## SOUTH SWP HYDROPOWER FERC PROJECT NO. 2426



## **OVERVIEW**

July 2021



State of California California Natural Resources Agency DEPARTMENT OF WATER RESOURCES



City of Los Angeles DEPARTMENT OF WATER AND POWER

## Contents

I.	INTRODUCTION					
П.	PROJECT LOCATION					
III.	WARNE POWER DEVELOPMENT					
	Quail Lake, Quail Lake Embankment, and Quail Lake Outlet6					
	Lower Quail Canal7					
	Peace Valley Pipeline Intake, Peace Valley Pipeline Intake Embankment, and Peace Valley Pipeline8					
	Gorman Bypass Channel9					
	Warne Power Plant and Switchyard10					
	Warne Transmission Line11					
	Primary Project Roads and Trails12					
	Recreation Facilities12					
IV.	CASTAIC POWER DEVELOPMENT13					
	Pyramid Dam and Lake13					
	Angeles Tunnel and Surge Chamber15					
	Castaic Penstocks16					
	Castaic Power Plant and Switchyard16					
	Elderberry Forebay Dam, Forebay, and Outlet17					
	Castaic Transmission Line20					
	Primary Project Roads and Trails20					
	Pyramid Lake Recreation Facilities20					
V.	PROTECTION, MITIGATION, AND ENHANCEMENT (PM&E) MEASURES					
	Geology and Soils (GS)23					
	Water Resources (WR)					
	Aquatic Resources (AR)24					
	Terrestrial Resources (TR)24					
	Recreation Resources (RR)24					
	Land Use (LU)25					
	Visual Resources (VR)25					
	Cultural Resources (CR)25					
VI.	General Integrated Licensing Process Flow Chart and Schedules					
	Integrated Licensing Process Flow Chart26					
	Post Final License Application (FLA) Filing Schedule27					
	FERC P-2426 Relicensing Schedule					

## I. INTRODUCTION

The Department of Water and Power of the City of Los Angeles (LADWP), a municipal corporation of the State of California, and the California Department of Water Resources (DWR), an agency of the State of California, hereinafter referred to as Co-Co-licensees, jointly hold the current Federal Energy Regulatory Commission (FERC) license P-2426 for the South State Water Project Hydropower Project, West Branch (SSWP).

Facilities associated with the SSWP, FERC license P-2426, are part of a larger water storage and delivery system, the State Water Project (SWP), which is the largest state-owned and operated water supply project of its kind in the United States. The SWP provides Southern California with many advantages, including affordable water supply, reliable regional clean energy, opportunities to integrate green energy, access to public recreation, and environmental benefits. Please refer to **Figure 1**.

The SSWP consists of two major power developments with a combined generation capacity of 1,350 megawatts (MW): the Warne Power Development and the Castaic Power Development.

The Warne Power Development, which includes Warne Power Plant and appurtenant facilities, is operated and maintained by DWR. The Castaic Power Development, which includes Castaic Power Plant and appurtenant facilities, is managed by LADWP and DWR, under the Contract for Cooperative Development West Branch, California Aqueduct, LADWP Contract No. 10099 (Cooperative Agreement), dated September 1, 1966.

Per the Cooperative Agreement, DWR manages the operation and maintenance of all facilities upstream of the Angeles Tunnel Surge Chamber including the Pyramid Lake recreation facilities, while LADWP manages the operation and maintenance of all facilities downstream of the Angeles Tunnel Surge Chamber, including the Surge Chamber.

The current FERC license P-2426 expires on January 31, 2022, and the Co-licensees have submitted a new relicensing application to FERC requesting to continue to operate the Warner Power Plant, the Castaic Power Plant, and other parts of the hydropower project for the next 50 years (hereinafter referred to as New License P-2426).



Figure 1. South SWP Hydropower Vicinity Map

## **II. PROJECT LOCATION**

The SSWP is located in northern Los Angeles County. For reference purposes, SSWP's boundary is shown in **Figure 2**. The boundary encompasses all pertinent lands and waters associated with all SSWP facilities and operations, including Project roads, and encloses those areas the Co-licensees found to conform to FERC requirements to "enclose only those lands necessary for operation and maintenance of the project and for other project purposes, such as recreation, shoreline control, or protection of environmental resources."



Figure 2. South SWP Hydropower, West Branch Map

## III. WARNE POWER DEVELOPMENT

Facilities and features of the Warne Power Development within the existing license include:

- (1) Quail Lake, Quail Lake Embankment and Quail Lake Outlet
- (2) Lower Quail Canal
- (3) Peace Valley Pipeline Intake, Peace Valley Pipeline Intake Embankment, and Peace Valley Pipeline
- (4) Gorman Bypass Channel
- (5) William E. Warne Power Plant (Warne Power Plant) and Switchyard
- (6) Warne Transmission Line
- (7) Primary Project Roads and Trails
- (8) Recreation Facilities.

These facilities are described below. DWR operates and manages all of the Warne Power Development facilities, with the exception of the Warne Transmission Line.

While the Warne Transmission Line is included as part of the Warne Power Development under the existing FERC license, it is a facility owned and operated by Southern California Edison (SCE). SCE's transmission line segment has never been a project work or included within the existing Project boundary, and was included in the original project license in error. The Co-licensees will not include any part of the SCE transmission line in the project boundary for the New License P-2426.

#### Quail Lake, Quail Lake Embankment, and Quail Lake Outlet

Quail Lake **Figure 3** is the uppermost facility of the project and is an off-stream impoundment located 5 miles southwest of the bifurcation of the East and West branches of the SWP, and about 23 miles northwest of the City of Santa Clarita. The Quail Lake Embankment (also known as State Highway 138, Primary Operating Road, and Secondary Operating Road Embankments) provides an operating road for Quail Lake.

The Quail Lake Outlet structure passes beneath State Highway 138. Quail Lake, with the Lower Quail Canal described below, serve as a forebay to the Warne Power Plant.



Figure 3. Quail Lake from the West Shore Looking East

## Lower Quail Canal

Water released from Quail Lake through the Quail Lake Outlet flows into Lower Quail Canal **Figure 4**. The 2-mile-long, concrete-lined canal serves as a conveyance to the Peace Valley Pipeline Intake and acts as a surge pond during startup of the Warne Power Plant until steady state flow is established from Quail Lake.



Figure 4. Lower Quail Canal Looking Downstream to Upstream

# Peