacent to project site; however, species is not expected to forage within project site due to previously disturbed/developed conditions. |
| Two-striped garter snake | *Thamnophis hammondii* | None/SSC | Occurs adjacent to permanent or semi-permanent bodies of water. This species feeds primarily on fish and amphibians. | **Low.** Castaic Lake provides suitable habitat for the species; however, once the lake drawdown is complete, the project site does not provide suitable habitat. |

Status

Federal: FE-federally endangered, FT – federally threatened

State: SE – state endangered; state threatened; FP – State Fully Protected, SSC – State Species of Special Concern, CE-Candidate for listing as Endangered, WL – Watch List

### *Prairie Falcon, Loggerhead Shrike, Yellow Warbler, and Barn Swallow*

Three special-status avian species (prairie falcon, loggerhead shrike, and yellow warbler) have a medium or high potential to occur (for foraging only); however, none of these species were observed during the field assessment. Suitable habitat for these species

exists in the California buckwheat – California sagebrush scrub vegetation adjacent to the tower bridge. Prairie falcon and loggerhead shrike have both been recorded within vicinity of the tower bridge (ESA, 2019a). Though not a special-status species, the observed mud nests of barn swallows underneath the tower bridge (ESA, 2019a) are protected under the federal Migratory Bird Treaty Act of 1918 (MBTA). The MBTA prohibits the take of native birds "by any means or manner to pursue, hunt, take, capture (or) kill" any migratory birds except as permitted by regulations issued by the U.S. Fish and Wildlife Service (USFWS). The term "take" is defined by USFWS regulation to mean to "pursue, hunt, shoot, wound, kill, trap, capture or collect" any migratory bird or any part, nest, or egg of any migratory bird covered by the conventions, or to attempt those activities. Construction activities on the tower bridge could potentially impact and displace nesting barn swallow. Impacts that could occur during construction would be considered less than significant with the implementation of **Mitigation Measure BIO-1** and **BIO-2**.

### *Mitigation Measures*

**BIO-1:** Prior to the start of construction that could affect special-status species, a qualified biologist shall provide a Worker Environmental Awareness Program (WEAP) training to all construction workers on-site. The training shall include materials to aid workers in identifying and special-status plants and wildlife that should be avoided; relocation procedures of species; applicable laws and regulations protecting such resources; and proper avoidance and communication procedures to protect sensitive biological resources, as well as common wildlife whenever possible.

**BIO-2:** If the nesting bird season cannot be avoided and construction underneath the tower bridge occurs March 1 to September 15, the following shall be implemented to avoid and minimize impacts to nesting birds:

- A qualified biologist shall conduct a preconstruction avian nesting survey no more than five days prior to initiation project activities on the tower bridge. If construction begins in the non-breeding season and proceeds continuously into the breeding season, no surveys are required. However, if there is a break of five days or more in project activities during the breeding season, a new nesting bird survey shall be conducted before construction begins again.
- The preconstruction survey shall cover all reasonable potential nesting locations underneath the tower bridge as well as any areas where vegetation removal/grading is proposed.
- If an active nest is found during the preconstruction avian nesting survey, a qualified biologist shall implement a suitable avoidance buffer that shall be based on the location of the nest, species, and the type of work that is being conducted. The nest site area shall not be disturbed until a qualified biologist confirms that the nest is inactive and the young have fledged. Buffer areas may be increased if any special-status birds or raptors are determined to be nesting in the area.

- A Nesting Bird Exclusion Plan (Bird Plan) shall be prepared if any birds such as barn swallows are observed nesting on the underside of the tower bridge. The Bird Plan will include procedures for avoiding impacts to nesting birds, including an overview of the proposed work that will be conducted where nests have been documented; purpose and need; survey methodology; laws and regulations protecting nesting birds; survey results and overview of potential impacts; and avoidance measures, including exclusionary techniques, and installation of materials to temporarily prevent barn swallows from re-entering the nests.

### *Bats*

Two special-status species of bats (pallid bat and Yuma myotis) were found to have a low potential to utilize the area for foraging and roosting. Based on the assessment conducted by ESA, no potential maternity roosts or guano were observed; however, metal beams beneath the tower bridge could provide suitable roosting habitat for these two species. Construction activities on the tower bridge could potentially impact and displace special-status bat species during roosting. However, with implementation of **Mitigation Measure BIO-3**, potential impacts to special-status bat species would be considered less than significant.

> **BIO-3:** A focused visual survey for roosting special-status bats shall focus on detecting evidence (guano) of bat roosting on the underside of the tower bridge. Qualified biologists shall conduct a visual survey to identify ingress/egress locations of potential bat roosting sites.
>
> In the event that it is determined that bats are roosting on the underside of the tower bridge, a Bat Exclusion Plan (Bat Plan) shall be prepared that includes procedures for avoiding impacts to roosting bats. The Bat Plan shall include an overview of the project; purpose and need; survey methodology; laws and regulations protecting bats; survey results and overview of potential impacts; and avoidance measures, such as preconstruction surveys, exclusionary techniques, and installation of materials to temporarily prevent bats from recolonization.

b) **No Impact.** Sensitive natural communities are those that are considered by the CDFW to be imperiled due to their decline in the region and/or their ability to support special-status plant and/or wildlife species. These communities include those that, if eliminated or substantially degraded, would sustain a significant adverse impact as defined under CEQA.

A review of the most recent CNDDB (CDFW, 2019) records revealed a list of 14 sensitive natural communities known to occur within the nine queried quadrangles: California Walnut Woodland, Mainland Cherry Forest, Riversidian Alluvial Fan Sage Scrub, Southern California Threespine Stickleback Stream, Southern Coast Live Oak Riparian Forest, Southern Cottonwood Willow Riparian Forest, Southern Mixed Riparian Forest, Southern Riparian Forest, Southern Riparian Scrub, Southern Sycamore Alder Riparian Woodland, Southern Willow Scrub, Valley Needlegrass Grassland, Valley Oak

Woodland, and Wildflower Field. None of these communities occur within the project site; therefore, no impact would occur.

Within the project site, riparian vegetation is extremely scarce. As indicated in the BRTR (ESA, 2019a), several Gooding's willow and Fremont cottonwood are naturally situated to the southeast of the tower bridge approximately 50 to 220 feet away. Aquatic vegetation densities in Castaic Lake are low, potentially due to normal facility operations and the accompanying changes in surface elevation of the lake (CDFW, 2013). The Gooding's willow and Fremont cottonwood located adjacent to the tower bridge are potentially hydrologically supported by the lake. However, due to the short duration of the drawdown period (10 months), these are not expected to be impacted. The aquatic ecosystem would recover over time, adjusting to re-stabilized water levels post-construction (ESA, 2019b).

c) **No Impact.** Based on the field assessment, there are no discernible hydrologic features (other than the lake) that would indicate that there are any federal or state regulated waters (e.g., drainages, wetlands, creeks, streams or marshes), such as riparian vegetation, hydric soils, ordinary high water mark, or established bed or bank. Therefore, other than the lake itself, there are no other federal or state regulated waters in the immediate vicinity of the project that are subject to the regulatory authority of the United States Army Corps of Engineers (USACE), CDFW, or Regional Water Quality Control Board (RWQCB). The proposed project includes the retrofit of an existing tower bridge within an existing lake and would not substantially divert or obstruct the natural flow of any river, stream, or lake. No impact would occur.

d) **Less than Significant Impact.** Wildlife movement corridors are areas where regional wildlife populations regularly and predictably move during dispersal or migration. Movement corridors in California are typically associated with ridgelines, valleys, rivers and creeks supporting riparian vegetation. Movement corridors link together areas of suitable wildlife habitat that are otherwise separated by rugged terrain, changes in vegetation, by human disturbance, or by the encroachment of urban development. Movement corridors are important as the combination of topography and other natural factors, in addition to urbanization, has fragmented or separated large open space areas. Castaic Lake is situated within two wildlife movement corridors.

Castaic Lake is a resting stop for migrating birds along the Pacific Flyway. The Pacific Flyway is a major north-south flyway for migratory birds in America, extending from Alaska to Patagonia. Every year, migratory birds travel some or all of this distance both in spring and in fall, following food sources, heading to breeding grounds, or travelling to overwintering sites. Bird that are migrating along the Pacific Flyway may stop to rest within Castaic Lake to feed and regain their strength before continuing. Some species may remain within Castaic Lake for the entire season, but most stay a few days before moving on (Wilson, 2010).

Castaic Lake is located within the Sierra Pelona Mountains and surrounding topography ranges from rolling hills to steep canyons and ridgelines. Species such as mountain lion (*Puma concolor*), bobcat (*Lynx rufus*), and American black bear (*Ursus americanus*) utilize these areas for foraging and movement. While Castaic Lake and the surrounding hills and mountains are undoubtedly utilized by wildlife for foraging and breeding purposes, it may be also utilized for migration purposes.

Within the last 20 years, there has been a substantial increase in residential development throughout the community of Castaic and city of Santa Clarita. This surge in residential development could potentially "push" mammal species away from those areas and reroute them towards Castaic Lake. The project site is surrounded by several wildlife movement corridors but is located within disturbed and/or developed conditions that consists of several paved access roads, a paved parking lot, Castaic Dam, and the tower bridge and high tower. Castaic Lake supports local wildlife for such species as coyote, striped skunk (*Mephitis mephitis*), and raccoon (*Procyon lotor*), amongst others; however, project activities would not impede or constrain local or regional wildlife movement. While mammals of all sizes could wander through the project site, project activities (including the lake drawdown) would not present an impact to local or regional wildlife movement. Additionally, the project site is not located within or adjacent to any designated critical habitat for special-status species.

Construction activities associated with the proposed project would not impede or disrupt any wildlife corridors or wildlife movement and impacts would be considered less than significant. Temporary impacts associated with the drawdown are described in more detail below.

### *Reservoir Drawdown*

The lake would begin to lower from its normal operating water elevation (approximately 1,505 feet) in June 15, 2021 and would return to the normal operating water elevation in April 15, 2022. From approximately November 1, 2021 through December 15, 2021, the water level would be lowered to approximately 1,380 feet. The water level would raise to 1,415 feet from January 15 through February 1, 2022, returning to normal operating levels by April 2022.

#### Migratory Birds

Though the water level of Castaic Lake is proposed to be temporarily lowered by approximately 125 feet during the drawdown period, overall food sources (fish) and areas of refuge for migratory birds are not expected to be impacted by the proposed drawdown. The lake would continue to provide open water opportunities for far-ranging migratory birds during the drawdown. In addition, several other open water features are available to migratory bird species in the vicinity of Castaic Lake, including Pyramid Lake approximately 12 miles to the northwest, Lake Piru approximately 9 miles to the west, the Los Angeles Department of Water and Power Van Norman Complex Reservoir

approximately 18 miles to the south, and Quail Lake approximately 17 miles to the north. Impacts would be considered less than significant.

### Fish

Analysis of fish species in the lake and the potential effects of the project's drawdown on the fish population was conducted in 2019, the results of this analysis are provided in a separate report, *Castaic Dam High Intake Tower Bridge Retrofit Project, Technical Memorandum,* and summarized in the BRTR. The fish community at Castaic Lake is dominated by non-native, warm-water species, however, several native species are also present. Seventeen species of non-native, warm water species can be found in Castaic Lake, including largemouth bass (*Micropterus salmoides*), smallmouth bass (*Micropterus dolomieu*), and bluegill (*Lepomis macrochirus*) to name a few (see Appendix B for a complete list of species). Native species at Castaic Lake include Sacramento blackfish (*Orthodon microlepidotus*), tule perch (*Hysterocarpus traskii*), hitch (*Lavinia exilicauda*), and prickly sculpin (*Cottus asper*). Castaic Lake also contains hatchery rainbow trout (*Oncorhynchus mykiss*), a cold water species. No federal or state-listed species are present in Castaic Lake.

Lowering of the reservoir's surface elevation would decrease the overall aquatic habitat area in the reservoir (ESA, 2019b). However, short-term drawdown and subsequent re-flooding is not likely to have long term effects on reservoir fish communities, so long as the lowered condition provides sufficient area and water quality to maintain habitat values for the variously sized fish (Chizinski et al., 2014). The proposed drawdown would lower water levels similar to a recent drawdown event which occurred in 2015 and was caused by state-wide drought conditions. The lower water elevation of 1,390 feet was sustained for a period of over 12 months during the drought, and appeared to maintain habitat area and water depths sufficient for the existing fish populations. No documentation of fish overcrowding, significant population declines, or fish kills were identified. As such, the aquatic resources at Castaic Lake would be expected to recover from the temporary effects of the drawdown as the water levels return to normal operating levels, similar to the 2015 drought conditions. Impacts would be considered less than significant

### Amphibians and Aquatic Reptiles

Amphibians and aquatic reptiles are expected to be impacted similarly to fish species during the lake drawdown. Two-striped garter snake and western pond turtle both inhabit Castaic Lake; however, these species are not expected to be present in the immediate vicinity of the project site, because preferred habitat conditions (i.e., areas to bask [for western pond turtle] and sandy, gradual sloping banks for leisure and foraging [for both species]) do not exist near the tower bridge and high tower. Basking opportunities for western pond turtle, and food sources and foraging for both species will continue to be available throughout the lake during the drawdown. As with fish, the aquatic resources would be expected to recover from the temporary effects as the water levels return to the normal operating elevation and the temporary effects of the drawdown are not expected

to present a significant impact on amphibians and aquatic reptile species. Impacts would be considered less than significant.

e) **No Impact.** The proposed retrofit to the tower bridge would not present any conflicts with any local policies or ordinances, such as those established by the Angeles Forest or Los Angeles County, including, but not limited to, a native tree protection, natural resource, or open space ordinance, since work would be confined to the existing bridge and staging areas and to currently disturbed areas; therefore, the project would no impact on local ordinances or policies pertaining to biological resources.

f) **No Impact.** The project site is not located within an established NCCP or HCP jurisdiction; therefore, no impacts would occur.

## References

California Department of Fish and Wildlife (CDFW). 2019. California Natural Diversity Database (CNDDB). USGS 7.5 minute topographic quadrangles: Warm Springs Mountain, Mint Canyon, Liebre Mountain, Burnt Peak, Lake Hughes, Whitaker Peak, Green Valley, Val Verde, and Newhall dated September 2019.

California Department of Fish and Game (CDFG). 2006. *Fish and Game Code of California*.

California Native Plant Society (CNPS). 2019. Inventory of Rare and Endangered Plants (online edition, v7-09b). California Native Plant Society. Sacramento, CA. Accessed September 2019 from http://www.cnps.org/inventory.

Chizinski, C. J., D. R. Martin, C. G. Huber, and K. L. Pope. 2014. The influence of a rapid drawdown and prolonged dewatering on angling pressure, catch, and harvest in a Nebraska reservoir. Great Plains Research 24:145-152.

Google Earth Pro. 2019. Aerial imagery. Accessed September 2019.

Environmental Science Associates (ESA). 2019a. Castaic Dam High Intake Tower Bridge Retrofit Project, Biological Technical Report.

ESA. 2019b. Castaic Dam High Intake Tower Bridge Retrofit Project, Biological Technical Report Memorandum.

U.S. Fish and Wildlife Service (USFWS). 2018a. Information for Planning and Consultation. Accessed November 2018 at https://ecos.fws.gov/ipac/.

USFWS. 2018b. Critical Habitat Portal. Accessed November 2018 at https://fws.maps.arcgis.com/home/webmap/viewer.html?webmap=9d8de5e265ad4fe09893cf75b8dbfb77.

*Wilson, Robert M. 2010. Seeking Refuge: Birds and Landscapes of the Pacific Flyway. Seattle: University of Washington Press.*

# 2.5 Cultural Resources

| Issues (and Supporting Information Sources): | Potentially Significant Impact | Less Than Significant with Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| **CULTURAL RESOURCES —** Would the project: | | | | |
| a) Cause a substantial adverse change in the significance of a historical resource pursuant to §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? | ☐ | ☒ | ☐ | ☐ |

## Discussion

**a)** **Less than Significant with Mitigation.** For the purposes of the proposed project and in consultation with DWR, direct impacts to historical resources due to the tower bridge retrofitting were analyzed, as were indirect impacts associated with the drawdown of Castaic Lake from the 1,505-foot elevation contour to the 1,380-foot elevation contour. As such, an Area of Direct Impacts (ADI) was delineated to address direct impacts and includes the construction impact area where work would occur, staging areas, and access routes. Similarly, an Area of Indirect Impacts (AII) was delineated, which includes the area around the lake shore where the drawdown would occur. The ADI is the area where cultural resources could be directly impacted through alteration or ground disturbance. The AII is the area where cultural resources could be indirectly adversely impacted through actions such as increased erosion due to wave action, looting, vandalism, etc. The following paragraphs summarize the identification of historical resources within the ADI and AII, respectively.

### Area of Direct Impact

Identification of historical resources (including both architectural and archaeological resources that could qualify as historical resources) within the ADI included: a records search at the California Historical Resources Information System (CHRIS) South Central Coastal Information Center (SCCIC) conducted on October 8, 2019; a search of the California Native American Heritage Commission (NAHC) Sacred Lands File (SLF) conducted on October 21, 2019; a cultural resources survey conducted on October 10, 2019; and a geoarchaeological review (Ehringer and Cleveland, 2019).

The CHRIS-SCCIC results indicate that no cultural resources have been previously recorded within the ADI or a 0.5-mile radius. The CHRIS-SCCIC results indicate that six cultural resources studies have been conducted within a 0.5-mile radius of the ADI (**Table 2-7**). Of these studies, four appear to overlap the proposed ADI (LA-848, -1667, -3848, and -12857). The entirety of the proposed project area and 0.5-mile radius have been included in previous cultural resources studies (Ehringer and Cleveland, 2019).

**TABLE 2-7**
**PREVIOUS CULTURAL RESOURCES INVESTIGATIONS WITHIN A 0.5-MILE RADIUS OF THE PROJECT AREA**

| Author | Report No. (LA-) | Title | Year |
|---|---|---|---|
| Leonard, Nelson N. III | 54 | *Archaeological Resources of the Proposed Castaic Conduit System* | 1974 |
| Pierce, Wendy | 13056 | *Department of Water Resources Supplemental Archaeological Survey Report, Castaic Geologic Exploration 2 Project, Los Angeles County, California* | 2015 |
| Schulz, Peter D. | *848 | *Review of Archaeological Resource Identification and Impact Mitigation California Aqueduct Project (West Branch, Mojave Division and Coastal Branch)* | 1977 |
| Tartaglia, Louis J. | *3848 | *Cultural Resources Survey Report Lake Castaic, California* | 1997 |
| Vader, Michael an Christopher Lockwood | *12857 | *California Department of Water Resources Castaic Lake Drawdown Project Phase I Cultural Resources Survey Report* | 2016 |
| Woodward, Jim | *1667 | *Archaeological Survey of Proposed New Development Areas in Castaic Lake State Recreation Area* | 1987 |

* Indicates study overlaps the proposed ADI

Previous surveys of the ADI include one conducted by ESA in 2014, that included the Castaic Lake shoreline between the 1,495-foot elevation contour and the 1,380-foot elevation contour. A small portion of the ADI was included as part of the survey; however, much of it could not be accessed due to steep slopes or inaccessibility leaving much of it unsurveyed (Vader and Lockwood, 2016). The ADI was also subject to survey in the 1960s/1970s in advance of the construction of the California Aqueduct and Castaic Dam and Lake (Nelson, 1974; Schulz, 1977). As such, the ADI does not appear to have been systematically surveyed for cultural resources for at least 40 years or more (Ehringer and Cleveland, 2019).

The SLF results indicate that no Native American resources or sacred sites are on file at the NAHC for the proposed project area (Quinn, 2019).

The cultural resources survey resulted in the identification and recordation of one architectural resource within the ADI – the Castaic Dam High Intake Tower Bridge (i.e., the tower bridge) and Castaic Dam High Intake Tower (i.e., the high tower). No archaeological resources were observed or recorded within the ADI during the survey, however, the area where the majority of ground disturbance would occur was inundated and was not accessible to surveyors (Ehringer and Cleveland, 2019).

The high tower and tower bridge are both components of Castaic Dam and Lake, which is in turn part of the SWP. The high tower is a round structure with projecting concrete panels extending to four sides, giving the appearance of an octagonal building. The high tower was constructed from reinforced concrete located at the end of the tower bridge, approximately 525 feet east from the current shoreline in Castaic Lake. The high tower is a vernacular industrial building, jutting high above the water

and measuring approximately 40 feet in diameter (with the concrete panels extending out an additional 5 feet). The high tower is topped with a gantry crane and ringed with metal safety rails, and the flat roof is accessed via a metal safety ladder on the western side of the high tower. The tower bridge is a four-span, concrete slab bridge structure measuring approximately 20 feet wide and flanked with metal and concrete guardrails. Entrance to the tower bridge and high tower is restricted by the presence of a chain link fence gate at the shoreline (Ehringer and Cleveland, 2019).

The tower bridge and tower were evaluated under the historical and architectural theme of the SWP and are recommended not eligible for listing in the National Register/California Register under Criteria A/1-D/4 (Ehringer and Cleveland, 2019). They may be eligible as contributors to a larger district related to the SWP, however, evaluation of such a district is beyond the scope of this report. Nonetheless, for the purposes of the proposed project, they are being considered as historical resources pursuant to CEQA. However, even if the SWP district existed, the proposed project's modifications to the tower bridge and tower would not result in a significant adverse change to the elements of the resource that would theoretically contribute to the resource's eligibility as a potential contributor to such a district, since the Castaic Dam and Lake would continue to reflect their association with mid-20th-century water conveyance and the SWP even after completion of the proposed project. Therefore, the proposed project would not result in a substantial adverse change in the significance of this historical resource.

While no archaeological resources were identified within the ADI, the area where the majority of ground disturbance would occur was inundated and was not accessible to surveyors. Since the proposed project would include excavations up to 10 feet in depth in areas that have not been systematically surveyed for at least 40 years or more, there is a potential for the proposed project to encounter unknown archaeological resources. Implementation of **Mitigation Measures CUL-1** and **CUL-2** would reduce potential direct impacts to archaeological resources qualifying as historical resources to a level of less than significant.

### Area of Indirect Impacts

Identification of historical resources within the AII is based on the 2016 cultural resources assessment prepared by ESA for the DWR Castaic Lake Drawdown Project (Vader and Lockwood, 2016). The assessment included a records search of Castaic Lake and a 0.5-mile buffer and a pedestrian survey of the area between the 1,495-foot and 1,380-foot elevation contours in November 2014. Based on the results of this assessment, a total of nine cultural resources are within the AII, including two prehistoric archaeological sites (CA-LAN--4475 and -4476); two historic-period archaeological sites (CA-LAN-4477 and -004478); two prehistoric isolates (P-19-101216 and -101217); one historic-period isolate (P-19-101218); and two historic built environment resources (P-19-003611 [ Dry Gulch Road] and -187811 [Lake Hughes Road]).

Resources CA-LAN-4477 and -4478, and P-19-101216, -101217, -101218, and -187811 were previously recommended not eligible for listing in the California Register, and do not qualify as historical resources pursuant to CEQA. Resources CA-LAN-4475 and -4476 were previously evaluated as eligible for listing in the California Register under Criterion 4 (information potential), and they qualify as historical resources pursuant to CEQA. Because P-19-003611 could not be accessed due to steep terrain and was not visually inspected, it has not been evaluated for listing in the California Register, However, it is being considered a historical resource for the purposes of this project[2].

Additionally, after ESA's survey and lake levels continued to decline, in April 2015 California State Parks recorded a new prehistoric archaeological site that had been at least partially submerged during the 2014 survey (referred to as the Castaic Incidental Find Site [Tejada, 2015]). The site appears to be at the 1,380-foot elevation contour. This site has not been evaluated for listing in the California Register. However, given that it has similar constituents to CA-LAN-4475 and -4476 with similar data potential, it is being considered a historical resource for the purposes of this project.[3]

Four historical resources have been identified within the AII, including three prehistoric archaeological sites (CA-LAN-4475 and -4476, and Castaic Incidental Find Site) and one historic-built resource (P-19-003611 [Dry Gulch Road]). These four resources could be subject to indirect impacts associated with the proposed project's drawdown of Castaic Lake, such as vandalism and erosion due to wave action. Also, there is the possibility that as-yet-unknown archaeological resources could be exposed in the AII as a result of the drawdown, particularly in the area between the 1,495-foot and 1,505-foot elevation contours, which was not surveyed in 2014 since it was not part of the DWR Castaic Lake Drawdown Project. Therefore, known historical resources, as well as as-yet-unknown archaeological resources that may qualify as historical resources, could be indirectly impacted by the proposed project. Implementation of **Mitigation Measures CUL-1** through **CUL-3** would reduce potential indirect impacts to archaeological resources qualifying as historical resources to a level of less than significant.

### *Mitigation Measures*

**CUL-1:** After the lake's surface elevation is lowered from the normal operation elevation of 1,505 feet to approximately 1,380 feet and the soils have dried sufficiently, a Qualified Archaeologist meeting the Secretary of the Interior's Professional Qualifications Standards for archaeology shall conduct a pre-construction archaeological resources survey of all accessible areas within the construction impact area and site access route and the area between the 1,495-foot and 1,505-foot elevation contours. DWR shall invite one representative from

[2] Pursuant to CEQA Guidelines Section 15064.5(a)(4), DWR has in its discretion determined that the resource may be a historical resource as defined in Public Resources Code sections 5020.1(j) or 5024.1

[3] *ibid*

the Fernandeño Tataviam Band of Mission Indians who consulted on this project (referred to hereafter as the consulting tribe) to participate in the survey. Prior to initiating the survey, the Qualified Archaeologist, or their designee, shall conduct a records search update at the South Central Coastal Information Center and a review of resources on file at California State Parks, U.S. Forest Service – Angeles National Forest, and U.S. Bureau of Land Management – Palm Springs-South Coast Field Office (land management agencies), to ensure that the most recent data is available to surveyors.

The survey shall document archaeological resources potentially qualifying as historical resources or unique archaeological resources or tribal cultural resources under CEQA. The Qualified Archaeologist shall document the results of the survey in a report addendum (or technical memorandum). The Qualified Archaeologist shall also prepare Department of Parks and Recreation (DPR) 523 forms for resources encountered during the survey, which shall be appended to the report. The Qualified Archaeologist shall submit the report to DWR within 5 days after completion of the survey. DWR shall provide a copy of the report addendum (or technical memorandum) and DPR 523 forms for resources that are prehistoric or Native American in origin to the consulting tribe for their review and comment, and shall provide them with 30 days to comment in writing. The Qualified Archaeologist shall prepare final documents incorporating DWR and tribal comments. The Qualified Archaeologist shall also submit the final documents to the South Central Coastal Information Center and land management agencies. In the event archaeological resources potentially qualifying as historical resources or unique archaeological resources or tribal cultural resources under CEQA are identified during the survey, they shall be treated in accordance with **Mitigation Measure CUL-2**.

**CUL-2:** In the event that archaeological resources potentially qualifying as historical resources or unique archaeological resources or tribal cultural resources under CEQA are encountered during pre-construction surveys or construction-related ground disturbance, the Qualified Archaeologist shall evaluate the resource to determine if it meets the definition for historical resource in CEQA Guidelines subdivision 15064.5(a) or unique archaeological resource in PRC subdivision 21083.2(g) or tribal cultural resource in PRC Section 21074. DWR shall consult with the consulting tribe on the eligibility of potential tribal cultural resources. If a discovery of archaeological materials occurs during construction, DWR or its contractor shall immediately cease all work activities in the area (within approximately 100 feet) of the discovery until the Qualified Archaeologist has inspected the discovery and conferred with DWR on the potential significance of the resource. In the event that the discovery is prehistoric or Native American in origin, DWR shall notify the consulting tribe and provide them with the opportunity to consult on the significance of the discovery, as well as the opportunity to provide a monitor during future ground disturbance, if deemed appropriate.

If it is determined that a discovered archaeological resource within the ADI meets the definition for historical resource in CEQA Guidelines subdivision 15064.5(a) or unique archaeological resource in PRC subdivision 21083.2(g) or tribal cultural resource in PRC subdivision 21074, avoidance and preservation in place shall be the preferred manner of mitigation. Preservation in place maintains the important relationship between artifacts and their archaeological context and also serves to avoid conflict with traditional and religious values of groups who may ascribe meaning to the resource. Preservation in place may be accomplished by, but is not limited to, avoidance, incorporating the resource into open space, capping, or deeding the site into a permanent conservation easement. If avoidance of a resource is determined by DWR to be infeasible in light of factors such as the nature of the find, proposed project design, costs, and other considerations, then the Qualified Archaeologist shall develop and implement an Archaeological Resources Data Recovery and Treatment Plan. The plan shall be designed to provide for adequately recovering the scientifically consequential information for which the resource is eligible for the CRHR under Criterion 4, which entails recovery of archaeological materials sufficient to address important regional and local research questions.

DWR shall afford the consulting tribe the opportunity to participate in development of plans for data recovery and treatment of prehistoric or Native American resources to ensure that cultural values ascribed to the resource by the tribe are considered . DWR shall also afford the consulting tribe the opportunity to monitor implementation of any data recovery or other treatment measures for prehistoric or Native American resources. Should the consulting tribe elect not to participate, DWR shall consult with other appropriate Native American representatives in determining treatment for prehistoric or Native American resources.

If any additional historical resources, unique archaeological resources, or tribal cultural resources are identified in the AII, they shall be subject to the site condition assessments required by **Mitigation Measure CUL-3**.

**CUL-3:** A Qualified Archaeologist meeting the Secretary of the Interior's Professional Qualifications Standards for archaeology, or an archaeologist working under their direct supervision, shall conduct periodic site condition assessments of resources CA-LAN-4475, CA-LAN-4476, Castaic Incidental Find Site, P-19-003611, P-19-101216, and P-19-101217, and any other historical or unique archaeological resources or tribal cultural resources that may be identified in the AII as a result of surveys and evaluations required in **Mitigation Measures CUL-1** and **CUL-2**. Site condition assessments shall be conducted on a monthly basis for the duration of the lake drawdown related to this project (estimated to be 4 months). DWR shall afford the consulting tribe the opportunity to participate in site condition assessments for prehistoric or Native American resources. The archaeologist shall inspect each resource to assess whether the

project's drawdown is adversely impacting resources through actions such as increased erosion due to wave action, looting, vandalism, or other disturbances that could be the inadvertent result of the project's drawdown.

The results of the monthly inspections shall be documented on Site Condition Assessment Forms and shall include: confirmation of resource boundaries with sub-meter GPS; relocation of previously identified artifacts; confirmation of locations, quantities, and types of artifacts present; general condition and disturbances observed; photography to document whether any change in resource condition has occurred; and recommendations for protective measures or for data recovery/documentation/interpretation for any resources that are being adversely impacted by the drawdown. DPR 523 form updates, following California Office of Historic Preservation's (OHP) *Instructions for Recording Historical Resources,* shall be prepared and filed with the South Central Coastal Information Center for all resources where changes in setting or condition are observed. Site Condition Assessment Forms and any associated DPR 523 form updates shall be submitted to DWR within 5 working days of completion of each inspection. DWR shall provide a copy of site conditions assessments and DPR 523 forms for resources that are prehistoric or native American in origin to the consulting tribe for their review and comment, and shall provide them with 30 days to comment in writing. The Qualified Archaeologist shall prepare final documents incorporating DWR and tribal comments.

If project-related adverse impacts occur to any resource(s), the Qualified Archaeologist shall provide recommendations for additional protective measures or data recovery and/or additional documentation and interpretation (depending on the nature of the resource). Protective measures may include, but would not be limited to, increased security patrols, temporary fencing and/or signage, or stabilization efforts. DWR shall afford the consulting tribe the opportunity to monitor implementation of any protective measures for prehistoric or Native American resources. If it is clear that additional protective measures would not prevent further damage and the project is likely to result in a substantial adverse change in the significance of a resource such that the resource will no longer convey its historical significance and would no longer be eligible for listing in the California Register, DWR shall implement data recovery and/or additional documentation and interpretation per the Qualified Archaeologist's recommendations. DWR shall implement recommended measures as expeditiously as possible to prevent further damage or to mitigate adverse impacts before additional damage occurs. If data recovery is selected, the Qualified Archaeologist shall develop and implement an Archaeological Resources Data Recovery and Treatment Plan following the same process as outlined under CUL-2.

If protective measures are implemented, verification of the measures' success shall be confirmed during the monthly site condition assessments for the duration

of the drawdown. If the protective measures fail to prevent further damage, then DWR shall implement data recovery and/or additional documentation and interpretation following the process outlined above.

b) **Less than Significant with Mitigation.** As described under Issue 2.5 a, no archaeological resources were identified within the ADI. While no archaeological resources were identified within the ADI, the area where the majority of ground disturbance would occur was inundated and was not accessible to surveyors. Since the proposed project would include excavations up to 10 feet in depth in areas not recently surveyed, there is a potential for the proposed project to directly impact unknown archaeological resources. Implementation of **Mitigation Measures CUL-1** and **CUL-2**, described under Issue 2.5 a, would reduce potential direct impacts to archaeological resources to a level of less than significant.

As described under Issue 2.5 a, archaeological resources are known to be within the AII. Also, there is the possibility that as-yet-unknown archaeological resources could be exposed in the AII as a result of the drawdown, particularly in the area between the 1,495-foot and 1,505-foot elevation contours, which was not surveyed in 2014 since it was not part of the DWR Castaic Lake Drawdown Project. Therefore, known and as as-yet-unknown archaeological resources located within the AII could be indirectly impacted by the proposed project. Implementation of **Mitigation Measures CUL-1** through **CUL-3**, described under Issue 2.5 a, would reduce potential impacts to archaeological resources to a level of less than significant.

c) **Less than Significant with Mitigation.** No human remains are known to exist within the ADI or AII, including those located outside of dedicated cemeteries, and the NAHC does not have any record of Native American burials within or near the proposed project area (Quinn, 2019). Nonetheless, given the proposed project would include excavations up to 10 feet in depth within the ADI as well as a drawdown of the entire lake. These actions have the potential to disturb and/or expose human remains. Implementation of **Mitigation Measure CUL-4** would reduce potential impacts to human remains to a level of less than significant.

### *Mitigation Measures*

**CUL-4:** Human remains discoveries shall be treated in accordance with California Health and Safety Code Section 7050.5 and Public Resources Code Section 5097.98, which require assessment of the discovery by the County Coroner, assignment of a Most Likely Descendant (MLD) by the California Native American Heritage Commission, and consultation between the MLD and the landowner regarding treatment of the discovery. Until the landowner has conferred with the MLD, DWR or its contractor shall ensure that the immediate vicinity where the discovery occurred is not disturbed by further activity, is adequately protected according to generally accepted cultural or archaeological standards or practices, and that further activities take into account the possibility of multiple burials. In the event of a humans remains discovery, DWR shall also notify the consulting tribe within 48 hours of the discovery.

## References

Ehringer, Candace, and Katherine Cleveland. 2019. *California Department of Water Resources Castaic Dam High Intake Tower Bridge Retrofit Project: Cultural Resources Assessment*. Prepared for California Department of Water Resources. Prepared by Environmental Science Associates.

Leonard, Nelson N. III. 1974. *Archaeological Resources of the Proposed Castaic Conduit System*. Document on file at SCCIC. Quinn, Steven. 2019. Letter RE: Results of a Sacred Lands Search for the Castaic Dam High Intake Tower Access Bridge Retrofit Project, Los Angeles County. Document on file at Environmental Science Associates.

Schulz, Peter D. 1977. *Review of Archaeological Resource Identification and Impact Mitigation California Aqueduct Project (West Branch, Mojave Division and Coastal Branch)*. Document on file at SCCIC.

Tejada, Barbara. 2015. California Department of Parks and Recreation 523 Forms for the Castaic Incidental Find Site. Document on file at California State Parks.

Vader, Michael, and Christopher Lockwood. 2016. *California Department of Water Resources Castaic Lake Drawdown Project Phase I Cultural Resources Survey Report*. Prepared for California Department of Water Resources. Prepared by Environmental Science Associates.

# 2.6 Energy

| Issues (and Supporting Information Sources): | Potentially Significant Impact | Less Than Significant with Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| **ENERGY —** Would the project: | | | | |
| 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? | ☐ | ☐ | ☒ | ☐ |

## Discussion

Supporting documentation of the energy calculations provided in this section are included in Appendix A of this IS/MND.

The proposed project would consume energy during construction activities primarily from on- and off-road vehicle, and off-road equipment fuel consumption in the form of diesel and gasoline. The analysis below includes the project's energy requirements and energy use efficiencies by fuel type for each stage of the project (construction and operations). However, operations energy consumption would be minimal as the project is an infrastructure project that involves tower bridge seismic retrofitting and does not include net new stationary sources. The project would require periodic maintenance activities which would involve a few trucks or vehicles. Fuel consumption from the few vehicles for periodic maintenance would result in minimal energy use. Additionally, the construction and operational activities would not include natural gas usage.

The project's estimated construction energy consumption was calculated using the CalEEMod Version 2016.3.2 and spreadsheet calculations to determine transportation fuel consumption. Electricity consumption estimates used for powering lighting and other construction activities were provided by the applicant.

a) **Less than Significant Impact.** The project would consume energy during construction activities, primarily from on- and off-road vehicle, and off-road equipment fuel consumption in the form of diesel and gasoline. For construction, electricity would be used for construction activities such as construction lighting. For comparison purposes, the project's construction energy demand from transportation fuel and electricity is compared to the Los Angeles County and Statewide transportation fuel sales and electricity usage. In addition, the project's construction electricity demand is compared to the Southern California Edison service area, which covers approximately 50,000 square miles, 180 incorporated cities, and 15 counties in Southern California (excluding San Diego and Imperial Counties) and in the southeast Sierra Nevada Mountains area. The estimated project fuel consumption and comparison to existing (2017) state and county usage are provide in **Table 2-8**. The total project use of gasoline- and diesel-powered mobile construction equipment would be less than 0.01 percent and less than 0.01 of the overall annual state gasoline- and diesel-usage in 2018, respectively, and less than 0.01 percent and approximately 0.04 percent of the Los Angeles County gasoline- and diesel-

usage in 2018, respectively. The annual use of electricity from construction activities would be less than 0.01 percent of the Los Angeles County electricity usage in 2018, less than 0.01 percent of the state electricity usage in 2018, and less than 0.01 percent of the SCE electricity kilo-watt hour sales in 2017. Therefore, the increased demand from the proposed project would not require regional or local capacity increases.

Project construction trucks would be required to comply with fuel saving regulations such as the USEPA Phase 1 and Phase 2 standards, which affect model year 2014 through model year 2027 medium- and heavy-duty trucks. The Phase 1 standards result in a reduction in fuel consumption from 6 to 23 percent over the 2010 baseline, depending on the vehicle type (USEPA, 2011). The USEPA and the National Highway Traffic Safety Administration (NHTSA) jointly finalized the Phase 2 standards, which cover model years 2021 through 2027 and require the phase in of a 5 to 25 percent reduction in fuel consumption over the 2017 baseline depending on the compliance year and vehicle type (USEPA, 2016). According to the USEPA, the Phase 2 standards would reduce oil consumption by up to two billion barrels (84 billion gallons) over the lifetime of the vehicles sold under the program (USEPA, 2018), and a portion of the fuel savings would be from those model year 2017 through 2027 medium- and heavy-duty trucks used for the project. Furthermore, mobile equipment used on-site would be limited by California law to a maximum of 5 minutes of idling time per location (Title 13 California Code of Regulations [CCR] Section 2485) as applicable. While the goal of the idling regulation is primarily to reduce public health impacts from diesel emissions, compliance with the regulation also results in energy savings in the form of reduced fuel consumption from unnecessary idling. As a result, construction of the project would not result in wasteful, inefficient, or unnecessary consumption of energy resources. Impacts would be less than significant.

**TABLE 2-8**
**ESTIMATED PROJECT CONSTRUCTION FUEL CONSUMPTION**

| | Total Project Fuel Consumption (gallons) | | Project Electrical Consumption |
|---|---|---|---|
| | **Diesel** | **Gasoline** | **GWh/yr** |
| Project Total Usage | 216,611 | 32,364 | 0.002 |
| Los Angeles County Usage[a] | 527,083,333 | 3,638,000,000 | 67,856 |
| % County Usage | 0.04% | <0.01% | <0.01% |
| State Usage[a] | 3,702,083,333 | 15,471,000,000 | 562,240 |
| % State Usage | <0.01% | <0.01% | <0.01% |
| SCE Electricity Usage[c] | NA | NA | 87,143 |
| % SCE Usage | NA | NA | <0.01% |

[a] CEC 2019a, CEC 2019b

[b] SCE 2019.

SOURCE: Refer to Appendix A

As stated above, operational energy consumption would be minimal as the project is an infrastructure project that involves bridge deck strengthening and seismic retrofitting of the tower bridge to the lake's high tower, and would not require new stationary sources. The proposed project would not result in net new electricity or natural gas energy consumption, but would require periodic maintenance activities which would involve a few trucks or vehicles per month, similar to existing conditions. Fuel consumption from the few vehicles for periodic maintenance would result in minimal energy use. Thus, operation of the project would use energy necessary to provide maintenance for the project but would not result in the wasteful, inefficient, and unnecessary use of energy and impacts would be less than significant.

b) **Less than Significant Impact.** Construction and operation of the project would not result in an increase in demand for natural gas and a minimal and temporary increase in electricity demand. As stated above, the project's energy consumption primarily would result from on- and off-road fuel, and off-road equipment use from construction related vehicles. The project is an infrastructure project that once constructed would not contribute to operational related energy consumption requiring increased supply or distribution facilities. Construction of the project would comply with applicable regulations that would minimize necessary fuel usage such as the USEPA Phase 2 standards and CARB idling regulation, as discussed previously. Therefore, the project's burden on energy demand would be minimal and would not result in a need for increased supply or distribution infrastructure capabilities and would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency. Impacts would be less than significant.

## References

California Air Resources Board, Proposed Regulation Order: Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling, Appendix A, 2004. Available at https://ww3.arb.ca.gov/regact/idling/isorappf.pdf. Accessed October 2019.

California Energy Commission, 2019a. 2018 California Annual Retail Fuel Outlet Report Results (CEC-A15) Energy Assessments Division, 2019. Available at: https://ww2.energy.ca.gov/almanac/transportation_data/gasoline/piira_retail_survey.html. Accessed October 2019.

California Energy Commission, 2019b. California Energy Consumption Database. Available at: http://www.ecdms.energy.ca.gov. Accessed October 2019.

United States Environmental Protection Agency (USEPA), 2011. EPA and NHTSA Adopt First-Ever Program to Reduce Greenhouse Gas Emissions and Improve Fuel Efficiency of Medium- and Heavy-Duty Vehicles, EPA-420-F-11-031, August. Available at: https://nepis.epa.gov/Exe/ZyPDF.cgi/P100BOT1.PDF?Dockey=P100BOT1.pdf. Accessed October 2019.

USEPA, 2016. Greenhouse Gas Emissions and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles—Phase 2, *Federal Register* 81(206), October 25. Available at: https://www.gpo.gov/fdsys/pkg/FR-2016-10-25/pdf/2016-21203.pdf. Accessed October 2019.

USEPA, 2018. Final Rule for Greenhouse Gas Emissions and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles - Phase 2. Available at: https://www.epa.gov/regulations-emissions-vehicles-and-engines/final-rule-greenhouse-gas-emissions-and-fuel-efficiency. Accessed October 2019.

# 2.7 Geology and Soils

| *Issues (and Supporting Information Sources):* | *Potentially Significant Impact* | *Less Than Significant with Mitigation Incorporated* | *Less Than Significant Impact* | *No Impact* |
|---|---|---|---|---|
| **GEOLOGY AND SOILS —** Would the project: | | | | |
| 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 waste water? | ☐ | ☐ | ☐ | ☒ |
| f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature? | ☐ | ☒ | ☐ | ☐ |

## Discussion

a.i-iv) **Less than Significant Impact.** The faults most susceptible to earthquake rupture are active faults, which have experienced surface displacement within the last 11,000 years. The project site is not located within an Alquist-Priolo Earthquake Fault Zone and no mapped active faults are known to pass through the immediate project region. The nearest Alquist-Priolo Earthquake Fault Zone is approximately 6 miles northwest of the project site. Therefore, the potential for fault rupture to affect the proposed project would be considered less than significant.

The project area is located in a seismically active region and is subject to strong ground shaking. The principal potential earthquake hazard for the project area is ground shaking, which could cause damage to buildings and infrastructure. However, the proposed project includes updates to the high tower's bridge at Castaic Lake in order to make it

seismically capable of withstanding a potential earthquake of 7.3 magnitude. Since the proposed project improves the capacity of the tower bridge to withstand ground shaking impacts would be considered less than significant.

Liquefaction is a phenomenon where unconsolidated and/or near saturated soils lose cohesion and are converted to a fluid state as a result of severe vibratory motion. The relatively rapid loss of soil during strong earthquake shaking results in the temporary fluid-like behavior of the soil. The proposed project site itself does not overlap with a liquefaction zone, unlike the Castaic Lagoon. The proposed project would include upgrades to the existing tower bridge and would not include construction of new or habitable facilities. Impacts would be considered less than significant.

Landslides are deep-seated ground failures (several tens to hundreds of feet deep) in which a large section of a slope detaches and slides downhill. Landslide-susceptible areas are characterized by steep slopes and downslope creep of surface materials. There is no information through the California Department of Conservation on landslides directly within the project site, areas located south of Castaic Lake are classified as having the potential for landslides. The proposed project includes updates to an existing tower bridge and would not add any new structures or impact existing habitable structures. The proposed project would not directly or indirectly include the risk of loss, injury or death involving seismic related ground failure and impacts would be considered less than significant.

The proposed project includes retrofitting existing infrastructure to be resilient to the potential impact of future earthquakes in the project area. Implementation of the proposed project would not expose people or structures, directly or indirectly, to potential substantial adverse impact, including loss, injury, or death resulting from seismically induced fault rupture, ground shaking, liquefaction or landslides.

b) **Less than Significant Impact.** During construction of the proposed project, grading and excavation activities would expose and disturb surface soils. Construction would begin once soil sufficiently dries to complete excavation work. Excavation would occur to a depth of up to 10 feet surrounding tower bridge piers and along the lakebed access road. During construction, approximately 2,750 cubic yards of soil would be removed and temporarily stored at nearby staging areas. Soil exposed by construction activities could be subject to erosion if exposed to heavy rain, winds, or other storm events. However, the proposed project would require a National Pollution Discharge Elimination System (NPDES) Construction General Permit from the Regional Water Quality Control Board, as the proposed project would disturb at least one acre of soil. A project specific Storm Water Pollution Prevention Plan (SWPPP) would be prepared in compliance with the Construction General Permit.

The SWPPP would identify erosion control and sediment control best management practices (BMPs) that would be implemented to minimize the occurrence of soil erosion or loss of topsoil. Once the carbon fiber jackets have been applied and allowed to cure,

the excavated soil would be backfilled around the Piers and Abutment 5. The remaining excavated soil would be stored on-site within the DWR maintenance yard for future maintenance needs. Additionally, once construction of the proposed project is complete water levels would be returned to normal operating conditions and any soils exposed during construction would become submerged again. With implementation of the required SWPPP and BMPs, impacts would be less than significant.

c) **Less than Significant Impact.** As discussed above, impacts relating to liquefaction and landslides would be less than significant. Land subsidence can occur as a result of groundwater or oil extraction. Construction and operation of the proposed project would not include water or oil extraction. Drawdown of the lake would not involve the pumping of groundwater. As such, implementation of the proposed project would not promote subsidence. Impacts would be less than significant.

d) **Less than Significant Impact.** Expansive soils are predominantly comprised of clays, which expand in volume when water is absorbed and shrink when the soil dries. Expansion is measured by shrink-swell potential, which is the volume change in soil with a gain in moisture. Soils with a moderate to high shrink-swell potential can cause damage to roads, buildings, and infrastructure (USDA, 2019). The project site is surrounded by Castaic-Balcom silty clay loams, Hanford sandy loam, and Ramona loam, all of which are well drained. The Hanford and Ramona loams are derived from alluvial granite and the Castaic-Balcom clay is derived of residuum weathered from sedimentary rocks. Soils within the lake are not mapped by USDA. These soils are contained solely under water and do not pose an issue related to shrinking and swelling as lake levels are maintained at particular operating levels year-round (except in the rare case of extreme drought conditions). The proposed project includes upgrades to an existing structure (tower bridge) and would not construct new facilities at the lake and would, therefore, not modify existing conditions. Impacts would be less than significant.

e) **No Impact.** The proposed project does not include septic tanks or alternative waste disposal systems. As a result, there is no potential for soil failure associated with the installation of septic tanks or alternative waste disposal systems.

f) **Less than Significant with Mitigation.** Castaic Lake is located within the Sierra Pelona Mountains, part of the Transverse Ranges of Southern California. Bedrock within the vicinity of Castaic Lake consists primarily of Castaic Formation marine clastic rocks, including shale, claystone, sandstone, and conglomerate (Dibblee and Ehrenspeck, 1997a/1997b). These rocks formed in a shallow marine environment during the late Miocene epoch (approximately 11.6–5.3 million years ago) between the Mohnian and Delmontian stages (Barren, 1989) and were subsequently uplifted. The Ski Arm of the lake is bounded primarily by gray, micaceous clay shale and claystone with some thin sandstone strata (Tc). The Fish Arm of the lake is bounded primarily by light gray to tan, arkosic sandstone with interbedded clay shale, as well as pebble-cobble conglomerate in lower strata (Tcs). The northern end of the Fish Arm is bounded by a conglomerate composed of hard sandstone cobbles and pebbles (Tcg).

The geology of the proposed project area has been mapped by Dibblee and Ehrenspeck at a scale of 1:24,000. The proposed project area is underlain by late Miocene-age clay shale or claystone (Tc) (also referred to as the Castaic Formation) (approximately 11.6-5.3 million years ago), older Pleistocene-age alluvium (Qoa) (approximately 2.5 million years ago – 11,000 B.P.), and recent (modern) artificial fill.

The Natural History Museum of Los Angeles County (LACM) conducted a search of its paleontology collection records on October 10, 2019 (McLeod, 2019). The search revealed that no vertebrate fossil localities have been recorded within the boundaries of the proposed project area. However, there are localities nearby from the same sedimentary deposits that occur within the proposed project area, both at surface and at depth.

The closest vertebrate fossil locality from older Pleistocene-age alluvium (Qoa) is LACM 5745, located about 17 miles to the south-southeast of the proposed project area in the northeastern San Fernando Valley. This locality produced fossil specimens of mastodon and horse in artificial fill. The next closest fossil vertebrate localities from older Pleistocene-age alluvium (Qoa) are LACM 3397 and LACM 7152, located about 20 miles south of the proposed project area near Van Norman Reservoir. LACM 3397 produced a specimen of fossil bison at a depth of 75 feet and LACM 7152 produced fossil mammoth and bison in terrace deposits.

The closest locality from the late Miocene-age Castaic Formation (Tc) is LACM (CIT) 440, located about 6 miles to the southeast of the proposed project area. This locality produced a fossil specimen of camel. Located a little further to the southeast of the proposed project area, locality LACM 5461 produced an uncommon fossil specimen of tapir from a shell bed. Slightly further to the south, LACM 7772-7773 produced fossil specimens of sea turtle, carnivore, and baleen whale. Even further to the southeast of the proposed project area, locality LACM 7656 produced a rare nearly complete carapace of a fossil leatherback turtle.

Excavations in the artificial fill exposed in the southern portion of the proposed project area is unlikely to uncover significant vertebrate fossil remains, unless excavations extend into underlying native sediments, such as the older alluvium or the Castaic Formation. Excavations in the older alluvium or Castaic Formation may encounter significant fossil vertebrate specimens. Since the proposed project's excavations would extend up to 10 feet in depth, it is possible that fossiliferous deposits could be encountered. Should fossiliferous deposits be encountered, the proposed project could result in an impact to unique paleontological resources. **Mitigation Measures GEO-1** and **GEO-2** would reduce potential impacts to a level of less than significant.

### *Mitigation Measures*

**GEO-1:** Prior to the start of construction, a Qualified Paleontologist (defined as a paleontologist who meets the standards of the Society of Vertebrate Paleontology), or their designee, shall conduct paleontological resources

sensitivity training for construction personnel. The training shall include instruction on the appearance of fossils, and the procedures and notification protocols to follow in the event of a discovery. DWR shall ensure that construction personnel are made available for and attend the training and retain documentation demonstrating attendance.

**GEO-2:** In the event of a fossil discovery by construction personnel, all work in the immediate vicinity of the find shall cease and the Qualified Paleontologist shall evaluate the find before restarting construction activity in the area. The Qualified Paleontologist shall assess the discovery and make recommendations as to the appropriate treatment. If the find is deemed significant, it shall be salvaged following the standards of the Society of Vertebrate Paleontology and curated with a certified repository. The Qualified Paleontologist shall provide recommendations regarding whether paleontological monitoring is warranted for future ground disturbance.

## References

Barren, John A. 1989. Diatom Stratigraphy of the Monterey Formation and related rocks, San Jose 30' by 60' quadrangle, California. Open-File Report 89-565. USGS, Reston, Virginia.

Dibblee, Tom W., and Helmut E. Ehrenspeck. 1997a. Geologic map of the Warm Springs Mountain quadrangle, Los Angeles County, California: Dibblee Geological Foundation, Dibblee Foundation Map DF-64, scale 1:24,000. Electronic document, http://ngmdb.usgs.gov/ngm-bin/pdp/zui_viewer.pl?id=34296, accessed February 4, 2015.

Dibblee, Tom W., and Helmut E. Ehrenspeck. 1997b. Geologic map of the Whitaker Peak quadrangle, Los Angeles and Ventura Counties, California: Dibblee Geological Foundation, Dibblee Foundation Map DF-63, scale 1:24,000. Electronic document, http://ngmdb.usgs.gov/ngm-bin/pdp/zui_viewer.pl?id=34295, accessed February 4, 2015.

McLeod, Samuel. 2019. Letter RE: Paleontological Resources for the Proposed Castaic Dam High Intake Tower Access Bridge Retrofit Project, ESA Project # D170020.17, in Castaic Lake, Los Angeles County, Project Area. Natural History Museum of Los Angeles County, Vertebrate Paleontology Section, 10 October 2019.United States Department of Agriculture (USDA). 2019. Natural Resources Conservation Service, Web Soil Survey, Available at: https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx, accessed on October 2019.

# 2.8 Greenhouse Gas Emissions

| Issues (and Supporting Information Sources): | Potentially Significant Impact | Less Than Significant with Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| **GREENHOUSE GAS EMISSIONS —** Would the project: | | | | |
| 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? | ☐ | ☐ | ☒ | ☐ |

## Discussion

"Global warming" and "global climate change" are the terms used to describe the increase in the average temperature of the earth's near-surface air and oceans since the mid-20th century and its projected continuation. According to the Intergovernmental Panel on Climate Change (IPCC) warming of the climate system is now considered unequivocal (IPCC, 2007). Natural processes and human actions have been identified as the causes of this warming. The IPCC has concluded that variations in natural phenomena such as solar radiation and volcanoes produced most of the warming from pre-industrial times to 1950 and had a small cooling effect afterward. After 1950, increasing greenhouse gas (GHG) concentrations resulting from human activity such as fossil fuel burning and deforestation are believed to be responsible for most of the observed temperature increase. Increases in GHG concentrations in the earth's atmosphere are thought to be the main cause of human-induced climate change. Certain gases in the atmosphere naturally trap heat by impeding the exit of solar radiation that is reflected back into space after striking the earth. This is sometimes referred to as the "greenhouse effect," and the gases that cause it are called "greenhouse gases." Some GHGs occur naturally and are necessary for keeping the earth's surface inhabitable. However, increases in the concentrations of these gases in the atmosphere during the last 100 years have decreased the amount of solar radiation that is reflected back into space, intensifying the natural greenhouse effect and increasing average global temperatures.

State law defines GHGs as carbon dioxide ($CO_2$), methane ($CH_4$), nitrous oxide ($N_2O$), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride ($SF_6$). When concentrations of these gases exceed natural concentrations in the atmosphere, the greenhouse effect may be intensified. $CO_2$, $CH_4$ and $N_2O$ occur naturally, and through human activity. Emissions of $CO_2$ are largely by-products of fossil fuel combustion, whereas $CH_4$ results from off-gassing[4] associated with agricultural practices and landfills. Other human-generated GHGs include fluorinated gases such as HFCs, PFCs and $SF_6$, which have much higher heat-absorption potential than $CO_2$, and are byproducts of certain industrial processes.

$CO_2$ is the reference gas for climate change because it is the predominant GHG emitted. The effect that each of the aforementioned gases can have on global warming is a combination of the mass of their emissions and their global warming potential (GWP). GWP indicates, on a pound-for-pound basis, how much a gas contributes to global warming relative to how much warming

4 Off-gassing is defined as the release of chemicals under normal conditions of temperature and pressure.

would be caused by the same mass of $CO_2$. For example, $CH_4$ and $N_2O$ are substantially more potent GHGs than $CO_2$, with GWPs of 25 and 298 times that of $CO_2$, respectively.

In emissions inventories, GHG emissions are typically reported in terms of pounds or metric tons of $CO_2$ equivalents ($CO_2e$). $CO_2e$ is calculated as the product of the mass emitted of a given GHG and its specific GWP. While $CH_4$ and $N_2O$ have much higher GWPs than $CO_2$, $CO_2$ is emitted in such vastly higher quantities that it accounts for the majority of GHG emissions in $CO_2e$, both from residential/commercial developments and human activity in general.

Although GHG emissions can be quantified, CARB, SCAQMD, and Los Angeles County have not formally adopted project-level significance thresholds for GHG emissions that would be applicable to the project. The Governor's Office of Planning and Research (OPR) released a technical advisory on CEQA and climate change that provided some guidance on assessing the significance of GHG emissions, and states that "lead agencies may undertake a project-by-project analysis, consistent with available guidance and current CEQA practice," (OPR, 2008) and that while "climate change is ultimately a cumulative impact, not every individual project that emits GHGs must necessarily be found to contribute to a significant cumulative impact on the environment." Furthermore, the technical advisory states that "CEQA authorizes reliance on previously approved plans and mitigation programs that have adequately analyzed and mitigated GHG emissions to a less than significant level as a means to avoid or substantially reduce the cumulative impact of a project." (OPR, 2008).

Per CEQA Guidelines Section 15064(h)(3), a project's incremental contribution to a cumulative impact can be found not cumulatively considerable if the project would comply with an approved plan or mitigation program that provides specific requirements that would avoid or substantially lessen the cumulative problem within the geographic area of the project.[5] To qualify, such a plan or program must be specified in law or adopted by the public agency with jurisdiction over the affected resources through a public review process to implement, interpret, or make specific the law enforced or administered by the public agency.[3] Examples of such programs include a "water quality control plan, air quality attainment or maintenance plan, integrated waste management plan, habitat conservation plan, natural community conservation plan, [and] plans or regulations for the reduction of greenhouse gas emissions."[3] Thus, CEQA Guidelines Section 15064(h)(3) allows a lead agency to make a finding of non-significance for GHG emissions if a project complies with a program or other regulatory schemes to reduce GHG emissions.[6]

5 14 CCR Section 15064(h)(3).

6 See, for example, San Joaquin Valley Air Pollution Control District (SJVAPCD), CEQA Determinations of Significance for projects Subject to ARB's GHG Cap-and-Trade Regulation, APR-2025 (June 25, 2014), in which the SJVAPCD "determined that GHG emissions increases that are covered under ABR's Cap-and-Trade regulation cannot constitute significant increases under CEQA…" Furthermore, the SCAQMD has taken this position in CEQA documents it has produced as a lead agency. The SCAQMD has prepared three Negative Declarations and one Draft Environmental Impact Report that demonstrate the SCAQMD has applied its 10,000 $MTCO_2e$/yr significance threshold in such a way that GHG emissions covered by the Cap-and-Trade Program do not constitute emissions that must be measured against the threshold. See SCAQMD, Final Negative Declaration for Ultramar Inc. Wilmington Refinery Cogeneration project, SHC No. 2012041014 (October 2014); SCAQMD Final Negative Declaration for Phillips 99 Los Angeles Refinery Carson Plant—Crude Oil Storage Capacity project, SCH No. 2013091029 (December 2014); SCAQMD Final Mitigated Negative Declaration for Toxic Air Contaminant Reduction for Compliance with SCAQMD Rules 1420.1 and 1402 at the Exide Technologies Facility in Vernon, CA, SCH No. 2014101040 (December 2014); and SCAQMD Final Environmental Impact Report for the Breitburn Santa Fe Springs Blocks 400/700 Upgrade project, SCH No. 2014121014 (August 2015).

a) **Less than Significant Impact.** According to SCAQMD methodology, because GHG emissions are a cumulative impact, project significance is determined by the combined amortized construction and operational emissions. As a method for evaluating significance under CEQA, SCAQMD developed a draft tiered flowchart in 2008 for determining significance thresholds for GHGs for industrial projects where SCAQMD is acting as the lead agency (SCAQMD, 2008). In December 2008, SCAQMD adopted a 10,000 metric tons of $CO_2e$ ($MTCO_2e$)/year threshold for industrial facilities for projects in which SCAQMD is the lead agency. Although SCAQMD has not formally adopted a significance threshold for GHG emissions generated by a project for which SCAQMD is not the lead agency, or a uniform methodology for analyzing impacts related to GHG emissions on global climate change, in the absence of any industry-wide accepted standards applicable to this project, the SCAQMD's significance threshold of 10,000 $MTCO_2e$ per year for industrial projects is the most relevant GHG significance threshold and is used as a benchmark for the project. It should be noted that the SCAQMD's significance threshold of 10,000 $MTCO_2e$ per year for industrial projects is intended for long-term operational GHG emissions. The SCAQMD has developed guidance for the determination of the significance of GHG construction emissions that recommends that total emissions from construction be amortized over an assumed project lifetime of 30 years and added to operational emissions and then compared to the threshold (SCAQMD, 2008).

The justification for the threshold is provided in SCAQMD's Interim CEQA GHG Significance Threshold for Stationary Sources, Rules and Plans (SCAQMD Interim GHG Threshold) (SCAQMD, 2008). The SCAQMD Interim GHG Threshold identifies a screening threshold to determine whether additional analysis is required. As stated by the SCAQMD:

> *"…the…screening level for stationary sources is based on an emission capture rate of 90 percent for all new or modified projects…the policy objective of [SCAQMD's] recommended interim GHG significance threshold proposal is to achieve an emission capture rate of 90 percent of all new or modified stationary source projects. A GHG significance threshold based on a 90 percent emission capture rate may be more appropriate to address the long-term adverse impacts associated with global climate change because most projects will be required to implement GHG reduction measures. Further, a 90 percent emission capture rate sets the emission threshold low enough to capture a substantial fraction of future stationary source projects that will be constructed to accommodate future statewide population and economic growth, while setting the emission threshold high enough to exclude small projects that will in aggregate contribute a relatively small fraction of the cumulative statewide GHG emissions. This assertion is based on the fact that [SCAQMD] staff estimates that these GHG emissions would account for slightly less than one percent of future 2050 statewide GHG emissions target (85 [$MMTCO_2e$ per year]). In addition, these small projects may be subject to future applicable GHG control regulations that would further reduce their overall future contribution to*

> *the statewide GHG inventory. Finally, these small sources are already subject to [Best Available Control Technology (BACT)] for criteria pollutants and are more likely to be single-permit facilities, so they are more likely to have few opportunities readily available to reduce GHG emissions from other parts of their facility."*

Thus, based on guidance from the SCAQMD, if an industrial project would emit GHGs less than 10,000 $MTCO_2e$ per year, the project would not be considered a substantial GHG emitter and GHG emission impact would be less than significant, requiring no additional analysis and no mitigation.

CEQA Guidelines 15064.4 (b)(1) states that a lead agency may use a model or methodology to quantify GHGs associated with a project. In late 2017, the SCAQMD in conjunction with the California Air Pollution Control Officers Association (CAPCOA) released the latest version of the CalEEMod (Version 2016.3.2). The purpose of this model is to estimate construction-source and operational-source emissions from direct and indirect sources. Accordingly, the latest version of CalEEMod has been used for this project to estimate the project's emission impacts.

Construction GHG emissions for the proposed project were estimated using CalEEMod Version 2016.3.2 with the same assumptions as the air quality analysis as described in Section 2.3, *Air Quality*. Proposed project-generated emissions were modeled based on general information provided in the proposed project description and default SCAQMD-recommended settings and parameters attributable to the proposed land use types and site location. Lake drawdown activities would begin in the third quarter of 2020 and active construction and seismic retrofitting activities beginning in Winter 2020, occurring in phases over approximately 15.5 months.

The proposed project's total estimated GHG emissions during the construction activities would be approximately 2,380 $MTCO_2e$ over the project duration of 15.5 months from Winter 2020 through early 2022. This would equal approximately 79 $MTCO_2e$ per year after amortization over 30 years per SCAQMD methodology.

Operational activities associated with the project would result in minor amounts of GHG emissions. Operational sources of GHG emissions would include mobile sources from vehicles for periodic maintenance. Mobile emissions would only add trace amounts of GHG emissions annually and would not substantially contribute to annual operational GHG emissions. As the amortized project construction emissions and negligible operational emissions would be less than the 10,000 $MTCO_2e$/year threshold, the proposed project would result in less than significant impacts.

b) **Less than Significant Impact.** The proposed project would not conflict with any plan, policy, or regulation aimed at reducing the emissions of greenhouse gas emissions, as discussed below. Impacts would be less than significant.

### *Consistency with CARB Scoping Plan*

The CARB Scoping Plan was designed to reduce Statewide GHG emissions to meet the adopted targets in Assembly Bill 32 (i.e., 1990 level GHG emissions by 2020) and Senate Bill 32 (i.e., 40 percent below 1990 level GHG emission by 2030) (CARB, 2008, 2011, 2014, 2017). The majority of the Scoping Plan measures target measures that reduce energy and transportation emissions from residential and commercial/industrial development and therefore the majority of the Scoping Plan measures are not applicable to the project as there is minimal operational energy or transportation emissions. The majority of project emissions are associated with construction activities. Out of the Recommended Actions contained in CARB's Scoping Plan, the actions that are most applicable to the proposed project would be reducing diesel-fueled commercial motor vehicle GHG exhaust and idling emissions, and waste management to divert solid waste from disposal facilities. The project would utilize contractors that comply with the California regulations to limit idling of on-site vehicles to 5 minutes or less at a location (Title 13 CCR Section 2485). While the goal of the idling regulation is primarily to reduce public health impacts from diesel emissions, compliance with the regulation also results in GHG emissions reductions in the form of reduced fuel combustion from unnecessary idling. Project construction trucks would also be required to comply with fuel saving regulations such as the USEPA standards for GHG emissions and fuel efficiency for medium- and heavy-duty trucks jointly developed by USEPA and the National Highway Traffic Safety Administration (NHTSA). The Phase 1 standards apply to combination tractors, heavy-duty pickup trucks and vans, and vocational vehicles starting in model year 2014 and result in a reduction in fuel consumption from 6 to 23 percent over the 2010 baseline, depending on the vehicle type (USEPA, 2011). The Phase 2 standards, which affect model year 2021 through model year 2027 medium- and heavy-duty trucks, require the phase in of a 5 to 25 percent reduction in fuel consumption over the 2017 baseline depending on the compliance year and vehicle type (USEPA, 2016). According to the USEPA, the Phase 2 standards would reduce oil consumption by up to two billion barrels (84 billion gallons) over the lifetime of the vehicles sold under the program (USEPA, 2018), and a portion of the GHG reductions would be from those model year 2014 through 2027 medium- and heavy-duty trucks used for the project.

Also, over excavated materials would be stored on-site within the DWR maintenance yard for future use, greatly minimizing the need to transport material off-site and minimizing potential haul truck-related emissions. As the project results in a minimal long-term consumption of energy and does not substantially increase traffic within the region, the project would not conflict with any of the Scoping Plan measures. That combined with the reduction in vehicle idling and maintaining soil on-site, the proposed project would be consistent with the Scoping Plan measures applicable to the project.

### *Consistency with SB 375*

The key goal of the Sustainable Communities Standard is to achieve GHG emission reduction targets through integrated land use and transportation strategies. The focus of these reductions is on transportation and land use strategies that influence vehicle travel.

As operational activities would not require any new, permanent employment and would only generate minor amounts of GHG emissions from vehicles for periodic maintenance, the proposed project would not significantly or permanently increase vehicle traffic within the County or the region. Therefore, the proposed project would not conflict with the implementation of SB 375.

### *Consistency with the Unincorporated Los Angeles County Community Climate Action Plan*

The Unincorporated Los Angeles County Community Climate Action Plan (CCAP) describes the County's plan for reducing the County's GHG emissions, including specific strategy areas for each of the major emissions sectors including: Green Building and Energy; Land Use and Transportation; Water Conservation and Wastewater, Waste Reduction Reuse and Recycling; and Land Conservation and Tree Planting (County of Los Angeles, 2015). As the proposed project represents an infrastructure project where operational activities would not require any new, permanent employment and would only continue to generate minor amounts of GHG emissions from vehicles for periodic maintenance similar to existing conditions, the proposed project would not significantly or permanently increase vehicle traffic within the County or the region. In addition, as the proposed project represents an infrastructure project with minimal operational activities, the proposed project would not require building energy, would not have significant water usage, would not generate significant amounts of waste and would not influence land conservation strategies. As discussed above, construction of the project would comply with applicable regulations for reducing GHG emissions from medium- and heavy-duty trucks, such as idling restrictions and standards for GHG emissions and fuel efficiency for medium- and heavy-duty trucks. Therefore, the proposed project would not conflict with the implementation of the Unincorporated Los Angeles County Community Climate Action Plan. Impacts would be less than significant.

## References

California Air Resources Board (CARB). 2008. *Climate Change Scoping Plan*. Approved December 2008. Available at: www.arb.ca.gov/cc/scopingplan/document/adopted_scoping_plan.pdf; Accessed December 2018.

CARB, 2011. *Final Supplement to the AB 32 Scoping Plan Functional Equivalent Document*. Released August 2011. Available at: https://www.arb.ca.gov/cc/scopingplan/document/final_supplement_to_sp_fed.pdf; Accessed December 2018.

CARB, 2014. *First Update to the Climate Change Scoping Plan: Building on the Framework*. Published May 2014. Available at: https://www.arb.ca.gov/cc/scopingplan/2013_update/first_update_climate_change_scoping_plan.pdf; accessed on December 2018.

CARB, 2017. The 2017 Climate Change Scoping Plan Update. January 2017. Available at: https://www.arb.ca.gov/cc/scopingplan/2030sp_pp_final.pdf. Accessed December 2018

Intergovernmental Panel on Climate Change (IPCC), 2007. Fourth Assessment Report of the IPCC. Available at: https://www.ipcc.ch/report/ar4/syr/. Accessed December 2018.

Los Angeles County, 2015. Final Unincorporated Los Angeles County Community Climate Action Plan 2020. Available at: http://planning.lacounty.gov/assets/upl/project/ccap_final-august2015.pdf. Accessed October 2019.SCAQMD. 2008, *Interim CEQA GHG Significance Threshold for Stationary Sources, Rules and Plans,* December 2008. http://www.aqmd.gov/docs/default-source/ceqa/handbook/greenhouse-gases-(ghg)-ceqa-significance-thresholds/ghgboardsynopsis.pdf?sfvrsn=2. Accessed December 2018.

Governor's Office of Planning and Research (OPR), 2008. Technical Advisory – CEQA and Climate Change: Addressing Climate Change through California Environmental Quality Act (CEQA) Review.

United States Environmental Protection Agency (USEPA), 2011. EPA and NHTSA Adopt First-Ever Program to Reduce Greenhouse Gas Emissions and Improve Fuel Efficiency of Medium- and Heavy-Duty Vehicles, EPA-420-F-11-031, August. Available at: https://nepis.epa.gov/Exe/ZyPDF.cgi/P100BOT1.PDF?Dockey=P100BOT1.pdf. Accessed October 2019.

USEPA, 2016. Greenhouse Gas Emissions and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles—Phase 2, *Federal Register* 81(206), October 25. Available at: https://www.gpo.gov/fdsys/pkg/FR-2016-10-25/pdf/2016-21203.pdf. Accessed October 2019.

USEPA, 2018. Final Rule for Greenhouse Gas Emissions and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles - Phase 2. Available at: https://www.epa.gov/regulations-emissions-vehicles-and-engines/final-rule-greenhouse-gas-emissions-and-fuel-efficiency. Accessed October 2019.

# 2.9 Hazards and Hazardous Materials

| *Issues (and Supporting Information Sources):* | *Potentially Significant Impact* | *Less Than Significant with Mitigation Incorporated* | *Less Than Significant Impact* | *No Impact* |
|---|---|---|---|---|
| **HAZARDS AND HAZARDOUS MATERIALS —** Would the project: | | | | |
| 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? | ☐ | ☐ | ☒ | ☐ |

## Discussion

a) **Less than Significant Impact.** The California Office of Emergency Services oversees state agencies and programs that regulate hazardous materials (Health and Safety Code, Article 1, Chapter 6.95). A hazardous material is any material that because of its quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or environment.

Soils around each pier and Abutment 5 would be excavated to a depth of 10 feet, and haul trucks would be used to haul excavated soils from the lake bed to be stored temporarily at nearby staging areas. During construction activities for the projects, typical hazardous materials would be used at the sites, including epoxy, hydraulic fluids, paints, cleaning materials, and vehicle fuels. The use of these materials during project construction would be short-term in nature and would occur in accordance with standard construction practices, as well as with applicable federal, state, and local health and safety regulations. Construction activities would not create a significant hazard to the public or environment

through the routine transport, use, or disposal of hazardous materials. Therefore, impacts would be less than significant.

b) **Less than Significant Impact.** Construction and operation of the proposed project would involve the use of minimal amounts of commercially available hazardous materials, including epoxy, hydraulic fluids, paints, cleaning materials, and vehicle fuels. Staging areas would be located within or near the West Boat Launch Ramp parking lot within previously disturbed, unvegetated areas. Staging areas and lake bed access roads would incorporate native materials and, if necessary, use only low-impact materials such as gravel for surfacing. It is assumed that any potentially hazardous materials used for the proposed project would be contained, stored, and used in accordance with manufacturers' instructions and handled in compliance with applicable standards and regulations, including California Occupational Safety and Health Administration (OSHA) requirements, and Title 8 and 22 of the Code of California Regulations. Best management practices (BMPs) that dictate handling of hazardous materials would be used during construction, to prevent accidental spills and to dictate a response in the case of a spill. Therefore, the project would not create a significant hazard to the public or the environment through reasonably forseeable upset and accident conditions involving the use of hazardous materials. Impacts would be less than significant.

c) **No Impact.** There are no schools within 0.25 miles of the project area. The nearest school is Northlake Hills Elementary, which is located approximately 1.2 miles southwest of the project area at 32545 Ridge Route Road, Castaic, CA. Therefore, the project would not emit hazardous emissions or handle hazardous materials within 0.25 miles of a school. No impacts would occur.

d) **No Impact.** Government Code Section 65962.5, amended in 1992, requires the California Environmental Protection Agency (CalEPA) to develop and update annually the Cortese List, which is a list of hazardous waste sites and other contaminated sites. According to the most recently published Cortese List, no hazardous waste sites are located on or in close proximity to the project site. Therefore, no impact would occur.

e) **No Impact.** The proposed project is not located within any of the airport sphere of influence areas identified in Los Angeles County Airport Land Use Plan maps (LACDRP, 2004). No public airports or private airstrips are within a two-mile vicinity of the proposed project. The nearest airport to the proposed project is Agua Dulce airport located approximately 15 miles east of the proposed project. Therefore, no impact would occur.

f) **No Impact.** The SCVA Plan identifies evacuation routes applicable to the project area. Santa Clarita Valley has freeway access along only three routes, which include Interstate 5 and State Route 14 going north and south, and State Route 126 going west. The primary evacuation route for Castaic Lake SRA is US Highway 5, which is the north-south arterial traversing Santa Clarita Valley, located approximately 2 miles southwest of the proposed project. US Highway 5 can be accessed via Lake Hughes Road which leads the

project site. The proposed project is not expected to result in a significant increase of workers driving on Interstate 5, State Route 14, or State Route 126, at least to the extent that they would physically interfere with emergency evacuation plans in Santa Clarita Valley. Therefore, no impact would occur.

g) **Less than Significant Impact.** Lands immediately surrounding the proposed project are designated by the California Department of Forestry and Fire Protection's (CAL FIRE) Fire Resource and Protection Program (FRAP) as "Very High" in State Responsibility Area mapping (CAL FIRE, 2007). These hazard areas are described according to their potential to cause fire hazards due to relevant factors such as fuels, terrain, and weather, and provide the basis for application of various mitigation strategies to reduce risks to buildings associated with wildfires. Retrofit activities for the tower bridge would occur on the lake bed, however, the lake is not given a fire severity designation and is mapped open water. Daily worker vehicle trips to the project site, equipment deliveries, spoils export, and other construction-related traffic would require trips within areas designated "Very High" fire hazard severity within the SRA. As indicated in response to Issue 2.9 b above, construction could include materials that are considered flammable, such as fuels and epoxy. The handling and storage of such materials would be conducted in accordance with applicable regulations and BMPs would be implemented to prevent accidental spills and to dictate a response in the case of a spill. In addition, as part of standard DWR protocol, the contractor would be required to prepare a Fire Prevention and Control Plan which complies with all provisions of the California Fire Code, Chapter 33. The plan would include appropriate preventative measures, emergency procedures to be followed, current emergency telephone numbers, and an area map (see Issue 2.20 b for a more detailed plan discussion). Therefore, potential impacts on people or structures associated with fire hazards would be less than significant.

## References

California Department of Forestry and Fire Protection (CAL Fire), 2007. Fire Hazard Severity Zones in SRA. Available: https://osfm.fire.ca.gov/divisions/wildfire-prevention-planning-engineering/wildland-hazards-building-codes/fire-hazard-severity-zones-maps/. Accessed October 11, 2019.

California Department of Toxic Substances Control (DTSC), 2019. Hazardous Waste and Substances Site List - Site Cleanup (Cortese List). Available: http://www.dtsc.ca.gov/SiteCleanup/Cortese_List.cfm. Accessed October 10, 2019.

Los Angeles County Department of Regional Planning (LACDRP), 2012. *Santa Clarita Valley Area Plan: One Valley One Vision 2012*. Available at: http://planning.lacounty.gov/assets/upl/project/ovov_2012-fulldoc.pdf. Accessed October 10, 2019.

# 2.10 Hydrology and Water Quality

| *Issues (and Supporting Information Sources):* | *Potentially Significant Impact* | *Less Than Significant with Mitigation Incorporated* | *Less Than Significant Impact* | *No Impact* |
|---|---|---|---|---|
| **HYDROLOGY AND WATER QUALITY —** Would the project: | | | | |
| 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? | ☐ | ☐ | ☐ | ☒ |

## Discussion

a) **Less than Significant Impact.** The proposed project would require earthwork activities such as site preparation, grading, stockpiling of soils and excavation. Once disturbed, soils could be exposed to the effects of wind and water erosion causing sedimentation in stormwater runoff if not managed appropriately. Construction would also involve use of chemicals and solvents such as fuel and lubricating grease for motorized heavy equipment, and epoxy on the piers. Inadvertent spills or releases of such chemicals could cause an adverse water quality impact if not managed appropriately. DWR would be required to prepare a Stormwater Pollution Prevention Plan (SWPPP) for coverage under the statewide stormwater discharge National Pollutant Detection and Elimination System (NPDES) permit. The SWPPP shall be maintained at the construction site for the entire duration of construction. The objectives of the SWPPP are to identify pollutant sources that may affect the quality of stormwater discharge and to implement best management practices (BMPs) to reduce pollutants in stormwater discharges during construction and after construction. Construction contractors would be made aware of the required BMPs and good housekeeping measures for the project area and associated construction staging

areas. Construction of the proposed project entails lowering of the water elevation levels at Castaic Lake to reach the piers of the tower bridge that are normally submerged. While water levels fluctuate annually at Castaic Lake, this project proposes temporarily reducing water levels beyond typical operations. The proposed project could cause short-term fluctuations in water temperature, dissolved oxygen, and turbidity within the lake. To assess the potential impact to water quality at Castaic Lake as result of the proposed project a Technical Memorandum was prepared, see the attachment to the BRTR in Appendix B.

The Technical Memorandum evaluated four key water quality parameters including: water temperature, dissolved oxygen, water clarity, and stratification. As discussed in the Technical Memorandum the proposed drawdown level is similar to the water elevation experienced during the 2015 drought. Therefore, the water conditions during the 2015 drought provide a good proxy for drawdown conditions and comparison with other non-drought years. Based on the water quality data from 2015 in comparison with 2018 (a non-drought year) the technical memorandum concludes that water temperature and dissolved oxygen in the littoral zone were similar. Water clarity in the littoral zone, however, was lower in all months of 2015 compared to 2018. This was likely due to re-suspension of sediments from banks during reduced water elevations. Water clarity in the littoral zone could temporarily decrease as result of the proposed project, but would return to normal upon the end of the drawdown period.

When investigating potential impacts to water quality in the pelagic zone, the technical memorandum concludes that changes in water temperature and dissolved oxygen could be impacted if the drawdown occurred in the summer and fall. However, the proposed lowest water levels during the drawdown would occur in winter and spring avoiding the warmer weather months and the potential water quality impacts that would result of construction occurring during them.

Once the piers and abutment are retrofitted, the lake level would return to normal operating levels. Potential water quality impacts due to construction activities would be less than significant, and no impact would occur as result of project operation.

b) **Less than Significant Impact.** Construction of the proposed project entails lowering water levels at the lake to allow for construction on sections of the project that are typically submerged under existing conditions. Lowering of the lake would be temporary and once construction is complete the lake would return to current levels. Water levels fluctuate annually to accommodate water supply for municipal, recreational, industrial, agricultural, and environmental issues in Southern California. Fluctuations are typically annual and seasonally repetitive regulated by standard operations. While the project involves drawing down the water elevation of the lake, no pumping of groundwater would occur as result of the proposed project. The project would not result in any increased use or extraction of local groundwater, and as such, impacts would be less than significant.

c.i-ii) **Less than Significant Impact.** Construction of the proposed project would involve drawing down the water elevation to retrofit the piers of the tower bridge that are currently submerged. The lake drawdown would result in a temporary increase of shoreline being exposed to potential erosion or siltation from ground-disturbing activities, such as grading and excavation. However, implementation of the required project-specific SWPPP would minimize the potential for erosion or siltation through the implementation of BMPs. Once the retrofit of the project components is completed, the lake water elevation would be raised back to current operating levels. Therefore, impacts associated with substantial erosion and temporary drainage alterations including flooding during construction would be less than significant.

c.iii) **Less than Significant Impact.** As discussed above, construction of the proposed project would temporarily alter flow within the project area due to ground disturbing activities. However, with implementation of the required project-specific SWPPP and associated BMPs, the retrofit of the project components would not create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff. Once operational, the project area would return to pre-project conditions. Therefore, the proposed project would be less than significant.

c.iv) **No Impact.** The Federal Emergency Management Act (FEMA) Flood Map Service Center for the project area shows that the project area is located within a Zone A "Without Base Flood Elevation (BFE)" location. Per FEMA, Zone A entails areas with a 1 percent annual chance of flooding, and because detailed analyses are not performed for such areas; no depths or base flood elevations are shown within these zones (FEMA, 2019). The project area is within Lake Castaic. Once the retrofitting has been completed, the project would be re-submerged and would therefore not impede or redirect flood flows. No impact would occur.

d) **Less than Significant Impact.** A tsunami is a sea wave of local or distant origin that results from large-scale seafloor displacements associated with earthquakes, major submarine slides or exploding volcanic islands (USGS, 2019a). An event such as an earthquake creates a large displacement of water resulting in a rise or mounding at the ocean surface that moves away from this center as a sea wave. The project area is located approximately 33 miles north of the Pacific Ocean and therefore, is not located within a tsunami risk zone. As discussed above, the project is located in FEMA designated Zone A, and the proposed project is located within Castaic Lake. A seiche is the sloshing of a closed body of water from earthquake shaking (USGS, 2019b). The project include work within Castaic Lake, in the event of an earthquake seiche waves could occur. However, the proposed project does not propose the construction of any new infrastructure, and the infrastructure present would be fortified as result of the proposed project. The existing infrastructure fortified by the proposed project is not a habitable structure. As such impacts as result of tsunami, seiche waves, or inundation would be less than significant.

e) **No Impact.** The proposed project is a tower bridge retrofit project and would not involve pumping or extraction of groundwater. Once the retrofit to the tower bridge are completed, operation of the high tower would not change. No impacts to water quality control plans or sustainable groundwater management plans would occur.

## References

Federal Emergency Management Agency (FEMA), 2019. FEMA Flood Map Service Center. Available at https://msc.fema.gov/portal/home, accessed October 2019.

USGS, 2019a. Earthquake Glossary, Tsunami. Available at: https://earthquake.usgs.gov/learn/glossary/?term=tsunami, accessed October 2019.

USGS, 2019b. Seismic Seiches. Available at: https://earthquake.usgs.gov/learn/topics/seiche.php, accessed October 2019.

# 2.11 Land Use and Planning

| *Issues (and Supporting Information Sources):* | *Potentially Significant Impact* | *Less Than Significant with Mitigation Incorporated* | *Less Than Significant Impact* | *No Impact* |
|---|---|---|---|---|
| **LAND USE AND PLANNING —** Would the project: | | | | |
| 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? | ☐ | ☐ | ☐ | ☒ |

## Discussion

a) **No Impact.** The proposed project is located within the Castaic Lake SRA, approximately 2.5 miles north of the community of Castaic, the nearest established community. The proposed project includes upgrades to an existing tower bridge and would not include additional structures with the potential to physically divide a community. Therefore, no impact would occur.

b) **No Impact.** The proposed project is located in a geographic area designated as Water (OS-W) and Open Space-Parks and Recreation (OS-PR) in the SCVA Plan Land Use Policy Map, and zoned for Open Space in the SCVA Plan Zoning Map. The proposed project includes upgrades to an existing tower bridge and would not conflict with any land use plan, policy or regulation. No impact would occur.

## References

Los Angeles County Department of Regional Planning, 2012. *Santa Clarita Valley Area Plan: One Valley One Vision 2012*. Available at: http://planning.lacounty.gov/ovov. Accessed October 10, 2019.

# 2.12 Mineral Resources

| *Issues (and Supporting Information Sources):* | *Potentially Significant Impact* | *Less Than Significant with Mitigation Incorporated* | *Less Than Significant Impact* | *No Impact* |
|---|---|---|---|---|
| **MINERAL RESOURCES —** Would the project: | | | | |
| 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? | ☐ | ☐ | ☐ | ☒ |

## Discussion

a,b) **No Impact.** According to the Mineral Resources Map included in Appendix II of the SCVA Plan, there are no mineral resources located in the project area (LACDRP, 2012). There are, two mineral resources in close proximity to the project area identified as Placer Gold Gulches. One Placer Gold Gulch is located on land just outside the project area boundary, on the northwestern tip of the Castaic Lake Ski Arm. The second Placer Gold Gulch is located between Lake Hughes Road and the southeastern boundary of Castaic Lake. Neither of these mineral resources would be impacted by construction activities. No impacts to mineral resources would occur.

## References

Los Angeles County Department of Regional Planning (LACDRP), 2012. *Santa Clarita Valley Area Plan: One Valley Vision 2012*. Available at: http://planning.lacounty.gov/assets/upl/project/ovov_2012-fulldoc.pdf. Accessed October 10, 2019.

# 2.13 Noise

| *Issues (and Supporting Information Sources):* | *Potentially Significant Impact* | *Less Than Significant with Mitigation Incorporated* | *Less Than Significant Impact* | *No Impact* |
|---|---|---|---|---|
| **NOISE —** Would the project result in: | | | | |
| 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 groundborne vibration or groundborne 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? | ☐ | ☐ | ☐ | ☒ |

## Discussion

a) **Less than Significant Impact.** Noise is defined as unwanted sound. Sound becomes unwanted when it creates a nuisance that interferes with normal activities, or when it causes physical harm and adversely affects human health. The standard unit of measurement of the loudness of sound is the decibel (dB). The zero point on the dB scale is based on the lowest sound level that a healthy, unimpaired human ear can detect. Changes of 3 dB or fewer are only perceptible in laboratory environments. An increase of 10 dB represents a 10-fold increase in acoustic energy, while 20 dB is 100 times more intense, and 30 dB is 1,000 times more intense. Each 10-dB increase in sound level is perceived as approximately a doubling of loudness (Egan, 1988).

Numerous methods have been developed to measure sound over a period of time, including: Equivalent Sound Level ($L_{eq}$) and Maximum Noise event ($L_{max}$). Noise level can vary depending on the noise source and duration. Below is description of the units of measure used in this analysis to describe the noise environment (Caltrans, 2013).

- $L_{eq}$: Time variations in noise exposure are typically expressed as a statistical description of the sound pressure level that is exceeded over some fraction of a given observation period (called $L_{eq}$). For example, the noise levels exceeded on 10 percent of readings is called $L_{10}$, the median (50th percentile) reading is called $L_{50}$, etc.
- $L_{max}$: The maximum instantaneous noise level recorded during a noise event is typically expressed as $L_{max}$.

The attenuation of sound is highly dependent on the conditions of the land between the noise source and receiver. To account for this ground-effect attenuation (absorption), two types of site conditions are commonly used in noise models, soft-site and hard-site conditions. Soft-site conditions account for the sound propagation loss over natural surfaces such as normal earth and ground vegetation. For point sources, a drop-off rate of 7.5 A-weighted decibles (dBA) for each doubling of distance from the point source is

typically observed over soft ground with landscaping, as compared with a 6.0 dBA for each doubling of distance over hard ground such as asphalt, concrete, stone and very hard packed earth (Caltrans, 2013).

### *County of Los Angeles*

The County of Los Angeles Noise Restrictions are provided in Chapter 12.08, Noise Control of the Los Angeles County Code (LACC). Chapter 12.08 provides procedures and criteria for the measurement of the sound level of "offending" noise sources.

The LACC outlines exterior noise standards for four noise zones based on land use type: noise-sensitive areas, residential properties, commercial properties, and industrial properties. The County's maximum exterior noise standards set forth in LACC Section 12.08.390 are provided in **Error! Reference source not found.** Los Angeles County Presumed Ambient Noise Levels and are shown in **Table 2-9.**

**TABLE 2-9**
**LOS ANGELES COUNTY PRESUMED AMBIENT NOISE LEVELS**

| Noise Zone | Zone | Daytime Hours (7 A.M. to 10 P.M.) dBA ($L_{eq}$) | Nighttime Hours (10 P.M. to 7 A.M.) dBA ($L_{eq}$) |
|---|---|---|---|
| I | Noise-sensitive area | 45 | 45 |
| II | Residential | 50 | 45 |
| III | Commercial | 60 | 55 |
| IV | Industrial | 70 | 70 |

SOURCE: *LACC, Section 12.08.390.*

LACC Section 12.08.440 prohibits construction between the hours of 7:00 p.m. and 7:00 a.m. and at any time on Sundays or holidays, if it creates a noise disturbance across a residential or commercial real-property line, except for emergency work of public service utilities or by variance issued by the County health officer. **Table 2-10** outlines the maximum noise levels permissible by construction equipment at affected buildings depending on land use. These noise thresholds pertain to two timeframes: daytime hours from 7:00 a.m. to 8:00 p.m. daily (except Sundays and holidays) and nighttime hours from 8:00 p.m. to 7:00 a.m. daily (or all day Sundays and holidays).

**TABLE 2-10**
**LOS ANGELES COUNTY PERMISSIBLE CONSTRUCTION EQUIPMENT NOISE AT RECEPTOR**

| Equipment Type | Receptor Type | Daytime Hours (7 A.M. to 8 P.M.) dBA ($L_{eq}$) | Nighttime Hours (8 P.M. to 7 A.M.) dBA ($L_{eq}$) |
|---|---|---|---|
| Mobile | Single-family Residential | 75 | 60 |
| short-term operation (less than 10 days) | Multi-family Residential | 80 | 64 |
| | Semiresidential/Commercial | 85 | 70 |
| | Business Structures | 85 | 85 |
| Stationary | Single-family Residential | 60 | 50 |
| long-term operation (more than 10 days) | Multi-family Residential | 65 | 55 |
| | Semiresidential/Commercial | 70 | 60 |

SOURCE: LACC, Section 12.08.440.

## *Construction*

### On-Site Construction Noise

Short-term construction noise impacts are related primarily to the use of heavy construction equipment. Construction equipment can be considered to operate in two modes: stationary and mobile. Stationary equipment operates in one location for one or more days at a time, with a fixed-power operation. Mobile equipment moves around a construction site with power applied in cyclic fashion (such as bulldozers, graders, and loaders). Individual pieces of construction equipment anticipated during construction of the proposed project could produce maximum noise levels of 77 dBA to 90 dBA $L_{max}$ at a reference distance of 50 feet from the noise source, as shown in **Table 2-11**. These maximum noise levels would occur when equipment is operating at full power. The estimated usage factor for the equipment is also shown in Table 2-11. The usage factors are based on Federal Highway Administration's (FHWA) Roadway Construction Noise Model (RCNM) User's Guide (FHWA, 2006).

Construction equipment would intermittently operate over an 8-hour period. Over the course of a construction day, the highest noise levels would be generated when multiple pieces of construction equipment are being operated concurrently. The nearest sensitive receptors are single-family residential uses located approximately 1.1 miles to the south of the project site. Additionally, there is a recreation area located approximately 700 feet west of the project, however, it is not considered a noise sensitive receptor in the LACC. At a distance of 1.1 miles, the noise levels from project construction would attenuate at a rate of at least 6 dBA per doubling of distance. At a distance of 1.1 miles, the construction noise would attenuate to a level such that the noise would be indistinguishable from the existing ambient noise environment at the sensitive receptor location. Changes in elevation and barrier attenuation between the site and the sensitive uses would also contribute to lower noise levels and any changes in ambient levels would be unperceivable.

Furthermore, proposed construction hours would occur within the LACC's permitted hours of 7:00 A.M. and 7:00 P.M., Monday through Saturday. Therefore, there would not be any conflict with the noise ordinance and construction noise levels would not affect the nearest sensitive uses and construction noise impacts would be less than significant.

**TABLE 2-11**
**CONSTRUCTION EQUIPMENT NOISE EMISSION LEVELS**

| Construction Equipment | Noise Level at 50 Feet (dBA, Lmax) | Estimated Usage Factor, % |
|---|---|---|
| Concrete Saw | 90 | 20% |
| Cranes | 81 | 16% |
| Dozer | 82 | 40% |
| Dump/Haul Truck | 84 | 40% |
| Generator Sets | 81 | 50% |
| Other Equipment | 85 | 50% |
| Paver | 77 | 50% |
| Tractors/Loaders/Backhoes | 80 | 25% |

Source: FHWA, 2006.

### Off-Site Construction Noise

On-road trucks would be used to transport materials to and from the construction areas. Trucks would travel past noise-sensitive residential uses along Ridge Route Road in the community of Castaic located in unincorporated Los Angeles County. However, the number of trucks would be minimal at approximately 30 employee trips per day and 12 vendor trips per day (analysis conservatively assumes all vehicles arrive in the same peak hour). The temporary addition of a minimal number of trucks per day during construction activities would cause noise levels of 56.8 dBA $L_{eq}$ and would be less than the allowable daytime mobile construction noise levels of 75 dBA $L_{eq}$ for Los Angeles County. Therefore, the off-site construction traffic noise impacts would be less than significant.

## *Operations*

The existing noise environment in the project area is dominated by traffic and watercraft noise from nearby roadways and Castaic Lake, as well as from other existing noise sources including overhead aircraft. As the project is an infrastructure project that involves retrofitting a tower bridge, operation of the project would not result in a net increase in operational noise levels. The project would require periodic maintenance activities, which would involve only a few trucks and/or vehicles periodically traveling on the bridge to access the high tower and local roadways. However, the maintenance trips would be equal or similar to the number of operational trips before the retrofit occurs and project operation would not result in a permanent increase in noise levels. As such, operation of the project would result in a less than significant impact.

b) **Less than Significant Impact.** The project would be constructed using typical construction techniques and would not use impact equipment, such as pile drivers or jack hammers. As such, it is anticipated that the equipment to be used during construction would not expose persons to or generate excessive groundborne vibration.

Ground-borne vibration is primarily generated from the use of construction equipment and from heavy-duty vehicle traffic and trains. Ground-borne vibration propagates from the source through the ground to adjacent buildings by surface waves. Vibration energy dissipates as it travels through the ground, causing the vibration amplitude to decrease with distance away from the source. Vibration in buildings is typically perceived as rattling of windows, shaking of loose items, or the motion of building surfaces. The vibration of building surfaces also can be radiated as sound and heard as a low-frequency rumbling noise, known as ground-borne noise. Vibration levels for potential structural damage is described in terms of the peak particle velocity (PPV) measured in inches per second (in/sec). Road vehicles rarely create enough ground-borne vibration amplitude to be perceptible to humans unless the receiver is in immediate proximity to the source or the road surface is poorly maintained and has potholes or bumps.

Human sensitivity to vibration varies by frequency and by receiver. Generally, people are more sensitive to low-frequency vibration. Human annoyance also is related to the number and duration of events; the more events or the greater the duration, the more annoying it becomes. Ground-borne vibration related to human annoyance is generally related to root mean square (rms) velocity levels and expressed as velocity in decibels (VdB).

The County does not address vibration in either their respective code or general plan noise elements. With respect to ground-borne vibration from construction activities, the Federal Transit Administration (FTA) has adopted guidance to limit ground-borne vibration based on the condition of the structures that are located in close proximity to construction activity. With respect to residential and commercial structures, the FTA technical publication, *Transit Noise and Vibration Impact Assessment Manual* (FTA, 2018), provides a vibration damage potential criterion for continuous/frequent intermittent vibration sources of 0.5 in/sec PPV for reinforced concrete, steel or timber buildings, 0.3 in/sec PPV for engineered concrete and masonry buildings (no plaster), 0.2 in/sec PPV for non-engineered timber and masonry buildings, and 0.12 in/sec PPV for buildings extremely susceptible to vibration damage (FTA, 2018).

### *Construction*

According to the FTA, ground vibrations from construction activities very rarely reach the level that can damage structures. A possible exception is the case of old, fragile buildings of historical significance where special care must be taken to avoid damage (FTA, 2018). The construction activities that typically generate the most severe vibrations are blasting and impact pile driving, which would not be utilized for the project. The project would utilize construction equipment such as use of dozers and excavators, which would generate ground-borne vibration during excavation and

foundation activities. Based on the vibration data by the FTA, typical vibration velocities from the operation of a large dozer would be approximately 0.089 in/sec PPV at 25 feet from the source of activity, 0.031 in/sec PPV at 50 feet distance, and 0.011 in/sec PPV at 100 feet distance.

The nearest residential buildings to the construction areas are located approximately 1.1 miles from the project site. As discussed above, vibration also attenuates rapidly with distance and at a distance of 1.1 miles, the vibration from project construction would be imperceptible and indistinguishable from background vibration levels in the area of the sensitive receptors. Based on this assessment, construction vibration impacts would be less than significant.

### *Operations*

Once construction activities have been completed, there would be no substantial sources of vibration activities from operation of the project. The project would not include new stationary sources of vibration. Periodic maintenance activities, which would involve a few trucks or vehicles periodically traveling on local roadways, would not generate perceptible vibration levels that would cause structural damage or human annoyance. Therefore, vibration impacts during project operation would be less than significant.

c) **No impact.** The project Site is located approximately 17 miles from the nearest airport (Agua Dulce Airpark) and is not part of any airport land use plan. No impact would occur.

## References

Federal Highway Administration (FHWA), 2006. Roadway Construction Noise Model – RCNM and User Guide, January 2006. Available at: https://www.fhwa.dot.gov/environment/noise/construction_noise/rcnm/. Accessed October 18, 2019.

Federal Transit Administration, 2018. Transit Noise and Vibration Impact Assessment Manual, September 2018. Available at: https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf. Accessed October 18, 2019.

M David Egan, Architectural Acoustics, Chapter 1, March, 1988.

# 2.14 Population and Housing

| *Issues (and Supporting Information Sources):* | *Potentially Significant Impact* | *Less Than Significant with Mitigation Incorporated* | *Less Than Significant Impact* | *No Impact* |
|---|---|---|---|---|
| **POPULATION AND HOUSING —** Would the project: | | | | |
| a) 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)? | ☐ | ☐ | ☐ | ☒ |
| b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere? | ☐ | ☐ | ☐ | ☒ |

## Discussion

a) **No Impact**. The proposed project would not directly induce population growth in the region because the project does not involve construction of new homes or businesses and would draw construction workers from the labor force within the region. The proposed project would not indirectly induce population growth in the region by removing an obstacle to growth, such as contributing to water supply capacity. Therefore, no impact would occur.

b) **No Impact.** The proposed project is located in a geographic area designated as Water (OS-W) and Open Space-Parks and Recreation (OS-PR), and zoned for Open Space (LACDRP, 2012). Therefore, no homes are located in the project area and the proposed project would not displace existing housing or necessitate the construction of replacement housing elsewhere. In addition, the proposed project includes upgrades to an existing tower bridge and would not include demolition of existing facilities or construction of new ones. No impact would occur.

## References

Los Angeles County Department of Regional Planning (LACDRP), 2012. *Santa Clarita Valley Area Plan: One Valley Vision 2012*. Available at: http://planning.lacounty.gov/assets/upl/project/ovov_2012-fulldoc.pdf. Accessed October 10, 2019.

# 2.15 Public Services

| *Issues (and Supporting Information Sources):* | *Potentially Significant Impact* | *Less Than Significant with Mitigation Incorporated* | *Less Than Significant Impact* | *No Impact* |
|---|---|---|---|---|
| **PUBLIC SERVICES —** | | | | |
| 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 following public services: | | | | |
| i) Fire protection? | ☐ | ☐ | ☒ | ☐ |
| ii) Police protection? | ☐ | ☐ | ☒ | ☐ |
| iii) Schools? | ☐ | ☐ | ☐ | ☒ |
| iv) Parks? | ☐ | ☐ | ☐ | ☒ |
| v) Other public facilities? | ☐ | ☐ | ☐ | ☒ |

## Discussion

a.i-ii) **Less than Significant Impact.** The Los Angeles County Fire Department (LACFD) and Department of Forestry and Fire Protection (CAL FIRE) provide fire protection services to the project area. The Los Angeles County Police Department (LACPD) provides police services to the project area. The California Highway Patrol (CHP) is responsible for the enforcement of traffic-related offenses in the County of Los Angeles' unincorporated areas. State Park Rangers are responsible for safety within the Castaic Lake SRA.

There are no residential structures associated with the proposed project and no new permanent employees would be located on-site after construction. Therefore, no new residents or employees would occupy the project site and service demands per person would not increase. The proposed project would not require the provision of, or need for, new or physically altered government facilities.

Construction of the project would entail delivery of fuel and fueling/maintenance of the construction equipment as well as temporary storage for scaffolding for other equipment and material (carbon fiber fabric, epoxy, concrete forms, etc.) daily. In the event of a fire or other emergency within the proposed project area, existing fire protection and police services within the community of Castaic or County of Los Angeles would be able to sufficiently respond to emergency events with existing equipment and staffing capacities. Therefore, implementation of the proposed project would not require new fire or police facilities to maintain response ratios, service ratios, or other measures of performance. Impacts would be considered less than significant.

a.iii) **No Impact.** The proposed project would not change existing demand for school services, as the proposed project would not result in an increase in population. Therefore, the proposed project would have no impact related to school services.

a.iv) **No Impact.** The proposed project would not result in an increase in population, and would not prompt the need for new parks. Therefore, the proposed project would have no impact related to parks.

a.v) **No Impact.** The proposed project would not include new housing or bring new businesses to the area that would require any additional services or public facilities, including libraries. Therefore, the proposed project would have no impact related to other public facilities.

# 2.16 Recreation

| Issues (and Supporting Information Sources): | Potentially Significant Impact | Less Than Significant with Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| **RECREATION —** | | | | |
| 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? | ☐ | ☒ | ☐ | ☐ |
| 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? | ☐ | ☐ | ☒ | ☐ |

## Discussion

a) **Less than Significant with Mitigation.** The proposed project would include temporarily lowering the water levels in Castaic Lake to approximately 1,380 feet amsl from normal operating capacity (1,505 feet amsl) for approximately 10 months in order to retrofit the tower bridge piers. Water-based recreational activities that typically occur in the lake include motorized/non-motorized boating, wake boarding, jet skiing, and fishing. Further, the lake is a popular location for hosting largemouth bass fishing tournaments each year. In 2019, bass fishing clubs scheduled a total of 18 tournaments over 10 months (the majority of tournaments were scheduled March through August, and no tournaments occurred in October or August). Lake drawdown would limit the number of boats allowed on the lake at any one time due to a reduction in surface area and the potential for submerged obstacles to be present. Additionally, the drawdown would cause operation of the West Boat Launch Ramp to be closed for approximately 5 months, starting in mid-September 2021 when water levels would dip below 1,435 feet amsl–the level at which the ramp would be out of the water and not functional–and ending in mid-February 2022 when the water would be returned to a level above 1,435 feet amsl, as shown by the gray line on Figure 7. The Main Boat Launch Ramp would remain operational at the 1,380 feet elevation; however, the number of lanes available at the Main Boat Launch Ramp would be reduced when water levels are below an elevation of approximately 1,380 feet. As a result, the diminished conditions in Castaic Lake may discourage recreational boaters and result in higher use at other local lakes. However, the lake has experienced prolonged periods of low water levels in the past without affecting recreational boating or the ability to host fishing tournaments in the lake. In 2015, a prolonged drought reduced the lakes surface elevation to levels similar to the conditions that would occur during the proposed project drawdown. During the drought years, organized fishing tournaments continued as scheduled (National Bass West, 2019). Furthermore, the proposed drawdown schedule indicates the lake would be at its lowest level from November 1 to December 15, which corresponds to the time of year when fishing tournaments are less frequent. As a result, it is assumed that the proposed project would not hinder fishing tournaments in Castaic to the extent that

fishermen would be required to relocate the tournaments and cause substantial physical deterioration at nearby lakes and recreational facilities.

The drawdown in Castaic Lake would expose shorelines on the perimeter of the lake shore and could hinder shoreline fishermen from accessing areas around the lake due to creating unsafe conditions such as exposing rocky shores and muddy shores. As a result, other fishing locations in the Santa Clarita Valley (such as Pyramid Lake, an approximately 20-mile drive north on U.S. Highway 5) may become popular alternative fishing locations used by visitors for the duration of the proposed project. There may be an increase in demand for fishing and other recreation activities at the Lower Lake, Pyramid Lake, or other nearby lakes as a result of the proposed project. However, the drawdown would last for approximately 10 months and any increase in fishing at other recreational facilities would be temporary and is not expected to impact nearby facilities to the extent that substantial physical deterioration would occur. Therefore, impacts would be less than significant.

The lake drawdown could potentially expose hazards that are typically submerged at the normal operating level. It is the responsibility of the Los Angeles County Parks' lifeguards to keep the lake safe. As a result, the lifeguards would need to place buoys throughout the lake to flag potential hazards. Since the lake elevation would lower by approximately 1.5 feet daily, the potential for submerged hazards to be exposed would change daily requiring the lifeguards to survey the lake every morning before visitors would be allowed on the lake. In addition, the docks within the marina would require constant maintenance to loosen the dock cable to prevent the docks from drying up on the shore as water levels recede. As a result, the drawdown would have a potentially significant impact on the lifeguard's availability to oversee the safety on the lake. However, with the implementation **Mitigation Measure REC-1**, requiring schedule coordination with Los Angeles County Parks and reconfiguration of water facilities when the lake is below 1485 feet would reduce the potential impacts to less than significant.

### *Mitigation Measures*

**REC-1:** Prior the start of the lake drawdown, the Department of Water Resources (DWR) shall coordinate with Los Angeles County Parks including providing a lake drawdown schedule. DWR shall identify a contact person responsible for communicating with Los Angeles County Parks, including status of the drawdown schedule. While the lake is below an elevation of 1485 feet (normal low operating conditions), DWR shall work with the Los Angeles County Parks to provide resources needed to assist in the reconfiguration of boat docks and buoys that are affected by the drawdown, including buoys needed to circumscribe submerged hazards.

b) **Less than Significant Impact.** As described in Issue 2.16 a, the proposed project would occur on the Castaic SRA Upper Lake and have temporary impacts on water levels and the surrounding shoreline, which are used by recreational visitors for boating and fishing. However, water levels would be restored to normal operating conditions once retrofit for

the tower bridge is complete. The project would not include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment. Therefore, impacts would be less than significant.

## References

National Bass West. 2019. Web Site. Available at: http://www.nationalbasswest.com/tournament-results/friends-of-castaic-lake-night-tournaments/friends-of-castaic-tournament-results-2014-2015/focl-year-to-date/. Accessed October 15, 2019.

# 2.17 Transportation

| *Issues (and Supporting Information Sources):* | *Potentially Significant Impact* | *Less Than Significant with Mitigation Incorporated* | *Less Than Significant Impact* | *No Impact* |
|---|---|---|---|---|
| **TRANSPORTATION —** Would the project: | | | | |
| a) Conflict with a program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities? | ☐ | ☐ | ☒ | ☐ |
| b) Would the project 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? | ☐ | ☐ | ☒ | ☐ |

## Discussion

a) **Less than Significant Impact.** The project would entail the drawdown of Castaic Lake to retrofit the existing tower bridge. The project site would be accessed from I-5, along Lake Hughes Road to Ridge Route Road to West Ramp Road, which ends at the West Boat Launch Ramp parking lot. Existing paved and newly constructed lake bed roads would be used for hauling and transporting material to and within the project area (Figure 4). Project construction is anticipated to take approximately 15.5 months. The work would occur within the SRA and between staging areas and access roads which would be located in close proximity to each other (Figure 2). Minor exporting of construction debris would be required. Importing of construction equipment would include one or more cranes, forklifts, and trucks to deliver and move materials on-site; ready-mix concrete trucks and a trailer-mounted or boom-equipped concrete pump to deliver and place concrete for the work at the top of the piers and abutment. Construction and restoration of the work areas and temporary access roads may involve the use of tracked bulldozers and excavators, loaders, compactors, motor graders, water trucks, dump trucks. Once the equipment and materials are on-site there would be minimal construction trips required during the retrofitting project. The daily trip would consist of workers accessing the site. It is not anticipated that soils would be required to be exported from the site. Vehicular access to recreational areas within the SRA would be maintained at all times. Once the lake is drawn down below an elevation of 1480 feet, the West Boat Launch Ramp would be closed. However, the portion of the parking lot not being used for construction staging and stockpiling would remain open for recreational visitors and park staff.

All of the construction traffic would occur on the west side of the lake and would not conflict with the recreational vehicles accessing the Main Boat Launch Ramp. The majority of construction traffic would be confined to the lake areas between the West Boat Launch Ramp parking lot, staging areas, and the tower bridge (see Figure 4). As a result, the proposed project would not conflict with any program plans, or any ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities. Impacts would be considered less than significant.

Once operational, existing staff would periodically maintain and access the high tower similar to existing conditions, and therefore, would not increase transit in the project area. No impact would occur.

b) **Less than Significant Impact.** In accordance with Senate Bill (SB) 743, the new CEQA Guidelines Section 15064.3, subdivision (b) was adopted in December 2018 by the California Natural Resources Agency. These revisions to the CEQA Guidelines criteria for determining the significance of transportation impacts are primarily focused on projects within transit priority areas and shift the focus from driver delay to reduction of greenhouse gas emissions, creation of multimodal networks, and promotion of a mix of land uses. Vehicle miles traveled, or VMT, is a measure of the total number of miles driven to or from a development and is sometimes expressed as an average per trip or per person. The newly adopted guidance provides that a lead agency may elect to be governed by the provisions of this section immediately. Beginning on July 1, 2020, the provisions of this section shall apply statewide. The County has not yet formally adopted its updated transportation significance thresholds or its updated transportation impact analysis procedures. Since the regulations of SB 743 have not been finalized or adopted by the County, a qualitative traffic analysis was used in this MND to determine significance of transportation impacts (see discussion in 17a above).

In addition, Section 15064.3 of the CEQA Guidelines suggests that the analysis of VMT impacts applies mainly to land use and transportation projects. Furthermore, projects that generate or attract fewer than 110 operational trips per day would generally be exempt from further consideration with respect to VMT and impacts are assumed to be less than significant. Per this guidance, since the proposed project is neither a land use nor a transportation project, and would generate very few operational trips, it can be assumed to have a less than significant impact with respect to VMT.

c) **No Impact.** The proposed project entails seismic retrofit of the existing tower bridge. Retrofit of the existing structures would not include any new geometric design features that could be considered dangerous or increase hazard in the project area. Additionally, once constructed the proposed project areas would return to pre-project conditions. No impact would occur.

d) **Less than Significant Impact.** Construction activities for the proposed project would take place mainly within the lake and tower bridge. Staging and stockpiling areas are located in close proximity to the lake and impact areas, reducing the need for trucks to be travelling within the SRA. Emergency access would be maintained at all times within the SRA. In addition, DWR will coordinate with Parks staff and will provide an anticipated schedule of activities outlining approximate daily active construction dates and time. Impacts would be considered less than significant.

# 2.18 Tribal Cultural Resources

| *Issues (and Supporting Information Sources):* | *Potentially Significant Impact* | *Less Than Significant with Mitigation Incorporated* | *Less Than Significant Impact* | *No Impact* |
|---|---|---|---|---|
| **TRIBAL CULTURAL RESOURCES —** | | | | |
| 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 a 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. | ☐ | ☒ | ☐ | ☐ |

## Discussion

a.i) This discussion provides an assessment of potential impacts related to tribal cultural resources that could result from implementation of the proposed project and is based on the results of a Sacred Land Files (SLF) search from the California Native American Heritage Commission (NAHC), as well as Assembly Bill 52 (AB 52) consultation with California Native American tribes. AB 52, through its implementing regulations, requires that lead agencies consult with California Native American tribes that are traditionally and culturally affiliated with the geographic area of the proposed project and who have requested in writing to be informed by the lead agency of proposed projects in the tribe's geographic area (PRC Section 21080.3.1[b] and [d]).

The NAHC maintains a confidential SLF which contains sites of traditional, cultural, or religious value to the Native American community. The NAHC was contacted on October 4, 2019, to request a search of the SLF for the proposed project. In a letter response dated October 21, 2019, the NAHC indicated that a search of the SLF returned negative results.

Pursuant to AB 52, DWR as the CEQA Lead Agency sent AB 52 consultation notification letters via certified mail on November 12, 2019 to three Native American groups affiliated with the proposed project's geographic area including the Fernandeño Tataviam Band of Mission Indians (FTBMI), the San Manuel Band of Mission Indians (San Manuel), and the Tongva Ancestral Territorial Tribal Nation (Tongva). The letters included a description of the proposed project and provided map figures depicting the project location.

To date, two responses have been received. In an email dated November 12, 2019, Alexandra McCleary, Tribal Archaeologist for the San Manuel, stated the proposed project is located outside of San Manuel's ancestral territory and that the San Manuel are not requesting consultation.

In an email dated December 4, 2019, Jairo Avila, Tribal Historic and Cultural Preservation Officer for the FTBMI, stated the proposed project is located within the FTBMI's traditional ancestral territory and formally requested consultation with DWR pursuant to AB 52. Mr. Avila also requested information regarding the soil conditions within the proposed project area and asked for a copy of the cultural resources report prepared for the project. DWR responded to Mr. Avila in a letter dated December 18, 2019 acknowledging FTBMI's request to engage in AB 52 consultation and stated the cultural resources report would be provided when completed. In a follow-up email dated January 20, 2020, DWR provided Mr. Avila with the cultural resources report. In an email dated February 20, 2020, Mr. Avila stated that the FTBMI identified significant tribal cultural resources throughout the Castaic Lake area, and requested a follow-up consultation call.

On February 27, 2020 DWR and its consultant met via conference call with Mr. Avila. During the call, Mr. Avila stated that the FTBMI consider all prehistoric resources to be tribal cultural resources, even if they did not meet the criteria for listing in the California Register. Mr. Avila re-iterated that there were tribal cultural resources within the project's lake drawdown area (referred to as the Area of Indirect Impacts, or AII, in the Cultural Resources section above), and that they could be inadvertently impacted by the project's lake draw down (such as from looting). Mr. Avila requested additions to the mitigation measures recommended in the cultural resources report. Mr. Avila indicated that he would provide his comments in writing.

In a letter dated February 29, 2020, the FTBMI re-iterated that the Tribe considers all prehistoric resources as tribal cultural resources, whether or not they are "determined eligible for listing and/or are not considered historical resources or unique archaeological resources under CEQA." The Tribe's letter also requested updated records searches; additional survey; Tribal participation in pre-construction archaeological surveys, site conditions assessments, and implementation of data recovery and protective measures; Tribal review and comment on cultural resources documents, including report addenda, DPR 523 forms, and any other cultural resources documents; Tribal notification of cultural resources and human remains discoveries; Tribal consultation on discoveries and the opportunity to provide monitoring in the event of discoveries; and Tribal participation in the development of archaeological resources data recovery and treatment plans. The Tribe's requests were considered during development of mitigation measures in Section 2.5, Cultural Resources, and Section 2.18, Tribal Cultural Resources.

### Summary of Identified Tribal Cultural Resources

No potential tribal cultural resources were identified within the ADI. Three prehistoric archaeological sites were identified within the AII; two (CA-LAN-4475 and -4476) of which were previously recommended eligible for listing in the California Register and therefore qualify as historical resources under CEQA, and one (Castaic Lake Incidental Find) which DWR is, in its discretion, treating as a historical resource for the purposes of this project based on its similarities to CA-LAN-4475 and CA-LAN-4476. None of the three resources has been formally evaluated for their eligibility for listing in the California Register as tribal cultural resources for their cultural value to a California Native American tribe pursuant to PRC Section 21074(a). Nonetheless, DWR has determined that because the three sites are considered historical resources, they will also be considered tribal cultural resources for the purpose of this project given. the significance of these resources to a California Native American tribe, specifically the FTBMI. While none of these resources would be directly impacted through project-related ground disturbing activities, they could be subject to indirect impacts, such as vandalism and erosion due to wave action resulting from exposure as a result of the proposed project's drawdown of Castaic Lake. Implementation of **Mitigation Measures CUL-1** through **CUL-4** and **TCR-1** through **TCR-5**, which were developed in consultation with the FTBMI, would reduce potential impacts to tribal cultural resources to a level of less than significant.

a.ii) As noted under Issue 2.18, a.i, consultation resulted in the identification of three prehistoric archaeological resources that are considered to be tribal cultural resources (CA-LAN-4475, -4476, and Castaic Lake Incidental Find). Additionally, while isolates do not typically qualify as historical resources, based on the value ascribed to isolates by the FTBMI and as a result of consultation with the Tribe, DWR is treating the two prehistoric isolates (P-19-101216 and -101217) as tribal cultural resources for the purposes of this project. While none of these resources would be directly impacted through project-related ground disturbing activities, they could be subject to indirect impacts associated with the proposed project's drawdown of Castaic Lake, such as vandalism and erosion due to wave action. Implementation of **Mitigation Measures CUL-1** through **CUL-4** and **TCR-1** through **TCR-5**, which were developed in consultation with the FTBMI, would reduce potential impacts to tribal cultural resources to a level of less than significant.

#### *Mitigation Measures*

**TCR-1:** A Native American monitor from the consulting tribe shall be invited to participate in pre-construction archaeological surveys and site conditions assessments for the duration of the project.

**TCR-2:** DWR shall provide the consulting tribe the opportunity to review and comment on the pre-construction survey report addendum, as well as Department of Parks and Recreation 523 forms and any other cultural resources documents prepared by the Qualified Archaeologist for all prehistoric or Native American resources.

**TCR-3:** DWR shall, in good faith, consult with the consulting tribe on the disposition and treatment of any Tribal Cultural Resource encountered during pre-construction surveys, construction related ground disturbance, and periodic site condition assessments.

**TCR-4:** If avoidance of a Tribal Cultural Resource is determined to be infeasible, any Archaeological Resources Data Recovery and Treatment Plan shall be developed and implemented in consultation with the consulting tribe.

**TCR-5:** Should Tribal Cultural Resources deemed significant to the consulting tribe be encountered during construction related ground disturbing activities, the consulting tribe shall be provided the opportunity to request that a Native American Monitor be present to observe remaining ground disturbing activities within the vicinity of the find.

# 2.19 Utilities and Service Systems

| Issues (and Supporting Information Sources): | Potentially Significant Impact | Less Than Significant with Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| **UTILITIES AND SERVICE SYSTEMS —** Would the project: | | | | |
| 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? | ☐ | ☐ | ☒ | ☐ |

## Discussion

a) **Less than Significant Impact.** The proposed project is a seismic retrofit of an existing tower bridge. Wastewater generated during construction of the proposed project would be minimal, consisting of portable toilet waste generated by construction workers. Waste water generated during construction would be collected within portable toilet facilities. All wastewater generated in portable toilets would be collected by a permitted portable toilet waste hauler and appropriately disposed of at an identified liquid-disposal station. In addition, power washing (hydroblasting or sponge blasting) activities would generate water during construction. Water from either power washing method would be contained as described in Section 1, *Project Description*, and would not be allowed to spill or flow into the lake. Water from power washing would be appropriately disposed of on- or off-site by the contractor. Construction or relocation of water or wastewater facilities would not be required for construction of the proposed project and impacts would be less than significant. The proposed project would not require the relocation or construction of stormwater drainage, electric power, natural gas, or telecommunications facilities. No impact would occur.

b) **No Impact.** The proposed project includes a seismic retrofit to an existing tower bridge and once constructed operation of the facility would remain unchanged. The proposed would not require water supplies to serve the project. No impact would occur.

c) **No Impact.** The proposed project is a seismic retrofit project and would not generate wastewater that would require treatment. No impact would occur.

d) **Less than Significant Impact.** The proposed project would require excavation of the lakebed and around the tower bridge piers. Soils would be stockpiled and re-used on-site, as appropriate. Any remaining excavated soil would be stored on-site within the DWR maintenance yard for future maintenance needs. . The proposed project could result in other construction-related debris that would require disposal at regional landfills serving the project area. Exported soils and debris generated during construction are anticipated to be minimal and would not result in a significant impact on the permitted capacity of landfills serving the project area. The nearest landfill to the proposed project area is the Chiquita Canyon Landfill, a solid waste landfill located in Castaic about seven miles from the project site. The Chiquita Canyon Landfill accepts mixed industrial waste, municipal waste, green materials, construction/demolition waste, and inert waste. The Chiquita Canyon Landfill is estimated to have sufficient capacity through the year 2047 (CalRecycle, 2018). Impacts would be considered less than significant.

e) **Less than Significant Impact.** Construction of the proposed project would result in minimal solid waste debris. Recycling and proper disposal of materials would comply with local applicable solid waste statutes and regulations. Compliance with all federal, state, and local statutes and regulations related to solid waste would ensure impacts would be less than significant.

## References

California Department of Resources Recycling and Recovery (CalRecycle), 2018. CalRecycle.ca.gov. Solid Waste Information System (SWIS). Available at: https://www2.calrecycle.ca.gov/swfacilities/Directory/19-AA-0052. Accessed October 10, 2019.

# 2.20 Wildfire

| Issues (and Supporting Information Sources): | Potentially Significant Impact | Less Than Significant with Mitigation Incorporated | Less Than Significant Impact | No Impact |
|---|---|---|---|---|
| **WILDFIRE —** If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project: | | | | |
| 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 uncontrolled spread of a 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? | ☐ | ☐ | ☒ | ☐ |

## Discussion

a) **Less than Significant Impact.** The proposed project would be located on the western end of the dam at Castaic Lake within a State Responsibility Area with a Very High Fire Hazard Severity designation from CAL FIRE (CAL FIRE, 2019). These hazard areas are described according to their potential to cause fire hazards due to relevant factors such as fuels, terrain, and weather, and provide the basis for application of various mitigation strategies to reduce risks to buildings associated with wildfires. However, the remote location of the proposed project site would not impede traffic through the area, nor impair any emergency response or evacuation plan in the local area. Impact to emergency response or evacuation plans would be less than significant.

b) **Less than Significant Impact.** As discussed above, the project is located in a zone designated by CAL FIRE as Very High Fire Hazard Severity. Construction of the proposed project would involve materials that are considered flammable, such as fuels and epoxy. The handling and storage of such materials would be conducted in accordance with applicable regulations and BMPs would be implemented to prevent accidental spills and to dictate a response in the case of a spill. Additionally, contractors would have to comply with PRC Sections 4427, 4428, 4431, and 4442. In addition, as part of standard DWR protocol, the contractor would be required to prepare a Fire Prevention and Control Plan which complies with all provisions of the California Fire Code, Chapter 33. The plan would include appropriate preventative measures, emergency procedures to be followed, current emergency telephone numbers, and an area map. Plans items will be outlined by DWR at the time of the project. At a minimum, the plan will be required to have the following:

- Procedures and policies for preventing and controlling worksite fires occurring during construction.

- Materials susceptible to spontaneous ignition would be stored in an approved disposal container.
- No fires would be allowed at the work site.
- Contractor would be required to maintain appropriate fire suppression equipment at the work site, including an all-wheel drive water truck or fire truck with a water tank of at least 3,000-gallon capacity.
- Internal combustion engines would be required to be equipped with spark arrestors and motorized construction equipment would be located such that the exhausts do not discharge again combustible materials.
- Gasoline-powered construction equipment with catalytic converters would need to be equipped with shielding or other acceptable fire prevention features.
- Contract would be required to maintain contact with local firefighting agencies for updates on fire conditions and would be communicated to DWR Engineers daily during times of elevated fire danger.
- Vehicles would be restricted to project rights of way unless otherwise allowed in writing by the DWR Engineer for fire control procedures.

During construction, strict adherence to PRC sections and preparation and implementation of the Fire Prevention and Control Plan would ensure that contractors are responsible for all monitoring and safety measures ensuring that any risk to exacerbate wildfire, and in turn, pollution due to wildfire are considered less than significant. Once construction is complete, the project site would be returned to pre-construction conditions, and the facilities would not be manned and would not store flammable materials. Impacts during operation would be less than significant.

c) **No Impact.** The proposed project would retrofit an existing tower bridge. The project would not involve the construction of any new infrastructure such as roads, fuel breaks, emergency water sources, power lines or other utilities. No impact would occur.

d) **Less than Significant Impact.** The proposed project would take place on sloped surfaces, namely the bed of Castaic Lake, once water has been drawn down to a sufficient level to expose project components for construction. However, the project site consists of the lakebed, tower bridge, and the surrounding proposed staging areas which are all disturbed developed land within or adjacent to the lake; and does not include habitable structures. As such, the risk downslope flooding or landslide as result of post-fire slope instability or drainage changes would be less than significant.

## References

California Department of Forestry and Fire Protection (CAL FIRE), 2007. Fire Hazard Severity Zones in SRA. Available: https://osfm.fire.ca.gov/divisions/wildfire-prevention-planning-engineering/wildland-hazards-building-codes/fire-hazard-severity-zones-maps/. Accessed October 11, 2019.

# 2.21 Mandatory Findings of Significance

| *Issues (and Supporting Information Sources):* | *Potentially Significant Impact* | *Less Than Significant with Mitigation Incorporated* | *Less Than Significant Impact* | *No Impact* |
|---|---|---|---|---|
| **MANDATORY FINDINGS OF SIGNIFICANCE —** | | | | |
| 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? | ☐ | ☒ | ☐ | ☐ |
| 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)? | ☐ | ☒ | ☐ | ☐ |
| c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly? | ☐ | ☒ | ☐ | ☐ |

## Discussion

a) **Less than Significant with Mitigation.** As discussed above within Section 2.4, construction of the proposed project would have the potential to disrupt nesting birds and roosting bats along the underside of the tower bridge. However, implementation of **Mitigation Measures BIO-1**, **BIO-2**, and **BIO-3** would ensure that impacts to biological resources are mitigated to a less than significant level. As discussed above in Section 2.5, construction activities within the exposed lakebed could potentially encounter archaeological and paleontological resources, or human remains. However, implementation of **Mitigation Measures CUL-1, CUL-2, CUL-3, CUL-4, GEO-1,** and **GEO-2** would reduce these impacts to a less than significant level. Once constructed, operation of the proposed project would have no long-term permanent impacts to biological or cultural resources.

### *Mitigation Measures*

Implementation of **Mitigation Measures BIO-1, BIO-2, BIO-3, CUL-1**, **CUL-2, CUL-3, CUL-4, GEO-1,** and **GEO-2**.

b) **Less than Significant with Mitigation.** A cumulative impact could occur if the proposed project would result in an incrementally considerable contribution to a significant cumulative impact in consideration of past, present, and reasonably foreseeable future projects for each resource area. No direct significant impacts were identified for the proposed project that could not be mitigated to a less than significant level. However, when combined with other projects within the vicinity, the proposed project may result in a contribution to a potentially significant cumulative impact.

The proposed project would have no impact on agriculture and forestry resources, land use and planning, mineral resources, population and housing and the proposed project would have less than significant impacts on aesthetics, energy, greenhouse gas emissions, hazards and hazardous materials, hydrology and water quality, noise, public services, transportation, tribal cultural resources, utilities and service systems, and wildfire. As a result, cumulative impacts related to these resources would not occur.

Air quality, biological resources, cultural resources, and recreation impacts that are generated by construction activities would be short-term and limited by minimal construction workers traveling to the site, and construction occurring in short durations due to phases. Furthermore, impacts related to air quality, biological resources, cultural resources, geology and soils, and recreation would be less than cumulatively considerable with implementation of mitigation measures. Therefore, cumulative impacts would be considered less than significant with implementation of mitigation.

### *Mitigation Measures*

Implementation of **Mitigation Measures AQ-1, BIO-1, BIO-2, BIO-3, CUL-1**, **CUL-2, CUL-3, CUL-4, GEO-1, GEO-2,** and **REC-1**.

c) **Less than Significant with Mitigation.** With implementation of mitigation measures included in this IS/MND, the proposed project would not result in substantial adverse effects to humans, either directly or indirectly.

### *Mitigation Measures*

Implementation of **Mitigation Measures AQ-1, BIO-1, BIO-2, BIO-3, CUL-1**, **CUL-2, CUL-3, CUL-4, GEO-1, GEO-2,** and **REC-1**.

# Appendix A

## Castaic Dam High Intake Tower Access Bridge Retrofit Project: Air Quality, Greenhouse Gas, and Energy Worksheets

ESA

# A-1 Project Construction Air Quality Emissions Worksheets - Unmitigated

**Castaic**

**Air Quality Construction Analysis**

| Regional Maximums<br>Source | ROG | NOX | CO | SO2<br>lb/day | Total PM10 | Total PM2.5 |
|---|---|---|---|---|---|---|
| 3.2 Site Preparation - 2020 | 0.8 | 7.7 | 12.7 | 0.0 | 2.6 | 0.9 |
| 3.3 Building Construction-Superstructure - 2020 | 11.9 | 125.1 | 89.1 | 0.2 | 8.0 | 5.8 |
| 3.3 Building Construction-Superstructure - 2021 | 45.0 | 108.8 | 84.9 | 0.2 | 7.0 | 5.0 |
| 3.4 Building Construction-Columns - 2021 | 45.1 | 110.8 | 85.4 | 0.2 | 7.2 | 5.1 |
| 3.4 Building Construction-Columns - 2022 | 9.7 | 97.5 | 82.3 | 0.2 | 6.3 | 4.4 |
| **Project Daily Maximum Emissions** | **45.12** | **125.06** | **89.06** | **0.20** | **7.98** | **5.77** |

**Castaic**

**Air Quality Construction Analysis**

| Summer | Onsite Emissions | | | | | | | | | | Offsite Emissions | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Source | ROG | NOX | CO | SO2 | Fugitive PM10 | Exhaust PM10 | Total PM10 | Fugitive PM2.5 | Exhaust PM2.5 | Total PM2.5 | ROG | NOX | CO | SO2 | Fugitive PM10 t | Exhaus PM10 | Total PM10 | Fugitive PM2.5 | Exhaust PM2.5 | Total PM2.5 |
| | lb/day | | | | | | | | | | lb/day | | | | | | | | | |
| 3.2 Site Preparation - 2020 | 0.63 | 7.05 | 4.76 | 0.01 | 0.02 | 0.31 | 0.33 | 0.00 | 0.29 | 0.29 | 0.18 | 0.64 | 7.97 | 0.02 | 2.28 | 0.02 | 2.29 | 0.60 | 0.01 | 0.62 |
| 3.3 Building Construction-Superstructure - 2020 | 11.67 | 122.15 | 80.55 | 0.17 | 0.00 | 5.39 | 5.39 | 0.00 | 5.04 | 5.04 | 0.27 | 2.91 | 8.51 | 0.03 | 2.53 | 0.06 | 2.59 | 0.68 | 0.05 | 0.73 |
| 3.3 Building Construction-Superstructure - 2021 | 44.89 | 108.28 | 77.74 | 0.17 | 0.00 | 4.66 | 4.66 | 0.00 | 4.35 | 4.35 | 0.15 | 0.55 | 7.17 | 0.02 | 2.28 | 0.01 | 2.29 | 0.60 | 0.01 | 0.62 |
| 3.4 Building Construction-Columns - 2021 | 44.89 | 108.28 | 77.74 | 0.17 | 0.00 | 4.66 | 4.66 | 0.00 | 4.35 | 4.35 | 0.23 | 2.55 | 7.64 | 0.03 | 2.53 | 0.05 | 2.58 | 0.68 | 0.04 | 0.72 |
| 3.4 Building Construction-Columns - 2022 | 9.61 | 97.04 | 75.79 | 0.17 | 0.00 | 4.05 | 4.05 | 0.00 | 3.78 | 3.78 | 0.13 | 0.48 | 6.50 | 0.02 | 2.28 | 0.01 | 2.29 | 0.60 | 0.01 | 0.62 |

| Regional Emissions | ROG | NOX | CO | SO2 | Fugitive PM10 | Exhaust PM10 | Total PM10 | Fugitive PM2.5 | Exhaust PM2.5 | Total PM2.5 |
|---|---|---|---|---|---|---|---|---|---|---|
| 3.2 Site Preparation - 2020 | 0.8 | 7.7 | 12.7 | 0.0 | 2.3 | 0.3 | 2.6 | 0.6 | 0.3 | 0.9 |
| 3.3 Building Construction-Superstructure - 2020 | 11.9 | 125.1 | 89.1 | 0.2 | 2.5 | 5.5 | 8.0 | 0.7 | 5.1 | 5.8 |
| 3.3 Building Construction-Superstructure - 2021 | 45.0 | 108.8 | 84.9 | 0.2 | 2.3 | 4.7 | 7.0 | 0.6 | 4.4 | 5.0 |
| 3.4 Building Construction-Columns - 2021 | 45.1 | 110.8 | 85.4 | 0.2 | 2.5 | 4.7 | 7.2 | 0.7 | 4.4 | 5.1 |
| 3.4 Building Construction-Columns - 2022 | 9.7 | 97.5 | 82.3 | 0.2 | 2.3 | 4.1 | 6.3 | 0.6 | 3.8 | 4.4 |
| **Project Daily Maximum Emissions** | **45.1217** | **125.0582** | **89.0569** | **0.2015** | **2.5327** | **5.4510** | **7.9837** | **0.6771** | **5.0911** | **5.7681** |

**Air Quality Construction Analysis**

| Winter | Onsite Emissions | | | | | | | | | | Offsite Emissions | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Fugitive | Exhaust | | Fugitive | Exhaust | Total | | | | | Fugitive | Exhaust | Total | Fugitive | Exhaust | Total |
| Source | ROG | NOX | CO | SO2 | PM10 | PM10 | Total PM10 | PM2.5 | PM2.5 | PM2.5 | ROG | NOX | CO | SO2 | PM10 | PM10 | PM10 | PM2.5 | PM2.5 | PM2.5 |
| | | | | | | lb/day | | | | | | | | | lb/day | | | | | |
| 3.2 Site Preparation - 2020 | 0.63 | 7.05 | 4.76 | 0.01 | 0.02 | 0.31 | 0.33 | 0.00 | 0.29 | 0.29 | 0.18 | 0.64 | 7.97 | 0.02 | 2.28 | 0.02 | 2.29 | 0.60 | 0.01 | 0.62 |
| 3.3 Building Construction-Superstructure - 2020 | 11.67 | 122.15 | 80.55 | 0.17 | 0.00 | 5.39 | 5.39 | 0.00 | 5.04 | 5.04 | 0.27 | 2.91 | 8.51 | 0.03 | 2.53 | 0.06 | 2.59 | 0.68 | 0.05 | 0.73 |
| 3.3 Building Construction-Superstructure - 2021 | 44.89 | 108.28 | 77.74 | 0.17 | 0.00 | 4.66 | 4.66 | 0.00 | 4.35 | 4.35 | 0.15 | 0.55 | 7.17 | 0.02 | 2.28 | 0.01 | 2.29 | 0.60 | 0.01 | 0.62 |
| 3.4 Building Construction-Columns - 2021 | 44.89 | 108.28 | 77.74 | 0.17 | 0.00 | 4.66 | 4.66 | 0.00 | 4.35 | 4.35 | 0.23 | 2.55 | 7.64 | 0.03 | 2.53 | 0.05 | 2.58 | 0.68 | 0.04 | 0.72 |
| 3.4 Building Construction-Columns - 2022 | 9.61 | 97.04 | 75.79 | 0.17 | 0.00 | 4.05 | 4.05 | 0.00 | 3.78 | 3.78 | 0.13 | 0.48 | 6.50 | 0.02 | 2.28 | 0.01 | 2.29 | 0.60 | 0.01 | 0.62 |

| Regional Emissions | ROG | NOX | CO | SO2 | Fugitive PM10 | Exhaust PM10 | Total PM10 | Fugitive PM2.5 | Exhaust PM2.5 | Total PM2.5 |
|---|---|---|---|---|---|---|---|---|---|---|
| 3.2 Site Preparation - 2020 | 0.8 | 7.7 | 12.7 | 0.0 | 2.3 | 0.3 | 2.6 | 0.6 | 0.3 | 0.9 |
| 3.3 Building Construction-Superstructure - 2020 | 11.9 | 125.1 | 89.1 | 0.2 | 2.5 | 5.5 | 8.0 | 0.7 | 5.1 | 5.8 |
| 3.3 Building Construction-Superstructure - 2021 | 45.0 | 108.8 | 84.9 | 0.2 | 2.3 | 4.7 | 7.0 | 0.6 | 4.4 | 5.0 |
| 3.4 Building Construction-Columns - 2021 | 45.1 | 110.8 | 85.4 | 0.2 | 2.5 | 4.7 | 7.2 | 0.7 | 4.4 | 5.1 |
| 3.4 Building Construction-Columns - 2022 | 9.7 | 97.5 | 82.3 | 0.2 | 2.3 | 4.1 | 6.3 | 0.6 | 3.8 | 4.4 |
| **Project Daily Maximum Emissions** | **45.1217** | **125.0582** | **89.0569** | **0.2015** | **2.5327** | **5.4510** | **7.9837** | **0.6771** | **5.0911** | **5.7681** |

**Air Quality Construction Analysis**

| Localized Emissions | Onsite Emissions | | | |
|---|---|---|---|---|
| Source | NOX | CO | Total PM10 lb/day | Total PM2.5 |
| 3.2 Site Preparation - 2020 | 7.05 | 4.76 | 0.33 | 0.29 |
| 3.3 Building Construction-Superstructure -2020 | 122.15 | 80.55 | 5.39 | 5.04 |
| 3.3 Building Construction-Superstructure -2021 | 108.28 | 77.74 | 4.66 | 4.35 |
| 3.4 Building Construction-Columns - 2021 | 108.28 | 77.74 | 4.66 | 4.35 |
| 3.4 Building Construction-Columns - 2022 | 97.04 | 75.79 | 4.05 | 3.78 |

| Localized Emissions | NOX | CO | Total PM10 | Total PM2.5 |
|---|---|---|---|---|
| 3.2 Site Preparation - 2020 | 7.05 | 4.76 | 0.33 | 0.29 |
| 3.3 Building Construction-Superstructure -2020 | 122.15 | 80.55 | 5.39 | 5.04 |
| 3.3 Building Construction-Superstructure -2021 | 108.28 | 77.74 | 4.66 | 4.35 |
| 3.4 Building Construction-Columns - 2021 | 108.28 | 77.74 | 4.66 | 4.35 |
| 3.4 Building Construction-Columns - 2022 | 97.04 | 75.79 | 4.05 | 3.78 |
| **Project Daily Maximum Emissions** | **122.15** | **80.55** | **5.39** | **5.04** |
| Localized Significance Thresholds | 173 | 2,500 | 51 | 18 |

SRA 15, 1-acre site, 200 m away from receptor

**Epoxy Coating VOC Emissions**

| | Total Gallons | Component A Gallons | Component B Gallons | Liters Per Column | VOC emission (g/l) | VOC emission (g/column) | VOC emissions (lbs/day) |
|---|---|---|---|---|---|---|---|
| Epoxy Primer for substrate surface | 75 | 50 | 25 | 95 | 3 | 284 | 0.63 |
| Epoxy Primer for fiber saturant | 1050 | 700 | 350 | 1325 | 3 | 3975 | 8.76 |
| Epoxy Paste/Filler | 300 | 200 | 100 | 379 | 7 | 2650 | 5.84 |
| UV Coating | 80 | | | 101 | 86 | 8681 | 19.14 |
| | | | | | | Total | 34.37 |

Notes: VOC content and gallon amount provided by client.

Castaic Lake High Tower Bridge Retrofit - Los Angeles-South Coast County, Summer

# Castaic Lake High Tower Bridge Retrofit

**Los Angeles-South Coast County, Summer**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| General Light Industry | 43.56 | 1000sqft | 1.00 | 43,560.00 | 0 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 33 |
| **Climate Zone** | 8 | | | **Operational Year** | 2022 |
| **Utility Company** | Southern California Edison | | | | |
| **CO2 Intensity (lb/MWhr)** | 702.44 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - see construction assumptions

Off-road Equipment - see construction assumptions

Off-road Equipment - see construction assumptions

Off-road Equipment - see construction assumptions

Trips and VMT - see construction assumptions

Construction Off-road Equipment Mitigation -

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblConstDustMitigation | WaterUnpavedRoadVehicleSpeed | 0 | 15 |
| tblConstructionPhase | NumDays | 100.00 | 144.00 |
| tblConstructionPhase | NumDays | 1.00 | 12.00 |
| tblConstructionPhase | NumDays | 100.00 | 132.00 |
| tblConstructionPhase | NumDaysWeek | 5.00 | 6.00 |
| tblConstructionPhase | NumDaysWeek | 5.00 | 6.00 |
| tblConstructionPhase | NumDaysWeek | 5.00 | 6.00 |
| tblConstructionPhase | PhaseEndDate | 5/10/2021 | 6/2/2021 |
| tblConstructionPhase | PhaseEndDate | 12/17/2020 | 12/16/2020 |
| tblConstructionPhase | PhaseStartDate | 12/22/2020 | 12/17/2020 |
| tblConstructionPhase | PhaseStartDate | 12/17/2020 | 12/3/2020 |
| tblGrading | AcresOfGrading | 0.00 | 0.50 |
| tblOffRoadEquipment | HorsePower | 231.00 | 120.00 |
| tblOffRoadEquipment | HorsePower | 84.00 | 250.00 |
| tblOffRoadEquipment | HorsePower | 84.00 | 250.00 |
| tblOffRoadEquipment | HorsePower | 231.00 | 120.00 |
| tblOffRoadEquipment | HorsePower | 97.00 | 120.00 |
| tblOffRoadEquipment | HorsePower | 97.00 | 250.00 |
| tblOffRoadEquipment | HorsePower | 130.00 | 50.00 |
| tblOffRoadEquipment | HorsePower | 97.00 | 120.00 |
| tblOffRoadEquipment | HorsePower | 81.00 | 120.00 |
| tblOffRoadEquipment | HorsePower | 124.00 | 120.00 |
| tblOffRoadEquipment | HorsePower | 402.00 | 175.00 |
| tblOffRoadEquipment | HorsePower | 97.00 | 120.00 |
| tblOffRoadEquipment | HorsePower | 402.00 | 1,000.00 |
| tblOffRoadEquipment | HorsePower | 172.00 | 500.00 |
| tblOffRoadEquipment | HorsePower | 247.00 | 500.00 |
| tblOffRoadEquipment | HorsePower | 97.00 | 250.00 |
| tblOffRoadEquipment | HorsePower | 130.00 | 50.00 |

| | | | |
|---|---|---|---|
| tblOffRoadEquipment | HorsePower | 81.00 | 120.00 |
| tblOffRoadEquipment | HorsePower | 124.00 | 120.00 |
| tblOffRoadEquipment | HorsePower | 402.00 | 175.00 |
| tblOffRoadEquipment | HorsePower | 402.00 | 1,000.00 |
| tblOffRoadEquipment | HorsePower | 172.00 | 500.00 |
| tblOffRoadEquipment | HorsePower | 247.00 | 500.00 |
| tblOffRoadEquipment | HorsePower | 97.00 | 250.00 |
| tblOffRoadEquipment | LoadFactor | 0.37 | 0.37 |
| tblOffRoadEquipment | LoadFactor | 0.42 | 0.42 |
| tblOffRoadEquipment | LoadFactor | 0.44 | 0.44 |
| tblOffRoadEquipment | LoadFactor | 0.38 | 0.38 |
| tblOffRoadEquipment | LoadFactor | 0.38 | 0.38 |
| tblOffRoadEquipment | LoadFactor | 0.42 | 0.42 |
| tblOffRoadEquipment | LoadFactor | 0.40 | 0.40 |
| tblOffRoadEquipment | LoadFactor | 0.37 | 0.37 |
| tblOffRoadEquipment | LoadFactor | 0.42 | 0.42 |
| tblOffRoadEquipment | LoadFactor | 0.44 | 0.44 |
| tblOffRoadEquipment | LoadFactor | 0.38 | 0.38 |
| tblOffRoadEquipment | LoadFactor | 0.38 | 0.38 |
| tblOffRoadEquipment | LoadFactor | 0.42 | 0.42 |
| tblOffRoadEquipment | LoadFactor | 0.40 | 0.40 |
| tblOffRoadEquipment | LoadFactor | 0.37 | 0.37 |
| tblOffRoadEquipment | OffRoadEquipmentType | | Tractors/Loaders/Backhoes |
| tblOffRoadEquipment | OffRoadEquipmentType | | Pavers |
| tblOffRoadEquipment | OffRoadEquipmentType | | Concrete/Industrial Saws |
| tblOffRoadEquipment | OffRoadEquipmentType | | Off-Highway Tractors |
| tblOffRoadEquipment | OffRoadEquipmentType | | Off-Highway Trucks |
| tblOffRoadEquipment | OffRoadEquipmentType | | Off-Highway Trucks |
| tblOffRoadEquipment | OffRoadEquipmentType | | Other Construction Equipment |
| tblOffRoadEquipment | OffRoadEquipmentType | | Rubber Tired Dozers |

| | | | |
|---|---|---|---|
| tblOffRoadEquipment | OffRoadEquipmentType | | Tractors/Loaders/Backhoes |
| tblOffRoadEquipment | OffRoadEquipmentType | | Pavers |
| tblOffRoadEquipment | OffRoadEquipmentType | | Concrete/Industrial Saws |
| tblOffRoadEquipment | OffRoadEquipmentType | | Off-Highway Tractors |
| tblOffRoadEquipment | OffRoadEquipmentType | | Off-Highway Trucks |
| tblOffRoadEquipment | OffRoadEquipmentType | | Off-Highway Trucks |
| tblOffRoadEquipment | OffRoadEquipmentType | | Other Construction Equipment |
| tblOffRoadEquipment | OffRoadEquipmentType | | Rubber Tired Dozers |
| tblOffRoadEquipment | OffRoadEquipmentType | | Tractors/Loaders/Backhoes |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 4.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 2.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 2.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 4.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 0.00 |
| tblOffRoadEquipment | UsageHours | 6.00 | 8.00 |
| tblOffRoadEquipment | UsageHours | 6.00 | 8.00 |
| tblOffRoadEquipment | UsageHours | 6.00 | 8.00 |
| tblOffRoadEquipment | UsageHours | 6.00 | 8.00 |
| tblOffRoadEquipment | UsageHours | 6.00 | 8.00 |
| tblOffRoadEquipment | UsageHours | 6.00 | 8.00 |
| tblTripsAndVMT | VendorTripNumber | 7.00 | 0.00 |
| tblTripsAndVMT | VendorTripNumber | 7.00 | 0.00 |
| tblTripsAndVMT | WorkerTripNumber | 18.00 | 0.00 |
| tblTripsAndVMT | WorkerTripNumber | 5.00 | 0.00 |
| tblTripsAndVMT | WorkerTripNumber | 18.00 | 0.00 |

## 2.0 Emissions Summary

### 2.1 Overall Construction (Maximum Daily Emission)

#### Unmitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2020 | 11.6716 | 122.1520 | 80.5456 | 0.1729 | 0.0442 | 5.3944 | 5.3944 | 4.7700e-003 | 5.0395 | 5.0395 | 0.0000 | 16,625.1099 | 16,625.1099 | 3.8317 | 0.0000 | 16,720.9028 |
| 2021 | 10.5232 | 108.2765 | 77.7389 | 0.1730 | 0.0000 | 4.6577 | 4.6577 | 0.0000 | 4.3517 | 4.3517 | 0.0000 | 16,631.6290 | 16,631.6290 | 3.8180 | 0.0000 | 16,727.0797 |
| 2022 | 9.6064 | 97.0441 | 75.7869 | 0.1731 | 0.0000 | 4.0454 | 4.0454 | 0.0000 | 3.7798 | 3.7798 | 0.0000 | 16,644.6852 | 16,644.6852 | 3.8096 | 0.0000 | 16,739.9238 |
| **Maximum** | **11.6716** | **122.1520** | **80.5456** | **0.1731** | **0.0442** | **5.3944** | **5.3944** | **4.7700e-003** | **5.0395** | **5.0395** | **0.0000** | **16,644.6852** | **16,644.6852** | **3.8317** | **0.0000** | **16,739.9238** |

#### Mitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2020 | 11.6716 | 122.1520 | 80.5456 | 0.1729 | 0.0172 | 5.3944 | 5.3944 | 1.8600e-003 | 5.0395 | 5.0395 | 0.0000 | 16,625.1099 | 16,625.1099 | 3.8317 | 0.0000 | 16,720.9028 |
| 2021 | 10.5232 | 108.2765 | 77.7389 | 0.1730 | 0.0000 | 4.6577 | 4.6577 | 0.0000 | 4.3517 | 4.3517 | 0.0000 | 16,631.6290 | 16,631.6290 | 3.8180 | 0.0000 | 16,727.0797 |
| 2022 | 9.6064 | 97.0441 | 75.7869 | 0.1731 | 0.0000 | 4.0454 | 4.0454 | 0.0000 | 3.7798 | 3.7798 | 0.0000 | 16,644.6851 | 16,644.6851 | 3.8096 | 0.0000 | 16,739.9238 |
| **Maximum** | **11.6716** | **122.1520** | **80.5456** | **0.1731** | **0.0172** | **5.3944** | **5.3944** | **1.8600e-003** | **5.0395** | **5.0395** | **0.0000** | **16,644.6851** | **16,644.6851** | **3.8317** | **0.0000** | **16,739.9238** |

| | ROG | NOx | 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** | **61.01** | **0.00** | **0.00** | **61.01** | **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 | Site Preparation | Site Preparation | 12/3/2020 | 12/16/2020 | 6 | 12 | |
| 2 | Building Construction-Superstructure | Building Construction | 12/17/2020 | 6/2/2021 | 6 | 144 | |
| 3 | Building Construction-Columns | Building Construction | 8/17/2021 | 1/17/2022 | 6 | 132 | |

**Acres of Grading (Site Preparation Phase): 0.5**

**Acres of Grading (Grading Phase): 0**

**Acres of Paving: 0**

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

### OffRoad Equipment

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Building Construction-Columns | Cranes | 4 | 8.00 | 120 | 0.29 |
| Building Construction-Columns | Forklifts | 0 | 6.00 | 89 | 0.20 |
| Building Construction-Columns | Generator Sets | 2 | 8.00 | 250 | 0.74 |
| Building Construction-Superstructure | Generator Sets | 2 | 8.00 | 250 | 0.74 |
| Building Construction-Superstructure | Cranes | 4 | 8.00 | 120 | 0.29 |
| Building Construction-Superstructure | Forklifts | 0 | 6.00 | 89 | 0.20 |
| Site Preparation | Graders | 0 | 8.00 | 187 | 0.41 |
| Building Construction-Columns | Tractors/Loaders/Backhoes | 1 | 8.00 | 120 | 0.37 |
| Building Construction-Columns | Welders | 0 | 8.00 | 46 | 0.45 |
| Site Preparation | Tractors/Loaders/Backhoes | 1 | 8.00 | 250 | 0.37 |
| Building Construction-Superstructure | Pavers | 1 | 8.00 | 50 | 0.42 |
| Building Construction-Superstructure | Tractors/Loaders/Backhoes | 1 | 8.00 | 120 | 0.37 |
| Building Construction-Superstructure | Concrete/Industrial Saws | 2 | 8.00 | 120 | 0.73 |
| Building Construction-Superstructure | Off-Highway Tractors | 1 | 8.00 | 120 | 0.44 |
| Building Construction-Superstructure | Off-Highway Trucks | 3 | 8.00 | 175 | 0.38 |
| Site Preparation | Tractors/Loaders/Backhoes | 1 | 8.00 | 120 | 0.37 |

| | | | | | |
|---|---|---|---|---|---|
| Building Construction-Superstructure | Off-Highway Trucks | 1 | 8.00 | 1000 | 0.38 |
| Building Construction-Superstructure | Other Construction Equipment | 1 | 8.00 | 500 | 0.42 |
| Site Preparation | Rubber Tired Dozers | 0 | 7.00 | 247 | 0.40 |
| Building Construction-Superstructure | Welders | 0 | 8.00 | 46 | 0.45 |
| Building Construction-Superstructure | Rubber Tired Dozers | 1 | 8.00 | 500 | 0.40 |
| Building Construction-Superstructure | Tractors/Loaders/Backhoes | 1 | 8.00 | 250 | 0.37 |
| Building Construction-Columns | Pavers | 1 | 8.00 | 50 | 0.42 |
| Building Construction-Columns | Concrete/Industrial Saws | 2 | 8.00 | 120 | 0.73 |
| Building Construction-Columns | Off-Highway Tractors | 1 | 8.00 | 120 | 0.44 |
| Building Construction-Columns | Off-Highway Trucks | 3 | 8.00 | 175 | 0.38 |
| Building Construction-Columns | Off-Highway Trucks | 1 | 8.00 | 1000 | 0.38 |
| Building Construction-Columns | Other Construction Equipment | 1 | 8.00 | 500 | 0.42 |
| Building Construction-Columns | Rubber Tired Dozers | 1 | 8.00 | 500 | 0.40 |
| Building Construction-Columns | Tractors/Loaders/Backhoes | 1 | 8.00 | 250 | 0.37 |

**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 |
|---|---|---|---|---|---|---|---|---|---|---|
| Building Construction-Columns | 18 | 0.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Site Preparation | 2 | 0.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction-Superstructure | 18 | 0.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

Use Soil Stabilizer

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

## 3.2 Site Preparation - 2020

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 0.0442 | 0.0000 | 0.0442 | 4.7700e-003 | 0.0000 | 4.7700e-003 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.6251 | 7.0529 | 4.7634 | 0.0117 | | 0.3106 | 0.3106 | | 0.2858 | 0.2858 | | 1,136.5560 | 1,136.5560 | 0.3676 | | 1,145.7457 |
| **Total** | **0.6251** | **7.0529** | **4.7634** | **0.0117** | **0.0442** | **0.3106** | **0.3548** | **4.7700e-003** | **0.2858** | **0.2905** | | **1,136.5560** | **1,136.5560** | **0.3676** | | **1,145.7457** |

### Unmitigated Construction Off-Site

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

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 0.0172 | 0.0000 | 0.0172 | 1.8600e-003 | 0.0000 | 1.8600e-003 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.6251 | 7.0529 | 4.7634 | 0.0117 | | 0.3106 | 0.3106 | | 0.2858 | 0.2858 | 0.0000 | 1,136.5560 | 1,136.5560 | 0.3676 | | 1,145.7457 |
| **Total** | **0.6251** | **7.0529** | **4.7634** | **0.0117** | **0.0172** | **0.3106** | **0.3278** | **1.8600e-003** | **0.2858** | **0.2876** | **0.0000** | **1,136.5560** | **1,136.5560** | **0.3676** | | **1,145.7457** |

## Mitigated Construction Off-Site

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

## 3.3 Building Construction-Superstructure - 2020

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 11.6716 | 122.1520 | 80.5456 | 0.1729 | | 5.3944 | 5.3944 | | 5.0395 | 5.0395 | | 16,625.1099 | 16,625.1099 | 3.8317 | | 16,720.9028 |
| **Total** | **11.6716** | **122.1520** | **80.5456** | **0.1729** | | **5.3944** | **5.3944** | | **5.0395** | **5.0395** | | **16,625.1099** | **16,625.1099** | **3.8317** | | **16,720.9028** |

### Unmitigated Construction Off-Site

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

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 11.6716 | 122.1520 | 80.5456 | 0.1729 | | 5.3944 | 5.3944 | | 5.0395 | 5.0395 | 0.0000 | 16,625.1099 | 16,625.1099 | 3.8317 | | 16,720.9028 |
| **Total** | **11.6716** | **122.1520** | **80.5456** | **0.1729** | | **5.3944** | **5.3944** | | **5.0395** | **5.0395** | **0.0000** | **16,625.1099** | **16,625.1099** | **3.8317** | | **16,720.9028** |

## Mitigated Construction Off-Site

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

## 3.3 Building Construction-Superstructure - 2021

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 10.5232 | 108.2765 | 77.7389 | 0.1730 | | 4.6577 | 4.6577 | | 4.3517 | 4.3517 | | 16,631.6290 | 16,631.6290 | 3.8180 | | 16,727.0797 |
| **Total** | **10.5232** | **108.2765** | **77.7389** | **0.1730** | | **4.6577** | **4.6577** | | **4.3517** | **4.3517** | | **16,631.6290** | **16,631.6290** | **3.8180** | | **16,727.0797** |

### Unmitigated Construction Off-Site

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

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 10.5232 | 108.2765 | 77.7389 | 0.1730 | | 4.6577 | 4.6577 | | 4.3517 | 4.3517 | 0.0000 | 16,631.6290 | 16,631.6290 | 3.8180 | | 16,727.0797 |
| **Total** | **10.5232** | **108.2765** | **77.7389** | **0.1730** | | **4.6577** | **4.6577** | | **4.3517** | **4.3517** | **0.0000** | **16,631.6290** | **16,631.6290** | **3.8180** | | **16,727.0797** |

## Mitigated Construction Off-Site

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

## 3.4 Building Construction-Columns - 2021

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 10.5232 | 108.2765 | 77.7389 | 0.1730 | | 4.6577 | 4.6577 | | 4.3517 | 4.3517 | | 16,631.6290 | 16,631.6290 | 3.8180 | | 16,727.0797 |
| **Total** | **10.5232** | **108.2765** | **77.7389** | **0.1730** | | **4.6577** | **4.6577** | | **4.3517** | **4.3517** | | **16,631.6290** | **16,631.6290** | **3.8180** | | **16,727.0797** |

### Unmitigated Construction Off-Site

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

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 10.5232 | 108.2765 | 77.7389 | 0.1730 | | 4.6577 | 4.6577 | | 4.3517 | 4.3517 | 0.0000 | 16,631.6290 | 16,631.6290 | 3.8180 | | 16,727.0797 |
| **Total** | **10.5232** | **108.2765** | **77.7389** | **0.1730** | | **4.6577** | **4.6577** | | **4.3517** | **4.3517** | **0.0000** | **16,631.6290** | **16,631.6290** | **3.8180** | | **16,727.0797** |

## Mitigated Construction Off-Site

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

## 3.4 Building Construction-Columns - 2022

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 9.6064 | 97.0441 | 75.7869 | 0.1731 | | 4.0454 | 4.0454 | | 3.7798 | 3.7798 | | 16,644.6852 | 16,644.6852 | 3.8096 | | 16,739.9238 |
| **Total** | **9.6064** | **97.0441** | **75.7869** | **0.1731** | | **4.0454** | **4.0454** | | **3.7798** | **3.7798** | | **16,644.6852** | **16,644.6852** | **3.8096** | | **16,739.9238** |

### Unmitigated Construction Off-Site

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

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 9.6064 | 97.0441 | 75.7869 | 0.1731 | | 4.0454 | 4.0454 | | 3.7798 | 3.7798 | 0.0000 | 16,644.6851 | 16,644.6851 | 3.8096 | | 16,739.9238 |
| **Total** | **9.6064** | **97.0441** | **75.7869** | **0.1731** | | **4.0454** | **4.0454** | | **3.7798** | **3.7798** | **0.0000** | **16,644.6851** | **16,644.6851** | **3.8096** | | **16,739.9238** |

## Mitigated Construction Off-Site

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

# Castaic Lake High Tower Bridge Retrofit

**Los Angeles-South Coast County, Winter**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| General Light Industry | 43.56 | 1000sqft | 1.00 | 43,560.00 | 0 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 33 |
| **Climate Zone** | 8 | | | **Operational Year** | 2022 |
| **Utility Company** | Southern California Edison | | | | |
| **CO2 Intensity (lb/MWhr)** | 702.44 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - see construction assumptions

Off-road Equipment - see construction assumptions

Off-road Equipment - see construction assumptions

Off-road Equipment - see construction assumptions

Trips and VMT - see construction assumptions

Construction Off-road Equipment Mitigation -

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblConstDustMitigation | WaterUnpavedRoadVehicleSpeed | 0 | 15 |
| tblConstructionPhase | NumDays | 100.00 | 144.00 |
| tblConstructionPhase | NumDays | 1.00 | 12.00 |
| tblConstructionPhase | NumDays | 100.00 | 132.00 |
| tblConstructionPhase | NumDaysWeek | 5.00 | 6.00 |
| tblConstructionPhase | NumDaysWeek | 5.00 | 6.00 |
| tblConstructionPhase | NumDaysWeek | 5.00 | 6.00 |
| tblConstructionPhase | PhaseEndDate | 5/10/2021 | 6/2/2021 |
| tblConstructionPhase | PhaseEndDate | 12/17/2020 | 12/16/2020 |
| tblConstructionPhase | PhaseStartDate | 12/22/2020 | 12/17/2020 |
| tblConstructionPhase | PhaseStartDate | 12/17/2020 | 12/3/2020 |
| tblGrading | AcresOfGrading | 0.00 | 0.50 |
| tblOffRoadEquipment | HorsePower | 231.00 | 120.00 |
| tblOffRoadEquipment | HorsePower | 84.00 | 250.00 |
| tblOffRoadEquipment | HorsePower | 84.00 | 250.00 |
| tblOffRoadEquipment | HorsePower | 231.00 | 120.00 |
| tblOffRoadEquipment | HorsePower | 97.00 | 120.00 |
| tblOffRoadEquipment | HorsePower | 97.00 | 250.00 |
| tblOffRoadEquipment | HorsePower | 130.00 | 50.00 |
| tblOffRoadEquipment | HorsePower | 97.00 | 120.00 |
| tblOffRoadEquipment | HorsePower | 81.00 | 120.00 |
| tblOffRoadEquipment | HorsePower | 124.00 | 120.00 |
| tblOffRoadEquipment | HorsePower | 402.00 | 175.00 |
| tblOffRoadEquipment | HorsePower | 97.00 | 120.00 |
| tblOffRoadEquipment | HorsePower | 402.00 | 1,000.00 |
| tblOffRoadEquipment | HorsePower | 172.00 | 500.00 |
| tblOffRoadEquipment | HorsePower | 247.00 | 500.00 |
| tblOffRoadEquipment | HorsePower | 97.00 | 250.00 |
| tblOffRoadEquipment | HorsePower | 130.00 | 50.00 |

| | | | |
|---|---|---|---|
| tblOffRoadEquipment | HorsePower | 81.00 | 120.00 |
| tblOffRoadEquipment | HorsePower | 124.00 | 120.00 |
| tblOffRoadEquipment | HorsePower | 402.00 | 175.00 |
| tblOffRoadEquipment | HorsePower | 402.00 | 1,000.00 |
| tblOffRoadEquipment | HorsePower | 172.00 | 500.00 |
| tblOffRoadEquipment | HorsePower | 247.00 | 500.00 |
| tblOffRoadEquipment | HorsePower | 97.00 | 250.00 |
| tblOffRoadEquipment | LoadFactor | 0.37 | 0.37 |
| tblOffRoadEquipment | LoadFactor | 0.42 | 0.42 |
| tblOffRoadEquipment | LoadFactor | 0.44 | 0.44 |
| tblOffRoadEquipment | LoadFactor | 0.38 | 0.38 |
| tblOffRoadEquipment | LoadFactor | 0.38 | 0.38 |
| tblOffRoadEquipment | LoadFactor | 0.42 | 0.42 |
| tblOffRoadEquipment | LoadFactor | 0.40 | 0.40 |
| tblOffRoadEquipment | LoadFactor | 0.37 | 0.37 |
| tblOffRoadEquipment | LoadFactor | 0.42 | 0.42 |
| tblOffRoadEquipment | LoadFactor | 0.44 | 0.44 |
| tblOffRoadEquipment | LoadFactor | 0.38 | 0.38 |
| tblOffRoadEquipment | LoadFactor | 0.38 | 0.38 |
| tblOffRoadEquipment | LoadFactor | 0.42 | 0.42 |
| tblOffRoadEquipment | LoadFactor | 0.40 | 0.40 |
| tblOffRoadEquipment | LoadFactor | 0.37 | 0.37 |
| tblOffRoadEquipment | OffRoadEquipmentType | | Tractors/Loaders/Backhoes |
| tblOffRoadEquipment | OffRoadEquipmentType | | Pavers |
| tblOffRoadEquipment | OffRoadEquipmentType | | Concrete/Industrial Saws |
| tblOffRoadEquipment | OffRoadEquipmentType | | Off-Highway Tractors |
| tblOffRoadEquipment | OffRoadEquipmentType | | Off-Highway Trucks |
| tblOffRoadEquipment | OffRoadEquipmentType | | Off-Highway Trucks |
| tblOffRoadEquipment | OffRoadEquipmentType | | Other Construction Equipment |
| tblOffRoadEquipment | OffRoadEquipmentType | | Rubber Tired Dozers |

| | | | |
|---|---|---|---|
| tblOffRoadEquipment | OffRoadEquipmentType | | Tractors/Loaders/Backhoes |
| tblOffRoadEquipment | OffRoadEquipmentType | | Pavers |
| tblOffRoadEquipment | OffRoadEquipmentType | | Concrete/Industrial Saws |
| tblOffRoadEquipment | OffRoadEquipmentType | | Off-Highway Tractors |
| tblOffRoadEquipment | OffRoadEquipmentType | | Off-Highway Trucks |
| tblOffRoadEquipment | OffRoadEquipmentType | | Off-Highway Trucks |
| tblOffRoadEquipment | OffRoadEquipmentType | | Other Construction Equipment |
| tblOffRoadEquipment | OffRoadEquipmentType | | Rubber Tired Dozers |
| tblOffRoadEquipment | OffRoadEquipmentType | | Tractors/Loaders/Backhoes |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 4.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 2.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 2.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 4.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 0.00 |
| tblOffRoadEquipment | UsageHours | 6.00 | 8.00 |
| tblOffRoadEquipment | UsageHours | 6.00 | 8.00 |
| tblOffRoadEquipment | UsageHours | 6.00 | 8.00 |
| tblOffRoadEquipment | UsageHours | 6.00 | 8.00 |
| tblOffRoadEquipment | UsageHours | 6.00 | 8.00 |
| tblOffRoadEquipment | UsageHours | 6.00 | 8.00 |
| tblTripsAndVMT | VendorTripNumber | 7.00 | 0.00 |
| tblTripsAndVMT | VendorTripNumber | 7.00 | 0.00 |
| tblTripsAndVMT | WorkerTripNumber | 18.00 | 0.00 |
| tblTripsAndVMT | WorkerTripNumber | 5.00 | 0.00 |
| tblTripsAndVMT | WorkerTripNumber | 18.00 | 0.00 |

## 2.0 Emissions Summary

### 2.1 Overall Construction (Maximum Daily Emission)

#### Unmitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2020 | 11.6716 | 122.1520 | 80.5456 | 0.1729 | 0.0442 | 5.3944 | 5.3944 | 4.7700e-003 | 5.0395 | 5.0395 | 0.0000 | 16,625.1099 | 16,625.1099 | 3.8317 | 0.0000 | 16,720.9028 |
| 2021 | 10.5232 | 108.2765 | 77.7389 | 0.1730 | 0.0000 | 4.6577 | 4.6577 | 0.0000 | 4.3517 | 4.3517 | 0.0000 | 16,631.6290 | 16,631.6290 | 3.8180 | 0.0000 | 16,727.0797 |
| 2022 | 9.6064 | 97.0441 | 75.7869 | 0.1731 | 0.0000 | 4.0454 | 4.0454 | 0.0000 | 3.7798 | 3.7798 | 0.0000 | 16,644.6852 | 16,644.6852 | 3.8096 | 0.0000 | 16,739.9238 |
| **Maximum** | **11.6716** | **122.1520** | **80.5456** | **0.1731** | **0.0442** | **5.3944** | **5.3944** | **4.7700e-003** | **5.0395** | **5.0395** | **0.0000** | **16,644.6852** | **16,644.6852** | **3.8317** | **0.0000** | **16,739.9238** |

#### Mitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2020 | 11.6716 | 122.1520 | 80.5456 | 0.1729 | 0.0172 | 5.3944 | 5.3944 | 1.8600e-003 | 5.0395 | 5.0395 | 0.0000 | 16,625.1099 | 16,625.1099 | 3.8317 | 0.0000 | 16,720.9028 |
| 2021 | 10.5232 | 108.2765 | 77.7389 | 0.1730 | 0.0000 | 4.6577 | 4.6577 | 0.0000 | 4.3517 | 4.3517 | 0.0000 | 16,631.6290 | 16,631.6290 | 3.8180 | 0.0000 | 16,727.0797 |
| 2022 | 9.6064 | 97.0441 | 75.7869 | 0.1731 | 0.0000 | 4.0454 | 4.0454 | 0.0000 | 3.7798 | 3.7798 | 0.0000 | 16,644.6851 | 16,644.6851 | 3.8096 | 0.0000 | 16,739.9238 |
| **Maximum** | **11.6716** | **122.1520** | **80.5456** | **0.1731** | **0.0172** | **5.3944** | **5.3944** | **1.8600e-003** | **5.0395** | **5.0395** | **0.0000** | **16,644.6851** | **16,644.6851** | **3.8317** | **0.0000** | **16,739.9238** |

| | ROG | NOx | 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** | **61.01** | **0.00** | **0.00** | **61.01** | **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 | Site Preparation | Site Preparation | 12/3/2020 | 12/16/2020 | 6 | 12 | |
| 2 | Building Construction-Superstructure | Building Construction | 12/17/2020 | 6/2/2021 | 6 | 144 | |
| 3 | Building Construction-Columns | Building Construction | 8/17/2021 | 1/17/2022 | 6 | 132 | |

**Acres of Grading (Site Preparation Phase): 0.5**

**Acres of Grading (Grading Phase): 0**

**Acres of Paving: 0**

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

### OffRoad Equipment

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Building Construction-Columns | Cranes | 4 | 8.00 | 120 | 0.29 |
| Building Construction-Columns | Forklifts | 0 | 6.00 | 89 | 0.20 |
| Building Construction-Columns | Generator Sets | 2 | 8.00 | 250 | 0.74 |
| Building Construction-Superstructure | Generator Sets | 2 | 8.00 | 250 | 0.74 |
| Building Construction-Superstructure | Cranes | 4 | 8.00 | 120 | 0.29 |
| Building Construction-Superstructure | Forklifts | 0 | 6.00 | 89 | 0.20 |
| Site Preparation | Graders | 0 | 8.00 | 187 | 0.41 |
| Building Construction-Columns | Tractors/Loaders/Backhoes | 1 | 8.00 | 120 | 0.37 |
| Building Construction-Columns | Welders | 0 | 8.00 | 46 | 0.45 |
| Site Preparation | Tractors/Loaders/Backhoes | 1 | 8.00 | 250 | 0.37 |
| Building Construction-Superstructure | Pavers | 1 | 8.00 | 50 | 0.42 |
| Building Construction-Superstructure | Tractors/Loaders/Backhoes | 1 | 8.00 | 120 | 0.37 |
| Building Construction-Superstructure | Concrete/Industrial Saws | 2 | 8.00 | 120 | 0.73 |
| Building Construction-Superstructure | Off-Highway Tractors | 1 | 8.00 | 120 | 0.44 |
| Building Construction-Superstructure | Off-Highway Trucks | 3 | 8.00 | 175 | 0.38 |

| | | | | | |
|---|---|---|---|---|---|
| Site Preparation | Tractors/Loaders/Backhoes | 1 | 8.00 | 120 | 0.37 |
| Building Construction-Superstructure | Off-Highway Trucks | 1 | 8.00 | 1000 | 0.38 |
| Building Construction-Superstructure | Other Construction Equipment | 1 | 8.00 | 500 | 0.42 |
| Site Preparation | Rubber Tired Dozers | 0 | 7.00 | 247 | 0.40 |
| Building Construction-Superstructure | Welders | 0 | 8.00 | 46 | 0.45 |
| Building Construction-Superstructure | Rubber Tired Dozers | 1 | 8.00 | 500 | 0.40 |
| Building Construction-Superstructure | Tractors/Loaders/Backhoes | 1 | 8.00 | 250 | 0.37 |
| Building Construction-Columns | Pavers | 1 | 8.00 | 50 | 0.42 |
| Building Construction-Columns | Concrete/Industrial Saws | 2 | 8.00 | 120 | 0.73 |
| Building Construction-Columns | Off-Highway Tractors | 1 | 8.00 | 120 | 0.44 |
| Building Construction-Columns | Off-Highway Trucks | 3 | 8.00 | 175 | 0.38 |
| Building Construction-Columns | Off-Highway Trucks | 1 | 8.00 | 1000 | 0.38 |
| Building Construction-Columns | Other Construction Equipment | 1 | 8.00 | 500 | 0.42 |
| Building Construction-Columns | Rubber Tired Dozers | 1 | 8.00 | 500 | 0.40 |
| Building Construction-Columns | Tractors/Loaders/Backhoes | 1 | 8.00 | 250 | 0.37 |

**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 |
|---|---|---|---|---|---|---|---|---|---|---|
| Building Construction-Columns | 18 | 0.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Site Preparation | 2 | 0.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction-Superstructure | 18 | 0.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

Use Soil Stabilizer

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

## 3.2 Site Preparation - 2020

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 0.0442 | 0.0000 | 0.0442 | 4.7700e-003 | 0.0000 | 4.7700e-003 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.6251 | 7.0529 | 4.7634 | 0.0117 | | 0.3106 | 0.3106 | | 0.2858 | 0.2858 | | 1,136.5560 | 1,136.5560 | 0.3676 | | 1,145.7457 |
| **Total** | **0.6251** | **7.0529** | **4.7634** | **0.0117** | **0.0442** | **0.3106** | **0.3548** | **4.7700e-003** | **0.2858** | **0.2905** | | **1,136.5560** | **1,136.5560** | **0.3676** | | **1,145.7457** |

### Unmitigated Construction Off-Site

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

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 0.0172 | 0.0000 | 0.0172 | 1.8600e-003 | 0.0000 | 1.8600e-003 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.6251 | 7.0529 | 4.7634 | 0.0117 | | 0.3106 | 0.3106 | | 0.2858 | 0.2858 | 0.0000 | 1,136.5560 | 1,136.5560 | 0.3676 | | 1,145.7457 |
| **Total** | **0.6251** | **7.0529** | **4.7634** | **0.0117** | **0.0172** | **0.3106** | **0.3278** | **1.8600e-003** | **0.2858** | **0.2876** | **0.0000** | **1,136.5560** | **1,136.5560** | **0.3676** | | **1,145.7457** |

## Mitigated Construction Off-Site

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

## 3.3 Building Construction-Superstructure - 2020

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 11.6716 | 122.1520 | 80.5456 | 0.1729 | | 5.3944 | 5.3944 | | 5.0395 | 5.0395 | | 16,625.1099 | 16,625.1099 | 3.8317 | | 16,720.9028 |
| **Total** | **11.6716** | **122.1520** | **80.5456** | **0.1729** | | **5.3944** | **5.3944** | | **5.0395** | **5.0395** | | **16,625.1099** | **16,625.1099** | **3.8317** | | **16,720.9028** |

### Unmitigated Construction Off-Site

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

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 11.6716 | 122.1520 | 80.5456 | 0.1729 | | 5.3944 | 5.3944 | | 5.0395 | 5.0395 | 0.0000 | 16,625.1099 | 16,625.1099 | 3.8317 | | 16,720.9028 |
| **Total** | **11.6716** | **122.1520** | **80.5456** | **0.1729** | | **5.3944** | **5.3944** | | **5.0395** | **5.0395** | **0.0000** | **16,625.1099** | **16,625.1099** | **3.8317** | | **16,720.9028** |

## Mitigated Construction Off-Site

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

## 3.3 Building Construction-Superstructure - 2021

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 10.5232 | 108.2765 | 77.7389 | 0.1730 | | 4.6577 | 4.6577 | | 4.3517 | 4.3517 | | 16,631.6290 | 16,631.6290 | 3.8180 | | 16,727.0797 |
| **Total** | **10.5232** | **108.2765** | **77.7389** | **0.1730** | | **4.6577** | **4.6577** | | **4.3517** | **4.3517** | | **16,631.6290** | **16,631.6290** | **3.8180** | | **16,727.0797** |

### Unmitigated Construction Off-Site

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

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 10.5232 | 108.2765 | 77.7389 | 0.1730 | | 4.6577 | 4.6577 | | 4.3517 | 4.3517 | 0.0000 | 16,631.6290 | 16,631.6290 | 3.8180 | | 16,727.0797 |
| **Total** | **10.5232** | **108.2765** | **77.7389** | **0.1730** | | **4.6577** | **4.6577** | | **4.3517** | **4.3517** | **0.0000** | **16,631.6290** | **16,631.6290** | **3.8180** | | **16,727.0797** |

## Mitigated Construction Off-Site

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

## 3.4 Building Construction-Columns - 2021

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 10.5232 | 108.2765 | 77.7389 | 0.1730 | | 4.6577 | 4.6577 | | 4.3517 | 4.3517 | | 16,631.6290 | 16,631.6290 | 3.8180 | | 16,727.0797 |
| **Total** | **10.5232** | **108.2765** | **77.7389** | **0.1730** | | **4.6577** | **4.6577** | | **4.3517** | **4.3517** | | **16,631.6290** | **16,631.6290** | **3.8180** | | **16,727.0797** |

### Unmitigated Construction Off-Site

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

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 10.5232 | 108.2765 | 77.7389 | 0.1730 | | 4.6577 | 4.6577 | | 4.3517 | 4.3517 | 0.0000 | 16,631.6290 | 16,631.6290 | 3.8180 | | 16,727.0797 |
| **Total** | **10.5232** | **108.2765** | **77.7389** | **0.1730** | | **4.6577** | **4.6577** | | **4.3517** | **4.3517** | **0.0000** | **16,631.6290** | **16,631.6290** | **3.8180** | | **16,727.0797** |

## Mitigated Construction Off-Site

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

## 3.4 Building Construction-Columns - 2022

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 9.6064 | 97.0441 | 75.7869 | 0.1731 | | 4.0454 | 4.0454 | | 3.7798 | 3.7798 | | 16,644.6852 | 16,644.6852 | 3.8096 | | 16,739.9238 |
| **Total** | **9.6064** | **97.0441** | **75.7869** | **0.1731** | | **4.0454** | **4.0454** | | **3.7798** | **3.7798** | | **16,644.6852** | **16,644.6852** | **3.8096** | | **16,739.9238** |

### Unmitigated Construction Off-Site

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

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 9.6064 | 97.0441 | 75.7869 | 0.1731 | | 4.0454 | 4.0454 | | 3.7798 | 3.7798 | 0.0000 | 16,644.6851 | 16,644.6851 | 3.8096 | | 16,739.9238 |
| **Total** | **9.6064** | **97.0441** | **75.7869** | **0.1731** | | **4.0454** | **4.0454** | | **3.7798** | **3.7798** | **0.0000** | **16,644.6851** | **16,644.6851** | **3.8096** | | **16,739.9238** |

## Mitigated Construction Off-Site

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

# A-2 Project Construction Air Quality Emissions Worksheets - Mitigated

**Castaic**

**Air Quality Construction Analysis**

| Regional Maximums | ROG | NOX | CO | SO2 | Total PM10 | PM2.5 |
|---|---|---|---|---|---|---|
| Source | | | | lb/day | | |
| 3.2 Site Preparation - 2020 | 0.6 | 7.0 | 13.9 | 0.0 | 2.6 | 0.9 |
| 3.3 Building Construction-Superstructure - 2020 | 7.5 | 95.8 | 103.4 | 0.2 | 7.1 | 5.1 |
| 3.3 Building Construction-Superstructure - 2021 | 41.4 | 90.2 | 101.6 | 0.2 | 6.5 | 4.7 |
| 3.4 Building Construction-Columns - 2021 | 41.4 | 92.2 | 102.1 | 0.2 | 6.8 | 4.8 |
| 3.4 Building Construction-Columns - 2022 | 6.6 | 87.1 | 100.5 | 0.2 | 6.2 | 4.5 |
| **Project Daily Maximum Emissions** | **41.45** | **95.82** | **103.39** | **0.20** | **7.10** | **5.10** |

**Castaic**

**Air Quality Construction Analysis**

| Summer | Onsite Emissions | | | | | | | | | | Offsite Emissions | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Source | ROG | NOX | CO | SO2 | Fugitive PM10 | Exhaust PM10 | Total PM10 | Fugitive PM2.5 | Exhaust PM2.5 | Total PM2.5 | ROG | NOX | CO | SO2 | Fugitive PM10 | Exhaus t PM10 | Total PM10 | Fugitive PM2.5 | Exhaust PM2.5 | Total PM2.5 |
| | | | | | | lb/day | | | | | | | | | | lb/day | | | | |
| 3.2 Site Preparation - 2020 | 0.46 | 6.32 | 5.94 | 0.01 | 0.02 | 0.27 | 0.29 | 0.00 | 0.26 | 0.26 | 0.18 | 0.64 | 7.97 | 0.02 | 2.28 | 0.02 | 2.29 | 0.60 | 0.01 | 0.62 |
| 3.3 Building Construction-Superstructure - 2020 | 7.26 | 92.92 | 94.88 | 0.17 | 0.00 | 4.51 | 4.51 | 0.00 | 4.37 | 4.37 | 0.27 | 2.91 | 8.51 | 0.03 | 2.53 | 0.06 | 2.59 | 0.68 | 0.05 | 0.73 |
| 3.3 Building Construction-Superstructure - 2021 | 41.22 | 89.68 | 94.44 | 0.17 | 0.00 | 4.22 | 4.22 | 0.00 | 4.10 | 4.10 | 0.15 | 0.55 | 7.17 | 0.02 | 2.28 | 0.01 | 2.29 | 0.60 | 0.01 | 0.62 |
| 3.4 Building Construction-Columns - 2021 | 41.22 | 89.68 | 94.44 | 0.17 | 0.00 | 4.22 | 4.22 | 0.00 | 4.10 | 4.10 | 0.23 | 2.55 | 7.64 | 0.03 | 2.53 | 0.05 | 2.58 | 0.68 | 0.04 | 0.72 |
| 3.4 Building Construction-Columns - 2022 | 6.47 | 86.66 | 94.05 | 0.17 | 0.00 | 3.95 | 3.95 | 0.00 | 3.85 | 3.85 | 0.13 | 0.48 | 6.50 | 0.02 | 2.28 | 0.01 | 2.29 | 0.60 | 0.01 | 0.62 |

| Regional Emissions | ROG | NOX | CO | SO2 | Fugitive PM10 | Exhaust PM10 | Total PM10 | Fugitive PM2.5 | Exhaust PM2.5 | Total PM2.5 |
|---|---|---|---|---|---|---|---|---|---|---|
| 3.2 Site Preparation - 2020 | 0.6 | 7.0 | 13.9 | 0.0 | 2.3 | 0.3 | 2.6 | 0.6 | 0.3 | 0.9 |
| 3.3 Building Construction-Superstructure - 2020 | 7.5 | 95.8 | 103.4 | 0.2 | 2.5 | 4.6 | 7.1 | 0.7 | 4.4 | 5.1 |
| 3.3 Building Construction-Superstructure - 2021 | 41.4 | 90.2 | 101.6 | 0.2 | 2.3 | 4.2 | 6.5 | 0.6 | 4.1 | 4.7 |
| 3.4 Building Construction-Columns - 2021 | 41.4 | 92.2 | 102.1 | 0.2 | 2.5 | 4.3 | 6.8 | 0.7 | 4.1 | 4.8 |
| 3.4 Building Construction-Columns - 2022 | 6.6 | 87.1 | 100.5 | 0.2 | 2.3 | 4.0 | 6.2 | 0.6 | 3.9 | 4.5 |
| **Project Daily Maximum Emissions** | **41.4483** | **95.8225** | **103.3940** | **0.2015** | **2.5327** | **4.5638** | **7.0965** | **0.6771** | **4.4230** | **5.1000** |

**Castaic**

**Air Quality Construction Analysis**

| Winter | Onsite Emissions | | | | | | | | | | Offsite Emissions | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Source | ROG | NOX | CO | SO2 | Fugitive PM10 | Exhaust PM10 | Total PM10 | Fugitive PM2.5 | Exhaust PM2.5 | Total PM2.5 | ROG | NOX | CO | SO2 | Fugitive PM10 | Exhaust PM10 | Total PM10 | Fugitive PM2.5 | Exhaust PM2.5 | Total PM2.5 |
| | lb/day | | | | | | | | | | lb/day | | | | | | | | | |
| 3.2 Site Preparation - 2020 | 0.46 | 6.32 | 5.94 | 0.01 | 0.02 | 0.27 | 0.29 | 0.00 | 0.26 | 0.26 | 0.18 | 0.64 | 7.97 | 0.02 | 2.28 | 0.02 | 2.29 | 0.60 | 0.01 | 0.62 |
| 3.3 Building Construction-Superstructure - 2020 | 7.26 | 92.92 | 94.88 | 0.17 | 0.00 | 4.51 | 4.51 | 0.00 | 4.37 | 4.37 | 0.27 | 2.91 | 8.51 | 0.03 | 2.53 | 0.06 | 2.59 | 0.68 | 0.05 | 0.73 |
| 3.3 Building Construction-Superstructure - 2021 | 41.22 | 89.68 | 94.44 | 0.17 | 0.00 | 4.22 | 4.22 | 0.00 | 4.10 | 4.10 | 0.15 | 0.55 | 7.17 | 0.02 | 2.28 | 0.01 | 2.29 | 0.60 | 0.01 | 0.62 |
| 3.4 Building Construction-Columns - 2021 | 41.22 | 89.68 | 94.44 | 0.17 | 0.00 | 4.22 | 4.22 | 0.00 | 4.10 | 4.10 | 0.23 | 2.55 | 7.64 | 0.03 | 2.53 | 0.05 | 2.58 | 0.68 | 0.04 | 0.72 |
| 3.4 Building Construction-Columns - 2022 | 6.47 | 86.66 | 94.05 | 0.17 | 0.00 | 3.95 | 3.95 | 0.00 | 3.85 | 3.85 | 0.13 | 0.48 | 6.50 | 0.02 | 2.28 | 0.01 | 2.29 | 0.60 | 0.01 | 0.62 |

| Regional Emissions | ROG | NOX | CO | SO2 | Fugitive PM10 | Exhaust PM10 | Total PM10 | Fugitive PM2.5 | Exhaust PM2.5 | Total PM2.5 |
|---|---|---|---|---|---|---|---|---|---|---|
| 3.2 Site Preparation - 2020 | 0.6 | 7.0 | 13.9 | 0.0 | 2.3 | 0.3 | 2.6 | 0.6 | 0.3 | 0.9 |
| 3.3 Building Construction-Superstructure - 2020 | 7.5 | 95.8 | 103.4 | 0.2 | 2.5 | 4.6 | 7.1 | 0.7 | 4.4 | 5.1 |
| 3.3 Building Construction-Superstructure - 2021 | 41.4 | 90.2 | 101.6 | 0.2 | 2.3 | 4.2 | 6.5 | 0.6 | 4.1 | 4.7 |
| 3.4 Building Construction-Columns - 2021 | 41.4 | 92.2 | 102.1 | 0.2 | 2.5 | 4.3 | 6.8 | 0.7 | 4.1 | 4.8 |
| 3.4 Building Construction-Columns - 2022 | 6.6 | 87.1 | 100.5 | 0.2 | 2.3 | 4.0 | 6.2 | 0.6 | 3.9 | 4.5 |
| **Project Daily Maximum Emissions** | **41.4483** | **95.8225** | **103.3940** | **0.2015** | **2.5327** | **4.5638** | **7.0965** | **0.6771** | **4.4230** | **5.1000** |

**Castaic**

**Air Quality Construction Analysis**

| Localized Emissions | Onsite Emissions | | | |
|---|---|---|---|---|
| Source | NOX | CO | Total PM10 lb/day | Total PM2.5 |
| 3.2 Site Preparation - 2020 | 6.32 | 5.94 | 0.29 | 0.26 |
| 3.3 Building Construction-Superstructure - 2020 | 92.92 | 94.88 | 4.51 | 4.37 |
| 3.3 Building Construction-Superstructure - 2021 | 89.68 | 94.44 | 4.22 | 4.10 |
| 3.4 Building Construction-Columns - 2021 | 89.68 | 94.44 | 4.22 | 4.10 |
| 3.4 Building Construction-Columns - 2022 | 86.66 | 94.05 | 3.95 | 3.85 |

| Localized Emissions | NOX | CO | Total PM10 | Total PM2.5 |
|---|---|---|---|---|
| 3.2 Site Preparation - 2020 | 6.32 | 5.94 | 0.29 | 0.26 |
| 3.3 Building Construction-Superstructure - 2020 | 92.92 | 94.88 | 4.51 | 4.37 |
| 3.3 Building Construction-Superstructure - 2021 | 89.68 | 94.44 | 4.22 | 4.10 |
| 3.4 Building Construction-Columns - 2021 | 89.68 | 94.44 | 4.22 | 4.10 |
| 3.4 Building Construction-Columns - 2022 | 86.66 | 94.05 | 3.95 | 3.85 |
| **Project Daily Maximum Emissions** | **92.92** | **94.88** | **4.51** | **4.37** |
| Localized Significance Thresholds | 173 | 2,500 | 51 | 18 |

SRA 15, 1-acre site, 200 m away from receptor

**Epoxy Coating VOC Emissions**

| | Total Gallons | Component A Gallons | Component B Gallons | Liters Per Column | VOC emission (g/l) | VOC emission (g/column) | VOC emissions (lbs/day) |
|---|---|---|---|---|---|---|---|
| Epoxy Primer for substrate surface | 75 | 50 | 25 | 95 | 3 | 284 | 0.63 |
| Epoxy Primer for fiber saturant | 1050 | 700 | 350 | 1325 | 3 | 3975 | 8.76 |
| Epoxy Paste/Filler | 300 | 200 | 100 | 379 | 7 | 2650 | 5.84 |
| UV Coating | 80 | | | 101 | 86 | 8681 | 19.14 |
| | | | | | | Total | 34.37 |

Notes: VOC content and gallon amount provided by client.

Castaic Lake High Tower Bridge Retrofit - Los Angeles-South Coast County, Summer

# Castaic Lake High Tower Bridge Retrofit

**Los Angeles-South Coast County, Summer**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| General Light Industry | 43.56 | 1000sqft | 1.00 | 43,560.00 | 0 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 33 |
| **Climate Zone** | 8 | | | **Operational Year** | 2022 |
| **Utility Company** | Southern California Edison | | | | |
| **CO2 Intensity (lb/MWhr)** | 702.44 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - see construction assumptions

Off-road Equipment - see construction assumptions

Off-road Equipment - see construction assumptions

Off-road Equipment - see construction assumptions

Trips and VMT - see construction assumptions

Construction Off-road Equipment Mitigation - see construction assumptions

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblConstDustMitigation | WaterUnpavedRoadVehicleSpeed | 0 | 15 |

| | | | |
|---|---|---|---|
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 8.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 2.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 2.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 3.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 4.00 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstructionPhase | NumDays | 100.00 | 144.00 |
| tblConstructionPhase | NumDays | 1.00 | 12.00 |
| tblConstructionPhase | NumDays | 100.00 | 132.00 |
| tblConstructionPhase | NumDaysWeek | 5.00 | 6.00 |
| tblConstructionPhase | NumDaysWeek | 5.00 | 6.00 |
| tblConstructionPhase | NumDaysWeek | 5.00 | 6.00 |
| tblConstructionPhase | PhaseEndDate | 5/10/2021 | 6/2/2021 |
| tblConstructionPhase | PhaseEndDate | 12/17/2020 | 12/16/2020 |
| tblConstructionPhase | PhaseStartDate | 12/22/2020 | 12/17/2020 |
| tblConstructionPhase | PhaseStartDate | 12/17/2020 | 12/3/2020 |
| tblGrading | AcresOfGrading | 0.00 | 0.50 |
| tblOffRoadEquipment | HorsePower | 231.00 | 120.00 |
| tblOffRoadEquipment | HorsePower | 84.00 | 250.00 |
| tblOffRoadEquipment | HorsePower | 84.00 | 250.00 |
| tblOffRoadEquipment | HorsePower | 231.00 | 120.00 |
| tblOffRoadEquipment | HorsePower | 97.00 | 120.00 |
| tblOffRoadEquipment | HorsePower | 97.00 | 250.00 |
| tblOffRoadEquipment | HorsePower | 130.00 | 50.00 |
| tblOffRoadEquipment | HorsePower | 97.00 | 120.00 |
| tblOffRoadEquipment | HorsePower | 81.00 | 120.00 |

| | | | |
|---|---|---|---|
| tblOffRoadEquipment | HorsePower | 124.00 | 120.00 |
| tblOffRoadEquipment | HorsePower | 402.00 | 175.00 |
| tblOffRoadEquipment | HorsePower | 97.00 | 120.00 |
| tblOffRoadEquipment | HorsePower | 402.00 | 1,000.00 |
| tblOffRoadEquipment | HorsePower | 172.00 | 500.00 |
| tblOffRoadEquipment | HorsePower | 247.00 | 500.00 |
| tblOffRoadEquipment | HorsePower | 97.00 | 250.00 |
| tblOffRoadEquipment | HorsePower | 130.00 | 50.00 |
| tblOffRoadEquipment | HorsePower | 81.00 | 120.00 |
| tblOffRoadEquipment | HorsePower | 124.00 | 120.00 |
| tblOffRoadEquipment | HorsePower | 402.00 | 175.00 |
| tblOffRoadEquipment | HorsePower | 402.00 | 1,000.00 |
| tblOffRoadEquipment | HorsePower | 172.00 | 500.00 |
| tblOffRoadEquipment | HorsePower | 247.00 | 500.00 |
| tblOffRoadEquipment | HorsePower | 97.00 | 250.00 |
| tblOffRoadEquipment | LoadFactor | 0.37 | 0.37 |
| tblOffRoadEquipment | LoadFactor | 0.42 | 0.42 |
| tblOffRoadEquipment | LoadFactor | 0.44 | 0.44 |
| tblOffRoadEquipment | LoadFactor | 0.38 | 0.38 |
| tblOffRoadEquipment | LoadFactor | 0.38 | 0.38 |
| tblOffRoadEquipment | LoadFactor | 0.42 | 0.42 |
| tblOffRoadEquipment | LoadFactor | 0.40 | 0.40 |
| tblOffRoadEquipment | LoadFactor | 0.37 | 0.37 |
| tblOffRoadEquipment | LoadFactor | 0.42 | 0.42 |
| tblOffRoadEquipment | LoadFactor | 0.44 | 0.44 |
| tblOffRoadEquipment | LoadFactor | 0.38 | 0.38 |
| tblOffRoadEquipment | LoadFactor | 0.38 | 0.38 |
| tblOffRoadEquipment | LoadFactor | 0.42 | 0.42 |
| tblOffRoadEquipment | LoadFactor | 0.40 | 0.40 |
| tblOffRoadEquipment | LoadFactor | 0.37 | 0.37 |

| | | | |
|---|---|---|---|
| tblOffRoadEquipment | OffRoadEquipmentType | | Tractors/Loaders/Backhoes |
| tblOffRoadEquipment | OffRoadEquipmentType | | Pavers |
| tblOffRoadEquipment | OffRoadEquipmentType | | Concrete/Industrial Saws |
| tblOffRoadEquipment | OffRoadEquipmentType | | Off-Highway Tractors |
| tblOffRoadEquipment | OffRoadEquipmentType | | Off-Highway Trucks |
| tblOffRoadEquipment | OffRoadEquipmentType | | Off-Highway Trucks |
| tblOffRoadEquipment | OffRoadEquipmentType | | Other Construction Equipment |
| tblOffRoadEquipment | OffRoadEquipmentType | | Rubber Tired Dozers |
| tblOffRoadEquipment | OffRoadEquipmentType | | Tractors/Loaders/Backhoes |
| tblOffRoadEquipment | OffRoadEquipmentType | | Pavers |
| tblOffRoadEquipment | OffRoadEquipmentType | | Concrete/Industrial Saws |
| tblOffRoadEquipment | OffRoadEquipmentType | | Off-Highway Tractors |
| tblOffRoadEquipment | OffRoadEquipmentType | | Off-Highway Trucks |
| tblOffRoadEquipment | OffRoadEquipmentType | | Off-Highway Trucks |
| tblOffRoadEquipment | OffRoadEquipmentType | | Other Construction Equipment |
| tblOffRoadEquipment | OffRoadEquipmentType | | Rubber Tired Dozers |
| tblOffRoadEquipment | OffRoadEquipmentType | | Tractors/Loaders/Backhoes |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 4.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 2.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 2.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 4.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 0.00 |
| tblOffRoadEquipment | UsageHours | 6.00 | 8.00 |
| tblOffRoadEquipment | UsageHours | 6.00 | 8.00 |
| tblOffRoadEquipment | UsageHours | 6.00 | 8.00 |

| | | | |
|---|---|---|---|
| tblOffRoadEquipment | UsageHours | 6.00 | 8.00 |
| tblOffRoadEquipment | UsageHours | 6.00 | 8.00 |
| tblOffRoadEquipment | UsageHours | 6.00 | 8.00 |
| tblTripsAndVMT | VendorTripNumber | 7.00 | 0.00 |
| tblTripsAndVMT | VendorTripNumber | 7.00 | 0.00 |
| tblTripsAndVMT | WorkerTripNumber | 18.00 | 0.00 |
| tblTripsAndVMT | WorkerTripNumber | 5.00 | 0.00 |
| tblTripsAndVMT | WorkerTripNumber | 18.00 | 0.00 |

# 2.0 Emissions Summary

## 2.1 Overall Construction (Maximum Daily Emission)

### Unmitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2020 | 11.6716 | 122.1520 | 80.5456 | 0.1729 | 0.0442 | 5.3944 | 5.3944 | 4.7700e-003 | 5.0395 | 5.0395 | 0.0000 | 16,625.1099 | 16,625.1099 | 3.8317 | 0.0000 | 16,720.9028 |
| 2021 | 10.5232 | 108.2765 | 77.7389 | 0.1730 | 0.0000 | 4.6577 | 4.6577 | 0.0000 | 4.3517 | 4.3517 | 0.0000 | 16,631.6290 | 16,631.6290 | 3.8180 | 0.0000 | 16,727.0797 |
| 2022 | 9.6064 | 97.0441 | 75.7869 | 0.1731 | 0.0000 | 4.0454 | 4.0454 | 0.0000 | 3.7798 | 3.7798 | 0.0000 | 16,644.6852 | 16,644.6852 | 3.8096 | 0.0000 | 16,739.9238 |
| **Maximum** | **11.6716** | **122.1520** | **80.5456** | **0.1731** | **0.0442** | **5.3944** | **5.3944** | **4.7700e-003** | **5.0395** | **5.0395** | **0.0000** | **16,644.6852** | **16,644.6852** | **3.8317** | **0.0000** | **16,739.9238** |

### Mitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2020 | 7.2623 | 92.9163 | 94.8827 | 0.1729 | 0.0172 | 4.5072 | 4.5072 | 1.8600e-003 | 4.3714 | 4.3714 | 0.0000 | 16,625.1099 | 16,625.1099 | 3.8317 | 0.0000 | 16,720.9028 |
| 2021 | 6.8498 | 89.6808 | 94.4414 | 0.1730 | 0.0000 | 4.2235 | 4.2235 | 0.0000 | 4.1045 | 4.1045 | 0.0000 | 16,631.6290 | 16,631.6290 | 3.8180 | 0.0000 | 16,727.0797 |
| 2022 | 6.4711 | 86.6576 | 94.0534 | 0.1731 | 0.0000 | 3.9500 | 3.9500 | 0.0000 | 3.8474 | 3.8474 | 0.0000 | 16,644.6851 | 16,644.6851 | 3.8096 | 0.0000 | 16,739.9238 |
| **Maximum** | **7.2623** | **92.9163** | **94.8827** | **0.1731** | **0.0172** | **4.5072** | **4.5072** | **1.8600e-003** | **4.3714** | **4.3714** | **0.0000** | **16,644.6851** | **16,644.6851** | **3.8317** | **0.0000** | **16,739.9238** |

| | ROG | NOx | 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 | 35.28 | 17.78 | -21.06 | 0.00 | 61.01 | 10.05 | 10.05 | 61.01 | 6.44 | 6.44 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

## 3.0 Construction Detail

### Construction Phase

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Site Preparation | Site Preparation | 12/3/2020 | 12/16/2020 | 6 | 12 | |
| 2 | Building Construction-Superstructure | Building Construction | 12/17/2020 | 6/2/2021 | 6 | 144 | |
| 3 | Building Construction-Columns | Building Construction | 8/17/2021 | 1/17/2022 | 6 | 132 | |

**Acres of Grading (Site Preparation Phase): 0.5**

**Acres of Grading (Grading Phase): 0**

**Acres of Paving: 0**

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

### OffRoad Equipment

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Building Construction-Columns | Cranes | 4 | 8.00 | 120 | 0.29 |
| Building Construction-Columns | Forklifts | 0 | 6.00 | 89 | 0.20 |
| Building Construction-Columns | Generator Sets | 2 | 8.00 | 250 | 0.74 |
| Building Construction-Superstructure | Generator Sets | 2 | 8.00 | 250 | 0.74 |
| Building Construction-Superstructure | Cranes | 4 | 8.00 | 120 | 0.29 |
| Building Construction-Superstructure | Forklifts | 0 | 6.00 | 89 | 0.20 |
| Site Preparation | Graders | 0 | 8.00 | 187 | 0.41 |
| Building Construction-Columns | Tractors/Loaders/Backhoes | 1 | 8.00 | 120 | 0.37 |
| Building Construction-Columns | Welders | 0 | 8.00 | 46 | 0.45 |
| Site Preparation | Tractors/Loaders/Backhoes | 1 | 8.00 | 250 | 0.37 |
| Building Construction-Superstructure | Pavers | 1 | 8.00 | 50 | 0.42 |

| | | | | | |
|---|---|---|---|---|---|
| Building Construction-Superstructure | Tractors/Loaders/Backhoes | 1 | 8.00 | 120 | 0.37 |
| Building Construction-Superstructure | Concrete/Industrial Saws | 2 | 8.00 | 120 | 0.73 |
| Building Construction-Superstructure | Off-Highway Tractors | 1 | 8.00 | 120 | 0.44 |
| Building Construction-Superstructure | Off-Highway Trucks | 3 | 8.00 | 175 | 0.38 |
| Site Preparation | Tractors/Loaders/Backhoes | 1 | 8.00 | 120 | 0.37 |
| Building Construction-Superstructure | Off-Highway Trucks | 1 | 8.00 | 1000 | 0.38 |
| Building Construction-Superstructure | Other Construction Equipment | 1 | 8.00 | 500 | 0.42 |
| Site Preparation | Rubber Tired Dozers | 0 | 7.00 | 247 | 0.40 |
| Building Construction-Superstructure | Welders | 0 | 8.00 | 46 | 0.45 |
| Building Construction-Superstructure | Rubber Tired Dozers | 1 | 8.00 | 500 | 0.40 |
| Building Construction-Superstructure | Tractors/Loaders/Backhoes | 1 | 8.00 | 250 | 0.37 |
| Building Construction-Columns | Pavers | 1 | 8.00 | 50 | 0.42 |
| Building Construction-Columns | Concrete/Industrial Saws | 2 | 8.00 | 120 | 0.73 |
| Building Construction-Columns | Off-Highway Tractors | 1 | 8.00 | 120 | 0.44 |
| Building Construction-Columns | Off-Highway Trucks | 3 | 8.00 | 175 | 0.38 |
| Building Construction-Columns | Off-Highway Trucks | 1 | 8.00 | 1000 | 0.38 |
| Building Construction-Columns | Other Construction Equipment | 1 | 8.00 | 500 | 0.42 |
| Building Construction-Columns | Rubber Tired Dozers | 1 | 8.00 | 500 | 0.40 |
| Building Construction-Columns | Tractors/Loaders/Backhoes | 1 | 8.00 | 250 | 0.37 |

## 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 |
|---|---|---|---|---|---|---|---|---|---|---|
| Building Construction-Columns | 18 | 0.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Site Preparation | 2 | 0.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction-Superstructure | 18 | 0.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use Soil Stabilizer

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

## 3.2 Site Preparation - 2020

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 0.0442 | 0.0000 | 0.0442 | 4.7700e-003 | 0.0000 | 4.7700e-003 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.6251 | 7.0529 | 4.7634 | 0.0117 | | 0.3106 | 0.3106 | | 0.2858 | 0.2858 | | 1,136.5560 | 1,136.5560 | 0.3676 | | 1,145.7457 |
| **Total** | **0.6251** | **7.0529** | **4.7634** | **0.0117** | **0.0442** | **0.3106** | **0.3548** | **4.7700e-003** | **0.2858** | **0.2905** | | **1,136.5560** | **1,136.5560** | **0.3676** | | **1,145.7457** |

### Unmitigated Construction Off-Site

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

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 0.0172 | 0.0000 | 0.0172 | 1.8600e-003 | 0.0000 | 1.8600e-003 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.4570 | 6.3196 | 5.9426 | 0.0117 | | 0.2706 | 0.2706 | | 0.2582 | 0.2582 | 0.0000 | 1,136.5560 | 1,136.5560 | 0.3676 | | 1,145.7457 |
| **Total** | **0.4570** | **6.3196** | **5.9426** | **0.0117** | **0.0172** | **0.2706** | **0.2879** | **1.8600e-003** | **0.2582** | **0.2601** | **0.0000** | **1,136.5560** | **1,136.5560** | **0.3676** | | **1,145.7457** |

## Mitigated Construction Off-Site

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

## 3.3 Building Construction-Superstructure - 2020

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 11.6716 | 122.1520 | 80.5456 | 0.1729 | | 5.3944 | 5.3944 | | 5.0395 | 5.0395 | | 16,625.1099 | 16,625.1099 | 3.8317 | | 16,720.9028 |
| **Total** | **11.6716** | **122.1520** | **80.5456** | **0.1729** | | **5.3944** | **5.3944** | | **5.0395** | **5.0395** | | **16,625.1099** | **16,625.1099** | **3.8317** | | **16,720.9028** |

### Unmitigated Construction Off-Site

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

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 7.2623 | 92.9163 | 94.8827 | 0.1729 | | 4.5072 | 4.5072 | | 4.3714 | 4.3714 | 0.0000 | 16,625.1099 | 16,625.1099 | 3.8317 | | 16,720.9028 |
| **Total** | **7.2623** | **92.9163** | **94.8827** | **0.1729** | | **4.5072** | **4.5072** | | **4.3714** | **4.3714** | **0.0000** | **16,625.1099** | **16,625.1099** | **3.8317** | | **16,720.9028** |

## Mitigated Construction Off-Site

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

## 3.3 Building Construction-Superstructure - 2021

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 10.5232 | 108.2765 | 77.7389 | 0.1730 | | 4.6577 | 4.6577 | | 4.3517 | 4.3517 | | 16,631.6290 | 16,631.6290 | 3.8180 | | 16,727.0797 |
| **Total** | **10.5232** | **108.2765** | **77.7389** | **0.1730** | | **4.6577** | **4.6577** | | **4.3517** | **4.3517** | | **16,631.6290** | **16,631.6290** | **3.8180** | | **16,727.0797** |

### Unmitigated Construction Off-Site

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

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 6.8498 | 89.6808 | 94.4414 | 0.1730 | | 4.2235 | 4.2235 | | 4.1045 | 4.1045 | 0.0000 | 16,631.6290 | 16,631.6290 | 3.8180 | | 16,727.0797 |
| **Total** | **6.8498** | **89.6808** | **94.4414** | **0.1730** | | **4.2235** | **4.2235** | | **4.1045** | **4.1045** | **0.0000** | **16,631.6290** | **16,631.6290** | **3.8180** | | **16,727.0797** |

## Mitigated Construction Off-Site

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

## 3.4 Building Construction-Columns - 2021

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 10.5232 | 108.2765 | 77.7389 | 0.1730 | | 4.6577 | 4.6577 | | 4.3517 | 4.3517 | | 16,631.6290 | 16,631.6290 | 3.8180 | | 16,727.0797 |
| **Total** | **10.5232** | **108.2765** | **77.7389** | **0.1730** | | **4.6577** | **4.6577** | | **4.3517** | **4.3517** | | **16,631.6290** | **16,631.6290** | **3.8180** | | **16,727.0797** |

### Unmitigated Construction Off-Site

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

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 6.8498 | 89.6808 | 94.4414 | 0.1730 | | 4.2235 | 4.2235 | | 4.1045 | 4.1045 | 0.0000 | 16,631.6290 | 16,631.6290 | 3.8180 | | 16,727.0797 |
| **Total** | **6.8498** | **89.6808** | **94.4414** | **0.1730** | | **4.2235** | **4.2235** | | **4.1045** | **4.1045** | **0.0000** | **16,631.6290** | **16,631.6290** | **3.8180** | | **16,727.0797** |

## Mitigated Construction Off-Site

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

## 3.4 Building Construction-Columns - 2022

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 9.6064 | 97.0441 | 75.7869 | 0.1731 | | 4.0454 | 4.0454 | | 3.7798 | 3.7798 | | 16,644.6852 | 16,644.6852 | 3.8096 | | 16,739.9238 |
| **Total** | **9.6064** | **97.0441** | **75.7869** | **0.1731** | | **4.0454** | **4.0454** | | **3.7798** | **3.7798** | | **16,644.6852** | **16,644.6852** | **3.8096** | | **16,739.9238** |

### Unmitigated Construction Off-Site

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

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 6.4711 | 86.6576 | 94.0534 | 0.1731 | | 3.9500 | 3.9500 | | 3.8474 | 3.8474 | 0.0000 | 16,644.6851 | 16,644.6851 | 3.8096 | | 16,739.9238 |
| **Total** | **6.4711** | **86.6576** | **94.0534** | **0.1731** | | **3.9500** | **3.9500** | | **3.8474** | **3.8474** | **0.0000** | **16,644.6851** | **16,644.6851** | **3.8096** | | **16,739.9238** |

## Mitigated Construction Off-Site

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

Castaic Lake High Tower Bridge Retrofit - Los Angeles-South Coast County, Winter

# Castaic Lake High Tower Bridge Retrofit

**Los Angeles-South Coast County, Winter**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| General Light Industry | 43.56 | 1000sqft | 1.00 | 43,560.00 | 0 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 33 |
| **Climate Zone** | 8 | | | **Operational Year** | 2022 |
| **Utility Company** | Southern California Edison | | | | |
| **CO2 Intensity (lb/MWhr)** | 702.44 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - see construction assumptions

Off-road Equipment - see construction assumptions

Off-road Equipment - see construction assumptions

Off-road Equipment - see construction assumptions

Trips and VMT - see construction assumptions

Construction Off-road Equipment Mitigation - see construction assumptions

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblConstDustMitigation | WaterUnpavedRoadVehicleSpeed | 0 | 15 |

| | | | |
|---|---|---|---|
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 8.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 2.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 2.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 3.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 4.00 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstEquipMitigation | Tier | No Change | Tier 3 |
| tblConstructionPhase | NumDays | 100.00 | 144.00 |
| tblConstructionPhase | NumDays | 1.00 | 12.00 |
| tblConstructionPhase | NumDays | 100.00 | 132.00 |
| tblConstructionPhase | NumDaysWeek | 5.00 | 6.00 |
| tblConstructionPhase | NumDaysWeek | 5.00 | 6.00 |
| tblConstructionPhase | NumDaysWeek | 5.00 | 6.00 |
| tblConstructionPhase | PhaseEndDate | 5/10/2021 | 6/2/2021 |
| tblConstructionPhase | PhaseEndDate | 12/17/2020 | 12/16/2020 |
| tblConstructionPhase | PhaseStartDate | 12/22/2020 | 12/17/2020 |
| tblConstructionPhase | PhaseStartDate | 12/17/2020 | 12/3/2020 |
| tblGrading | AcresOfGrading | 0.00 | 0.50 |
| tblOffRoadEquipment | HorsePower | 231.00 | 120.00 |
| tblOffRoadEquipment | HorsePower | 84.00 | 250.00 |
| tblOffRoadEquipment | HorsePower | 84.00 | 250.00 |
| tblOffRoadEquipment | HorsePower | 231.00 | 120.00 |
| tblOffRoadEquipment | HorsePower | 97.00 | 120.00 |
| tblOffRoadEquipment | HorsePower | 97.00 | 250.00 |
| tblOffRoadEquipment | HorsePower | 130.00 | 50.00 |
| tblOffRoadEquipment | HorsePower | 97.00 | 120.00 |
| tblOffRoadEquipment | HorsePower | 81.00 | 120.00 |

| | | | |
|---|---|---|---|
| tblOffRoadEquipment | HorsePower | 124.00 | 120.00 |
| tblOffRoadEquipment | HorsePower | 402.00 | 175.00 |
| tblOffRoadEquipment | HorsePower | 97.00 | 120.00 |
| tblOffRoadEquipment | HorsePower | 402.00 | 1,000.00 |
| tblOffRoadEquipment | HorsePower | 172.00 | 500.00 |
| tblOffRoadEquipment | HorsePower | 247.00 | 500.00 |
| tblOffRoadEquipment | HorsePower | 97.00 | 250.00 |
| tblOffRoadEquipment | HorsePower | 130.00 | 50.00 |
| tblOffRoadEquipment | HorsePower | 81.00 | 120.00 |
| tblOffRoadEquipment | HorsePower | 124.00 | 120.00 |
| tblOffRoadEquipment | HorsePower | 402.00 | 175.00 |
| tblOffRoadEquipment | HorsePower | 402.00 | 1,000.00 |
| tblOffRoadEquipment | HorsePower | 172.00 | 500.00 |
| tblOffRoadEquipment | HorsePower | 247.00 | 500.00 |
| tblOffRoadEquipment | HorsePower | 97.00 | 250.00 |
| tblOffRoadEquipment | LoadFactor | 0.37 | 0.37 |
| tblOffRoadEquipment | LoadFactor | 0.42 | 0.42 |
| tblOffRoadEquipment | LoadFactor | 0.44 | 0.44 |
| tblOffRoadEquipment | LoadFactor | 0.38 | 0.38 |
| tblOffRoadEquipment | LoadFactor | 0.38 | 0.38 |
| tblOffRoadEquipment | LoadFactor | 0.42 | 0.42 |
| tblOffRoadEquipment | LoadFactor | 0.40 | 0.40 |
| tblOffRoadEquipment | LoadFactor | 0.37 | 0.37 |
| tblOffRoadEquipment | LoadFactor | 0.42 | 0.42 |
| tblOffRoadEquipment | LoadFactor | 0.44 | 0.44 |
| tblOffRoadEquipment | LoadFactor | 0.38 | 0.38 |
| tblOffRoadEquipment | LoadFactor | 0.38 | 0.38 |
| tblOffRoadEquipment | LoadFactor | 0.42 | 0.42 |
| tblOffRoadEquipment | LoadFactor | 0.40 | 0.40 |
| tblOffRoadEquipment | LoadFactor | 0.37 | 0.37 |

| | | | |
|---|---|---|---|
| tblOffRoadEquipment | OffRoadEquipmentType | | Tractors/Loaders/Backhoes |
| tblOffRoadEquipment | OffRoadEquipmentType | | Pavers |
| tblOffRoadEquipment | OffRoadEquipmentType | | Concrete/Industrial Saws |
| tblOffRoadEquipment | OffRoadEquipmentType | | Off-Highway Tractors |
| tblOffRoadEquipment | OffRoadEquipmentType | | Off-Highway Trucks |
| tblOffRoadEquipment | OffRoadEquipmentType | | Off-Highway Trucks |
| tblOffRoadEquipment | OffRoadEquipmentType | | Other Construction Equipment |
| tblOffRoadEquipment | OffRoadEquipmentType | | Rubber Tired Dozers |
| tblOffRoadEquipment | OffRoadEquipmentType | | Tractors/Loaders/Backhoes |
| tblOffRoadEquipment | OffRoadEquipmentType | | Pavers |
| tblOffRoadEquipment | OffRoadEquipmentType | | Concrete/Industrial Saws |
| tblOffRoadEquipment | OffRoadEquipmentType | | Off-Highway Tractors |
| tblOffRoadEquipment | OffRoadEquipmentType | | Off-Highway Trucks |
| tblOffRoadEquipment | OffRoadEquipmentType | | Off-Highway Trucks |
| tblOffRoadEquipment | OffRoadEquipmentType | | Other Construction Equipment |
| tblOffRoadEquipment | OffRoadEquipmentType | | Rubber Tired Dozers |
| tblOffRoadEquipment | OffRoadEquipmentType | | Tractors/Loaders/Backhoes |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 4.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 2.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 2.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 4.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 0.00 |
| tblOffRoadEquipment | UsageHours | 6.00 | 8.00 |
| tblOffRoadEquipment | UsageHours | 6.00 | 8.00 |
| tblOffRoadEquipment | UsageHours | 6.00 | 8.00 |

| | | | |
|---|---|---|---|
| tblOffRoadEquipment | UsageHours | 6.00 | 8.00 |
| tblOffRoadEquipment | UsageHours | 6.00 | 8.00 |
| tblOffRoadEquipment | UsageHours | 6.00 | 8.00 |
| tblTripsAndVMT | VendorTripNumber | 7.00 | 0.00 |
| tblTripsAndVMT | VendorTripNumber | 7.00 | 0.00 |
| tblTripsAndVMT | WorkerTripNumber | 18.00 | 0.00 |
| tblTripsAndVMT | WorkerTripNumber | 5.00 | 0.00 |
| tblTripsAndVMT | WorkerTripNumber | 18.00 | 0.00 |

# 2.0 Emissions Summary

## 2.1 Overall Construction (Maximum Daily Emission)

### Unmitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2020 | 11.6716 | 122.1520 | 80.5456 | 0.1729 | 0.0442 | 5.3944 | 5.3944 | 4.7700e-003 | 5.0395 | 5.0395 | 0.0000 | 16,625.1099 | 16,625.1099 | 3.8317 | 0.0000 | 16,720.9028 |
| 2021 | 10.5232 | 108.2765 | 77.7389 | 0.1730 | 0.0000 | 4.6577 | 4.6577 | 0.0000 | 4.3517 | 4.3517 | 0.0000 | 16,631.6290 | 16,631.6290 | 3.8180 | 0.0000 | 16,727.0797 |
| 2022 | 9.6064 | 97.0441 | 75.7869 | 0.1731 | 0.0000 | 4.0454 | 4.0454 | 0.0000 | 3.7798 | 3.7798 | 0.0000 | 16,644.6852 | 16,644.6852 | 3.8096 | 0.0000 | 16,739.9238 |
| **Maximum** | **11.6716** | **122.1520** | **80.5456** | **0.1731** | **0.0442** | **5.3944** | **5.3944** | **4.7700e-003** | **5.0395** | **5.0395** | **0.0000** | **16,644.6852** | **16,644.6852** | **3.8317** | **0.0000** | **16,739.9238** |

### Mitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2020 | 7.2623 | 92.9163 | 94.8827 | 0.1729 | 0.0172 | 4.5072 | 4.5072 | 1.8600e-003 | 4.3714 | 4.3714 | 0.0000 | 16,625.1099 | 16,625.1099 | 3.8317 | 0.0000 | 16,720.9028 |
| 2021 | 6.8498 | 89.6808 | 94.4414 | 0.1730 | 0.0000 | 4.2235 | 4.2235 | 0.0000 | 4.1045 | 4.1045 | 0.0000 | 16,631.6290 | 16,631.6290 | 3.8180 | 0.0000 | 16,727.0797 |
| 2022 | 6.4711 | 86.6576 | 94.0534 | 0.1731 | 0.0000 | 3.9500 | 3.9500 | 0.0000 | 3.8474 | 3.8474 | 0.0000 | 16,644.6851 | 16,644.6851 | 3.8096 | 0.0000 | 16,739.9238 |
| **Maximum** | **7.2623** | **92.9163** | **94.8827** | **0.1731** | **0.0172** | **4.5072** | **4.5072** | **1.8600e-003** | **4.3714** | **4.3714** | **0.0000** | **16,644.6851** | **16,644.6851** | **3.8317** | **0.0000** | **16,739.9238** |

| | ROG | NOx | 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 | 35.28 | 17.78 | -21.06 | 0.00 | 61.01 | 10.05 | 10.05 | 61.01 | 6.44 | 6.44 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

## 3.0 Construction Detail

### Construction Phase

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Site Preparation | Site Preparation | 12/3/2020 | 12/16/2020 | 6 | 12 | |
| 2 | Building Construction-Superstructure | Building Construction | 12/17/2020 | 6/2/2021 | 6 | 144 | |
| 3 | Building Construction-Columns | Building Construction | 8/17/2021 | 1/17/2022 | 6 | 132 | |

**Acres of Grading (Site Preparation Phase): 0.5**

**Acres of Grading (Grading Phase): 0**

**Acres of Paving: 0**

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

### OffRoad Equipment

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Building Construction-Columns | Cranes | 4 | 8.00 | 120 | 0.29 |
| Building Construction-Columns | Forklifts | 0 | 6.00 | 89 | 0.20 |
| Building Construction-Columns | Generator Sets | 2 | 8.00 | 250 | 0.74 |
| Building Construction-Superstructure | Generator Sets | 2 | 8.00 | 250 | 0.74 |
| Building Construction-Superstructure | Cranes | 4 | 8.00 | 120 | 0.29 |
| Building Construction-Superstructure | Forklifts | 0 | 6.00 | 89 | 0.20 |
| Site Preparation | Graders | 0 | 8.00 | 187 | 0.41 |
| Building Construction-Columns | Tractors/Loaders/Backhoes | 1 | 8.00 | 120 | 0.37 |
| Building Construction-Columns | Welders | 0 | 8.00 | 46 | 0.45 |
| Site Preparation | Tractors/Loaders/Backhoes | 1 | 8.00 | 250 | 0.37 |
| Building Construction-Superstructure | Pavers | 1 | 8.00 | 50 | 0.42 |
| Building Construction-Superstructure | Tractors/Loaders/Backhoes | 1 | 8.00 | 120 | 0.37 |

| | | | | | |
|---|---|---|---|---|---|
| Building Construction-Superstructure | Concrete/Industrial Saws | 2 | 8.00 | 120 | 0.73 |
| Building Construction-Superstructure | Off-Highway Tractors | 1 | 8.00 | 120 | 0.44 |
| Building Construction-Superstructure | Off-Highway Trucks | 3 | 8.00 | 175 | 0.38 |
| Site Preparation | Tractors/Loaders/Backhoes | 1 | 8.00 | 120 | 0.37 |
| Building Construction-Superstructure | Off-Highway Trucks | 1 | 8.00 | 1000 | 0.38 |
| Building Construction-Superstructure | Other Construction Equipment | 1 | 8.00 | 500 | 0.42 |
| Site Preparation | Rubber Tired Dozers | 0 | 7.00 | 247 | 0.40 |
| Building Construction-Superstructure | Welders | 0 | 8.00 | 46 | 0.45 |
| Building Construction-Superstructure | Rubber Tired Dozers | 1 | 8.00 | 500 | 0.40 |
| Building Construction-Superstructure | Tractors/Loaders/Backhoes | 1 | 8.00 | 250 | 0.37 |
| Building Construction-Columns | Pavers | 1 | 8.00 | 50 | 0.42 |
| Building Construction-Columns | Concrete/Industrial Saws | 2 | 8.00 | 120 | 0.73 |
| Building Construction-Columns | Off-Highway Tractors | 1 | 8.00 | 120 | 0.44 |
| Building Construction-Columns | Off-Highway Trucks | 3 | 8.00 | 175 | 0.38 |
| Building Construction-Columns | Off-Highway Trucks | 1 | 8.00 | 1000 | 0.38 |
| Building Construction-Columns | Other Construction Equipment | 1 | 8.00 | 500 | 0.42 |
| Building Construction-Columns | Rubber Tired Dozers | 1 | 8.00 | 500 | 0.40 |
| Building Construction-Columns | Tractors/Loaders/Backhoes | 1 | 8.00 | 250 | 0.37 |

**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 |
|---|---|---|---|---|---|---|---|---|---|---|
| Building Construction-Columns | 18 | 0.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Site Preparation | 2 | 0.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction-Superstructure | 18 | 0.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use Soil Stabilizer

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

## 3.2 Site Preparation - 2020

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 0.0442 | 0.0000 | 0.0442 | 4.7700e-003 | 0.0000 | 4.7700e-003 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.6251 | 7.0529 | 4.7634 | 0.0117 | | 0.3106 | 0.3106 | | 0.2858 | 0.2858 | | 1,136.5560 | 1,136.5560 | 0.3676 | | 1,145.7457 |
| **Total** | **0.6251** | **7.0529** | **4.7634** | **0.0117** | **0.0442** | **0.3106** | **0.3548** | **4.7700e-003** | **0.2858** | **0.2905** | | **1,136.5560** | **1,136.5560** | **0.3676** | | **1,145.7457** |

### Unmitigated Construction Off-Site

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

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 0.0172 | 0.0000 | 0.0172 | 1.8600e-003 | 0.0000 | 1.8600e-003 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.4570 | 6.3196 | 5.9426 | 0.0117 | | 0.2706 | 0.2706 | | 0.2582 | 0.2582 | 0.0000 | 1,136.5560 | 1,136.5560 | 0.3676 | | 1,145.7457 |
| **Total** | **0.4570** | **6.3196** | **5.9426** | **0.0117** | **0.0172** | **0.2706** | **0.2879** | **1.8600e-003** | **0.2582** | **0.2601** | **0.0000** | **1,136.5560** | **1,136.5560** | **0.3676** | | **1,145.7457** |

## Mitigated Construction Off-Site

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

## 3.3 Building Construction-Superstructure - 2020

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 11.6716 | 122.1520 | 80.5456 | 0.1729 | | 5.3944 | 5.3944 | | 5.0395 | 5.0395 | | 16,625.1099 | 16,625.1099 | 3.8317 | | 16,720.9028 |
| **Total** | **11.6716** | **122.1520** | **80.5456** | **0.1729** | | **5.3944** | **5.3944** | | **5.0395** | **5.0395** | | **16,625.1099** | **16,625.1099** | **3.8317** | | **16,720.9028** |

### Unmitigated Construction Off-Site

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

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 7.2623 | 92.9163 | 94.8827 | 0.1729 | | 4.5072 | 4.5072 | | 4.3714 | 4.3714 | 0.0000 | 16,625.1099 | 16,625.1099 | 3.8317 | | 16,720.9028 |
| **Total** | **7.2623** | **92.9163** | **94.8827** | **0.1729** | | **4.5072** | **4.5072** | | **4.3714** | **4.3714** | **0.0000** | **16,625.1099** | **16,625.1099** | **3.8317** | | **16,720.9028** |

## Mitigated Construction Off-Site

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

## 3.3 Building Construction-Superstructure - 2021

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 10.5232 | 108.2765 | 77.7389 | 0.1730 | | 4.6577 | 4.6577 | | 4.3517 | 4.3517 | | 16,631.6290 | 16,631.6290 | 3.8180 | | 16,727.0797 |
| **Total** | **10.5232** | **108.2765** | **77.7389** | **0.1730** | | **4.6577** | **4.6577** | | **4.3517** | **4.3517** | | **16,631.6290** | **16,631.6290** | **3.8180** | | **16,727.0797** |

### Unmitigated Construction Off-Site

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

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 6.8498 | 89.6808 | 94.4414 | 0.1730 | | 4.2235 | 4.2235 | | 4.1045 | 4.1045 | 0.0000 | 16,631.6290 | 16,631.6290 | 3.8180 | | 16,727.0797 |
| **Total** | **6.8498** | **89.6808** | **94.4414** | **0.1730** | | **4.2235** | **4.2235** | | **4.1045** | **4.1045** | **0.0000** | **16,631.6290** | **16,631.6290** | **3.8180** | | **16,727.0797** |

## Mitigated Construction Off-Site

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

## 3.4 Building Construction-Columns - 2021

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 10.5232 | 108.2765 | 77.7389 | 0.1730 | | 4.6577 | 4.6577 | | 4.3517 | 4.3517 | | 16,631.6290 | 16,631.6290 | 3.8180 | | 16,727.0797 |
| **Total** | **10.5232** | **108.2765** | **77.7389** | **0.1730** | | **4.6577** | **4.6577** | | **4.3517** | **4.3517** | | **16,631.6290** | **16,631.6290** | **3.8180** | | **16,727.0797** |

### Unmitigated Construction Off-Site

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

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 6.8498 | 89.6808 | 94.4414 | 0.1730 | | 4.2235 | 4.2235 | | 4.1045 | 4.1045 | 0.0000 | 16,631.6290 | 16,631.6290 | 3.8180 | | 16,727.0797 |
| **Total** | **6.8498** | **89.6808** | **94.4414** | **0.1730** | | **4.2235** | **4.2235** | | **4.1045** | **4.1045** | **0.0000** | **16,631.6290** | **16,631.6290** | **3.8180** | | **16,727.0797** |

## Mitigated Construction Off-Site

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

## 3.4 Building Construction-Columns - 2022

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 9.6064 | 97.0441 | 75.7869 | 0.1731 | | 4.0454 | 4.0454 | | 3.7798 | 3.7798 | | 16,644.6852 | 16,644.6852 | 3.8096 | | 16,739.9238 |
| **Total** | **9.6064** | **97.0441** | **75.7869** | **0.1731** | | **4.0454** | **4.0454** | | **3.7798** | **3.7798** | | **16,644.6852** | **16,644.6852** | **3.8096** | | **16,739.9238** |

### Unmitigated Construction Off-Site

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

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 6.4711 | 86.6576 | 94.0534 | 0.1731 | | 3.9500 | 3.9500 | | 3.8474 | 3.8474 | 0.0000 | 16,644.6851 | 16,644.6851 | 3.8096 | | 16,739.9238 |
| **Total** | **6.4711** | **86.6576** | **94.0534** | **0.1731** | | **3.9500** | **3.9500** | | **3.8474** | **3.8474** | **0.0000** | **16,644.6851** | **16,644.6851** | **3.8096** | | **16,739.9238** |

## Mitigated Construction Off-Site

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

**Castaic**

**Total On-Road Emissions**

**Castaic**

**Total On-Road Emissions**

| Construction Phase | Daily One-Way Trips | Haul Days per Phase (days) | Work Hours per Day (hours/day) | One-Way Trip Distance per Day (miles) | Idling per Day (minutes) | Regional Emissions (pounds/day) ROG | NOX | CO | SO2 | PM10 Dust | PM10 Exh | Total PM10 | PM2.5 Dust | PM2.5 Exh | Total PM2.5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Site Preparation | 2020 | | | | | | | | | | | | | | |
| Vendor | 0 | 0 | 12 | 23 | 15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker | 30 | 12 | 12 | 100 | 0 | 0.18 | 0.64 | 7.97 | 0.02 | 2.28 | 0.02 | 2.29 | 0.60 | 0.01 | 0.62 |
| Total | | | | | | 0.18 | 0.64 | 7.97 | 0.02 | 2.28 | 0.02 | 2.29 | 0.60 | 0.01 | 0.62 |
| Building Construction-Superstructure | 2020 | | | | | | | | | | | | | | |
| Vendor | 12 | 6 | 12 | 23 | 15 | 0.09 | 2.27 | 0.54 | 0.01 | 0.25 | 0.04 | 0.29 | 0.07 | 0.04 | 0.11 |
| Worker | 30 | 13 | 12 | 100 | 0 | 0.18 | 0.64 | 7.97 | 0.02 | 2.28 | 0.02 | 2.29 | 0.60 | 0.01 | 0.62 |
| Total | | | | | | 0.27 | 2.91 | 8.51 | 0.03 | 2.53 | 0.06 | 2.59 | 0.68 | 0.05 | 0.73 |
| Building Construction-Superstructure | 2021 | | | | | | | | | | | | | | |
| Vendor | 0 | 0 | 12 | 23 | 15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker | 30 | 131 | 12 | 100 | 0 | 0.15 | 0.55 | 7.17 | 0.02 | 2.28 | 0.01 | 2.29 | 0.60 | 0.01 | 0.62 |
| Total | | | | | | 0.15 | 0.55 | 7.17 | 0.02 | 2.28 | 0.01 | 2.29 | 0.60 | 0.01 | 0.62 |
| Building Construction-Columns | 2021 | | | | | | | | | | | | | | |
| Vendor | 12 | 18 | 12 | 23 | 15 | 0.08 | 2.00 | 0.48 | 0.01 | 0.25 | 0.03 | 0.29 | 0.07 | 0.03 | 0.10 |
| Worker | 30 | 118 | 12 | 100 | 0 | 0.15 | 0.55 | 7.17 | 0.02 | 2.28 | 0.01 | 2.29 | 0.60 | 0.01 | 0.62 |
| Total | | | | | | 0.23 | 2.55 | 7.64 | 0.03 | 2.53 | 0.05 | 2.58 | 0.68 | 0.04 | 0.72 |
| Building Construction-Columns | 2022 | | | | | | | | | | | | | | |
| Vendor | 0 | 0 | 12 | 23 | 15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker | 30 | 14 | 12 | 100 | 0 | 0.13 | 0.48 | 6.50 | 0.02 | 2.28 | 0.01 | 2.29 | 0.60 | 0.01 | 0.62 |
| Total | | | | | | 0.13 | 0.48 | 6.50 | 0.02 | 2.28 | 0.01 | 2.29 | 0.60 | 0.01 | 0.62 |

**Castaic**
**Running Emissions**

| | | Running Emissions Factor (grams/mile) | | | | | |
|---|---|---|---|---|---|---|---|
| | | ROG | NOX | CO | SO2 | PM10 | PM2.5 |
| 2020Vendor | Vendor | 0.15052095 | 3.661476833 | 0.82032612 | 0.01250546 | 0.0674547 | 0.06124278 |
| 2020Worker | Worker | 0.02663624 | 0.096097887 | 1.20453196 | 0.00316067 | 0.002367 | 0.00217971 |
| 2021Vendor | Vendor | 0.12175156 | 3.217634225 | 0.70325362 | 0.01222293 | 0.05527116 | 0.04911126 |
| 2021Worker | Worker | 0.02296386 | 0.083007514 | 1.08376285 | 0.00306823 | 0.00220153 | 0.00202718 |
| 2022Vendor | Vendor | 0.0717977 | 2.602453214 | 0.52331731 | 0.01185125 | 0.02991351 | 0.02359656 |
| 2022Worker | Worker | 0.01983052 | 0.072203528 | 0.98204326 | 0.00297251 | 0.00205325 | 0.00189053 |

| Construction Phase | Daily One-Way Trips | Haul Days per Phase (days) | Work Hours per Day (hours/day) | One-Way Trip Distance per Day (miles) | Regional Emissions (pounds/day) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | ROG | NOX | CO | SO2 | PM10 | PM2.5 |
| Site Preparation | 2020 | | | | | | | | | |
| Vendor | 0 | 0 | 12 | 23 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker | 30 | 12 | 12 | 100 | 0.18 | 0.64 | 7.97 | 0.02 | 0.02 | 0.01 |
| Building Construction-Superstructure | 2020 | | | | | | | | | |
| Vendor | 12 | 6 | 12 | 23 | 0.09 | 2.21 | 0.50 | 0.01 | 0.04 | 0.04 |
| Worker | 30 | 13 | 12 | 100 | 0.18 | 0.64 | 7.97 | 0.02 | 0.02 | 0.01 |
| Building Construction-Superstructure | 2021 | | | | | | | | | |
| Vendor | 0 | 0 | 12 | 23 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker | 30 | 131 | 12 | 100 | 0.15 | 0.55 | 7.17 | 0.02 | 0.01 | 0.01 |
| Building Construction-Columns | 2021 | | | | | | | | | |
| Vendor | 12 | 18 | 12 | 23 | 0.07 | 1.95 | 0.43 | 0.01 | 0.03 | 0.03 |
| Worker | 30 | 118 | 12 | 100 | 0.15 | 0.55 | 7.17 | 0.02 | 0.01 | 0.01 |
| Building Construction-Columns | 2022 | | | | | | | | | |
| Vendor | 0 | 0 | 12 | 23 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker | 30 | 14 | 12 | 100 | 0.13 | 0.48 | 6.50 | 0.02 | 0.01 | 0.01 |

**Castaic**
**Idling Emissions**

| | Idling Emissions Factor (grams/minute) | | | | | |
|---|---|---|---|---|---|---|
| | ROG | NOX | CO | SO2 | PM10 | PM2.5 |
| 2020Vendor Vendor | 0.00987959 | 0.142517399 | 0.12251179 | 0.00022933 | 0.00030983 | 0.00029642 |
| 2020Worker Worker | 0 | 0 | 0 | 0 | 0 | 0 |
| 2021Vendor Vendor | 0.00978725 | 0.13997517 | 0.1278175 | 0.00023088 | 0.00022325 | 0.00021359 |
| 2021Worker Worker | 0 | 0 | 0 | 0 | 0 | 0 |
| 2022Vendor Vendor | 0.0096457 | 0.137105548 | 0.13427245 | 0.00023364 | 0.00010016 | 9.5824E-05 |
| 2022Worker Worker | 0 | 0 | 0 | 0 | 0 | 0 |

| Construction Phase | Daily One-Way Trips | Haul Days per Phase (days) | Work Hours per Day (hours/day) | Idling minutes per Day (miles) | Regional Emissions (pounds/day) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | ROG | NOX | CO | SO2 | PM10 | PM2.5 |
| Site Preparation | 2020 | | | | | | | | | |
| Vendor | 0 | 0 | 12 | 15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker | 30 | 12 | 12 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Building Construction-Superstructure | 2020 | | | | | | | | | |
| Vendor | 12 | 6 | 12 | 15 | 0.00 | 0.06 | 0.05 | 0.00 | 0.00 | 0.00 |
| Worker | 30 | 13 | 12 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Building Construction-Superstructure | 2021 | | | | | | | | | |
| Vendor | 0 | 0 | 12 | 15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker | 30 | 131 | 12 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Building Construction-Columns | 2021 | | | | | | | | | |
| Vendor | 12 | 18 | 12 | 15 | 0.00 | 0.06 | 0.05 | 0.00 | 0.00 | 0.00 |
| Worker | 30 | 118 | 12 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Building Construction-Columns | 2022 | | | | | | | | | |
| Vendor | 0 | 0 | 12 | 15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker | 30 | 14 | 12 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

**Castaic**
**Road Dust, Break Wear, and Tire wear Emissions**

| | Emission Factors (grams/mile) | | | | | |
|---|---|---|---|---|---|---|
| | PM10 | | | PM2.5 | | |
| | RD | BW | TW | RD | BW | TW |
| 2020Vendor Vendor | 3.00E-01 | 0.095689863 | 0.02378913 | 7.36E-02 | 0.04100994 | 0.00594728 |
| 2020Worker Worker | 3.00E-01 | 0.036750011 | 0.008 | 7.36E-02 | 0.01575 | 0.002 |
| 2021Vendor Vendor | 3.00E-01 | 0.095694022 | 0.02379166 | 7.36E-02 | 0.04101172 | 0.00594791 |
| 2021Worker Worker | 3.00E-01 | 0.036750011 | 0.008 | 7.36E-02 | 0.01575 | 0.002 |
| 2022Vendor Vendor | 3.00E-01 | 0.095697894 | 0.02379395 | 7.36E-02 | 0.04101338 | 0.00594849 |
| 2022Worker Worker | 3.00E-01 | 0.036750011 | 0.008 | 7.36E-02 | 0.01575 | 0.002 |
| 2023Vendor Vendor | 3.00E-01 | 0.095701749 | 0.02379617 | 7.36E-02 | 0.04101504 | 0.00594904 |
| 2023Worker Worker | 3.00E-01 | 0.036750011 | 0.008 | 7.36E-02 | 0.01575 | 0.002 |

| Construction Phase | Daily One-Way Trips | Haul Days per Phase (days) | Work Hours per Day (hours/day) | One-Way Trip Distance per Day (miles) | Regional Emissions (pounds/day) PM10 RD | PM10 BW | PM10 TW | PM2.5 RD | PM2.5 BW | PM2.5 TW |
|---|---|---|---|---|---|---|---|---|---|---|
| Site Preparation | 2020 | | | | | | | | | |
| Vendor | 0 | 0 | 12 | 23 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker | 30 | 12 | 12 | 100 | 1.98 | 0.24 | 0.05 | 0.49 | 0.10 | 0.01 |
| Building Construction-Superstructure | 2020 | | | | | | | | | |
| Vendor | 12 | 6 | 12 | 23 | 0.18 | 0.06 | 0.01 | 0.04 | 0.02 | 0.00 |
| Worker | 30 | 13 | 12 | 100 | 1.98 | 0.24 | 0.05 | 0.49 | 0.10 | 0.01 |
| Building Construction-Superstructure | 2021 | | | | | | | | | |
| Vendor | 0 | 0 | 12 | 23 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker | 30 | 131 | 12 | 100 | 1.98 | 0.24 | 0.05 | 0.49 | 0.10 | 0.01 |
| Building Construction-Columns | 2021 | | | | | | | | | |
| Vendor | 12 | 18 | 12 | 23 | 0.18 | 0.06 | 0.01 | 0.04 | 0.02 | 0.00 |
| Worker | 30 | 118 | 12 | 100 | 1.98 | 0.24 | 0.05 | 0.49 | 0.10 | 0.01 |
| Building Construction-Columns | 2022 | | | | | | | | | |
| Vendor | 0 | 0 | 12 | 23 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker | 30 | 14 | 12 | 100 | 1.98 | 0.24 | 0.05 | 0.49 | 0.10 | 0.01 |

# Castaic
## Road Dust

**Paved Road Dust Emission Factors (Assumes No Precipitation)**

Formula: $EF_{Dust,P} = (k\ (sL)^{0.91} \times (W)^{1.02})$

Where:

- $EF_{Dust,P}$ = Paved Road Dust Emission Factor (having the same units as k)
- k = particle size multiplier
- sL = road surface silt loading ($g/m^2$)
- W = average fleet vehicle weight (tons) (CARB uses 2.4 tons as a fleet average vehicle weight factor)

| | Emission Factor (grams per VMT) | |
|---|---|---|
| | PM10 | PM2.5 |
| k | 0.9979 | 0.2449 |
| sL | 0.1 | 0.1 |
| W | 2.4 | 2.4 |
| $EF_{Dust,P}$ | 3.00E-01 | 7.36E-02 |

**Unpaved Road Dust Emission Factors (Assumes No Precipitation)**

Formula: $EF_{Dust,U} = (k\ (\ s / 12)^{1} \times (Sp / 30)^{0.5} / (M / 0.5)^{0.2}) - C)$

Where:

- $EF_{Dust,U}$ = Unpaved Road Dust Emission Factor (having the same units as k)
- k = particle size multiplier
- s = surface material silt content (%)
- Sp = mean vehicle speed (mph)
- M = surface material moisture content (%)
- C = Emission Factor for 1980s vehicle fleet exhaust, brake wear, and tire wear

| | Emission Factor (grams per VMT) | |
|---|---|---|
| | PM10 | PM2.5 |
| k | 816.47 | 81.65 |
| s | 4.3% | 4.3% |
| Sp | 15 | 15 |
| M | 0.5% | 0.5% |
| C | 0.00047 | 0.00036 |
| $EF_{Dust,U}$ | 5.20E+00 | 5.19E-01 |

Sources:


SCAQMD, CalEEMod, Version 2011.1.

CARB, *Entrained Dust from Paved Road Travel: Emission Estimation Methodology Background Document* , (1997).

USEPA, *AP-42* , Fifth Edition, Volume I, Chapter 13.2.1 - Paved Roads, (2011).

PCR Services Corporation, 2013.

# A-3 Project Construction Greenhouse Gas Emissions Worksheets

**Castaic Construction GHG Emissions**

Construction GHG Emissions Summary

| Year | Project Equipment Emissions (MTCO2e/year) | Project On-Road Emissions (MTCO2e/year) | Project Total (MTCO2e/year) |
|---|---|---|---|
| 2020 | 105.39 | 26.47 | 131.86 |
| 2021 | 1889.229 | 240.14 | 2129.37 |
| 2022 | 106.30 | 12.70 | 119.01 |
| Project Total | | | 2,380 |
| **30 Year-Amortization** | | | **79** |

$MTCO_2e$=Metric Tons Carbon Dioxide equivalents

Castaic Lake High Tower Bridge Retrofit - Los Angeles-South Coast County, Annual

# Castaic Lake High Tower Bridge Retrofit

**Los Angeles-South Coast County, Annual**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| General Light Industry | 43.56 | 1000sqft | 1.00 | 43,560.00 | 0 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 33 |
| **Climate Zone** | 8 | | | **Operational Year** | 2022 |
| **Utility Company** | Southern California Edison | | | | |
| **CO2 Intensity (lb/MWhr)** | 702.44 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - see construction assumptions

Off-road Equipment - see construction assumptions

Off-road Equipment - see construction assumptions

Off-road Equipment - see construction assumptions

Trips and VMT - see construction assumptions

Construction Off-road Equipment Mitigation -

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblConstDustMitigation | WaterUnpavedRoadVehicleSpeed | 0 | 15 |
| tblConstructionPhase | NumDays | 100.00 | 144.00 |

| | | | |
|---|---|---|---|
| tblConstructionPhase | NumDays | 1.00 | 12.00 |
| tblConstructionPhase | NumDays | 100.00 | 132.00 |
| tblConstructionPhase | NumDaysWeek | 5.00 | 6.00 |
| tblConstructionPhase | NumDaysWeek | 5.00 | 6.00 |
| tblConstructionPhase | NumDaysWeek | 5.00 | 6.00 |
| tblConstructionPhase | PhaseEndDate | 5/10/2021 | 6/2/2021 |
| tblConstructionPhase | PhaseEndDate | 12/17/2020 | 12/16/2020 |
| tblConstructionPhase | PhaseStartDate | 12/22/2020 | 12/17/2020 |
| tblConstructionPhase | PhaseStartDate | 12/17/2020 | 12/3/2020 |
| tblGrading | AcresOfGrading | 0.00 | 0.50 |
| tblOffRoadEquipment | HorsePower | 231.00 | 120.00 |
| tblOffRoadEquipment | HorsePower | 84.00 | 250.00 |
| tblOffRoadEquipment | HorsePower | 84.00 | 250.00 |
| tblOffRoadEquipment | HorsePower | 231.00 | 120.00 |
| tblOffRoadEquipment | HorsePower | 97.00 | 120.00 |
| tblOffRoadEquipment | HorsePower | 97.00 | 250.00 |
| tblOffRoadEquipment | HorsePower | 130.00 | 50.00 |
| tblOffRoadEquipment | HorsePower | 97.00 | 120.00 |
| tblOffRoadEquipment | HorsePower | 81.00 | 120.00 |
| tblOffRoadEquipment | HorsePower | 124.00 | 120.00 |
| tblOffRoadEquipment | HorsePower | 402.00 | 175.00 |
| tblOffRoadEquipment | HorsePower | 97.00 | 120.00 |
| tblOffRoadEquipment | HorsePower | 402.00 | 1,000.00 |
| tblOffRoadEquipment | HorsePower | 172.00 | 500.00 |
| tblOffRoadEquipment | HorsePower | 247.00 | 500.00 |
| tblOffRoadEquipment | HorsePower | 97.00 | 250.00 |
| tblOffRoadEquipment | HorsePower | 130.00 | 50.00 |
| tblOffRoadEquipment | HorsePower | 81.00 | 120.00 |
| tblOffRoadEquipment | HorsePower | 124.00 | 120.00 |
| tblOffRoadEquipment | HorsePower | 402.00 | 175.00 |

| | | | |
|---|---|---|---|
| tblOffRoadEquipment | HorsePower | 402.00 | 1,000.00 |
| tblOffRoadEquipment | HorsePower | 172.00 | 500.00 |
| tblOffRoadEquipment | HorsePower | 247.00 | 500.00 |
| tblOffRoadEquipment | HorsePower | 97.00 | 250.00 |
| tblOffRoadEquipment | LoadFactor | 0.37 | 0.37 |
| tblOffRoadEquipment | LoadFactor | 0.42 | 0.42 |
| tblOffRoadEquipment | LoadFactor | 0.44 | 0.44 |
| tblOffRoadEquipment | LoadFactor | 0.38 | 0.38 |
| tblOffRoadEquipment | LoadFactor | 0.38 | 0.38 |
| tblOffRoadEquipment | LoadFactor | 0.42 | 0.42 |
| tblOffRoadEquipment | LoadFactor | 0.40 | 0.40 |
| tblOffRoadEquipment | LoadFactor | 0.37 | 0.37 |
| tblOffRoadEquipment | LoadFactor | 0.42 | 0.42 |
| tblOffRoadEquipment | LoadFactor | 0.44 | 0.44 |
| tblOffRoadEquipment | LoadFactor | 0.38 | 0.38 |
| tblOffRoadEquipment | LoadFactor | 0.38 | 0.38 |
| tblOffRoadEquipment | LoadFactor | 0.42 | 0.42 |
| tblOffRoadEquipment | LoadFactor | 0.40 | 0.40 |
| tblOffRoadEquipment | LoadFactor | 0.37 | 0.37 |
| tblOffRoadEquipment | OffRoadEquipmentType | | Tractors/Loaders/Backhoes |
| tblOffRoadEquipment | OffRoadEquipmentType | | Pavers |
| tblOffRoadEquipment | OffRoadEquipmentType | | Concrete/Industrial Saws |
| tblOffRoadEquipment | OffRoadEquipmentType | | Off-Highway Tractors |
| tblOffRoadEquipment | OffRoadEquipmentType | | Off-Highway Trucks |
| tblOffRoadEquipment | OffRoadEquipmentType | | Off-Highway Trucks |
| tblOffRoadEquipment | OffRoadEquipmentType | | Other Construction Equipment |
| tblOffRoadEquipment | OffRoadEquipmentType | | Rubber Tired Dozers |
| tblOffRoadEquipment | OffRoadEquipmentType | | Tractors/Loaders/Backhoes |
| tblOffRoadEquipment | OffRoadEquipmentType | | Pavers |
| tblOffRoadEquipment | OffRoadEquipmentType | | Concrete/Industrial Saws |

| | | | |
|---|---|---|---|
| tblOffRoadEquipment | OffRoadEquipmentType | | Off-Highway Tractors |
| tblOffRoadEquipment | OffRoadEquipmentType | | Off-Highway Trucks |
| tblOffRoadEquipment | OffRoadEquipmentType | | Off-Highway Trucks |
| tblOffRoadEquipment | OffRoadEquipmentType | | Other Construction Equipment |
| tblOffRoadEquipment | OffRoadEquipmentType | | Rubber Tired Dozers |
| tblOffRoadEquipment | OffRoadEquipmentType | | Tractors/Loaders/Backhoes |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 4.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 2.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 2.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 4.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 0.00 |
| tblOffRoadEquipment | UsageHours | 6.00 | 8.00 |
| tblOffRoadEquipment | UsageHours | 6.00 | 8.00 |
| tblOffRoadEquipment | UsageHours | 6.00 | 8.00 |
| tblOffRoadEquipment | UsageHours | 6.00 | 8.00 |
| tblOffRoadEquipment | UsageHours | 6.00 | 8.00 |
| tblOffRoadEquipment | UsageHours | 6.00 | 8.00 |
| tblTripsAndVMT | VendorTripNumber | 7.00 | 0.00 |
| tblTripsAndVMT | VendorTripNumber | 7.00 | 0.00 |
| tblTripsAndVMT | WorkerTripNumber | 18.00 | 0.00 |
| tblTripsAndVMT | WorkerTripNumber | 5.00 | 0.00 |
| tblTripsAndVMT | WorkerTripNumber | 18.00 | 0.00 |

# 2.0 Emissions Summary

## 2.1 Overall Construction

### Unmitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2020 | 0.0796 | 0.8363 | 0.5521 | 1.1900e-003 | 2.7000e-004 | 0.0369 | 0.0372 | 3.0000e-005 | 0.0345 | 0.0345 | 0.0000 | 104.2197 | 104.2197 | 0.0246 | 0.0000 | 104.8346 |
| 2021 | 1.3101 | 13.4804 | 9.6785 | 0.0215 | 0.0000 | 0.5799 | 0.5799 | 0.0000 | 0.5418 | 0.5418 | 0.0000 | 1,878.4510 | 1,878.4510 | 0.4312 | 0.0000 | 1,889.2317 |
| 2022 | 0.0672 | 0.6793 | 0.5305 | 1.2100e-003 | 0.0000 | 0.0283 | 0.0283 | 0.0000 | 0.0265 | 0.0265 | 0.0000 | 105.6986 | 105.6986 | 0.0242 | 0.0000 | 106.3034 |
| **Maximum** | **1.3101** | **13.4804** | **9.6785** | **0.0215** | **2.7000e-004** | **0.5799** | **0.5799** | **3.0000e-005** | **0.5418** | **0.5418** | **0.0000** | **1,878.4510** | **1,878.4510** | **0.4312** | **0.0000** | **1,889.2317** |

### 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 | | | | | |
| 2020 | 0.0796 | 0.8363 | 0.5521 | 1.1900e-003 | 1.0000e-004 | 0.0369 | 0.0370 | 1.0000e-005 | 0.0345 | 0.0345 | 0.0000 | 104.2196 | 104.2196 | 0.0246 | 0.0000 | 104.8345 |
| 2021 | 1.3101 | 13.4804 | 9.6785 | 0.0215 | 0.0000 | 0.5799 | 0.5799 | 0.0000 | 0.5418 | 0.5418 | 0.0000 | 1,878.4488 | 1,878.4488 | 0.4312 | 0.0000 | 1,889.2294 |
| 2022 | 0.0672 | 0.6793 | 0.5305 | 1.2100e-003 | 0.0000 | 0.0283 | 0.0283 | 0.0000 | 0.0265 | 0.0265 | 0.0000 | 105.6985 | 105.6985 | 0.0242 | 0.0000 | 106.3033 |
| **Maximum** | **1.3101** | **13.4804** | **9.6785** | **0.0215** | **1.0000e-004** | **0.5799** | **0.5799** | **1.0000e-005** | **0.5418** | **0.5418** | **0.0000** | **1,878.4488** | **1,878.4488** | **0.4312** | **0.0000** | **1,889.2294** |

| | ROG | NOx | 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** | **62.96** | **0.00** | **0.03** | **66.67** | **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) |
|---|---|---|---|---|
| 1 | 12-3-2020 | 3-2-2021 | 4.0121 | 4.0121 |
| 2 | 3-3-2021 | 6-2-2021 | 4.6841 | 4.6841 |
| 3 | 6-3-2021 | 9-2-2021 | 0.8655 | 0.8655 |
| 4 | 9-3-2021 | 12-2-2021 | 4.6332 | 4.6332 |
| 5 | 12-3-2021 | 3-2-2022 | 2.2535 | 2.2535 |
| | | Highest | 4.6841 | 4.6841 |

## 3.0 Construction Detail

### Construction Phase

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Site Preparation | Site Preparation | 12/3/2020 | 12/16/2020 | 6 | 12 | |
| 2 | Building Construction-Superstructure | Building Construction | 12/17/2020 | 6/2/2021 | 6 | 144 | |
| 3 | Building Construction-Columns | Building Construction | 8/17/2021 | 1/17/2022 | 6 | 132 | |

**Acres of Grading (Site Preparation Phase): 0.5**

**Acres of Grading (Grading Phase): 0**

**Acres of Paving: 0**

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

### OffRoad Equipment

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Building Construction-Columns | Cranes | 4 | 8.00 | 120 | 0.29 |
| Building Construction-Columns | Forklifts | 0 | 6.00 | 89 | 0.20 |
| Building Construction-Columns | Generator Sets | 2 | 8.00 | 250 | 0.74 |
| Building Construction-Superstructure | Generator Sets | 2 | 8.00 | 250 | 0.74 |
| Building Construction-Superstructure | Cranes | 4 | 8.00 | 120 | 0.29 |

| | | | | | |
|---|---|---|---|---|---|
| Building Construction-Superstructure | Forklifts | 0 | 6.00 | 89 | 0.20 |
| Site Preparation | Graders | 0 | 8.00 | 187 | 0.41 |
| Building Construction-Columns | Tractors/Loaders/Backhoes | 1 | 8.00 | 120 | 0.37 |
| Building Construction-Columns | Welders | 0 | 8.00 | 46 | 0.45 |
| Site Preparation | Tractors/Loaders/Backhoes | 1 | 8.00 | 250 | 0.37 |
| Building Construction-Superstructure | Pavers | 1 | 8.00 | 50 | 0.42 |
| Building Construction-Superstructure | Tractors/Loaders/Backhoes | 1 | 8.00 | 120 | 0.37 |
| Building Construction-Superstructure | Concrete/Industrial Saws | 2 | 8.00 | 120 | 0.73 |
| Building Construction-Superstructure | Off-Highway Tractors | 1 | 8.00 | 120 | 0.44 |
| Building Construction-Superstructure | Off-Highway Trucks | 3 | 8.00 | 175 | 0.38 |
| Site Preparation | Tractors/Loaders/Backhoes | 1 | 8.00 | 120 | 0.37 |
| Building Construction-Superstructure | Off-Highway Trucks | 1 | 8.00 | 1000 | 0.38 |
| Building Construction-Superstructure | Other Construction Equipment | 1 | 8.00 | 500 | 0.42 |
| Site Preparation | Rubber Tired Dozers | 0 | 7.00 | 247 | 0.40 |
| Building Construction-Superstructure | Welders | 0 | 8.00 | 46 | 0.45 |
| Building Construction-Superstructure | Rubber Tired Dozers | 1 | 8.00 | 500 | 0.40 |
| Building Construction-Superstructure | Tractors/Loaders/Backhoes | 1 | 8.00 | 250 | 0.37 |
| Building Construction-Columns | Pavers | 1 | 8.00 | 50 | 0.42 |
| Building Construction-Columns | Concrete/Industrial Saws | 2 | 8.00 | 120 | 0.73 |
| Building Construction-Columns | Off-Highway Tractors | 1 | 8.00 | 120 | 0.44 |
| Building Construction-Columns | Off-Highway Trucks | 3 | 8.00 | 175 | 0.38 |
| Building Construction-Columns | Off-Highway Trucks | 1 | 8.00 | 1000 | 0.38 |
| Building Construction-Columns | Other Construction Equipment | 1 | 8.00 | 500 | 0.42 |
| Building Construction-Columns | Rubber Tired Dozers | 1 | 8.00 | 500 | 0.40 |
| Building Construction-Columns | Tractors/Loaders/Backhoes | 1 | 8.00 | 250 | 0.37 |

**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 |
|---|---|---|---|---|---|---|---|---|---|---|
| Building Construction-Columns | 18 | 0.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Site Preparation | 2 | 0.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction-Superstructure | 18 | 0.00 | 0.00 | 0.00 | 14.70 | 6.90 | 20.00 | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

Use Soil Stabilizer

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

## 3.2 Site Preparation - 2020

**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 | | | | | 2.7000e-004 | 0.0000 | 2.7000e-004 | 3.0000e-005 | 0.0000 | 3.0000e-005 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 3.7500e-003 | 0.0423 | 0.0286 | 7.0000e-005 | | 1.8600e-003 | 1.8600e-003 | | 1.7100e-003 | 1.7100e-003 | 0.0000 | 6.1864 | 6.1864 | 2.0000e-003 | 0.0000 | 6.2364 |
| **Total** | **3.7500e-003** | **0.0423** | **0.0286** | **7.0000e-005** | **2.7000e-004** | **1.8600e-003** | **2.1300e-003** | **3.0000e-005** | **1.7100e-003** | **1.7400e-003** | **0.0000** | **6.1864** | **6.1864** | **2.0000e-003** | **0.0000** | **6.2364** |

**Unmitigated Construction Off-Site**

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

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 1.0000e-004 | 0.0000 | 1.0000e-004 | 1.0000e-005 | 0.0000 | 1.0000e-005 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 3.7500e-003 | 0.0423 | 0.0286 | 7.0000e-005 | | 1.8600e-003 | 1.8600e-003 | | 1.7100e-003 | 1.7100e-003 | 0.0000 | 6.1864 | 6.1864 | 2.0000e-003 | 0.0000 | 6.2364 |
| **Total** | **3.7500e-003** | **0.0423** | **0.0286** | **7.0000e-005** | **1.0000e-004** | **1.8600e-003** | **1.9600e-003** | **1.0000e-005** | **1.7100e-003** | **1.7200e-003** | **0.0000** | **6.1864** | **6.1864** | **2.0000e-003** | **0.0000** | **6.2364** |

## Mitigated Construction Off-Site

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

## 3.3 Building Construction-Superstructure - 2020

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0759 | 0.7940 | 0.5236 | 1.1200e-003 | | 0.0351 | 0.0351 | | 0.0328 | 0.0328 | 0.0000 | 98.0333 | 98.0333 | 0.0226 | 0.0000 | 98.5982 |
| **Total** | **0.0759** | **0.7940** | **0.5236** | **1.1200e-003** | | **0.0351** | **0.0351** | | **0.0328** | **0.0328** | **0.0000** | **98.0333** | **98.0333** | **0.0226** | **0.0000** | **98.5982** |

### Unmitigated Construction Off-Site

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

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0759 | 0.7940 | 0.5236 | 1.1200e-003 | | 0.0351 | 0.0351 | | 0.0328 | 0.0328 | 0.0000 | 98.0332 | 98.0332 | 0.0226 | 0.0000 | 98.5980 |
| **Total** | **0.0759** | **0.7940** | **0.5236** | **1.1200e-003** | | **0.0351** | **0.0351** | | **0.0328** | **0.0328** | **0.0000** | **98.0332** | **98.0332** | **0.0226** | **0.0000** | **98.5980** |

## Mitigated Construction Off-Site

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

## 3.3 Building Construction-Superstructure - 2021

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.6893 | 7.0921 | 5.0919 | 0.0113 | | 0.3051 | 0.3051 | | 0.2850 | 0.2850 | 0.0000 | 988.2614 | 988.2614 | 0.2269 | 0.0000 | 993.9331 |
| **Total** | **0.6893** | **7.0921** | **5.0919** | **0.0113** | | **0.3051** | **0.3051** | | **0.2850** | **0.2850** | **0.0000** | **988.2614** | **988.2614** | **0.2269** | **0.0000** | **993.9331** |

### Unmitigated Construction Off-Site

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

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.6893 | 7.0921 | 5.0919 | 0.0113 | | 0.3051 | 0.3051 | | 0.2850 | 0.2850 | 0.0000 | 988.2602 | 988.2602 | 0.2269 | 0.0000 | 993.9319 |
| **Total** | **0.6893** | **7.0921** | **5.0919** | **0.0113** | | **0.3051** | **0.3051** | | **0.2850** | **0.2850** | **0.0000** | **988.2602** | **988.2602** | **0.2269** | **0.0000** | **993.9319** |

## Mitigated Construction Off-Site

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

## 3.4 Building Construction-Columns - 2021

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.6209 | 6.3883 | 4.5866 | 0.0102 | | 0.2748 | 0.2748 | | 0.2568 | 0.2568 | 0.0000 | 890.1896 | 890.1896 | 0.2044 | 0.0000 | 895.2985 |
| **Total** | **0.6209** | **6.3883** | **4.5866** | **0.0102** | | **0.2748** | **0.2748** | | **0.2568** | **0.2568** | **0.0000** | **890.1896** | **890.1896** | **0.2044** | **0.0000** | **895.2985** |

### Unmitigated Construction Off-Site

| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.6209 | 6.3883 | 4.5866 | 0.0102 | | 0.2748 | 0.2748 | | 0.2568 | 0.2568 | 0.0000 | 890.1886 | 890.1886 | 0.2044 | 0.0000 | 895.2975 |
| **Total** | **0.6209** | **6.3883** | **4.5866** | **0.0102** | | **0.2748** | **0.2748** | | **0.2568** | **0.2568** | **0.0000** | **890.1886** | **890.1886** | **0.2044** | **0.0000** | **895.2975** |

## Mitigated Construction Off-Site

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

## 3.4 Building Construction-Columns - 2022

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0672 | 0.6793 | 0.5305 | 1.2100e-003 | | 0.0283 | 0.0283 | | 0.0265 | 0.0265 | 0.0000 | 105.6986 | 105.6986 | 0.0242 | 0.0000 | 106.3034 |
| **Total** | **0.0672** | **0.6793** | **0.5305** | **1.2100e-003** | | **0.0283** | **0.0283** | | **0.0265** | **0.0265** | **0.0000** | **105.6986** | **105.6986** | **0.0242** | **0.0000** | **106.3034** |

### Unmitigated Construction Off-Site

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

## Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0672 | 0.6793 | 0.5305 | 1.2100e-003 | | 0.0283 | 0.0283 | | 0.0265 | 0.0265 | 0.0000 | 105.6985 | 105.6985 | 0.0242 | 0.0000 | 106.3033 |
| **Total** | **0.0672** | **0.6793** | **0.5305** | **1.2100e-003** | | **0.0283** | **0.0283** | | **0.0265** | **0.0265** | **0.0000** | **105.6985** | **105.6985** | **0.0242** | **0.0000** | **106.3033** |

## Mitigated Construction Off-Site

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

**Castaic**

**Total On-Road Emissions**

**Castaic**

**Total On-Road Emissions**

| Construction Phase | Daily One-Way Trips | Haul Days per Phase (days) | Work Hours per Day (hours/day) | One-Way Trip Distance per Day (miles) | Idling per Day (minutes) | Regional Emissions (MT/yr) Total CO2e |
|---|---|---|---|---|---|---|
| Site Preparation | 2020 | | | | | |
| Vendor | 0 | 0 | 12 | 23 | 15 | 0.00 |
| Worker | 30 | 12 | 12 | 100 | 0 | 11.59 |
| Total | | | | | | 11.59 |
| | | | | | | |
| Building Construction-Superstructure | 2020 | | | | | |
| Vendor | 12 | 6 | 12 | 23 | 15 | 2.33 |
| Worker | 30 | 13 | 12 | 100 | 0 | 12.55 |
| Total | | | | | | 14.88 |
| | | | | | | |
| Building Construction-Superstructure | 2021 | | | | | |
| Vendor | 0 | 0 | 12 | 23 | 15 | 0.00 |
| Worker | 30 | 131 | 12 | 100 | 0 | 122.74 |
| Total | | | | | | 122.74 |
| | | | | | | |
| Building Construction-Columns | 2021 | | | | | |
| Vendor | 12 | 18 | 12 | 23 | 15 | 6.83 |
| Worker | 30 | 118 | 12 | 100 | 0 | 110.56 |
| Total | | | | | | 117.40 |
| | | | | | | |
| Building Construction-Columns | 2022 | | | | | |
| Vendor | 0 | 0 | 12 | 23 | 15 | 0.00 |
| Worker | 30 | 14 | 12 | 100 | 0 | 12.70 |
| Total | | | | | | 12.70 |

**Castaic**
**Running Emissions**

| | | Running Emissions Factor (grams/mile) | | |
|---|---|---|---|---|
| | | CO2 | CH4 | N2O |
| 2020Vendor | Vendor | 1340.46338 | 0.04529837 | 0.19169371 |
| 2020Worker | Worker | 319.458691 | 0.00617495 | 0.00790785 |
| 2021Vendor | Vendor | 1311.85371 | 0.04440854 | 0.18764154 |
| 2021Worker | Worker | 310.119284 | 0.00538825 | 0.00712331 |
| 2022Vendor | Vendor | 1273.54109 | 0.04239589 | 0.18204996 |
| 2022Worker | Worker | 300.448479 | 0.00471177 | 0.00646256 |

| Construction Phase | Daily One-Way Trips | Haul Days per Phase (days) | Work Hours per Day (hours/day) | One-Way Trip Distance per Day (miles) | Regional Emissions (MT/year) CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|
| Site Preparation | 2020 | | | | | | | |
| Vendor | 0 | 0 | 12 | 23 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker | 30 | 12 | 12 | 100 | 11.50 | 0.01 | 0.08 | 11.59 |
| Building Construction-Superstructure | 2020 | | | | | | | |
| Vendor | 12 | 6 | 12 | 23 | 2.21 | 0.00 | 0.09 | 2.30 |
| Worker | 30 | 13 | 12 | 100 | 12.46 | 0.01 | 0.09 | 12.55 |
| Building Construction-Superstructure | 2021 | | | | | | | |
| Vendor | 0 | 0 | 12 | 23 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker | 30 | 131 | 12 | 100 | 121.88 | 0.05 | 0.81 | 122.74 |
| Building Construction-Columns | 2021 | | | | | | | |
| Vendor | 12 | 18 | 12 | 23 | 6.48 | 0.01 | 0.27 | 6.75 |
| Worker | 30 | 118 | 12 | 100 | 109.78 | 0.05 | 0.73 | 110.56 |
| Building Construction-Columns | 2022 | | | | | | | |
| Vendor | 0 | 0 | 12 | 23 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker | 30 | 14 | 12 | 100 | 12.62 | 0.00 | 0.08 | 12.70 |

**Castaic**
**Idling Emissions**

| | Idling Emissions Factor (grams/minute) | | |
|---|---|---|---|
| | CO2 | CH4 | N2O |
| 2020Vendor Vendor | 24.6020747 | 0.00063132 | 0.0038577 |
| 2020Worker Worker | 0 | 0 | 0 |
| 2021Vendor Vendor | 24.7786148 | 0.00063074 | 0.00388666 |
| 2021Worker Worker | 0 | 0 | 0 |
| 2022Vendor Vendor | 25.0816526 | 0.00062854 | 0.00393519 |
| 2022Worker Worker | 0 | 0 | 0 |

| Construction Phase | Daily One-Way Trips | Haul Days per Phase (days) | Work Hours per Day (hours/day) | Idling minutes per Day (miles) | Regional Emissions (MT/year) CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|
| Site Preparation | 2020 | | | | | | | |
| Vendor | 0 | 0 | 12 | 15 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker | 30 | 12 | 12 | 0 | 0.00 | 0.00 | 0.00 | 0.00 |
| Building Construction-Superstructure | 2020 | | | | | | | |
| Vendor | 12 | 6 | 12 | 15 | 0.03 | 0.00 | 0.00 | 0.03 |
| Worker | 30 | 13 | 12 | 0 | 0.00 | 0.00 | 0.00 | 0.00 |
| Building Construction-Superstructure | 2021 | | | | | | | |
| Vendor | 0 | 0 | 12 | 15 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker | 30 | 131 | 12 | 0 | 0.00 | 0.00 | 0.00 | 0.00 |
| Building Construction-Columns | 2021 | | | | | | | |
| Vendor | 12 | 18 | 12 | 15 | 0.08 | 0.00 | 0.00 | 0.08 |
| Worker | 30 | 118 | 12 | 0 | 0.00 | 0.00 | 0.00 | 0.00 |
| Building Construction-Columns | 2022 | | | | | | | |
| Vendor | 0 | 0 | 12 | 15 | 0.00 | 0.00 | 0.00 | 0.00 |
| Worker | 30 | 14 | 12 | 0 | 0.00 | 0.00 | 0.00 | 0.00 |

# A-4 Project Construction Energy Consumption Worksheets

**Castaic**
**Construction Energy Analysis**

**Fuel Consumption Summary**

| Category | Value |
|---|---|
| Diesel fuel for Off-Road Equipment | 215,769 |
| Diesel fuel for Vendor Trucks | 842 |
| Gasoline fuel for workers | 32,364 |
| Total Diesel Consumption | 216,611 |
| Total Gasoline Consumption | 32,364 |
| Construction Phase Duration (years) | 0.92 |

| Source | Diesel | Gas |
|---|---|---|
| Off-Road Equipment | 215,769 | - |
| Vendor | 842 | - |
| Worker | - | 32,364 |
| **Total Project Fuel Consumption** | **216,611** | **32,364** |

| | Los Angeles County Fuel Consumption | | State Fuel Consumption | |
|---|---|---|---|---|
| | Diesel | Gas | Diesel | Gas |
| | 527,083,333 | 3,638,000,000 | 3,702,083,333 | 15,471,000,000 |
| Annual Project % of Consumption | 0.041% | 0.0009% | 0.0059% | 0.0002% |

1. California Energy Commission, California Retail Fuel Outlet Annual Reporting (CEC-A15) Results, 2018
https://ww2.energy.ca.gov/almanac/transportation_data/gasoline/piira_retail_survey.html
Diesel is adjusted to account for retail (52%) and non-retail (48%) diesel sales.

| | MWh/year | kWh/year | |
|---|---|---|---|
| **Construction Electricity Use** | 0.002 | 2,000 | **Project Percent of Total** |
| **Los Angeles County** | 67,856.281 | 67,856,281,249 | 0.0000029% |
| **State** | 562,240.387 | 562,240,386,857 | 0.0000004% |
| **SCE** | 87,143.000 | 87,143,000,000 | 0.0000023% |

Notes:
Construction electricity use provided by client.
SCE, 2018 Annual Financial and Statistical Report
https://www.edison.com/content/dam/eix/documents/investors/corporate-governance/eix-sce-2018-annual-report.pdf
County and State fuel usage
http://www.ecdms.energy.ca.gov/elecbycounty.asphttp://www.ecdms.energy.ca.gov/elecbycounty.as

**Castaic**
**Construction Energy Analysis**

**Off-Road Equipment**

**Equipment ≤ 100 HP**

| Parameter | Value |
|---|---|
| pounds diesel fuel/hp-hr (lb/hp-hr):[1] | 0.41 |
| diesel fuel density (lb/gal):[1] | 7.11 |
| diesel gallons/hp-hr (gal/hp-hr): | 0.06 |
| Total hp-hr : | 46,368 |
| Total diesel consumption (gal): | 2,661 |

**Equipment > 100 HP**

| Parameter | Value |
|---|---|
| pounds diesel fuel/hp-hr (lb/hp-hr):[1] | 0.37 |
| diesel fuel density (lb/gal):[1] | 7.11 |
| diesel gallons/hp-hr (gal/hp-hr): | 0.05 |
| Total hp-hr: | 4,127,971 |
| Total diesel gallons: | 213,108 |

**Total diesel gallons (off-road equipment): 215,769**

1. 2017 Off-road Diesel Emission Factors, cells B30 and B31

| Phase | Equipment | # of Equipment | Hours/ Day | HP | Load Factor | Days | Total hp-hr |
|---|---|---|---|---|---|---|---|
| Site Preparation | Graders | 0 | 8 | 187 | 0.41 | 12 | 0 |
| Site Preparation | Rubber Tired Dozers | 0 | 7 | 247 | 0.40 | 12 | 0 |
| Site Preparation | Tractors/Loaders/Backhoes | 1 | 8 | 120 | 0.37 | 12 | 4,262 |
| Site Preparation | Tractors/Loaders/Backhoes | 1 | 8 | 250 | 0.37 | 12 | 8,880 |
| Building Construction-Superstructure | Concrete/Industrial Saws | 2 | 8 | 120 | 0.73 | 144 | 201,830 |
| Building Construction-Superstructure | Cranes | 4 | 8 | 120 | 0.29 | 144 | 160,358 |
| Building Construction-Superstructure | Forklifts | 0 | 6 | 89 | 0.20 | 144 | 0 |
| Building Construction-Superstructure | Generator Sets | 2 | 8 | 250 | 0.74 | 144 | 426,240 |
| Building Construction-Superstructure | Off-Highway Tractors | 1 | 8 | 120 | 0.44 | 144 | 60,826 |
| Building Construction-Superstructure | Off-Highway Trucks | 3 | 8 | 175 | 0.38 | 144 | 229,824 |
| Building Construction-Superstructure | Off-Highway Trucks | 1 | 8 | 1000 | 0.38 | 144 | 437,760 |
| Building Construction-Superstructure | Other Construction Equipment | 1 | 8 | 500 | 0.42 | 144 | 241,920 |
| Building Construction-Superstructure | Pavers | 1 | 8 | 50 | 0.42 | 144 | 24,192 |
| Building Construction-Superstructure | Rubber Tired Dozers | 1 | 8 | 500 | 0.40 | 144 | 230,400 |
| Building Construction-Superstructure | Tractors/Loaders/Backhoes | 1 | 8 | 120 | 0.37 | 144 | 51,149 |
| Building Construction-Superstructure | Tractors/Loaders/Backhoes | 1 | 8 | 250 | 0.37 | 144 | 106,560 |
| Building Construction-Superstructure | Welders | 0 | 8 | 46 | 0.45 | 144 | 0 |
| Building Construction-Columns | Concrete/Industrial Saws | 2 | 8 | 120 | 0.73 | 132 | 185,011 |
| Building Construction-Columns | Cranes | 4 | 8 | 120 | 0.29 | 132 | 146,995 |
| Building Construction-Columns | Forklifts | 0 | 6 | 89 | 0.20 | 132 | 0 |
| Building Construction-Columns | Generator Sets | 2 | 8 | 250 | 0.74 | 132 | 390,720 |
| Building Construction-Columns | Off-Highway Tractors | 1 | 8 | 120 | 0.44 | 132 | 55,757 |
| Building Construction-Columns | Off-Highway Trucks | 3 | 8 | 175 | 0.38 | 132 | 210,672 |
| Building Construction-Columns | Off-Highway Trucks | 1 | 8 | 1000 | 0.38 | 132 | 401,280 |
| Building Construction-Columns | Other Construction Equipment | 1 | 8 | 500 | 0.42 | 132 | 221,760 |
| Building Construction-Columns | Pavers | 1 | 8 | 50 | 0.42 | 132 | 22,176 |
| Building Construction-Columns | Rubber Tired Dozers | 1 | 8 | 500 | 0.40 | 132 | 211,200 |
| Building Construction-Columns | Tractors/Loaders/Backhoes | 1 | 8 | 120 | 0.37 | 132 | 46,886 |
| Building Construction-Columns | Tractors/Loaders/Backhoes | 1 | 8 | 250 | 0.37 | 132 | 97,680 |
| Building Construction-Columns | Welders | 0 | 8 | 46 | 0.45 | 132 | 0 |

| | |
|---|---|
| **Total ≤ 100** | 46,368 |
| **Total >100** | 4,127,971 |

## Castaic

**Total On-Road Fuel Consumption**

| | | gal/mile | gal/min |
|---|---|---|---|
| 2020Vendor | Vendor | 0.1298909 | 9.15757E-06 |
| 2020Worker | Worker | 0.03844702 | 1.94905E-06 |
| 2021Vendor | Vendor | 0.12720883 | 9.12128E-06 |
| 2021Worker | Worker | 0.03742093 | 2.06198E-06 |
| 2022Vendor | Vendor | 0.12346263 | 8.98135E-06 |
| 2022Worker | Worker | 0.03636982 | 2.00421E-06 |
| 2023Vendor | Vendor | 0.11698571 | 8.58941E-06 |
| 2023Worker | Worker | 0.03532451 | 1.94677E-06 |

| Construction Phase | Daily One-Way Trips | Haul Days per Phase (days) | Work Hours per Day (hours/day) | One-Way Trip Distance per Day (miles) | Idling per Day (minutes) | Regional Emissions (gallons) gal/mile | gal/min | gal/day | Total Gallons/yr |
|---|---|---|---|---|---|---|---|---|---|
| Site Preparation | 2020 | | | | | | | | |
| Vendor | 0 | 0 | 12 | 23 | 15 | 0.13 | 9.16E-06 | 0 | 0 |
| Worker | 30 | 12 | 12 | 100 | 0 | 0.04 | 1.95E-06 | 115 | 1,384 |
| Building Construction-Superstruc | 2020 | | | | | | | | |
| Vendor | 12 | 6 | 12 | 23 | 15 | 0.13 | 9.16E-06 | 36 | 214 |
| Worker | 30 | 13 | 12 | 100 | 0 | 0.04 | 1.95E-06 | 115 | 1,499 |
| Building Construction-Superstruc | 2021 | | | | | | | | |
| Vendor | 0 | 0 | 12 | 23 | 15 | 0.13 | 9.12E-06 | 0 | 0 |
| Worker | 30 | 131 | 12 | 100 | 0 | 0.04 | 2.06E-06 | 112 | 14,706 |
| Building Construction-Columns | 2021 | | | | | | | | |
| Vendor | 12 | 18 | 12 | 23 | 15 | 0.13 | 9.12E-06 | 35 | 628 |
| Worker | 30 | 118 | 12 | 100 | 0 | 0.04 | 2.06E-06 | 112 | 13,247 |
| Building Construction-Columns | 2022 | | | | | | | | |
| Vendor | 0 | 0 | 12 | 23 | 15 | 0.12 | 8.98E-06 | 0 | 0 |
| Worker | 30 | 14 | 12 | 100 | 0 | 0.04 | 2.00E-06 | 109 | 1,528 |

# APPENDIX B

## Biological Resources Technical Report

ESA

770 Paseo Camarillo
Suite 310
Camarillo, CA 93010
805.9145.1500 phone

www.esassoc.com

January 28, 2020

Ms. Gina Radieve
Senior Environmental Scientist
Division of Engineering
California Department of Water Resources
1416 9th Street
Sacramento, CA 95814

**Subject:** Biological Resources Technical Report for the Castaic Dam High Intake Tower Bridge Retrofit Project, Los Angeles County, California

Dear Ms. Radieve:

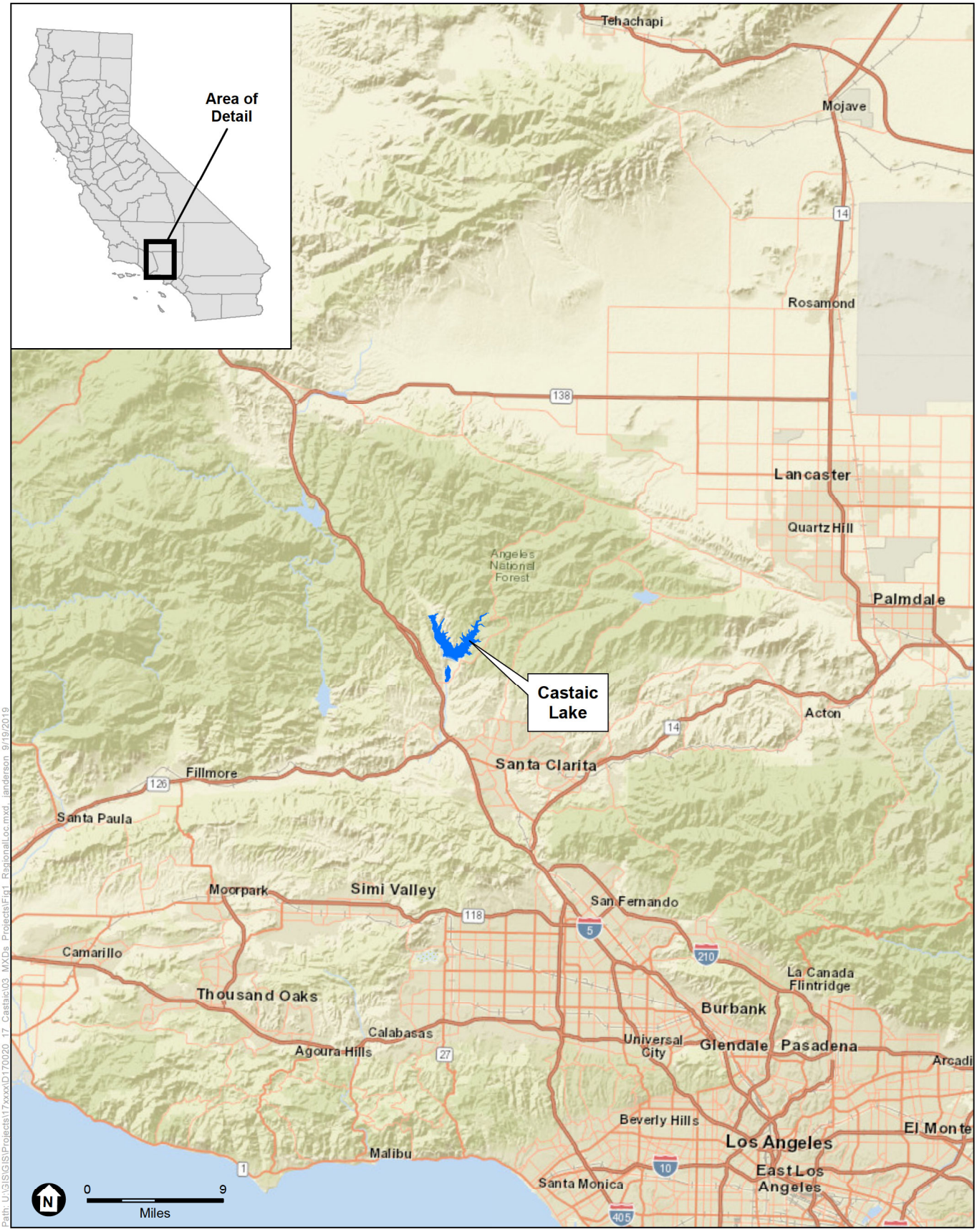
This letter report documents the findings of a biological resource assessment conducted by Environmental Science Associates (ESA) at the High Intake Tower Bridge, located at Castaic Lake, Los Angeles County (Project site). A description of the project, methods used during the assessment, assessment results, impacts analysis, and mitigation measure recommendations are described in this report.

# Project Description

Castaic Lake is located 41 miles northeast of downtown Los Angeles within the Sierra Pelona Mountains, north of Santa Clarita along the Interstate 5 freeway (**Figures 1 and 2**). The Castaic Dam High Intake Tower Bridge (tower bridge) provides access to the Castaic Dam High Intake Tower (high tower) and allows for maintenance and operations crews to ensure that the tower continues to function as intended (**Figure 3**). The tower and bridge were designed in the 1960s and constructed in the late 1960s through the early 1970s. The tower bridge is elevated from the lake bottom by three piers (Piers 2-4) and one abutment at the lakeshore (Abutment 5), as shown on Figure 3.

In order to access the pier footings for the retrofit work, the lake's surface elevation needs to be lowered from the normal operation elevation of 1,505 feet to approximately 1,380 feet (**Figure 4**). Pier 2 is the tallest of the three piers and is located in the deepest portion of the lake affected by the proposed project. The drawdown would take approximately four months to bring the surface elevation to 1,380 feet to repair Pier 2. It is anticipated that it would take approximately six weeks to retrofit each pier.

A construction laydown area would likely be required within or near the western launch ramp parking lot. Construction activities would include clearing and grading an access road within the exposed lake bed to access each pier. Construction at each of the three piers would require excavation of the footings to apply a jacket around the pier for carbon fiber reinforcement**.** The location of the tower bridge, high tower, construction access routes, and equipment staging areas are depicted on (**Figure 5**).

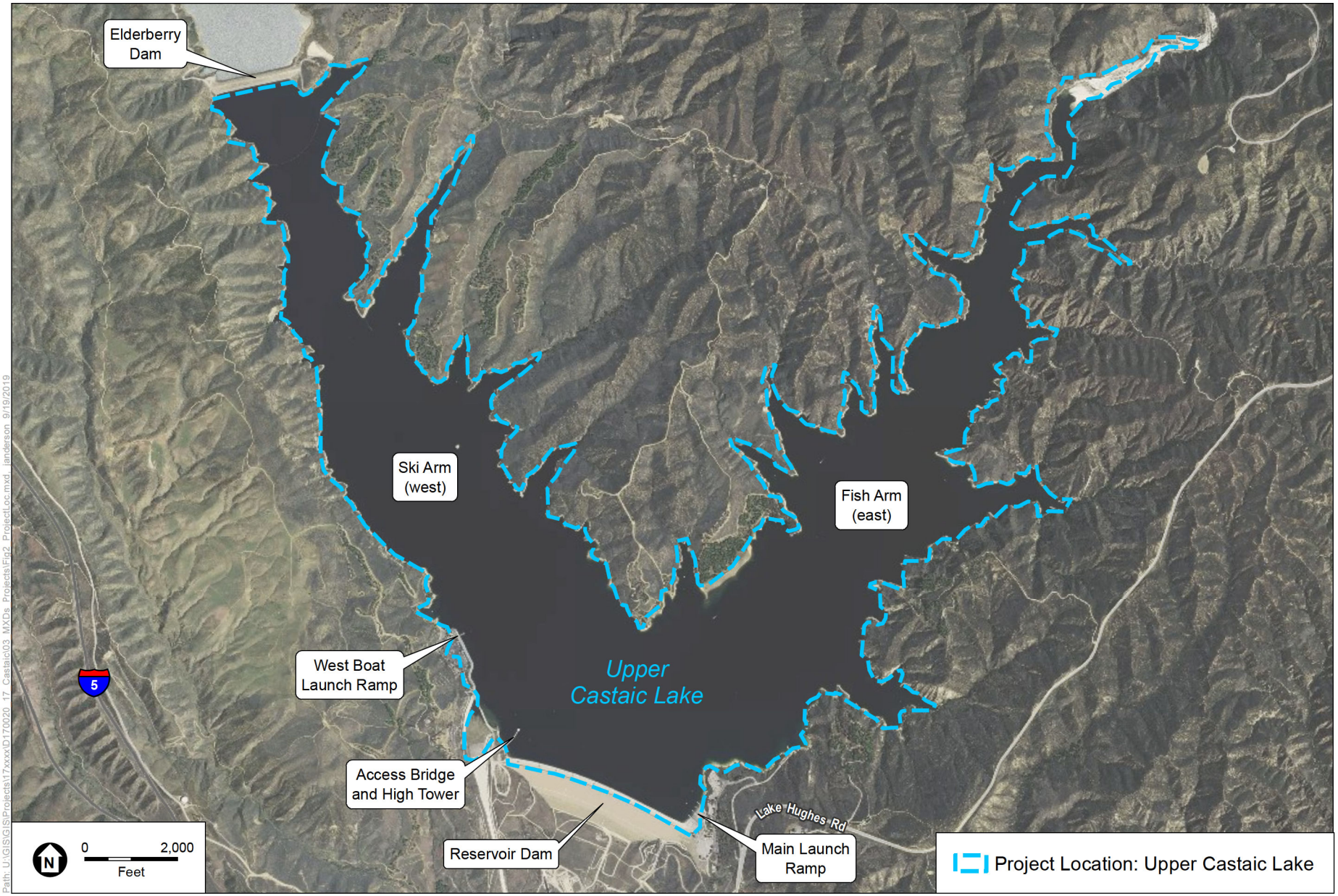



SOURCE: ESRI

DWR SoCal On-Call for Environmental Services - Castaic

**Figure 1**
Regional Location

ESA



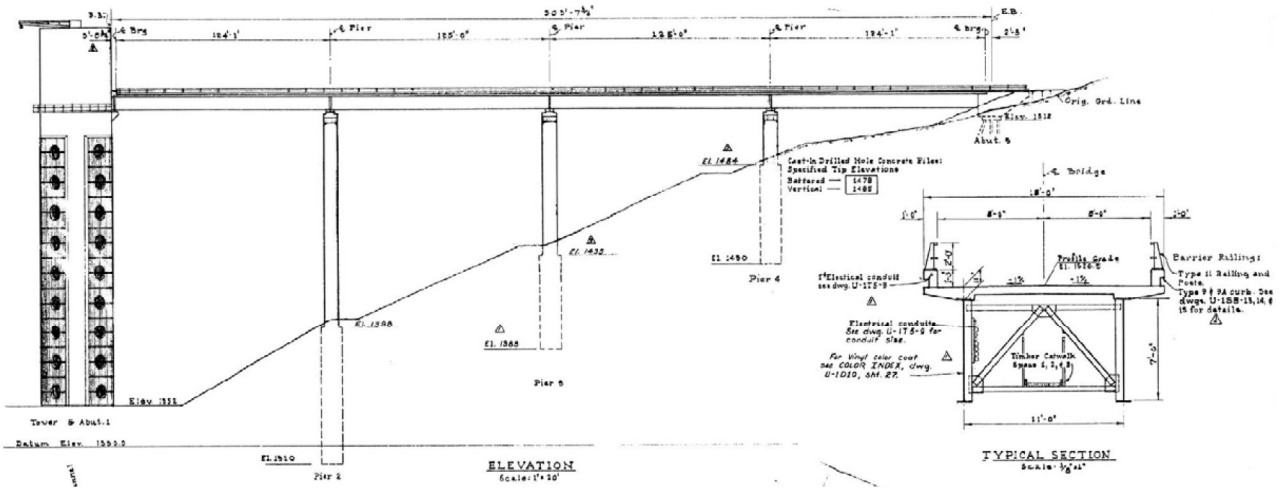

SOURCE: Mapbox

DWR Task Order 17

**Figure 2**
Project Location Map

ESA

Castaic Dam High Tower Access Bridge




Access Bridge Elevation

SOURCE: Department of Water Resources, 2019

DWR SoCal On-Call for Environmental Services - Castaic

**Figure** 3
Access Bridge and High Tower

ESA

LAX\17xxxx\D170020.00 - DWR SoCal On-Call for Env Services\01 Active Contract Tasks\D170020.17_Castaic\05 Graphics-GIS-Modeling\Illustrator

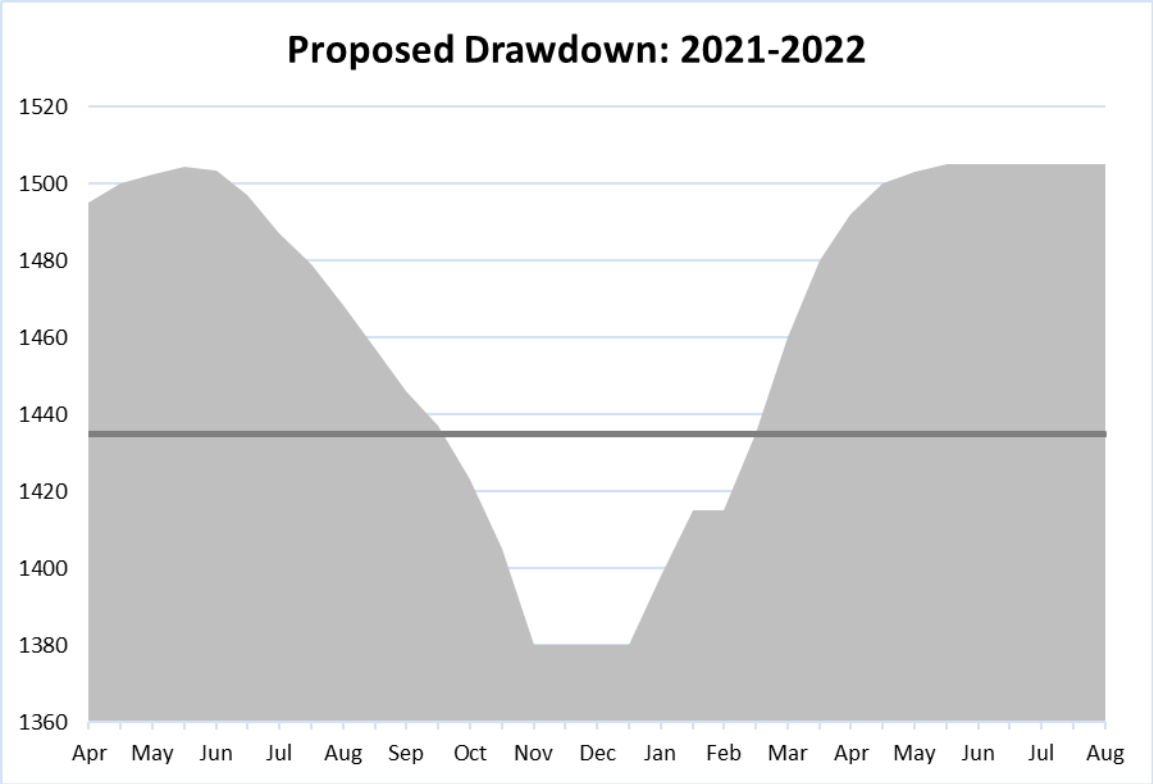



**Figure 4**
Proposed Drawdown Scenario

SOURCE: Google Earth, 2018

DWR Task Order 17

**Figure 5**
Project Staging Areas

ESA

# Methods

### *Database Review*

The California Department of Fish and Wildlife (CDFW) California Natural Diversity Data Base (CNDDB) (CDFW, 2019) and California Native Plant Society Rare Plant Inventory (CNPS, 2019) were queried to identify special-status plant and wildlife species that have been previously recorded in the region. The search area for these database queries included the Warm Springs Mountain United States Geological Survey (USGS) 7.5-minute quadrangle map in which the project is located, as well as the surrounding eight USGS quadrangles: Mint Canyon, Liebre Mountain, Burnt Peak, Lake Hughes, Whitaker Peak, Green Valley, Val Verde, and Newhall. In addition, the United States Fish and Wildlife Service (USFWS) Environmental Conservation Online System was also queried to assess whether the tower bridge is located within or near designated critical habitat for listed species. These resources were used to establish a list of special-status species and sensitive natural plant communities that have been recorded in the area of the Project.

### *Field Assessment*

A biological resources field assessment was conducted by ESA senior biologist Travis Marella on September 27, 2019. The assessment consisted of characterizing and mapping the vegetation communities and general conditions of the tower bridge and high tower, construction access routes, and equipment staging, including a 300-foot buffer area in all directions. All incidental observations of flora and fauna, including sign of wildlife presence (e.g., scat, tracks, burrows, vocalization, etc.) were noted during the assessment, which are described below in the Existing Conditions section. Special attention was afforded in assessing suitable habitat for the species that have been recorded in the region based on the results of the database review. This includes determining if any special-status wildlife may occur within the vegetation and habitats that surround the Project site, such as roosting habitat for bats, suitable burrows for burrowing owls (*Athene cunicularia*) or American badger (*Taxidea taxus*), typical nesting habitat for birds and raptors, and appropriate riparian habitat for such species as least Bell's vireo (*Vireo bellii pusillus*), California red-legged frog (*Rana draytonii*) and arroyo toad (*Anaxyrus californicus*). Vegetation was characterized and delineated on aerial photographs during the field assessment and then digitized on aerial maps using a Geographic Information System software (ArcGIS). The nomenclature used to describe the vegetation is based on *A Manual of California Vegetation*, *Second Edition (Manual)* (Sawyer 2009), or characterized based on species dominance when not identified in the *Manual*. Representative photographs of the Project area are provided in **Attachment A**.

# Existing Conditions

Several paved and unpaved access roads are located adjacent to the tower bridge and high tower. These roads are designed for DWR staff to access the bridge, pump stations, and the dam, which is located nearby to the southeast. Several patches of California buckwheat – California Sagebrush scrub are located adjacent to the tower bridge and staging areas. The staging areas have been previously disturbed and are mostly devoid of any vegetation, one of which is an existing asphalt parking area used for the West Boat Launch Ramp. This parking area has some landscape planters that have various ornamental trees and shrubs, including longleaf pitch pine (*Pinus palustris,* non-native), honey locust (*Gleditsia triacanthos*, non-native), London plane (*Platanus* × *acerifolia* , non-native), and toyon (*Heteromeles arbutifolia*, native). Several Gooding's willow (*Salix gooddingii*)

and Fremont cottonwood (*Populus fremontii*) are located approximately 50 to 220 feet to the southeast of the tower bridge that are naturally occurring and may be hydrologically supported by the lake.

## *Vegetation*

Vegetation communities located adjacent to the tower bridge are described in detail below and are depicted on **Figure 6.**

### California sagebrush - California buckwheat scrub - *Artemisia californica - Eriogonum fasciculatum Shrubland Alliance*

This native community was characterized and mapped in several locations in the vicinity of the tower bridge. This community is co-dominated by California sagebrush (*Artemisia californica*) and California buckwheat (*Eriogonum fasciculatum*). Less dominant species that were observed were generally dispersed intermittently, including telegraph weed (*Heterotheca grandiflora*), black sage (*Salvia mellifera*), horseweed (*Erigeron canadensis*), coyote brush (*Baccharis pilularis*), Russian thistle (*Kali tragus*), and brittlebush (*Encelia farinosa*).

### Non-Native Grassland

This non-native community was characterized and mapped in one area located in the vicinity of the tower bridge. This area appears to have been disturbed by grading or other invasive practices. Species observed within this community were limited to Russian thistle and shortpod mustard (*Hirschfeldia incana*).

## *Special-Status Plants and Wildlife*

The general area surrounding the Project is in a disturbed condition and provides limited habitat that is valuable to special-status plant and wildlife species. Numerous common wildlife occur in the area, and several were observed during the field assessment conducted by ESA, such as resident birds including American bushtit (*Psaltriparus minimus*), mallard (*Anas platyrhynchos*), California scrub jay (*Aphelocoma californica*), great blue heron (*Ardea herodias*), and green heron *(Butorides virescens*). Several mud nests, belonging to barn swallows (*Hirundo rustica*), were observed on the underside of the tower bridge. Mammal species observed during the assessment included: coyote (*Canis latrans*), California ground squirrel (*Otospermophilus beecheyi*), and desert cottontail (*Sylvilagus audubonii*). One reptile and fish species were observed, western fence lizard (*Sceloporus occidentalis*) and striped bass (*Morone saxatilis*), respectively. All wildlife and plant species observed during the field assessment are listed in **Attachment B**.

Special-status wildlife and plant species are defined as those animals and plants that, because of their recognized rarity or vulnerability to various forms of habitat loss or population decline, are recognized by federal, state, or other agencies as under threat from human-associated developments. Some of these species receive specific protection that is defined by federal or state endangered species legislation. Others have been designated as special-status on the basis of adopted policies and expertise of state resource agencies or organizations with acknowledged expertise, or policies adopted by local governmental agencies such as counties, cities, and special districts to meet local conservation objectives.

SOURCE: Google Earth, 2018

DWR Task Order 17

**Figure 6**
Vegetation Communities

ESA

According to the CNDDB and CNPS database search results, 46 special-status wildlife species and 42 special-status plant species have been previously recorded in the Warm Springs Mountain USGS quadrangle and the eight surrounding quadrangles (see these database search results **Attachment C**). However, due to the high level of disturbance and development that has occurred, as well as an absence of suitable habitat, it was determined that no special-status plants have potential to occur in the Project site.

Of the 46 special-status wildlife species, only 18 species listed in **Table 1 Special-Status Wildlife Species** were determined to have varying levels of potential to occur within the Project site, including species that could be affected by the temporary drawdown of the lake during construction, based on the following criteria:

> **Low Potential:** The Project site only provides limited habitat for a particular species, such as, but not limited to, submergence much of the year by reservoir water, habitats that are subjected to substantial disturbances from previous grading activities or developments (e.g., roads, buildings, parking lots, etc.), fragmented habitat, and/or certain habitat requirements are absent while others are present. For example, suitable vegetation is present, but soil substrate is inadequate. In addition, low potential would be assumed if the known range or habitat requirements for a particular species is outside of the project area.
>
> **Medium Potential:** The Project site provides marginal habitat for a particular species. For example, the habitat characteristics are suitable for a particular species (e.g., vegetation, soils, elevation) and the site is within the known range of the species, but the habitat is moderately disturbed by past human activities and therefore/or may not support all stages of a species life cycle.
>
> **High Potential**: The Project site provides suitable habitat conditions for a particular species and/or known populations occur in the immediate area.
>
> **Present**: The species has been observed or previously recorded within the Project site.

**TABLE 1**
**POTENTIALLY OCCURRING SPECIAL-STATUS WILDLIFE SPECIES ON THE PROJECT SITE**

| Common Name | Scientific Name | Status (Federal/State) | Habitat | Potential to Occur |
|---|---|---|---|---|
| **Birds** | | | | |
| Cooper's hawk | *Accipiter cooperii* | None/WL | Mature forest, open woodlands, wood edges, river groves. Nests in coniferous, deciduous, and mixed woods, typically those with tall trees and with openings or edge habitat nearby. Also found among trees along rivers through open country, and increasingly in suburbs and cities where some tall trees exist for nest sites. In winter may be in fairly open country, especially in west. | **Low**. The tower bridge and surrounding vegetation does not provide suitable nesting habitat; however, this species could forage in the area. |
| Southern California rufous-crowned sparrow | *Aimophila ruficeps* | None/WL | Grassy or rocky slopes with sparse low bushes; open pine-oak woods. Habitat varies in different parts of range, but always in brushy areas. In Southwest, usually in rocky areas of foothills and lower canyons, in understory of pine-oak woods, or in chaparral or coastal scrub. | **Low.** The tower bridge and surrounding vegetation does not provide suitable nesting habitat; however, this species could forage in the area. |
| Grasshopper sparrow | *Ammodramus savannarum* | None/SSC | Grassland, hayfields, prairies. Breeds in rather dry fields and prairies, especially those with fairly tall grass and weeds and a few scattered shrubs. Also nests in overgrown pastures and hayfields, and sometimes in fields of other crops. | **Low.** The tower bridge and surrounding vegetation does not provide suitable nesting habitat; however, this species could forage in the area. |

| Common Name | Scientific Name | Status (Federal/State) | Habitat | Potential to Occur |
|---|---|---|---|---|
| Bell's sage sparrow | *Artemisiospiza belli belli* | None/WL | Coastal sage scrub, chaparral; in winter, also deserts. Found year-round in unique sage scrub habitat on the California coastal slope and foothills. In the interior, also breeds in saltbush, chamise, and other low shrubs of arid flats. In winter some spread eastward into open flats and deserts with scattered brush. | **Low**. The tower bridge and surrounding vegetation does not provide suitable nesting habitat; however, this species could forage in the area. |
| Burrowing owl | *Athene cunicularia* | None/SSC | Open, dry annual and perennial grasslands, deserts, and scrublands with low-grading vegetation | **Low**. Suitable habitat is present in the vicinity of the Project site; however, no suitable burrows that can be used for nesting or wintering are present. |
| White-tailed kite | *Elanus leucurus* | None/FP | Open groves, river valleys, marshes, and grasslands | **Low**. The tower bridge and surrounding vegetation does not provide suitable nesting habitat; however, this species could forage in the area. |
| California horned lark | *Eremophila alpestris* | None/WL | Prairies, fields, airports, shores, tundra. Inhabits open ground, generally avoiding areas with trees or even bushes. May occur in a wide variety of situations that are sufficiently open: short-grass prairies, extensive lawns (as on airports or golf courses), plowed fields, stubble fields, beaches, lake flats, dry tundra of far north or high mountains. | **Low**. The tower bridge and surrounding vegetation does not provide suitable nesting habitat; however, this species could forage in the area. |
| Prairie falcon | *Falco mexicanus* | None/WL | Open hills, plains, prairies, deserts. Typically found in fairly dry open country, including grassland and desert. Also in open country above treeline in high mountains. In winter, often found in farmland and around lakes and reservoirs. | **High (foraging only)**. The tower bridge and surrounding vegetation does not provide suitable nesting habitat; however, this species could forage in the area. However, this species was observed in 2015 adjacent to Castaic Lagoon, approximately one-mile south of tower bridge. |

| Common Name | Scientific Name | Status (Federal/State) | Habitat | Potential to Occur |
|---|---|---|---|---|
| Bald eagle | *Haliaeetus leucocephalus* | None/FE/FP | Coasts, rivers, large lakes; in migration, also mountains, open country. Typically, close to water, also locally in open dry country. Occurs in a variety of waterside settings where prey is abundant. | **Low**. The tower bridge and surrounding vegetation does not provide suitable nesting habitat; however, this species could forage in the area. |
| Loggerhead shrike | *Lanius ludovicianus* | None/SSC | Semi-open country with lookout posts; wires, trees, scrub. Breeds in any kind of semi-open terrain, from large clearings in wooded regions to open grassland or desert with a few scattered trees or large shrubs | **High (foraging only)**. Suitable foraging habitat is present that includes California buckwheat-California sagebrush. Species was observed in 2015 in Castaic Lagoon, approximately 0.7 miles south of tower bridge. This species is not expected to nest in the vicinity of the Project. |
| Yellow warbler | *Setophaga petechial* | None/SSC | Widespread in any wet brushy habitat. | **Medium (foraging only)**. Suitable habitat for foraging is available adjacent to tower bridge and lake in the California buckwheat-California sagebrush approximately 200 feet away; however, this species is not expected to nest in the vicinity of the Project. |
| **Mammals** | | | | |
| Pallid bat | *Antrozous pallidus* | None/SSC | Grasslands, shrublands, woodlands, and coniferous forests; most common in open, dry habitat with rocky areas for roosting, as well as abandon buildings and medal clad structures. | **Low.** Sign or evidence (guano) of species was not detected during field reconnaissance; however, marginal habitat that consists of metal beams with seams capable of supporting a bat roost exists underneath the tower bridge. |

| Common Name | Scientific Name | Status (Federal/State) | Habitat | Potential to Occur |
|---|---|---|---|---|
| Yuma myotis | *Myotis yumanensis* | None/SSC | Found in a variety of habitats, ranging from juniper and riparian woodlands to desert regions near open water Species found wherever there are rivers, streams, ponds, lakes, etc. When not near water over which to forage, can be found roosting in caves, attics, buildings, mines, underneath bridges, and other similar structures. | **Low.** Sign or evidence (guano) of species was not detected during field reconnaissance; however, marginal habitat that consists of metal beams with seams capable of supporting a bat roost exists underneath the tower bridge. |
| **Reptiles** | | | | |
| California glossy snake | *Arizona elegans occidentalis* | None/SSC | Most common in desert habitats but also occur in chaparral, sagebrush, valley-foothill hardwood, pine-juniper, and annual grass. | **Low**. Fragmented areas supporting California buckwheat-California sagebrush are present in the vicinity of the Project site; however, this species is not expected to forage within Project site due to its previously disturbed/developed conditions. |
| Coastal western whiptail | *Aspidoscelis tigris* ssp. *Stejnegeri* | None/SSC | Deserts and semiarid areas with sparse vegetation and open areas, woodland and riparian areas. | **Low**. Fragmented areas supporting California buckwheat-California sagebrush are present in the vicinity of the Project site; however, this species is not expected to forage within Project site due to its previously disturbed/developed conditions. |
| Western pond turtle | *Emys marmorata* | None/SSC | Aquatic habitats with exposed areas for basking, with aquatic vegetation, such as algae and other water plants | **Low**. Castaic Lake provides suitable habitat; however, the Project site itself does not provide suitable habitat. Areas for basking opportunities (logs, rocks and boulders) are absent from the Project site but exists in other parts of Castaic Lake. |

| Common Name | Scientific Name | Status (Federal/State) | Habitat | Potential to Occur |
|---|---|---|---|---|
| Coast horned lizard | *Phrynosoma blainvillii* | None/SSC | Various habitats throughout the foothills of California including coast live oak woodland and the herbaceous cover and friable soils. | **Low**. Fragmented areas supporting California buckwheat-California sagebrush are present in the vicinity of the Project site; however, this species is not expected to forage within Project site due to its previously disturbed/developed conditions. |
| Two-striped garter snake | *Thamnophis hammondii* | None/SSC | Occurs adjacent to permanent or semi-permanent bodies of water. This species feeds primarily on fish and amphibians. | **Low.** Castaic Lake provides suitable habitat for the species; however, once the lake drawdown is complete, the Project site does not provide suitable habitat. |

Status

Federal: FE-federally endangered, FT – federally threatened

State: SE – state endangered; state threatened; FP – State Fully Protected, SSC – State Species of Special Concern, CE-Candidate for listing as Endangered, WL – Watch List

### *Nesting Birds*

Barn swallow nests were observed on the underside of the tower bridge. The remaining areas within the Project site provide little-to-no habitat for supporting nesting birds due to the level of disturbance that exists. Nesting birds, including barn swallows, are protected in accordance with the federal Migratory Bird Treaty Act of 1918 (MBTA). The MBTA prohibits the take of native birds "by any means or manner to pursue, hunt, take, capture (or) kill" any migratory birds except as permitted by regulations issued by the U.S. Fish and Wildlife Service (USFWS). The term "take" is defined by USFWS regulation to mean to "pursue, hunt, shoot, wound, kill, trap, capture or collect" any migratory bird or any part, nest, or egg of any migratory bird covered by the conventions, or to attempt those activities.

### *Sensitive Natural Communities and Riparian Habitat*

Sensitive natural communities are listed by CDFW on their List of Vegetation Alliances and Associations (CDFG 2010). Communities on this list are given a Global (G) and State (S) rarity ranking on a scale of 1 to 5, where communities with a ranking of 5 are the most common and communities with a ranking of 1 are the rarest and of the highest priority to preserve. For the purpose of this report, Sensitive natural communities are those communities that have a state ranking of S3 or rarer, and are generally those that are considered by the CDFW to be imperiled due to their decline in the region and/or the habitat they provide to rare and endemic wildlife species. Continued degradation and destruction of these ecologically important communities could threaten the regional distribution and viability of the community and possibly the sensitive species they support.

A review of the most recent CNDDB (CDFW, 2019) records revealed a list of 14 sensitive natural communities known to occur within the Warm Springs Mountain and eight surrounding quadrangles of the Project site: California Walnut Woodland, Mainland Cherry Forest, Riversidian Alluvial Fan Sage Scrub, Southern California Threespine Stickleback Stream, Southern Coast Live Oak Riparian Forest, Southern Cottonwood Willow Riparian Forest, Southern Mixed Riparian Forest, Southern Riparian Forest, Southern Riparian Scrub, Southern Sycamore Alder Riparian Woodland, Southern Willow Scrub, Valley Needlegrass Grassland, Valley Oak Woodland, and Wildflower Field; however, none of these communities occur within the Project site.

Riparian habitats are often transitional between terrestrial and aquatic ecosystems and are distinguished by gradients in biophysical conditions, ecological processes and biota. They are areas through which surface and subsurface hydrology connect water bodies with their adjacent uplands. They include those portions of terrestrial ecosystems that significantly influence exchanges of energy and matter with aquatic ecosystems. Riparian habitats are typically adjacent to perennial, intermittent, and ephemeral streams, lakes and estuarine-marine shorelines (Collins et al 2006). Riparian habitat is not present within the project site (e.g., tower bridge, access roads, and staging areas). However, several Gooding's willow and Fremont cottonwood trees are located approximately 50 to 220 feet to the southeast of the tower bridge.

### *Jurisdictional Resources*

Based on the field assessment, there are no discernible hydrologic features (other than the lake) that would indicate that there are any federal or state regulated waters (e.g., drainages, wetlands, creeks, streams or marshes), such as riparian vegetation, hydric soils, ordinary high water mark, or established bed or bank. Therefore, other than the lake itself, there are no other federal or state regulated waters in the immediate vicinity of the Project that are subject to the regulatory authority of the United States Army Corps of Engineers (USACE), CDFW, or Regional Water Quality Control Board (RWQCB). The lake elevation is capable of sustaining a water level at 1,515 feet (NOAA, 2019).

### *Critical Habitat*

Based on the review of the USFWS Environmental Conservation Online System, designated critical habitat for arroyo toad (*Anaxyrus californicus*) is located in Castaic Creek, approximately five miles northwest of the Project site. Designated critical habitat for California red-legged frog is located in San Franciscquito Creek, approximately five miles east of the Project site.

### *Wildlife Movement Corridors*

Wildlife movement corridors are areas where regional wildlife populations regularly and predictably move during dispersal or migration. Movement corridors in California are typically associated with ridgelines, valleys, rivers and creeks supporting riparian vegetation. Movement corridors link together areas of suitable wildlife habitat that are otherwise separated by rugged terrain, changes in vegetation, by human disturbance, or by the encroachment of urban development. Movement corridors are important as the combination of topography and other natural factors, in addition to urbanization, has fragmented or separated large open space areas

Castaic Lake is a resting stop for migrating birds along the Pacific Flyway. The Pacific Flyway is a major north-south flyway for migratory birds in America, extending from Alaska to Patagonia. Every year, migratory birds travel some or all of this distance both in spring and in fall, following food sources, heading to breeding grounds,

or travelling to overwintering sites. Bird that are migrating along the Pacific Flyway may stop to rest within Castaic Lake to feed and regain their strength before continuing. Some species may remain within Castaic Lake for the entire season, but most stay a few days before moving on (Wilson 2010).

Castaic Lake is located within the Sierra Pelona Mountains and surrounding topography ranges from rolling hills to steep canyons and ridgelines. Species such as mountain lion (*Puma concolor*), bobcat (*Lynx rufus*), and American black bear (*Ursus americanus*) utilize these areas for foraging and movement. While Castaic Lake and the surrounding hills and mountains are undoubtedly utilized by wildlife for foraging and breeding purposes, it may be also utilized for migration purposes.

### *Habitat Conservation Plan and Natural Community Conservation Plan*

A habitat conservation plan (HCP) is a document that meets federal Endangered Species Act (ESA) requirements and enables local agencies to allow projects and activities to occur in endangered species' habitats. In exchange, those projects and activities must incorporate HCP-prescribed measures to avoid, minimize, or compensate for adverse effects on natural communities and endangered species.

A natural community conservation plan (NCCP) is the State counterpart to the federal HCP. It provides a means of complying with the Natural Community Conservation Plan Act (NCCP Act) and securing take authorization at the State level. The NCCP Act is broader than federal ESA and the California Endangered Species Act. The primary objective of the NCCP program is to conserve natural communities at the ecosystem scale while accommodating compatible land uses. To be approved by CDFW, an NCCP must provide for the conservation of species and protection and management of natural communities in perpetuity within the area covered by permits.

The Project site is not located within an NCCP or HCP.

# Impact Analysis

### *Reservoir Drawdown*

According to the most recent Project schedule, the lake will begin to lower its normal operating level (1,505 feet) in July 2021 and will return to the normal operating level in April 2022. From approximately November 1, 2021 through December 15, 2021, the water level will be kept at approximately 1,380 feet (this will be the lowest that the water level will be throughout the construction period).

### *Special-Status Plants and Wildlife*

#### Special-Status Plants

The tower bridge and surrounding area do not support suitable habitat for special-status plant species due to a general absence of suitable habitat from past disturbance and developments, including but not limited to: grading and vegetation removal, access road construction, asphalt covered areas, and submergence much of the year by reservoir water.

**Special-Status Wildlife**

Avian Species

Suitable habitat for three special-status avian species - prairie falcon, loggerhead shrike and yellow warbler, includes the California sagebrush – California buckwheat scrub vegetation within the vicinity of the tower bridge. Based on the presence of suitable habitat within areas surrounding the project site, there is a medium to high potential for these special-status wildlife species to occur. These species are not expected to nest or forage on-site due to absence of suitable habitat, but they could forage in the California sagebrush – California buckwheat scrub that is present in the immediate area.

Eight additional avian species have a low potential to occur on the project site and include: Cooper's hawk, southern California rufous-crowned sparrow, grasshopper sparrow, Bell's sage sparrow, burrowing owl, white-tailed kite, California horned lark, and bald eagle. The tower bridge and surrounding vegetation do not provide suitable nesting habitat for these species (including no suitable burrows for burrowing owl); however, there is low potential for these species to forage in the vicinity. The adjacent California sagebrush – California buckwheat scrub could be a foraging location for these species (excluding bald eagle); however, these vegetation communities are not ideal foraging habitats and these species are not expected. In addition, bald eagles are not expected but could potentially fly overhead for foraging.

Amphibians and Reptiles

California glossy snake, coast horned lizard, and coastal whiptail, have a low potential to occur on the project site, due to the current disturbed conditions and absence of suitable habitat; however, there is low potential for these species to occur in the vicinity where marginal habitat is present.

The effects of temporary drawdown of the lake would have a similar effect on amphibians and aquatic reptiles as on fish. For example, two-striped garter snake and western pond turtle both inhabit Castaic Lake; however, these species are not expected to breed or forage in the immediate vicinity of the Project site, because preferred habitat conditions such as areas to bask for western pond turtle, and sandy, gradual sloping banks for foraging (for these species are not present) in the immediate vicinity of the tower bridge and high tower. Basking opportunities for western pond turtle, and food sources and foraging for pond turtle and garter snake will continue to be available during the lake drawdown. As with fish, the aquatic resources would be expected to recover from the temporary effects as the water levels return to the normal operating elevation. Therefore, the temporary effects of the drawdown are not expected to present a significant impact on endemic amphibians and aquatic reptile species.

Bats

No bats, or sign of bats (e.g., guano) were detected under the tower bridge. Bats, including pallid bat and Yuma myotis, have a low potential to roost within the metal beams/pillars under the bridge. The drawdown of the water level would not impact roosting bats; however, impacts from construction activities, such as noise, vibration and application of protective coating, could displace roosting bats, if present. Avoidance of roosting bats would prevent any impacts from occurring (see Recommended Mitigation Measures, BIO-3).

***Migratory and Nesting Birds***

Though the water level of Castaic Lake is proposed to be temporarily lowered by up to 125 feet during the drawdown period, overall food sources (fish) and areas of refuge for migratory birds are not expected to be

impacted by the proposed drawdown. The lake would continue to provide open water opportunities for far-ranging migratory birds during the drawdown. In addition, several other open water features are available to migratory bird species in the vicinity of Castaic Lake, including Pyramid Lake approximately 12 miles to the northwest, Lake Piru approximately 9 miles to the west, the Los Angeles Department of Water and Power Van Norman Complex Reservoir approximately 18 miles to the south, and Quail Lake approximately 17 miles to the north.

Barn swallow nests were observed on the underside of the tower bridge. Construction activities on the tower bridge could potentially impact and displace nesting barn swallows. Avoidance of active bird nests would prevent any impacts from occurring (see Recommended Mitigation Measures, BIO-2).

### *Fish*

The potential effects of the Project's drawdown on the fish population was analyzed in a separate report, Castaic Dam High Intake Tower Bridge Retrofit Project, Technical Memorandum (Tech Memo, **Attachment D**), and are summarized here. The fish community at Castaic Lake is dominated by non-native, warm-water species, however, several native species are also present. Non-native, warm water species found in Castaic Lake include largemouth bass (*Micropterus salmoides*), smallmouth bass (*Micropterus dolomieu*), bluegill (*Lepomis macrochirus*), green sunfish (*Lepomis cyanellus*), black crappie (*Pomoxis nigromaculatus*), white crappie (*Pomoxis annularis*), striped bass (*Morone saxatilis*), channel catfish (*Ictalurus punctatus*), white catfish (*Ameiurus catus*), brown bullhead (*Ameiurus nebulosus*), common carp (*Cyprinus carpio*), goldfish (*Carassius auratus*), golden shiner (*Notemigonus crysoleucas*), threadfin shad (Dorosoma petenense), inland silverside (*Menidia beryllina*), bigscale logperch (*Percina macrolepida*), and shimofuri gobi (*Tridentiger bifasciatus*). Native species at Castaic Lake include Sacramento blackfish (*Orthodon microlepidotus*), tule perch (*Hysterocarpus traskii*), hitch (*Lavinia exilicauda*), and prickly sculpin (*Cottus asper*). Castaic Lake also contains hatchery rainbow trout (*Oncorhynchus mykiss*), a cold water species. No federal or state-listed species are present in Castaic Lake.

The lake's surface elevation is proposed to be lowered from the normal operation elevation of 1,505 feet to approximately 1,380 feet. Lowering of the reservoir's surface elevation would decrease the overall aquatic habitat area by approximately 125 feet, or approximately two-thirds (approximately 200,000 acre feet) of the reservoir (ESA 2019). However, short-term drawdown and subsequent re-flooding is not likely to have long term effects on reservoir fish communities, so long as the lowered condition provides sufficient area and water quality to maintain habitat values for the variously sized fish (Chizinski et al. 2014). The proposed drawdown would lower water levels similar to a recent drawdown event in 2015 caused by state-wide drought conditions. The lower water elevation of 1,390 feet was sustained for a period of over 12 months during the drought, and appeared to maintain habitat area and water depths sufficient for the existing fish populations. No documentation of fish overcrowding, significant population declines, or fish kills were identified. The aquatic resources would be expected to recover from the temporary effects of the proposed Project's drawdown as the water levels return to normal operating levels.

### *Wildlife Movement Corridors*

Within the last 20 years, there has been a substantial increase in residential development throughout the community of Castaic and city of Santa Clarita. This surge in residential development could potentially "push" mammal species away from those areas and reroute them towards Castaic Lake. The Project site is surrounded by

several wildlife movement corridors but is located within disturbed and/or developed conditions that consists of several paved access roads, a paved parking lot, Castaic Dam, and the tower bridge and high tower. Castaic Lake supports habitat for such species as coyote, striped skunk (*Mephitis mephitis*), and raccoon (*Procyon lotor*), amongst others; however, project activities would not impede or constrain local or regional wildlife movement. While mammals of all sizes could wander through the Project site, Project activities (including the lake drawdown) would not present an impact to local or regional wildlife movement. Additionally, the Project site is not located within or adjacent to any designated critical habitat for any special-status species.

### *Riparian Habitat and Sensitive Natural Communities*

Within the Project site, riparian vegetation is extremely scarce. As previously stated, several Gooding's willow and Fremont cottonwood are naturally situated to the southeast of the tower bridge approximately 50 to 220 feet away. Aquatic vegetation densities in Castaic Lake are low, potentially due to normal facility operations and the accompanying changes in surface elevation of the lake (CDFW 2013). Species that depend on riparian vegetation, such as least Bell's vireo, are not expected to be impacted by the Project, since a limited amount of riparian trees (i.e., Gooding's willow) are present in the vicinity of the Project. Moreover, the temporary drawdown of the lake will not eliminate or reduce riparian woodlands that are hydrologically supported by the lake; therefore, no impacts on least Bell's vireo habitat or breeding populations are expected to occur. Lastly, the Gooding's willow and Fremont cottonwood trees located adjacent to the tower bridge are not expected to be impacted by the lake drawdown, and as concluded in the Tech Memo (Attachment D), the aquatic ecosystem would recover over time, adjusting to re-stabilized water levels.

The tower bridge or adjacent areas do not support sensitive natural communities identified in local or regional plans, policies, regulations, or by the CDFW. Therefore, no impacts to sensitive plant communities would occur from the development of the proposed project.

### *Consistency with Local Policies and Ordinances*

The proposed retrofit to the tower bridge would not present any conflicts with any local policies or ordinances, such as those established by the Angeles National Forest or Los Angeles County, including, but not limited to, a native tree protection, natural resource, or open space ordinance, since the retrofit work will be confined to disturbed areas including the existing tower bridge, access roads and staging areas; therefore, the project would not have an impact on local ordinances or policies pertaining to biological resources.

### *Consistency with Adopted Natural Community Conservation Plan or Habitat Conservation Plan*

The tower bridge does not occur within an adopted HCP or NCCP; therefore, no impacts would occur.

## Recommended Mitigation Measures

### *Special-Status Wildlife*

Construction activities could result in impacts to special-status wildlife. The following measures are recommended to be implemented to avoid potentially significant impacts to special-status wildlife during project construction activities:

**BIO-1 (Worker Environmental Awareness Program):** Prior to the start of construction that could affect special-status species, a qualified biologist should provide a Worker Environmental Awareness Program (WEAP) training to all construction workers on-site. The training should include materials to aid workers in identifying special-status plants and wildlife that should be avoided; relocation procedures of species; applicable laws and regulations protecting such resources; and proper avoidance and communication procedures to protect sensitive biological resources, as well as common wildlife whenever possible.

**BIO-2 (Nesting Bird Avoidance):** If the nesting bird season cannot be avoided and construction underneath the tower bridge occurs between March 1 and September 15, the following should be implemented to avoid and minimize impacts to nesting birds:

- A qualified biologist should conduct a preconstruction avian nesting survey no more than five days prior to initiation project activities on the tower bridge. If construction begins in the non-breeding season and proceeds continuously into the breeding season, no surveys are required. However, if there is a break of five days or more in project activities during the breeding season, a new nesting bird survey should be conducted before construction begins again.
- The preconstruction survey should cover all reasonable potential nesting locations underneath the tower bridge as well as any areas where vegetation removal/grading is proposed.
- If an active nest is found during the preconstruction avian nesting survey, a qualified biologist should implement a suitable avoidance buffer should be based on the location of the nest, species, and the type of work that is being conducted. The nest site area should not be disturbed until a qualified biologist confirms that the nest is inactive and the young have fledged. Buffer areas may be increased if any special-status birds or raptors are determined to be nesting in the area.
- A Nesting Bird Exclusion Plan (Bird Plan) should be prepared if any birds such as barn swallows are observed nesting on the underside of the tower bridge. The Bird Plan will include procedures for avoiding impacts to nesting birds, including an overview of the proposed work that will be conducted where nests have been documented; purpose and need; survey methodology; laws and regulations protecting nesting birds; survey results and overview of potential impacts; and avoidance measures, including exclusionary techniques, and installation of materials to temporarily prevent barn swallows from re-entering the nests.

**BIO-3 (Roosting Bat Avoidance):** A focused visual survey for roosting and special-status bats should be conducted on the underside of the tower bridge. This survey will focus on the detecting evidence (guano) of bat roosting on the underside of the tower bridge, as well as a visual assessment of ingress/egress locations during dusk.

In the event that it is determined that bats are roosting on the underside of the tower bridge, a Bat Exclusion Plan (Bat Plan) should be prepared that includes procedures for avoiding impacts to roosting bats. The Bat Plan should include an overview of the project; purpose and need; survey methodology; laws and regulations protecting bats; survey results and overview of potential impacts; and avoidance measures, such as preconstruction surveys, exclusionary techniques, and installation of materials to temporarily prevent bats from recolonization.

# Conclusions

The Project site is disturbed/developed and consists of several paved access roads, a paved parking lot, Castaic Dam, and the tower bridge and high tower. The Project site is also submerged much of the year by reservoir water; therefore, the Project would not have a significant impact on biological resources with the implementation of recommended mitigation measures **BIO 1**, **BIO 2**, and **BIO 3**.

Due to the existing disturbed and developed condition within and generally surrounding the Project site, there is no potential for special-status plants to be present. Similarly, the disturbed and developed conditions reduce the potential for special-status wildlife species to be present; however, loggerhead shrike, prairie falcon, and yellow warbler have a moderate-to-high potential to forage in the vicinity of the Project, particularly within the adjacent California sagebrush – California buckwheat scrub. There is virtually no potential for these species to nest in the immediate vicinity of the Project due to an absence of preferred nesting habitat for these species. Terrestrial species with a low potential to occur include California glossy snake, coast horned lizard and coastal whiptail, which could forage and inhabit the scrub habitat adjacent to the Project site. However, these species are not expected to occur within the Project site itself, due to the current disturbed conditions, and because the proposed retrofit activities will be conducted over the water/lakebed where these species would not occur. Nesting swallow are present underneath the tower bridge; however, impacts to nesting birds can be minimized by conducting a pre-construction bird survey and preparing a nesting bird avoidance plan as suggested in Mitigation Measure BIO-2. Bats have a low potential to roost within the metal beams under the tower bridge, but impacts to roosting bats can be minimized or avoided by conducting a pre-construction bat roosting survey, and preparing a bat exclusion plan if roosting bats are determined to be present as specified in Mitigation Measure BIO-3.

Aquatic species, including fish, western pond turtle and two-striped garter snake, may be impacted by the short-term drawdown and subsequent re-flooding. However, the impacts would be temporary and are not expected to have long term effects on reservoir fish communities or foraging opportunities for amphibian and other aquatic species, since an abundance of foraging resources will remain intact during the temporary drawdown, and the lake habitat will return to pre-Project conditions when the water is returned to normal operating levels. The amount of riparian habitat in the vicinity of the Project site is minimal, consisting of several Gooding's willow and Fremont cottonwood, which are present approximately 50 to 220 feet from the tower bridge and water's edge. Other riparian habitats throughout the edges of Castaic Lake are expected to sustain a hydrologic connection through groundwater resources and are not expected to recede during the timeframe of Project construction. Riparian habitats that are supported by the lake's hydrology are not expected to recede by a measurable amount. In addition, any reduction that could occur would be temporary and would return to current conditions when the lake elevation is returned to normal operating conditions.

The Project will not impact any designated critical habitat or any wildlife movement corridors. Designated critical habitat is not present in the Project site. The two nearest designated critical habitats are located approximately five miles north (arroyo toad) in Castaic Creek and five miles east (California red-legged frog) in San Francisquito Creek. Additionally, the Project site will not impede or restrict any wildlife movement. The water level within Castaic Lake will gradually be reduced over the drawdown period, but will not have a significant impact on migratory bird species, as area to forage, breed, and rest will remain available throughout the lake. In addition, several other open water features providing similar habitat quality are available to migratory bird

species within an 18-mile radius of Castaic Lake, including Pyramid Lake, Lake Piru, Quail Lake, and Van Norman Complex Reservoir.

# References

California Department of Fish and Game (CDFG). 2010. List of Vegetation Alliances and Associations. The Vegetation Classification and Mapping Program. Wildlife & Habitat Data Analysis Branch. September 2010.

California Department of Fish and Wildlife (CDFW). 2019. California Natural Diversity Database (CNDDB) Commercial version, Information dated March 19, 2019. Rarefind 5 query results for Warm Springs Mountain and the eight surrounding USGS 7.5-minute quadrangles.

California Native Plant Society (CNPS), Rare Plant Program. 2019. Inventory of Rare and Endangered Plants of California (online edition, v8-03a 0.39). California Native Plant Society. Query results for Warm Springs Mountain and the eight surrounding USGS 7.5-minute quadrangles. Sacramento, CA.

Chizinski, C. J., D. R. Martin, C. G. Huber, and K. L. Pope. 2014. The influence of a rapid drawdown and prolonged dewatering on angling pressure, catch, and harvest in a Nebraska reservoir. Great Plains Research 24:145-152.

Collins, J.N., M. Sutula, E. Stein, M., M. Odaya, E. Zhang, and K. Larned. 2006. Comparison of Methods to Map California Riparian Areas. San Francisco Estuary Institute.

National Oceanic and Atmospheric Administration (NOAA). 2019. California/Nevada River Forecast Center. Website found at: https://www.cnrfc.noaa.gov/mobile/riverImage.php?id=CSKC1&type=Obs

Sawyer, J.O., T. Keeler-Wolf, and J.M. Evens. 2009. A Manual of California Vegetation. 2nd Edition. California Native Plant Society.

Wilson, Robert M. 2010. Seeking Refuge: Birds and Landscapes of the Pacific Flyway. Seattle: University of Washington Press.

On behalf of ESA, it has been a pleasure preparing this information for you. Please do not hesitate to contact Travis Marella or Greg Ainsworth at (805) 914-1500 if you have any questions or comments regarding this report.

Sincerely,

Travis Marella
Senior Biologist

Greg Ainsworth
Biology Director

Attachments: A – Representative Site Photographs
B – Flora and Fauna Compendia
C – CNDDB and CNPS Database Search Results
D – Castaic Dam High Intake Tower Bridge Retrofit Project, Technical Memorandum

# Attachment A
## **Site Photographs**

**Photo 1.** Facing north at Access Bridge and High Tower (left side).

**Photo 2.** Facing north at Access Bridge and High Tower.

**Photo 3.** Facing north at underneath of Access Road and High Tower.

**Photo 4.** Facing northwest at underneath of Access Road and High Tower. Several barn swallow mud nests were observed as well as wasp nests.

**Photo 5.** Facing north at large amount of bird whitewash under Access Bridge and High Tower.

**Photo 6.** Facing north at one of the five potential staging areas.

**Photo 7.** Facing west at California sagebrush – California buckwheat scrub.

**Photo 8.** Facing south at California sagebrush – California buckwheat scrub adjacent to one of the potential staging areas.

**Photo 9.** Facing northwest at California sagebrush – California buckwheat scrub adjacent to one of the potential staging areas.

**Photo 10.** Facing west at developed conditions at the West Boat Launch Ramp (one of the potential staging areas).

**Photo 11.** Facing southwest at developed conditions at the West Boat Launch Ramp (one of the potential staging areas).

**Photo 12.** Facing east at Access Bridge and High Tower from the West Boat Launch Ramp.

# Attachment B
## **Flora and Fauna Compendia**

# FLORA COMPENDIA

| Scientific name | Common name |
|---|---|
| **Vegetation** | |
| *Artemisia californica* | California sagebrush |
| *Atriplex confertifolia* | shadescale saltbush |
| *Baccharis pilularis* | coyote brush |
| *Brassica nigra* | black mustard |
| *Brassica tournefortii* | Asian mustard |
| *Corymbia citriodora* | lemon-scented gum |
| *Cupressus sempervirens* | Italian cypress |
| *Cynodon dactylon* | Bermuda grass |
| *Encelia farinosa* | brittlebush |
| *Erigeron canadensis* | horseweed |
| *Eriogonum fasciculatum* | California buckwheat |
| *Fraxinus velutina* | velvet ash |
| *Gleditsia triacanthos* | honey locust |
| *Heteromeles arbutifolia* | toyon |
| *Heterotheca grandiflora* | telegraphweed |
| *Juniperus* sp. | juniper |
| *Kali tragus* | Russian thistle |
| *Magnolia grandiflora* | southern magnolia |
| *Marrubium vulgare* | common horehound |
| *Nicotiana glauca* | tree tobacco |
| *Pinus palustris* | longleaf pitch pine |
| *Platanus × acerifolia* | London plane tree |
| *Populus fremontii* | Fremont's cottonwood |
| *Ricinus communis* | castor bean |
| *Salix gooddingii* | Gooding's willow |
| *Salvia mellifera* | black sage |
| *Schinus molle* | Peruvian peppertree |
| *Tamarix* sp. | salt cedar |

# FAUNA COMPENDIA

| Scientific name | Common name |
|---|---|
| **Birds** | |
| *Anas platyrhynchos* | mallard |
| *Aphelocoma californica* | California scrub jay |
| *Ardea Herodias* | great blue heron |
| *Butorides virescens* | green heron |
| *Calypte anna* | Anna's hummingbird |
| *Cathartes aura* | turkey vulture |
| *Charadrius vociferus* | killdeer |
| *Columba livia* | rock dove |
| *Corvus brachyrhynchos* | American crow |
| *Corvus corax* | common raven |
| *Fulica americana* | American coot |
| *Hirundo rustica* | barn swallow |
| *Melozone crissalis* | California towhee |
| *Mimus polyglottos* | northern mockingbird |
| *Psaltriparus minimus* | American bushtit |
| *Sayornis nigricans* | black phoebe |
| *Setophaga coronata* | yellow-rumped warbler |
| *Spinus psaltria* | lesser goldfinch |
| *Zenaida macroura* | mourning dove |
| **Mammals** | |
| *Canis latrans* | coyote (scat) |
| *Otospermophilus beecheyi* | California ground squirrel |
| *Sylvilagus audubonii* | desert cottontail |
| **Reptiles** | |
| *Sceloporus occidentalis* | western fence lizard |
| **Fish** | |
| *Morone saxatilis* | striped bass |

# Attachment C
## CNDDB and CNPS Results

# Selected Elements by Common Name

## California Department of Fish and Wildlife

## California Natural Diversity Database

**Query Criteria:** Quad IS (Mint Canyon (3411844) OR Liebre Mtn. (3411866) OR Burnt Peak (3411865) OR Lake Hughes (3411864) OR Whitaker Peak (3411856) OR Warm Springs Mountain (3411855) OR Green Valley (3411854) OR Val Verde (3411846) OR Newhall (3411845))<br /> AND Taxonomic Group IS (Fish OR Amphibians OR Reptiles OR Birds OR Mammals OR Mollusks OR Arachnids OR Crustaceans OR Insects)

| Species | Element Code | Federal Status | State Status | Global Rank | State Rank | Rare Plant Rank/CDFW SSC or FP |
|---|---|---|---|---|---|---|
| **American badger**<br>*Taxidea taxus* | AMAJF04010 | None | None | G5 | S3 | SSC |
| **arroyo chub**<br>*Gila orcuttii* | AFCJB13120 | None | None | G2 | S2 | SSC |
| **arroyo toad**<br>*Anaxyrus californicus* | AAABB01230 | Endangered | None | G2G3 | S2S3 | SSC |
| **bald eagle**<br>*Haliaeetus leucocephalus* | ABNKC10010 | Delisted | Endangered | G5 | S3 | FP |
| **Bell's sage sparrow**<br>*Artemisiospiza belli belli* | ABPBX97021 | None | None | G5T2T3 | S3 | WL |
| **burrowing owl**<br>*Athene cunicularia* | ABNSB10010 | None | None | G4 | S3 | SSC |
| **California condor**<br>*Gymnogyps californianus* | ABNKA03010 | Endangered | Endangered | G1 | S1 | FP |
| **California glossy snake**<br>*Arizona elegans occidentalis* | ARADB01017 | None | None | G5T2 | S2 | SSC |
| **California horned lark**<br>*Eremophila alpestris actia* | ABPAT02011 | None | None | G5T4Q | S4 | WL |
| **California legless lizard**<br>*Anniella sp.* | ARACC01070 | None | None | G3G4 | S3S4 | SSC |
| **California red-legged frog**<br>*Rana draytonii* | AAABH01022 | Threatened | None | G2G3 | S2S3 | SSC |
| **coast horned lizard**<br>*Phrynosoma blainvillii* | ARACF12100 | None | None | G3G4 | S3S4 | SSC |
| **coastal California gnatcatcher**<br>*Polioptila californica californica* | ABPBJ08081 | Threatened | None | G4G5T2Q | S2 | SSC |
| **coastal whiptail**<br>*Aspidoscelis tigris stejnegeri* | ARACJ02143 | None | None | G5T5 | S3 | SSC |
| **Cooper's hawk**<br>*Accipiter cooperii* | ABNKC12040 | None | None | G5 | S4 | WL |
| **Crotch bumble bee**<br>*Bombus crotchii* | IIHYM24480 | None | Candidate Endangered | G3G4 | S1S2 | |
| **foothill yellow-legged frog**<br>*Rana boylii* | AAABH01050 | None | Candidate Threatened | G3 | S3 | SSC |

| Species | Element Code | Federal Status | State Status | Global Rank | State Rank | Rare Plant Rank/CDFW SSC or FP |
|---|---|---|---|---|---|---|
| **grasshopper sparrow**<br>*Ammodramus savannarum* | ABPBXA0020 | None | None | G5 | S3 | SSC |
| **hoary bat**<br>*Lasiurus cinereus* | AMACC05030 | None | None | G5 | S4 | |
| **least Bell's vireo**<br>*Vireo bellii pusillus* | ABPBW01114 | Endangered | Endangered | G5T2 | S2 | |
| **lodgepole chipmunk**<br>*Neotamias speciosus speciosus* | AMAFB02172 | None | None | G4T2T3 | S2S3 | |
| **loggerhead shrike**<br>*Lanius ludovicianus* | ABPBR01030 | None | None | G4 | S4 | SSC |
| **mountain plover**<br>*Charadrius montanus* | ABNNB03100 | None | None | G3 | S2S3 | SSC |
| **pallid bat**<br>*Antrozous pallidus* | AMACC10010 | None | None | G5 | S3 | SSC |
| **prairie falcon**<br>*Falco mexicanus* | ABNKD06090 | None | None | G5 | S4 | WL |
| **quino checkerspot butterfly**<br>*Euphydryas editha quino* | IILEPK405L | Endangered | None | G5T1T2 | S1S2 | |
| **San Diego black-tailed jackrabbit**<br>*Lepus californicus bennettii* | AMAEB03051 | None | None | G5T3T4 | S3S4 | SSC |
| **Santa Ana sucker**<br>*Catostomus santaanae* | AFCJC02190 | Threatened | None | G1 | S1 | |
| **southern California rufous-crowned sparrow**<br>*Aimophila ruficeps canescens* | ABPBX91091 | None | None | G5T3 | S3 | WL |
| **southern grasshopper mouse**<br>*Onychomys torridus ramona* | AMAFF06022 | None | None | G5T3 | S3 | SSC |
| **spotted bat**<br>*Euderma maculatum* | AMACC07010 | None | None | G4 | S3 | SSC |
| **Swainson's hawk**<br>*Buteo swainsoni* | ABNKC19070 | None | Threatened | G5 | S3 | |
| **Tehachapi pocket mouse**<br>*Perognathus alticola inexpectatus* | AMAFD01082 | None | None | G1G2T1T2 | S1S2 | SSC |
| **Townsend's big-eared bat**<br>*Corynorhinus townsendii* | AMACC08010 | None | None | G3G4 | S2 | SSC |
| **tricolored blackbird**<br>*Agelaius tricolor* | ABPBXB0020 | None | Threatened | G2G3 | S1S2 | SSC |
| **two-striped gartersnake**<br>*Thamnophis hammondii* | ARADB36160 | None | None | G4 | S3S4 | SSC |
| **unarmored threespine stickleback**<br>*Gasterosteus aculeatus williamsoni* | AFCPA03011 | Endangered | Endangered | G5T1 | S1 | FP |
| **vernal pool fairy shrimp**<br>*Branchinecta lynchi* | ICBRA03030 | Threatened | None | G3 | S3 | |

| Species | Element Code | Federal Status | State Status | Global Rank | State Rank | Rare Plant Rank/CDFW SSC or FP |
|---|---|---|---|---|---|---|
| **western mastiff bat**<br>*Eumops perotis californicus* | AMACD02011 | None | None | G5T4 | S3S4 | SSC |
| **western pond turtle**<br>*Emys marmorata* | ARAAD02030 | None | None | G3G4 | S3 | SSC |
| **western spadefoot**<br>*Spea hammondii* | AAABF02020 | None | None | G3 | S3 | SSC |
| **western yellow-billed cuckoo**<br>*Coccyzus americanus occidentalis* | ABNRB02022 | Threatened | Endangered | G5T2T3 | S1 | |
| **white-tailed kite**<br>*Elanus leucurus* | ABNKC06010 | None | None | G5 | S3S4 | FP |
| **yellow warbler**<br>*Setophaga petechia* | ABPBX03010 | None | None | G5 | S3S4 | SSC |
| **yellow-breasted chat**<br>*Icteria virens* | ABPBX24010 | None | None | G5 | S3 | SSC |
| **Yuma myotis**<br>*Myotis yumanensis* | AMACC01020 | None | None | G5 | S4 | |

**Record Count: 46**

CNPS California Native Plant Society

Inventory of Rare and Endangered Plants

*The database used to provide updates to the Online Inventory is under construction. View updates and changes made since May 2019 here.

## Plant List

**42** matches found. *Click on scientific name for details*

**Search Criteria**

California Rare Plant Rank is one of [1A, 1B, 2A, 2B, 3, 4],
FESA is one of [Endangered, Threatened, Candidate, Not Listed],
CESA is one of [Endangered, Threatened, Rare, Not Listed], Found in Quads 3411866, 3411865, 3411864, 3411856, 3411855, 3411854, 3411846 3411845 and 3411844;

Modify Search Criteria | Export to Excel | Modify Columns | Modify Sort | Display Photos

| Scientific Name | Common Name | Family | Lifeform | Blooming Period | CA Rare Plant Rank | State Rank | Global Rank |
|---|---|---|---|---|---|---|---|
| Acanthoscyphus parishii var. parishii | Parish's oxytheca | Polygonaceae | annual herb | Jun-Sep | 4.2 | S3S4 | G4? T3T4 |
| Allium howellii var. clokeyi | Mt. Pinos onion | Alliaceae | perennial bulbiferous herb | Apr-Jun | 1B.3 | S2 | G4T2 |
| Androsace elongata ssp. acuta | California androsace | Primulaceae | annual herb | Mar-Jun | 4.2 | S3S4 | G5? T3T4 |
| Berberis nevinii | Nevin's barberry | Berberidaceae | perennial evergreen shrub | (Feb)Mar-Jun | 1B.1 | S1 | G1 |
| Calochortus catalinae | Catalina mariposa lily | Liliaceae | perennial bulbiferous herb | (Feb)Mar-Jun | 4.2 | S3S4 | G3G4 |
| Calochortus clavatus var. clavatus | club-haired mariposa lily | Liliaceae | perennial bulbiferous herb | (Mar)May-Jun | 4.3 | S3 | G4T3 |
| Calochortus clavatus var. gracilis | slender mariposa lily | Liliaceae | perennial bulbiferous herb | Mar-Jun (Nov) | 1B.2 | S2S3 | G4T2T3 |
| Calochortus palmeri var. palmeri | Palmer's mariposa lily | Liliaceae | perennial bulbiferous herb | Apr-Jul | 1B.2 | S2 | G3T2 |
| Calochortus plummerae | Plummer's mariposa lily | Liliaceae | perennial bulbiferous herb | May-Jul | 4.2 | S4 | G4 |
| Calystegia peirsonii | Peirson's morning-glory | Convolvulaceae | perennial rhizomatous herb | Apr-Jun | 4.2 | S4 | G4 |
| Castilleja gleasoni | Mt. Gleason paintbrush | Orobanchaceae | perennial herb (hemiparasitic) | May-Jun (Sep) | 1B.2 | S2 | G2 |
| | | Rosaceae | | Feb-May | 4.3 | S4 | G5T4 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Cercocarpus betuloides var. blancheae | island mountain-mahogany | | perennial evergreen shrub | | | | |
| Chorizanthe parryi var. fernandina | San Fernando Valley spineflower | Polygonaceae | annual herb | Apr-Jul | 1B.1 | S1 | G2T1 |
| Chorizanthe parryi var. parryi | Parry's spineflower | Polygonaceae | annual herb | Apr-Jun | 1B.1 | S2 | G3T2 |
| Clinopodium mimuloides | monkey-flower savory | Lamiaceae | perennial herb | Jun-Oct | 4.2 | S3 | G3 |
| Cryptantha clokeyi | Clokey's cryptantha | Boraginaceae | annual herb | Apr | 1B.2 | S3 | G3 |
| Deinandra paniculata | paniculate tarplant | Asteraceae | annual herb | (Mar)Apr-Nov(Dec) | 4.2 | S4 | G4 |
| Delphinium parryi ssp. purpureum | Mt. Pinos larkspur | Ranunculaceae | perennial herb | May-Jun | 4.3 | S4 | G4T4 |
| Dodecahema leptoceras | slender-horned spineflower | Polygonaceae | annual herb | Apr-Jun | 1B.1 | S1 | G1 |
| Galium grande | San Gabriel bedstraw | Rubiaceae | perennial deciduous shrub | Jan-Jul | 1B.2 | S1 | G1 |
| Harpagonella palmeri | Palmer's grapplinghook | Boraginaceae | annual herb | Mar-May | 4.2 | S3 | G4 |
| Helianthus inexpectatus | Newhall sunflower | Asteraceae | perennial rhizomatous herb | Aug-Oct | 1B.1 | S1 | G1 |
| Helianthus nuttallii ssp. parishii | Los Angeles sunflower | Asteraceae | perennial rhizomatous herb | Aug-Oct | 1A | SH | G5TH |
| Hordeum intercedens | vernal barley | Poaceae | annual herb | Mar-Jun | 3.2 | S3S4 | G3G4 |
| Hulsea vestita ssp. parryi | Parry's sunflower | Asteraceae | perennial herb | Apr-Aug | 4.3 | S4 | G5T4 |
| Juglans californica | Southern California black walnut | Juglandaceae | perennial deciduous tree | Mar-Aug | 4.2 | S4 | G4 |
| Lepechinia fragrans | fragrant pitcher sage | Lamiaceae | perennial shrub | Mar-Oct | 4.2 | S3 | G3 |
| Lepechinia rossii | Ross' pitcher sage | Lamiaceae | perennial shrub | May-Sep | 1B.2 | S1 | G1 |
| Lilium humboldtii ssp. ocellatum | ocellated Humboldt lily | Liliaceae | perennial bulbiferous herb | Mar-Jul (Aug) | 4.2 | S4? | G4T4? |
| Navarretia fossalis | spreading navarretia | Polemoniaceae | annual herb | Apr-Jun | 1B.1 | S2 | G2 |
| Navarretia ojaiensis | Ojai navarretia | Polemoniaceae | annual herb | May-Jul | 1B.1 | S2 | G2 |
| Navarretia setiloba | Piute Mountains navarretia | Polemoniaceae | annual herb | Apr-Jul | 1B.1 | S2 | G2 |
| Opuntia basilaris var. brachyclada | short-joint beavertail | Cactaceae | perennial stem succulent | Apr-Jun (Aug) | 1B.2 | S3 | G5T3 |
| Orcuttia californica | California Orcutt grass | Poaceae | annual herb | Apr-Aug | 1B.1 | S1 | G1 |
| Phacelia hubbyi | Hubby's phacelia | Hydrophyllaceae | annual herb | Apr-Jul | 4.2 | S4 | G4 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Phacelia mohavensis | Mojave phacelia | Hydrophyllaceae | annual herb | Apr-Aug | 4.3 | S4 | G4Q |
| Pseudognaphalium leucocephalum | white rabbit-tobacco | Asteraceae | perennial herb | (Jul)Aug-Nov(Dec) | 2B.2 | S2 | G4 |
| Senecio aphanactis | chaparral ragwort | Asteraceae | annual herb | Jan-Apr (May) | 2B.2 | S2 | G3 |
| Sidalcea neomexicana | salt spring checkerbloom | Malvaceae | perennial herb | Mar-Jun | 2B.2 | S2 | G4 |
| Streptanthus campestris | southern jewelflower | Brassicaceae | perennial herb | (Apr)May-Jul | 1B.3 | S3 | G3 |
| Stylocline masonii | Mason's neststraw | Asteraceae | annual herb | Mar-May | 1B.1 | S1 | G1 |
| Symphyotrichum greatae | Greata's aster | Asteraceae | perennial rhizomatous herb | Jun-Oct | 1B.3 | S2 | G2 |

**Suggested Citation**

California Native Plant Society, Rare Plant Program. 2019. Inventory of Rare and Endangered Plants of California (online edition, v8-03 0.39). Website http://www.rareplants.cnps.org [accessed 25 September 2019].

**Search the Inventory**
Simple Search
Advanced Search
Glossary

**Information**
About the Inventory
About the Rare Plant Program
CNPS Home Page
About CNPS
Join CNPS

**Contributors**
The Calflora Database
The California Lichen Society
California Natural Diversity Database
The Jepson Flora Project
The Consortium of California Herbaria
CalPhotos

**Questions and Comments**
rareplants@cnps.org

© Copyright 2010-2018 California Native Plant Society. All rights reserved

# Selected Elements by Common Name

## California Department of Fish and Wildlife

## California Natural Diversity Database

**Query Criteria:** Quad IS (Mint Canyon (3411844) OR Green Valley (3411854) OR Warm Springs Mountain (3411855) OR Liebre Mtn. (3411866) OR Burnt Peak (3411865) OR Lake Hughes (3411864) OR Whitaker Peak (3411856) OR Val Verde (3411846) OR Newhall (3411845))<br /> AND Taxonomic Group IS (Dune OR Scrub OR Herbaceous OR Marsh OR Riparian OR Woodland OR Forest OR Alpine OR Inland Waters OR Marine OR Estuarine OR Riverine OR Palustrine)

| Species | Element Code | Federal Status | State Status | Global Rank | State Rank | Rare Plant Rank/CDFW SSC or FP |
|---|---|---|---|---|---|---|
| **California Walnut Woodland**<br>*California Walnut Woodland* | CTT71210CA | None | None | G2 | S2.1 | |
| **Mainland Cherry Forest**<br>*Mainland Cherry Forest* | CTT81820CA | None | None | G1 | S1.1 | |
| **Riversidian Alluvial Fan Sage Scrub**<br>*Riversidian Alluvial Fan Sage Scrub* | CTT32720CA | None | None | G1 | S1.1 | |
| **Southern California Threespine Stickleback Stream**<br>*Southern California Threespine Stickleback Stream* | CARE2320CA | None | None | GNR | SNR | |
| **Southern Coast Live Oak Riparian Forest**<br>*Southern Coast Live Oak Riparian Forest* | CTT61310CA | None | None | G4 | S4 | |
| **Southern Cottonwood Willow Riparian Forest**<br>*Southern Cottonwood Willow Riparian Forest* | CTT61330CA | None | None | G3 | S3.2 | |
| **Southern Mixed Riparian Forest**<br>*Southern Mixed Riparian Forest* | CTT61340CA | None | None | G2 | S2.1 | |
| **Southern Riparian Forest**<br>*Southern Riparian Forest* | CTT61300CA | None | None | G4 | S4 | |
| **Southern Riparian Scrub**<br>*Southern Riparian Scrub* | CTT63300CA | None | None | G3 | S3.2 | |
| **Southern Sycamore Alder Riparian Woodland**<br>*Southern Sycamore Alder Riparian Woodland* | CTT62400CA | None | None | G4 | S4 | |
| **Southern Willow Scrub**<br>*Southern Willow Scrub* | CTT63320CA | None | None | G3 | S2.1 | |
| **Valley Needlegrass Grassland**<br>*Valley Needlegrass Grassland* | CTT42110CA | None | None | G3 | S3.1 | |
| **Valley Oak Woodland**<br>*Valley Oak Woodland* | CTT71130CA | None | None | G3 | S2.1 | |
| **Wildflower Field**<br>*Wildflower Field* | CTT42300CA | None | None | G2 | S2.2 | |

**Record Count: 14**

# Attachment D

## Castaic Dam High Intake Tower Bridge Retrofit Project, Technical Memorandum

Final

# CASTAIC DAM HIGH INTAKE TOWER ACCESS BRIDGE RETROFIT PROJECT

## Technical Memorandum

Prepared for
Department of Water Resources

September 2019

ESA

Final

# CASTAIC DAM HIGH INTAKE TOWER ACCESS BRIDGE RETROFIT PROJECT

## Technical Memorandum

Prepared for
Department of Water Resources

September 2019

626 Wilshire Boulevard
Suite 1100
Los Angeles, CA 90017
213.599.4300
esassoc.com

ESA

| | | |
|---|---|---|
| Bend | Oakland | San Diego |
| Camarillo | Orlando | San Francisco |
| Delray Beach | Pasadena | Santa Monica |
| Destin | Petaluma | Sarasota |
| Irvine | Portland | Seattle |
| Los Angeles | Sacramento | Tampa |

**OUR COMMITMENT TO SUSTAINABILITY** | ESA helps a variety of public and private sector clients plan and prepare for climate change and emerging regulations that limit GHG emissions. ESA is a registered assessor with the California Climate Action Registry, a Climate Leader, and founding reporter for the Climate Registry. ESA is also a corporate member of the U.S. Green Building Council and the Business Council on Climate Change (BC3). Internally, ESA has adopted a Sustainability Vision and Policy Statement and a plan to reduce waste and energy within our operations. This document was produced using recycled paper.

# TABLE OF CONTENTS

## Castaic Dam High Intake Tower Access Bridge Retrofit Project


Page

**1.0 Introduction....2**

**2.0 Project Description....2**

**3.0 Local Setting....7**
Existing Aquatic Biological Resources....7
Water Quality....11
Recreational Activities....12
Operations at Castaic Lake....13

**4.0 Impacts Discussion....14**
Potential Direct Impacts to Aquatic Biological Resources....15
Potential Impacts to Water Quality....16
Potential Impacts to Recreational Opportunities....20
Potential Impacts to Operational Activities....22

**Conclusion....23**

# CASTAIC DAM HIGH INTAKE TOWER ACCESS BRIDGE RETROFIT PROJECT

Technical Memorandum

## 1.0 Introduction

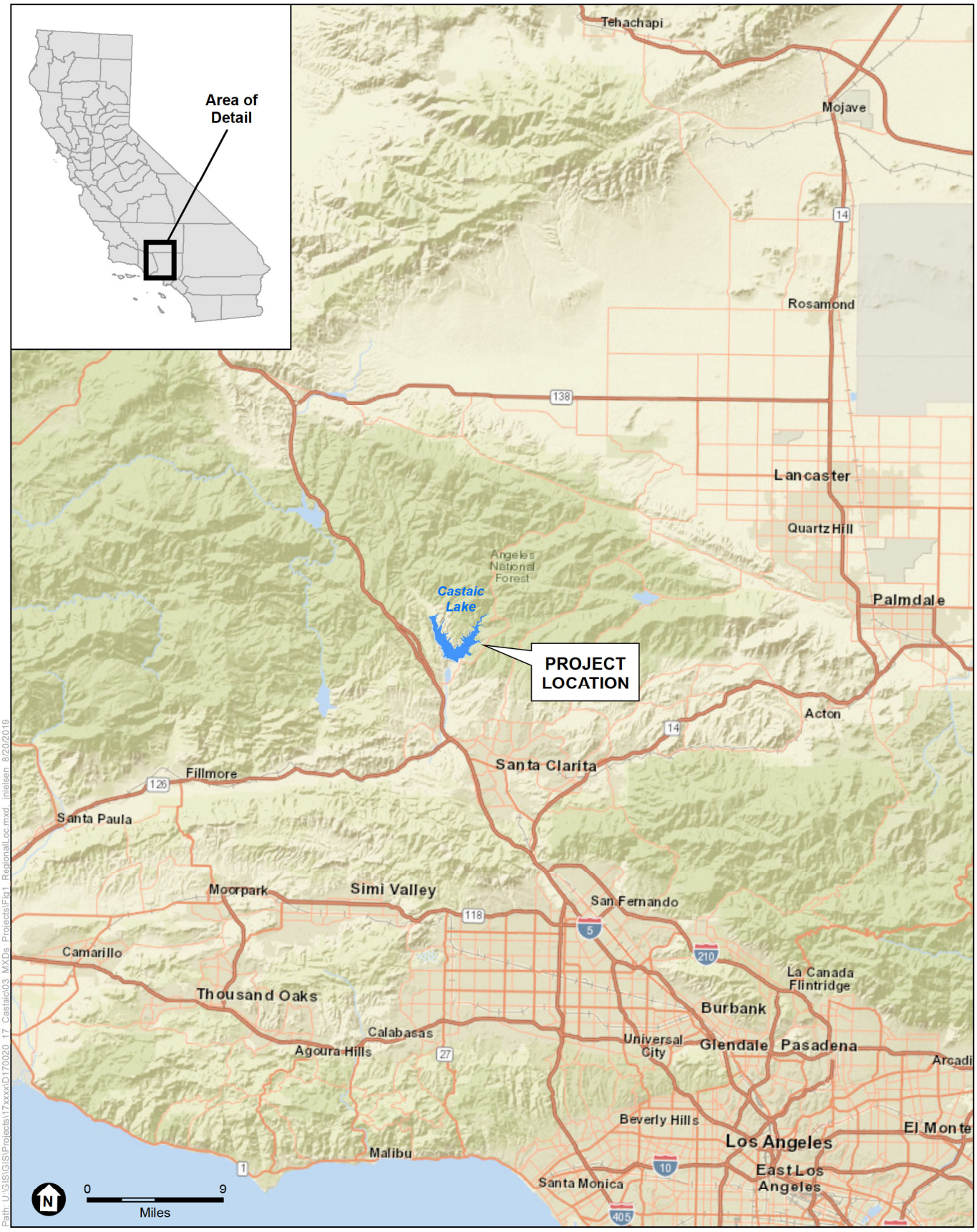
The Department of Water Resources (DWR) is proposing to implement the Castaic Dam High Intake Tower Access Bridge Retrofit Project (project) to seismically retrofit the outlet tower bridge at Castaic Lake. The purpose of this technical memorandum is to provide a preliminary assessment of the potential environmental impacts of the proposed project to assist in comparing potential implementation schedule scenarios. This memo evaluates aquatic resources, water quality, and recreational uses of the lake. In addition, operational considerations are summarized. The compiled setting and impact information is meant to assist in strategic environmental compliance planning and scheduling. Subsequent analysis under the California Environmental Quality Act (CEQA) will be conducted by DWR.

## 2.0 Project Description

### Background

Castaic Lake is located 41 miles northeast of downtown Los Angeles within the Sierra Pelona Mountains, north of Santa Clarita along the Interstate 5 freeway (**Figure 1**). The normal operational surface elevation of Castaic Lake is 1,505 feet above mean sea level, with a surface area of approximately 2,200 acres, and a storage capacity of approximately 324,000 acre feet of water. Castaic Lake's earthen dam was constructed in 1972 in the Castaic Creek Basin as part of the State Water Project (SWP), supplying domestic water and hydroelectric power to southern California. Castaic Lake is one of the SWP's largest recreational lakes and the terminus of the California Aqueduct's West Branch, providing emergency storage in the event of a shutdown of the SWP in northern California.

The SWP is a water supply and conveyance system that includes 25 dams, 34 reservoirs, 20 pumping plants, four pumping-generating plants, five hydroelectric power plants, and more than 700 miles of canals and pipelines. The SWP is funded by the 29 SWP Contractors who contract with DWR for water supplies. Water is supplied to Castaic Lake from Elderberry Forebay, via Angeles Tunnel, an approximately 7-mile aqueduct from Pyramid Lake, which is located north of Castaic Lake. Hydroelectricity is produced by allowing water to fall using gravity from Pyramid Lake to Elderberry Forebay, the water travels through turbines located at the Castaic Power Plant.




SOURCE: ESRI

DWR SoCal On-Call for Environmental Services - Castaic

**Figure 1**
Project Location

ESA

The Castaic Power Plant located on Elderberry Forebay at the northern end of the lake's west branch was designed, built, and operated by the Los Angeles Department of Water and Power (LADWP).

The annual water level fluctuations at Castaic Lake. The lake surface elevations are highest in the summer and fall and drop during the winter and spring. The shorelines are generally steep with a few small coves. Aquatic vegetation is generally lacking due to water level fluctuations.

The Castaic Dam High Intake Tower Access Bridge (access bridge) provides access to the Castaic Dam High Intake Tower (high tower) and carries electrical conduits for powering the high tower valves and other equipment (**Figure 2**). The access bridge allows for maintenance and operations crews to ensure that the tower continues to function as intended. The tower and bridge were designed in the 1960s and constructed in the late 1960s through the early 1970s. The access bridge is elevated from the lake bottom by three piers (Piers 2-4) and one abutment at the lakeshore (Abutment 5), as shown on Figure 2.

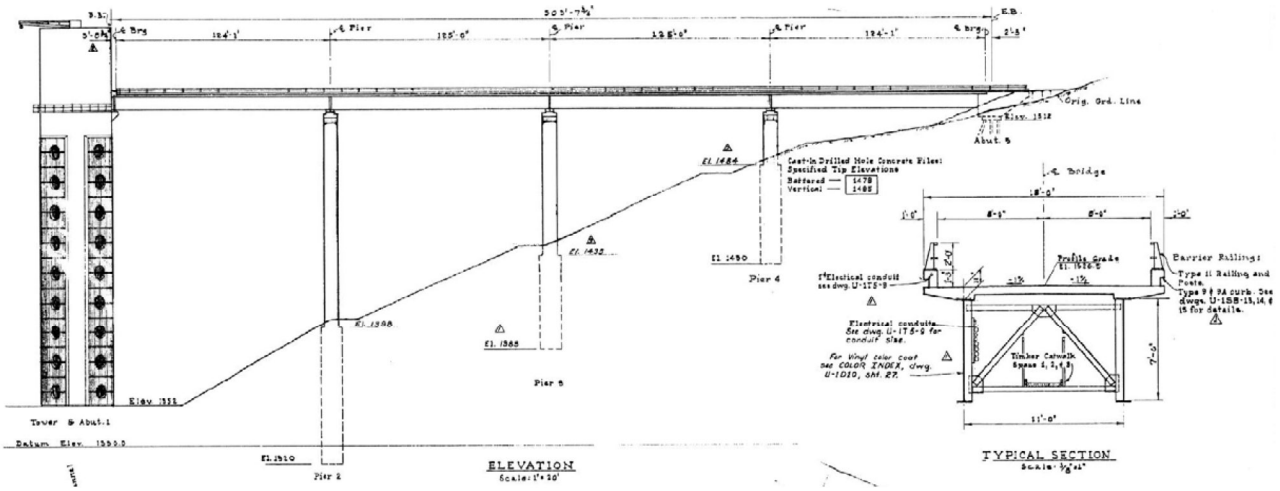
During the 1994 Northridge earthquake the access bridge experienced a permanent longitudinal displacement of 2.5 inches. This resulted in an expansion gap decrease at the high tower and an increase at Pier 2 (Stantec 2019). As a result of this damage, the bridge required repairs and was retrofitted in 1998. The retrofit measures were implemented to ensure the bridge would withstand future earthquake events. Several modifications were made to the access bridge, the most important being installation of retainer blocks at the girder bearings and restrainer cables tying together the girder ends. However, even with the previous retrofits, it has been determined the access bridge requires additional retrofits to make it seismically capable of withstanding a potential earthquake. Piers 2 through 4, and abutment 5 require the footing to be jacketed and strengthened to meet current seismic requirements.

## Construction Activities

In order to access the pier footings, the lake's surface elevation needs to be lowered from the normal operation elevation of 1,505 feet to approximately 1,380 feet. Pier 2 is the largest of the three piers and is located in the deepest portion of the lake. The drawdown would take approximately four months to bring the surface elevation to 1,380 feet to repair Pier 2. It is anticipated that it would take approximately six weeks to retrofit each pier.

A construction laydown area would likely be required within or near the western launch ramp parking lot. Construction activities would include clearing and grading an access road within the exposed lake bed to access each pier. Construction at each of the three piers would require excavation of the footings to apply a jacket around the pier for carbon fiber reinforcement**.** Construction equipment could include the following: excavators, backhoes, loader, dump trucks, crew trucks, concrete trucks, cranes, personal vehicles, compactor, delivery trucks, and a water truck.

Castaic Dam High Tower Access Bridge




Access Bridge Elevation

SOURCE: Department of Water Resources, 2019

DWR SoCal On-Call for Environmental Services - Castaic

**Figure 2**
Access Bridge

ESA

LAX\17xxxx\D170020.00 - DWR SoCal On-Call for Env Services\01 Active Contract Tasks\D170020.17_Castaic\05 Graphics-GIS-Modeling\Illustrator

Traffic entering and leaving the site could include daily personal construction worker vehicles, equipment deliveries, concrete deliveries, export of excavated spoils, and other construction-related traffic. Access to the site would be from I-5 to Lake Hughes Road to Ridge Route Road to West Ramp Road, which ends at the west ramp parking lot. The west launch ramp would be

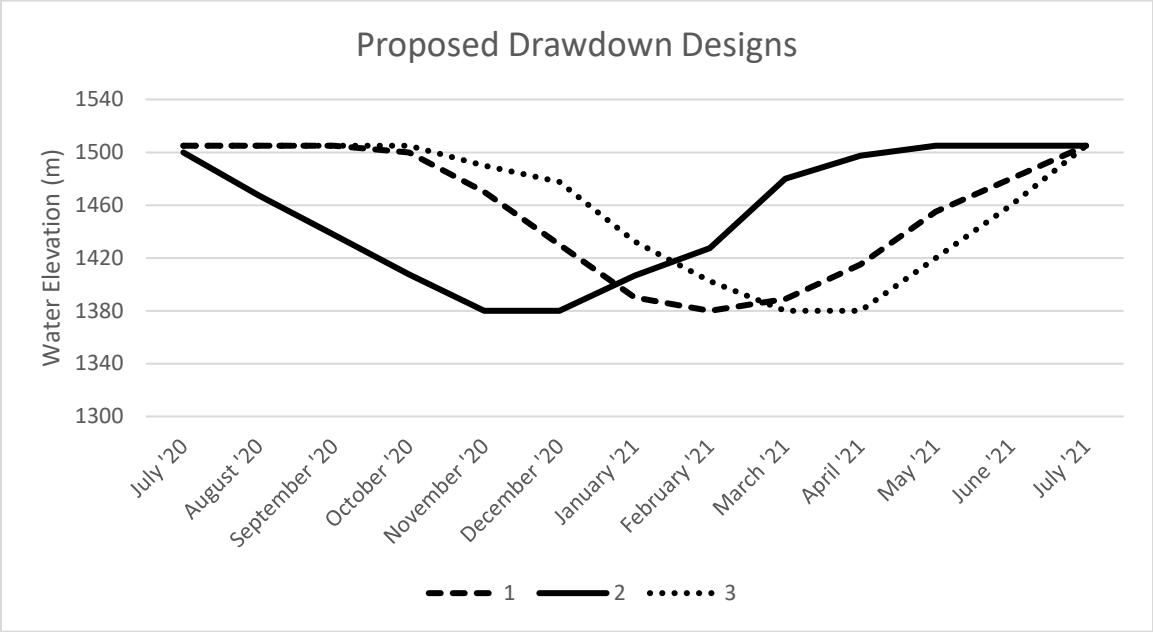
closed during the retrofit due to the lake level. The ramp extends to an elevation of 1,435 feet and at the lowest point of the drawdown to 1,380 feet, the ramp would be out of the water.

## Schedule Scenarios

DWR is considering three drawdown schedule scenarios to conduct the repair work. The three scenarios are described below and are shown on **Figure 3**.

- **Scenario 1**: Scenario 1 would begin drawdown on September 15, 2020 and would reach an elevation of 1,380 feet by January 15, 2020. The lake would remain at the lowered lake level through March 1, 2020, at which time refilling of the lake would begin. The lake would return to its normal operating elevation (1,505 feet) by June 15, 2020. The duration of the drawdown, construction and refilling of the lake would encompass approximately nine months.
- **Scenario 2:** Scenario 2 would begin drawdown on June 1, 2020 and would reach an elevation of 1,380 feet by November 1, 2020. The lake would remain at the lowered lake level through December 15, 2020, at which time refilling of the lake would begin. The lake would return to its normal operating elevation (1,505 feet) by May 1, 2020. The duration of the drawdown, construction and refilling the lake would encompass approximately ten months.
- **Scenario 3:** Scenario 3 would begin drawdown on October 15, 2020 and would reach an elevation of 1,380 feet by January 1, 2020. The lake would remain at the lowered lake level through April 15, 2020, at which time refilling of the lake would begin. The lake would return to its normal operating elevation (1,505 feet) by June 15, 2020. The duration of the drawdown, construction and refilling the lake would encompass approximately nine months.

**FIGURE 3. PROPOSED DRAWDOWN SCENARIOS**




# 3.0 Local Setting

The following describes the existing setting for aquatic biological resources, water quality, recreation, and operations at Castaic Lake.

## Existing Aquatic Biological Resources

### Fishes

The fish community at Castaic Lake is dominated by non-native, warm water species, however, several native species are also present. Non-native, warm water species found in Castaic Lake include largemouth bass (*Micropterus salmoides*), smallmouth bass (*Micropterus dolomieu*), bluegill (*Lepomis macrochirus*), green sunfish (*Lepomis cyanellus*), black crappie (*Pomoxis nigromaculatus*), white crappie (*Pomoxis annularis*), striped bass (*Morone saxatilis*), channel catfish (*Ictalurus punctatus*), white catfish (*Ameiurus catus*), brown bullhead (*Ameiurus nebulosus*), common carp (*Cyprinus carpio*), goldfish (*Carassius auratus*), golden shiner (*Notemigonus crysoleucas*), threadfin shad (*Dorosoma petenense*), inland silverside (*Menidia beryllina*), bigscale logperch (*Percina macrolepida*), and shimofuri gobi (*Tridentiger bifasciatus*). Native species at Castaic Lake include Sacramento blackfish (*Orthodon microlepidotus*), tule perch (*Hysterocarpus traskii*), hitch (*Lavinia exilicauda*), and prickly sculpin (*Cottus asper*). Castaic Lake also contains hatchery rainbow trout (*Oncorhynchus mykiss*), a cold water species. No federal or state-listed species are present in Castaic Lake.

Largemouth bass and bluegill were the most abundant species sampled during by the California Department of Fish and Wildlife (CDFW) during surveys in spring (May) and fall (October) of 2013 (CDFW 2013). Due to their abundance and recreational importance, these species as well as

striped bass and rainbow trout are the focus of this analysis, and are representative of the overall aquatic ecosystem.

## Largemouth Bass

### *Preferred Habitat*

Largemouth bass are non-native to California, but were introduced in 1891 to serve as a game fish (Dill and Cordone 1997). Today, largemouth bass are widespread and common in lakes, reservoirs, creeks, estuaries, and large rivers throughout California. Largemouth bass prefer shallow water (generally less than 6 meters deep) with substrates of silt and sand. The littoral zone (shallow area of light penetration) often has high species diversity and is where fish reproduction and development occur (Cooke et al. 2005). Preferred largemouth bass habitats have little water current, slight to moderate water clarity, and moderate densities of aquatic vegetation (Moyle 2002).

### *Diet*

Largemouth bass are pursuit and ambush predators that forage during daylight hours but are most active at dusk. In general, juvenile largemouth bass diets consist of zooplankton and insect larvae. As largemouth bass mature, diets shift to larger macroinvertebrates and fish. Adult largemouth bass are primarily piscivorous and consume a wide variety of small-bodied and juvenile fish, including other largemouth bass.

### *Reproduction*

Largemouth bass spawning starts in March or April when water temperatures reach 59-60 degrees Fahrenheit (°F) and continues through June in water temperatures up to 75°F. Nests are generally constructed in shallow water, often around 1 m deep, in sand, gravel, or debris-littered substrates. (Moyle 2002). Spawning is initiated by a female approaching a nest. A mating pair will circle the nest, settle into the nest, and release their eggs and milt simultaneously. A female may spawn again with the same or other male largemouth bass. The fertilized eggs adhere to the nest and hatch 2-7 days later. Offspring stay in the nest for 5-8 days before they become free swimming, and will remain guarded by the male for another 2-4 weeks. The spawning and rearing period for an individual largemouth bass lasts about a 6-8 weeks**.**

## Bluegill

### *Preferred Habitat*

Bluegill are non-native to California, but were introduced sometime in the late 1890's to early 1900's as both a food fish and sport fish (Dill and Cordone 1997). Today, bluegill are common in lakes, reservoirs, creeks, estuaries, and large rivers across the state (Fuller and Cannister 2019). Bluegill prefer environments with rooted aquatic vegetation over substrates of silt, sand, or gravel.

### *Diet*

Bluegill are mostly predatory, but highly opportunistic feeders that commonly feed on zooplankton, insects and insect larvae, fish and fish eggs, and sometimes algae and aquatic plants if other food sources are scarce.

### *Reproduction*

Bluegill typically spawn in the spring when water temperatures reach 64-70°F (Moyle 2002). Bluegill are colonial nest builders. Males construct nests in shallow water by creating depression in the sediment and adding leaves or twigs. Typical spawning occurs over gravel, sand, or mud. When a female is ready to spawn she approaches the nesting colony and is courted by a male and led back to his nest. Females release about a dozen eggs into a nest which are quickly fertilized by the male. Males use the same nest to spawn with multiple females, and females may spawn with multiple males within the colony. Breeding for a colony typically occurs within the span of a day, ensuring that all the young emerge around the same time. Developing embryos are guarded by the male for 2-3 days until they hatch, after which the male guards the young for several days.

## Striped Bass

### *Preferred Habitat*

Striped bass are non-native to California, but were introduced in the early 1879 as both a food fish and sport fish (Dill and Cordone 1997). The striped bass is now abundant from the San Francisco Bay into the Sacramento-San Joaquin Delta and upstream in most major rivers and creeks below barriers. Striped bass have also been planted in a number of reservoirs across California. It is likely that the striped bass in Castaic Lake were transported via the California Aqueduct and the associated water conveyance systems (Moyle 2002). Striped bass are anadromous. Adults regularly move between salt and fresh water spending most of their lives in estuarine environments if they are not impeded by infrastructure.

### *Diet*

Striped bass are pelagic predators, often traveling and feeding in groups. Larval and juvenile Striped bass feed mostly on invertebrates, but become increasingly piscivorous as they mature. Striped bass will feed on almost any fish or invertebrate within their environment.

### *Reproduction*

Striped bass spawning takes place when water temperatures are between 59-68°F. In California, spawning may begin as early as March and typically peaks from May into early June (Moyle 2002). Typically, striped bass spawn in masses and in areas with slight current. Once the eggs are fertilized they float downstream, suspended just off the substrate as they float (Moyle 2002). Evidence from multiple reservoirs across the nation has shown that striped bass are capable of successfully reproducing in reservoir systems. In these systems, striped bass eggs will hatch if they are not subjected to suffocation by silt or water quality (Bayless 1967). It is possible, but uncertain if the population of striped bass in Castaic Lake is a breeding population. It is also

possible that the population is, at least in part, sustained with fish entering from the California Aqueduct.

## Rainbow Trout

### *Preferred Habitat*

Rainbow trout are native to the Pacific states, from Alaska down to Mexico. They naturally occur in cool, clear, fast-flowing streams with an abundance of invertebrate life. Rainbow trout are commonly raised in hatcheries and planted throughout California for recreational purposes. CDFW typically plants rainbow trout in Castaic Lake from autumn to spring depending on water temperature and flow criteria. In 2019, rainbow trout were planted twice; once between 2/17/2019 – 2/23/2019 and a second time during 4/28/2019 – 5/4/2019.

### *Diet*

Rainbow trout feed on a variety of terrestrial insects, adult and emergent aquatic insects, aquatic insect larvae, amphipods, snails, and small fish, but diet is largely based on prey availability (Moyle 2002). In lakes and reservoirs rainbow trout feed primarily on benthic invertebrates and zooplankton, but become increasing pisivorous as they mature.

### *Reproduction*

Rainbow trout life history and reproductive strategy is highly variable and depends on a multitude of factors from genetics to their environmental conditions. Rainbow trout planted in Castaic Lake are considered put-and-take trout, meaning they are hatchery trout raised with the goal of being caught by recreational anglers. Butler and Borgeson (1965) revealed that most planted trout are caught within two weeks of being planted. Therefore, it is unlikely that rainbow trout reproduce in Castaic Lake. If Castaic Lake Rainbow Trout were to spawn, spawning would occur in the small creeks terminating in the lake. Mature adults would likely swim into tributaries during summer to spawn in cool, clear, fast-flowing waters, following a typical spawning pattern of lake resident trout.

## Other Fish Species

There are a number of other fish species that occur in Castaic Lake, such as white catfish, channel catfish, and a suite of California native species. Spawning for most or all of these species is likely to occur from spring into summer. A fall electrofishing survey by CDFW reported low abundances for all species, except largemouth bass and bluegill.

## Primary Producers and Invertebrates

Documentation and abundance of primary producers (macrophytes, phytoplankton, and algae) and benthic invertebrate species occurring in Castaic Lake is limited. However, these species play a critical role in the health of any aquatic ecosystem by cycling nutrients and acting as a food resource for larger organisms, such as fish.

The bulk of existing knowledge on invertebrate species in Castaic Lake is restricted to quagga mussels (*Dreissena rostriformeis*). Due to their invasive and destructive ecology, quagga mussels

are closely monitored through a vessel inspection program and monthly monitoring events at Castaic Lake. In 2016, a handful of individuals were discovered in 2016 within the Pyramid and Castaic Lake complex, triggering a series of inspections and surveys. A water drawdown, such as those proposed single drawdown event, is unlikely to have any long term impacts on quagga mussels. However, repeated reservoir drawdowns have been used as a control measure on invasive mussels by inducing mortality through desiccation and exposure (Nalepa and Schloesser 2014).

## Water Quality

Water levels at Castaic Lake fluctuate annually to accommodate water supply for municipal, recreational, industrial, agricultural, and environmental uses in southern California. Fluctuations are typically annual, and seasonally repetitive, regulated by standard operations. Lake surface elevations are highest in the winter and spring, and drop during the summer and fall. This project, proposes reducing water levels at Castaic Lake beyond typical operations. A reduction in water elevation could cause potential impacts to water quality. A single, short-term event to lower the water level at Castaic Lake could cause short-term fluctuations in water temperature, dissolved oxygen, and turbidity within the lake but would not likely have long term effects on water quality.

Below is a summary of the key water quality parameters evaluated.

**Water Temperatur**e. Water temperature plays an important role in biological activity and growth, and water chemistry. Biological organisms such as fish, insects, zooplankton, and phytoplankton have preferred temperatures ranges. When temperatures fluctuate too far above or below these ranges, it can impact organism's metabolism, growth, and reproduction. Water chemistry is also influenced by water temperature.

**Dissolved Oxygen.** Water temperature can inversely affect dissolved oxygen concentrations. Oxygen solubility decreases as water temperatures increase. This relationship is important because an increase in water temperature may reduce the amount of dissolved oxygen available for aquatic organisms that depend on it. Similarly, at warmer temperatures, the metabolic rate of an organism increases but less oxygen is available. Dissolved oxygen comes from the atmosphere and from photosynthesis of aquatic plants. Surface water, where the water and atmosphere interact, generally has the highest concentration of dissolved oxygen. Dissolved oxygen is lower at greater depths. Warm and cold water fish species are sensitive to dissolved oxygen levels, preferring levels above 5mg/l and 6.5 mg/l, respectively (USEPA 1986). Dissolved oxygen levels below 3mg/l for several days may be lethal. Invertebrates also showed responses to dissolved oxygen below 2 mg/l.

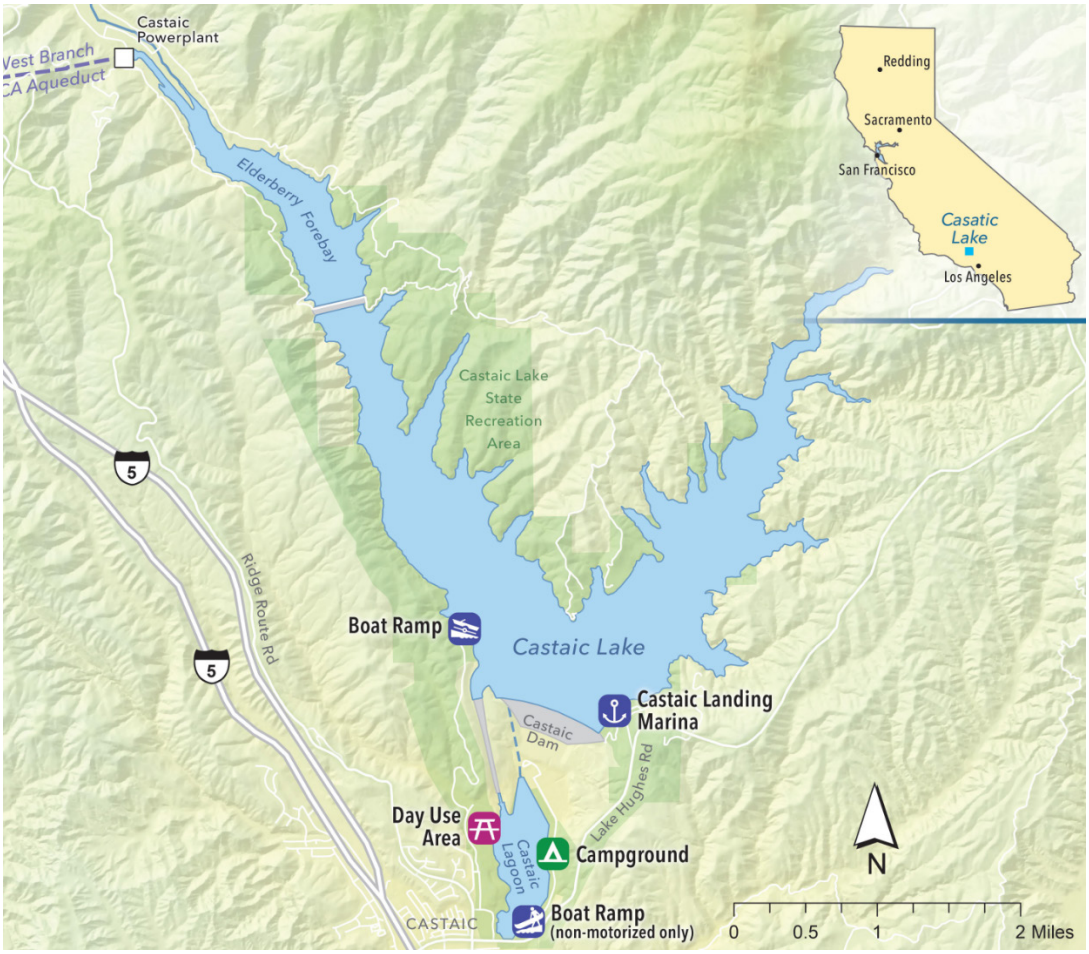
**Water Clarity.** Turbidity is a measurement of suspended material in the water and is used to describe water clarity. Factors that may influence water clarity include but are not limited to abundance of algae, zooplankton, and suspended sediment. Turbidity is often measured with a secchi disk. A secchi disk is lowered into the water column until it is no longer visible from the surface. The point at which the disk is no longer visible, is a function of the lake clarity; a high secchi reading indicates more water clarity, a low secchi reading indicates less water clarity.

**Stratification.** Deep lakes and reservoirs often experience stratification of water quality variables at different depths. Thermal stratification, vertical differences in water temperature, is usually seasonal. In summer, the surface layers, including the littoral zone are warmer than deeper layers. Thermal stratification is lessoned and water temperatures become more uniform in colder months and when lake water elevations are lowered (Wetzel 2001).

## Recreational Activities

Castaic Lake is located within the Castaic Lake State Recreation Area (SRA) which is operated by California State Parks and provides areas for hiking, horseback riding, biking, boating, fishing, and camping. Castaic Lake SRA features two lakes: Upper Lake and Lower Lake (lagoon). The Upper Lake has two launch ramps (west and main launch ramps) and is used for boating within various waterways and coves, wake boarding, jet skiing, and fishing (**Figure 4**). The Lower Lake has a launch area for kayaks, float tubes, and other non-gasoline boating activities, picnic areas, fishing, and a swim beach during the summer months.

**FIGURE 4. LAUNCH RAMP LOCATIONS**



## Boating

The Upper Lake provides 2,235 acres for motorized watercraft opportunities at the SRA, mainly along its west arm, dedicated to activities such as water skiing, wakeboarding, and other towable watercraft. The west launch ramp is used as a seasonal ramp which could reach a lowest elevation of 1,435-feet with a capacity of 6 full lanes of traffic. The main launch ramp could reach a lowest elevation of 1,325-feet with a capacity of 18 full lanes of traffic. Aluminum boats are available for rent at the main launch ramp. An approximately 1-mile area in front of the dam is dedicated to personal watercraft (e.g. jetski). The Lower Lake has one launch ramp, for non-motorized boating activities.

## Fishing

The Upper Lake has 29 miles of shoreline available to shoreline fisherman. The east arm of the Upper Lake is dedicated to fishing, but fishing is also allowed in the west arm coves and shoreline, and along the dam. The CDFW seasonally stocks Castaic Lake with rainbow trout from autumn to spring. In addition to the stocked trout, several other species are present within the lake, including largemouth bass, bluegill, striped bass, catfish, and crappie.

Additional recreational opportunities occur during the summer months, the majority of which are held at the lower lake. Events scheduled for the Upper Lake include an Annual Fishing and Fun Day for Kids in May, which is one of the lake's largest single-day draws, and Moonlight Madness Fishing at the Upper Lake's main launch ramp, which occurs once per month from May through September.

### *Fishing Tournaments*

Castaic Lake is well known for its largemouth bass fishing tournaments. Six of the top 25 largemouth bass ever recorded have come from Castaic Lake, with four in the top ten. Several bass fishing clubs, including Castaic Bass Federation, Castaic Bass Club, American Bass, and National Bass West hold tournaments at the lake. For the 2019 season, 18 tournaments were scheduled by these clubs encompassing 10 months (no tournaments were listed in October or November), with the majority of the tournaments held March through August.

# Operations at Castaic Lake

DWR's Standing Operating Order provides operational instructions and defines limitations of Lake/Reservoirs and notifications to be made during normal adverse conditions. A Winter Operations Mode (January 1st through March 1st) dictates that maximum water levels shall not exceed elevation 1485.5 feet in order to avoid activation of the Castaic spillway during a 100-year event and reduce the likelihood and duration of flows through the spillway.

The following operational procedures pertaining to water surface variations are also outlined as requirements of the Standing Operating Order:

| Timeframe | Water Surface Variations |
|---|---|
| March 1st to September 15th | Shall not exceed 7 feet during each 7-day period, or 2 feet each day |
| April 1st to April 30th | Shall not exceed 4 feet during each 7-day period or 2 feet each day |
| May 1st to September 15th | Total drawdown is limited to 90 feet |

Source: DWR Standing Operating Oder PC 500.27, 2019

In 2015, prolonged drought conditions forced Castaic Lake levels to be reduced below normal operating levels. Castaic Lake water levels in 2015 ranged from 1,375 feet to 1,404 feet, with the water levels maintained below 1,390 feet for approximately 5 months and water levels below 1,380 feet for approximately 42 days. The average annual operating level in 2015 was 1,390 feet with a surface area of approximately 1,130 acres at the lowest elevation. The average surface area during 2015 was 1,252 acres. In comparison, the average operating level in 2014 was 1,445 with a lowest elevation of 1,378 feet in September with an average surface area of 1,672 acres. In March of 2016 the average operating level was 1,453 feet and the lowest level was 1,374 feet in March with an average surface area of 1,729 acres. 2019 water levels ranged from 1,477 feet to 1,507 feet with an average surface area of 2,065 acres. See **Table 1** below:

**Table 1**
**Multiyear Operational Conditions**

| Operating Year | Lowest Operating Elevation (feet) | Average Operating Elevation (feet) | Days Operated below 1,380 feet | Average Annual Surface Area (acres) |
|---|---|---|---|---|
| 2014 | 1,378 | 1,445 | 13 days | 1,672 |
| 2015 | 1,375 | 1,390 | 42 days | 1,252 |
| 2016 | 1,374 | 1,453 | 1 day | 1,729 |
| 2019 | 1,477 | 1,495 | 0 day | 2,065 |

Source: DWR 2019

# 4.0 Impacts Discussion

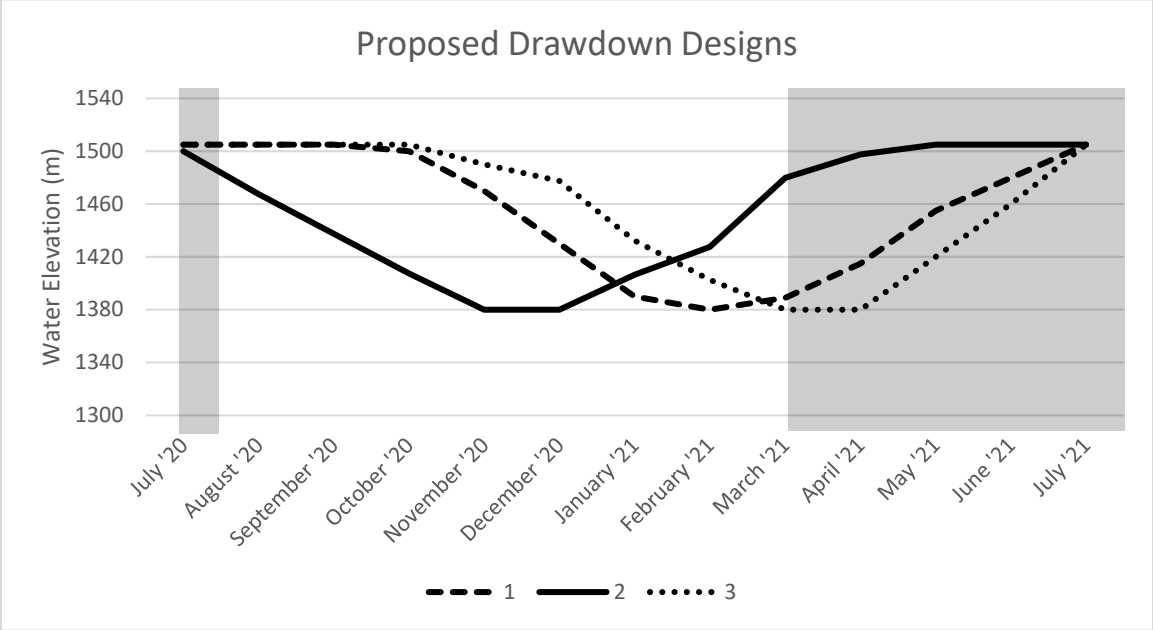
The following discussion provides an analysis related to aquatic biological resources (including water quality impacts) and recreational resources comparing each of the three drawdown scenarios.

# Potential Direct Impacts to Aquatic Biological Resources

The lowering of the reservoir's surface elevation would decrease the overall aquatic habitat area in the reservoir. However, short-term drawdown and subsequent re-flooding is not likely to have long term effects on reservoir fish communities so long as the lowered condition provides sufficient area and water quality to maintain habitat values for the variously sized fish (Chizinski et al. 2014). The proposed drawdown would lower water levels similar to a recent drawdown event in 2015 caused by state-wide drought conditions. The lower water elevation of 1390 feet was sustained for a period of over 12 months, and appeared to maintain habitat area and water depths sufficient for the existing fish populations. No documentation of fish overcrowding, significant population declines, or fish kills were identified.

Lowered water levels from March through July would reduce the amount of littoral habitat available for largemouth bass and bluegill during their spawning season and therefore, could have a potential short term impact on those fisheries. As shown in **Figure 5**, proposed drawdown Scenario 2 would limit impacts to the reproduction of fishes that spawn in the littoral zone, by minimizing low water levels in spring. Scenarios 1 and 3 would reduce littoral habitat during spring spawning seasons, likely leading to greater impact to spawning habitat in the littoral zone compared to Scenario 2. Under Scenarios 1 and 3, the reservoir would not re-fill to capacity until July, likely leading to much of the historic littoral zone spawning habitat being dry during peak spawning months of April and May. Any spawning activities that do occur during lower water levels would be inundated by returning water levels. Therefore, reservoir drawdowns in Scenarios 1 and 3 could cause at least a partial year-class failure for spawning Largemouth Bass and Bluegill.

**FIGURE 5. WATER ELEVATIONS THROUGHOUT PROPOSED CONSTRUCTION PERIOD.**




Shaded region indicates approximate timing of Largemouth Bass and Bluegill spawning.

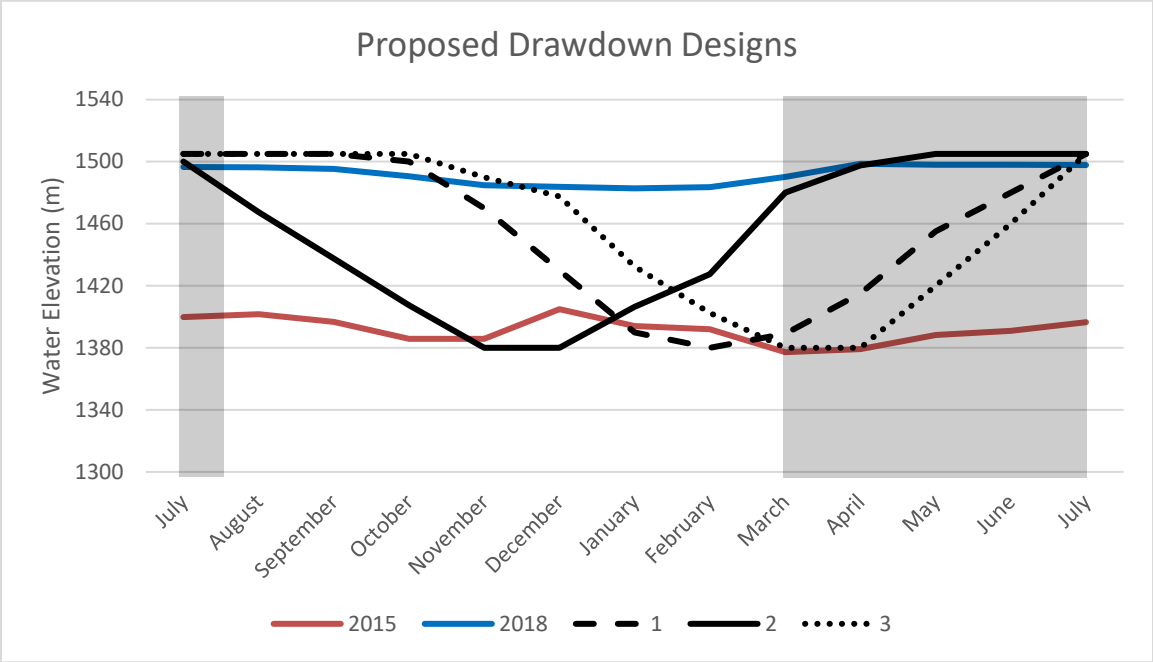
Loss of submergent aquatic vegetation could constrain warm water species, such as largemouth bass and bluegill, by reducing structure and habitat, as well as, reducing populations of invertebrates that the fish feed on (Wilcox and Meeker 1992). However, aquatic vegetation densities in Castaic Lake are low, potentially due to normal facility operations and the accompanying changes in surface elevation of the lake (CDFW 2013). The aquatic ecosystem would recover over time, adjusting to re-stabilized water levels.

Changes in phytoplankton and benthic algae as a result of a drawdown are difficult to predict because they are understudied, and existing studies show contrasting results (Carmignani and Roy 2017). Grimas (1965) found that biomass and density of aquatic benthic invertebrates are often lowest in lakes with drawdown amplitudes greater than three meters, but there are many factors that influence benthic invertebrate populations including lake morphometry, benthic algae distribution and availability, macrophyte density/biomass, substrate characteristics, and organic matter. In some instances, winter drawdowns have resulted in decreased invertebrate densities initially, but within several months the densities rebounded to pre-drawdown densities (Carmignani and Roy 2017).

## Potential Impacts to Water Quality

As shown in **Figure 6**, the proposed drawdown level is similar to the water elevation experienced during the 2015 drought. Therefore, water quality conditions experienced during 2015 provide a good proxy for proposed drawdown conditions. A comparison of measured water temperature, dissolved oxygen, and turbidity in Castaic Lake during 2015 and 2018, a non-drought year, were used to investigate potential constraints on water quality during the three proposed drawdown scenarios. Comparisons in water quality conditions in the littoral zone and throughout the water column were made between years.

**FIGURE 6. WATER ELEVATION OF PROPOSED SCENARIOS AND MEASURED WATER ELEVATIONS DURING 2015 AND 2018.**




Shaded region indicates approximate timing of Largemouth Bass and Bluegill spawning.

## Littoral Zone Water Quality

Water quality measurements collected twice a month at Castaic Lake provide a good data set to evaluate water quality impacts. Water quality summaries below use the average monthly measurement at 2 meters depth to look at monthly patterns in the littoral zone between 2015 and 2018. A depth of 2 meters was used to summarize water quality data because sunlight is able to penetrate to the substrate at least 2m deep during standard water operations.

Water temperatures in the littoral zone were similar across months in 2015 and 2018. In both years, water temperatures in the littoral zone were lowest during winter months, reaching a lowest monthly average of 12.4°C and 13°C in 2015 and 2018, respectively. Water temperatures steadily increased through spring (**Figure 7a**).

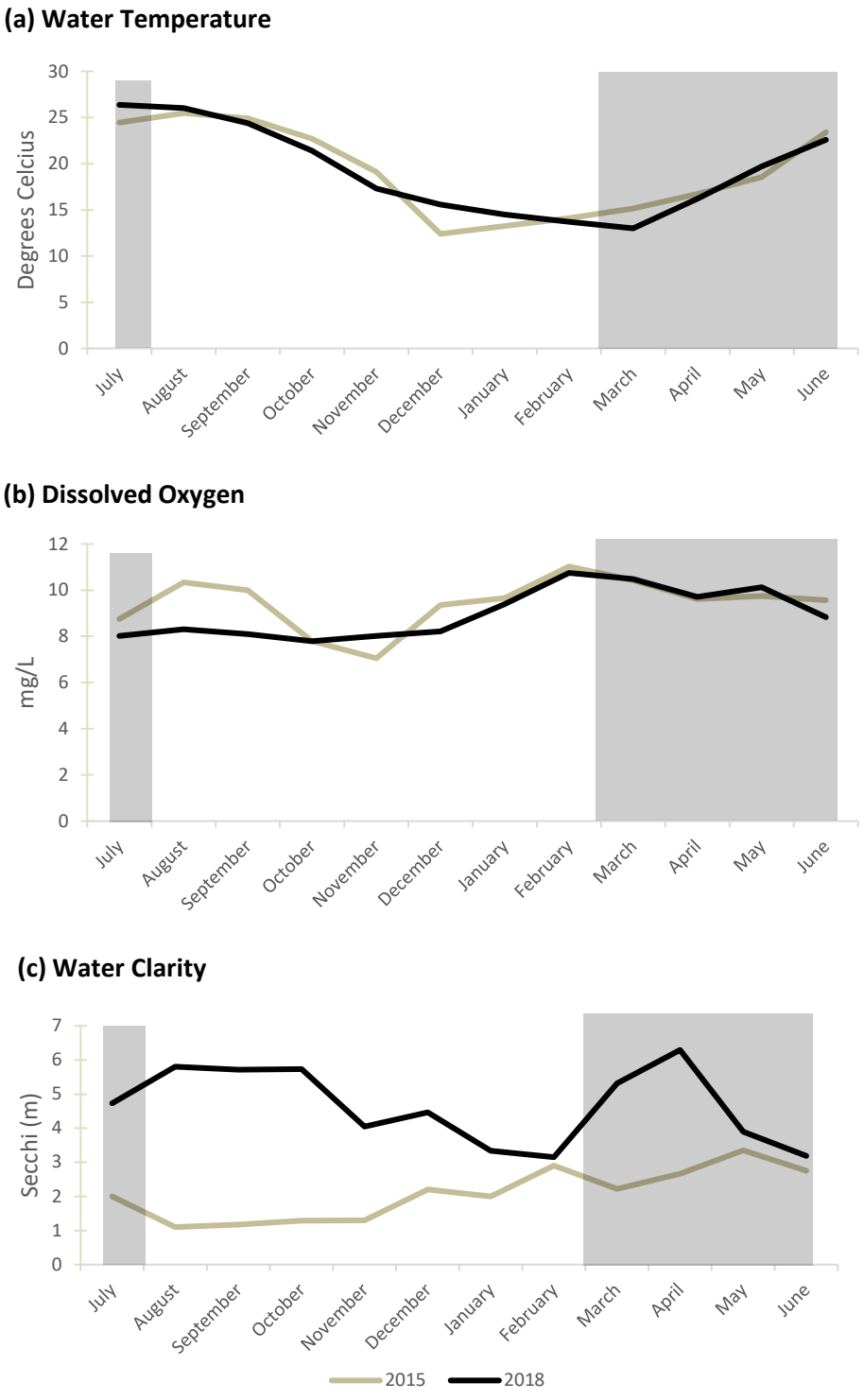
Dissolved oxygen in the littoral zone was similar in most months in 2015 and 2018 (**Figure 7b**). In both years, dissolved oxygen in the littoral zone was lowest during winter months. Dissolved oxygen is naturally low in winter from reduced photosynthesis and lower respiration demand from aquatic organisms (Carmignani and Roy 2017).

During the 2015 drought year, water clarity in the littoral zone was lower in all months compared to standard operations in 2018 (**Figure 7c**). Decreased water quality in 2015 was likely due to re-suspension of sediments from banks during reduced water elevations.

Therefore, the most significant impact to littoral zone water quality due to the proposed drawdown would likely be decreased water clarity due to re-suspension of bank sediments. Decreased water clarity could modify light penetration and thus primary production, suffocate larval fish as sediment particles settle, and clog or damage gill structures and impair respiratory

and feeding abilities of fish. While it is possible that increased turbidity would continue beyond the scheduled drawdown period, changes to water clarity would likely be temporary and return to normal once the drawdown period ended.

**FIGURE 7. AVERAGE WATER QUALITY MEASUREMENTS AT 2 METERS DEPTH IN 2015 AND 2018.**




Shaded region indicates approximate timing of Largemouth Bass and Bluegill spawning.

## Stratification

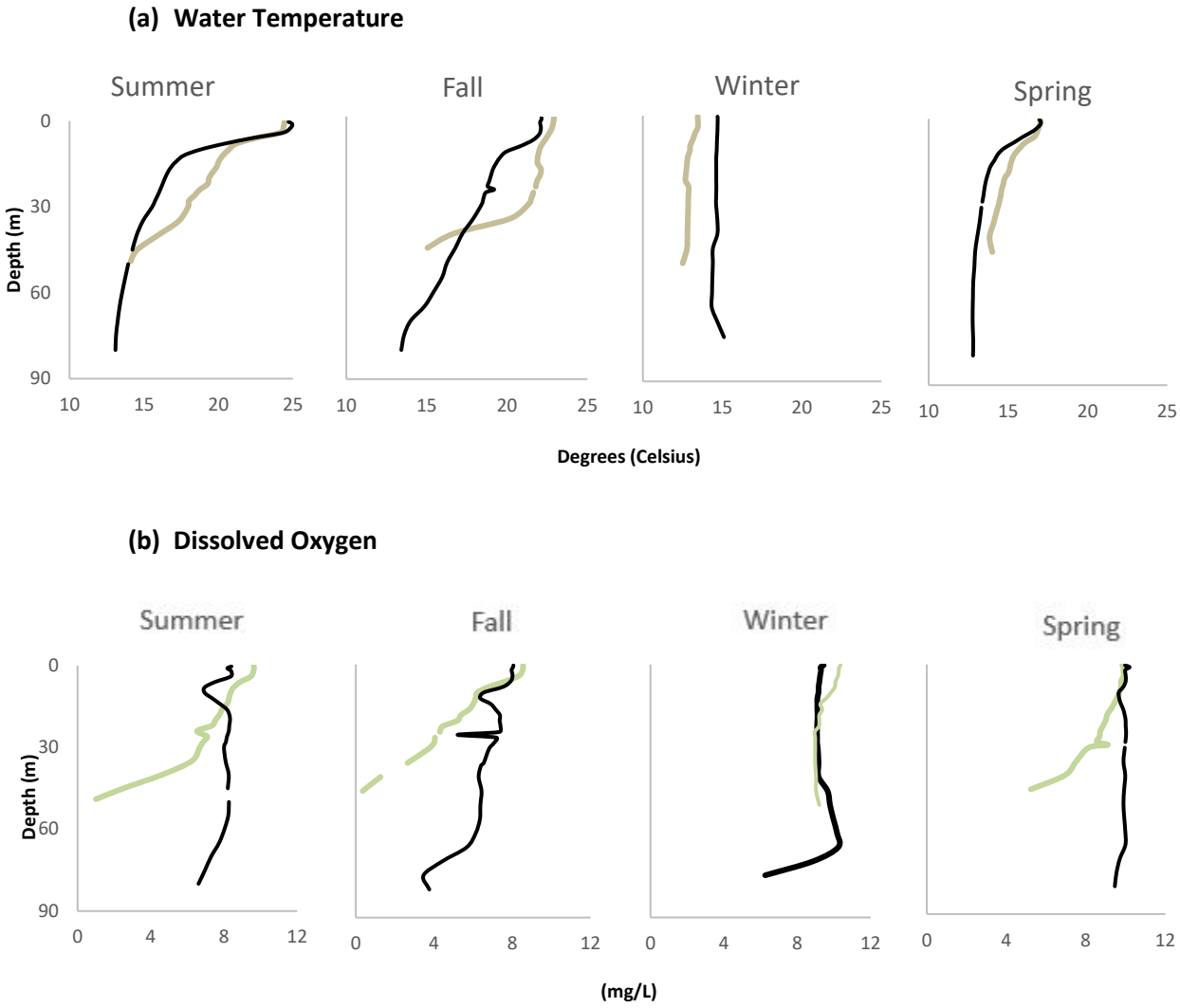
Vertical profile measurements for water temperature and dissolved oxygen were also recorded at Castaic Lake during 2015 and 2018 (**Figure 8**). The depth of vertical measurements indicates the depth of Castaic Lake during each year's sampling, with measurements as deep as 50m in 2015 and over 80m in 2018. For the purpose of this review, measurements were averaged seasonally, (summer includes June, July, and August; fall includes September, October, November; winter includes December, January, February; and spring includes March, April, May).

Thermal stratification was present in spring, summer, and fall of 2015 and 2018. Water temperatures at depths >5 m were warmer in 2015 than 2018 in spring through fall, while shallow water temperatures (< 5 m deep) were similar between years (**Figure 8a**).

Dissolved oxygen levels were generally lower in 2015 during spring through fall than dissolved oxygen levels at similar depths in 2018 (**Figure 8b**). This pattern is expected due to the observations of water temperatures (Figure 7a) and the inverse relationship between water temperature and dissolved oxygen. Dissolved oxygen levels were below 5 mg/l in summer and fall at the lowest depths (> 30 m) in 2015, while dissolved oxygen levels remained above 5 mg/l at nearly all depths in 2018 (Figure 7b). Dissolved oxygen levels lower than 5 mg/l would likely be unsuitable for any fish present in the benthic zone, and become lethal once levels go below 3 mg/l. In addition, benthic habitat likely became unsuitable for invertebrates in summer and fall, 2015, likely impacting food availability for pelagic fish species.

Proposed drawdown stratification similar to 2015 could lead to warmer water temperatures in spring through fall that may limit the volume of available cold-water habitat and displace cold water species like rainbow trout. Also, short-term suspension of rainbow trout planting may occur if water temperatures do not meet criteria. Low dissolved oxygen conditions in summer and fall could also impact invertebrate populations in the benthic zone, impacting food availability for pelagic species such as rainbow trout and striped bass. Therefore, unlike impacts for the littoral zone, proposed drawdown Scenario 2 would likely have the greater impact to pelagic zone species due to the drawdown occurring in summer and fall when impacts to pelagic zone temperatures and dissolved oxygen would be expected to be the greatest, while proposed drawdowns 1 and 3 would occur in the winter and spring, avoiding the warm weather months.

**FIGURE 8. SEASONAL VERTICAL PROFILE DATA OF (A) WATER TEMPERATURE AND (B) DISSOLVED OXYGEN IN 2015 (GREY LINE) AND 2018 (BLACK LINE).**




# Potential Impacts to Recreational Opportunities

Lowering of the water level would only occur within the Upper Lake and recreational activities conducted at the Lower Lake would not be impacted by the proposed project.

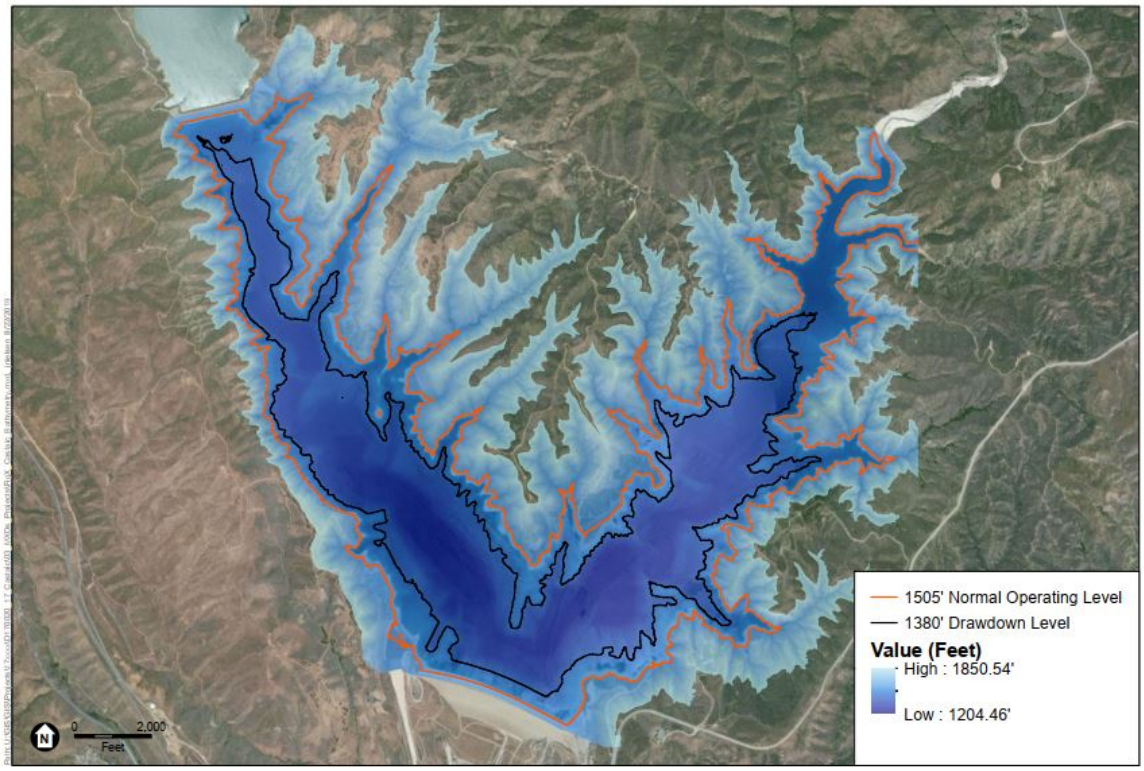
## Boating

Lowering of the water levels within the Upper Lake would reduce the surface area available for boating activities from the current area of 2,065 acres to approximately 1,130 acres, and therefore would reduce the number of boats allowed in the lake. In addition, reduced water levels could create shallow areas that would hinder the arms of the lake unusable for boat access. **Figure 9**

shows water level contours for the lake at normal operation of 1,505 feet and the proposed drawdown limit of 1,380 feet. The lake lowering past 1,435 feet would require the West Ramp to be closed, only leaving the Main Ramp available for boat launching during the drawdown. The reduction in water levels at the lake could reduce visitorship for motorized watercrafts and associated activities. This impact would be similar for all drawdown scenarios assuming visitorship is stable year-round.

It is likely that boating and water-related recreational activities are more prominent during the summer months when the weather is warmer. As such, boating activities would be impacted by drawdown Scenarios 1 and 3, as water levels would be reduced during the summer months of June through September.

**FIGURE 9. CASTAIC LAKE WATER LEVEL COMPARISON**



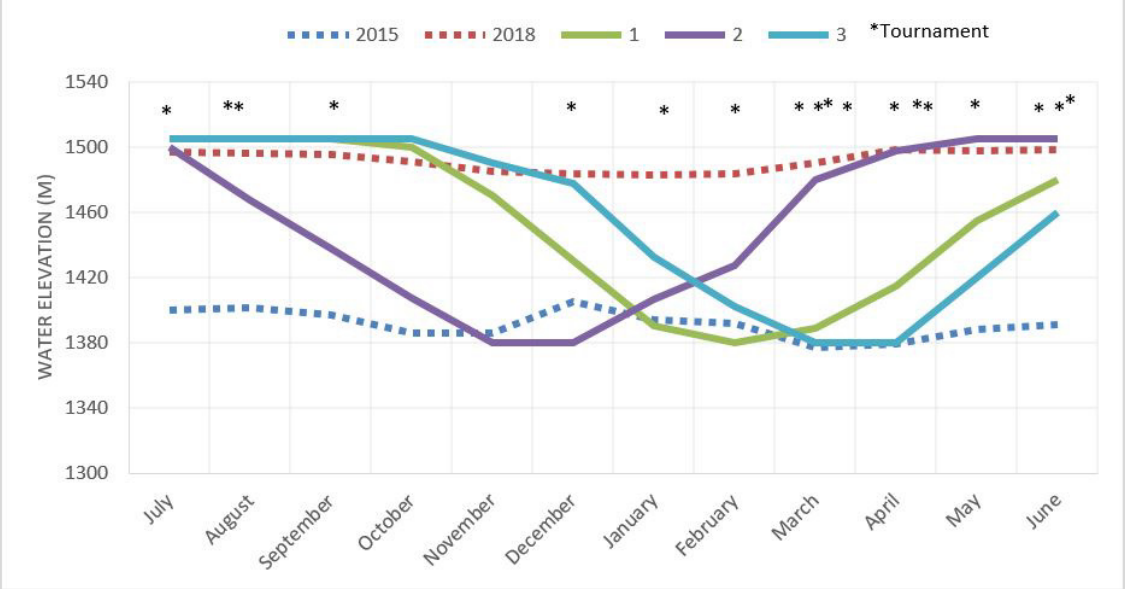

## Fishing

Reduced water levels would expose the bottom of the lake. These areas around the perimeter of the lakeshore would be comprised of soft, wet dirt. This could hinder shoreline fishermen from accessing fishing areas around the lake and increase the demand for fishing at the Lower Lake. Peak trout fishing season is considered to be from October through May and coincides with the CDFW stocking efforts. Lakeshore fishermen impacts would be similar for all drawdown months.

Recreational fishing opportunities at the lake such as the Annual Fishing and Fun Day for Kids and the Moonlight Madness Fishing would occur May through September. These activities would overlap with the water level drawdown in Scenarios 1 and 3.

As shown on **Figure 10**, several fishing tournaments were schedule in 2019, the majority of the tournaments are scheduled between March through August. The lake level would be lowered during these months for Scenarios 1 and 3. However, during the drawdown the lake conditions would be similar to the 2015 drought conditions which did not hinder the fishing tournaments. The Friends of Castaic Lake continued to host Largemouth Bass tournaments during the 2015 drought year (http://www.nationalbasswest.com/tournament-results/friends-of-castaic-tournament-results-2014-2015/focl-year-to-date/).

**FIGURE 10. PROPOSED DRAWDOWN SCENARIOS AND FISHING TOURNAMENT DATES**




## Other Recreational Activities

The lowering of the lake would not impact other recreational activities at the Castaic Lake, such as biking, hiking, camping, and horseback riding. However, construction access and staging requirements would result in boat ramp lane closures and temporary reduced parking availability. These access restrictions would be similar for each of the schedule scenarios. Although Scenario 3 may have the greatest impact due to the construction activities scheduled for the spring time.

# Potential Impacts to Operational Activities

Castaic Lake was built to provide emergency storage during a shutdown of the California Aqueduct to the north, assuring water deliveries to West Branch users. It also provides regulatory storage for deliveries during normal operations and recreational opportunities for Southern California. Metropolitan Water District of Southern California's (MWD) Foothill Feeder is part of the system that delivers water from Castaic Lake to Santa Clarita Valley Water (SCVW) for treatment and distribution for urban use.

Castaic Lake is bisected by the Elderberry Forebay Dam, which creates the adjacent Elderberry Forebay. The SWP aqueduct water comes from Pyramid Lake through the Angeles Tunnel and is used to power Castaic Power Plant, a pumped-storage hydroelectric facility on the northern end of the forebay. Water from the lake is distributed throughout the northern portion of the Greater Los Angeles Area. A portion of the water is released into Castaic Lagoon below the dam, to maintain its water level for recreation.

The Elderberry Forebay is separated from Castaic Lake by Elderberry Forebay Dam, located at the upper end of Castaic Lake and provides regulatory storage for Castaic Power Plant (operated by LADWP). During on-peak hours when the value of energy is high, water from Pyramid Lake, located north of Castaic, flows 7.5 miles through the Angeles Tunnel and the turbines of Castaic Power Plant to produce electricity. The water then enters Elderberry Forebay. During off-peak hours (nighttime and all day Sunday) when the cost of power is low, water stored in Elderberry Forebay is pumped back into Pyramid Lake.

The annual water level fluctuations at Castaic Lake. The lake surface elevations are highest in the summer and fall and drop during the winter and spring. In 2018, the surface elevations in the summer averaged 1,497 feet and the winter averaged 1,482 feet. The lowering of the lake during the winter months when temperatures are mild, days are shorter and the need for outdoor irrigation is minimal would reduce operational constraints on the ability for MWD to deliver water to SCVW and the operations of the Castaic Power Plant.

Scenario 3 would occur in the winter months when the demand for water and power is lower. While Scenario 1 and 2 would occur during the summer months when the demand on water and electricity is higher. Scenario 1 and 2 may result in operational constraints on MWD, SCVW and LADWP.

# Conclusion

The proposed project would lower the water levels at Castaic Lake over a 6 – 9-month period while repair work on the outlet tower bridge is conducted. None of the three proposed schedule scenarios would result in a fatal flaw impact to biological resources, water quality, recreation or operations. Each scenario provides tradeoffs as described below.

The drawdown would reduce the amount of littoral (shallow area of light penetration) habitat available to aquatic organisms, potentially during spawning periods of introduced sport fishes such as the largemouth bass and bluegill. The lake is dominated by introduced fish species and does not support sensitive aquatic wildlife that could be subject to the federal or State Endangered Species Acts. Although the drawdown may affect the spawning success of introduced species during the construction year, the one-time event is unlikely to have a long-term impact to the ecosystem or vitality of the sport fishery. Scenario 2 would have the least impact to fish spawning, with the water levels returning to normal levels prior to spawning season. However, since Scenario 2 would begin lowering the lake in the summer and fall, higher water temperatures may occur in the shallower water that could stress the open water fishes. In any case, the aquatic

resources would be expected to recover from the temporary effects as the water levels return to normal levels.

The lowering of the lake would require limiting the number of boats allowed on the water at any one time due to the reduced surface area and the potential for submerged obstacles to be present. In addition, the West Boat Ramp would be closed during much of the construction period, limiting boat ramp access. This limitation could discourage recreational users and result in higher use at other local lakes. This may result in a loss of revenue for State Parks since recreational users would opt to go to other lakes while Castaic Lake is drawn down during the access bridge retrofit. Since boating activities typically correspond to the warmer months, Scenario 2 would be the most impactful since it occurs during the summer months.

In the past the largemouth bass tournaments occur year round and generally are not impacted by lake water elevations. During the 2015 drought the lake was at historic lows and the organized tournaments proceed as scheduled. However, generally fewer tournaments are scheduled in the winter months and the majority of the tournaments are held in March through August. Nonetheless, each of the scenarios would overlap lower water levels with the majority of scheduled water recreational activities.

Construction access constraints could impact the use of the picnic areas and the hiking, biking and horse trails that meander throughout the hillside on the west side of the lake. These recreational areas are used year round. Construction associated with the bridge retrofit would be similar for each of the drawdown scenarios.

# APPENDIX C

## Cultural Resources Assessment

***Confidential***

**Confidential – Not For Public Distribution**

# California Department of Water Resources Castaic Dam High Intake Tower Bridge Retrofit Project

## Cultural Resources Assessment Report

Prepared for
California Department of Water Resources
Division of Environmental Services
3500 Industrial Boulevard
West Sacramento, California 95691

January 2020

ESA

**Confidential – Not For Public Distribution**

# California Department of Water Resources Castaic Dam High Intake Tower Bridge Retrofit Project

## Cultural Resources Assessment Report

January 2020

Prepared for:
California Department of Water Resources
Division of Environmental Services
3500 Industrial Boulevard
West Sacramento, California 95691

Prepared by:
ESA
626 Wilshire Blvd. Suite 1100
Los Angeles, CA 90017

Project Directors:
Monica Strauss, M.A., RPA
Amber Grady, M.A.

Report Authors:
Candace Ehringer, M.A., RPA
Katherine Cleveland, M.A.
Michael Vader, B.A.

Project Location:
Warm Springs Mountain (CA) USGS 7.5-minute Topographic Quad
Township 5 North, Range 17 West, Section 13

Acreage:
Area of Direct Impact – 5.71 acres
Area of Indirect Impacts – 1,019 acres

626 Wilshire Boulevard
Suite 1100
Los Angeles, CA 90017
213.599.4300
www.esassoc.com

| | |
|---|---|
| Irvine | Sacramento |
| Los Angeles | San Diego |
| Oakland | San Francisco |
| Orlando | Santa Monica |
| Pasadena | Seattle |
| Petaluma | Tampa |
| Portland | Camarillo |

D170020.17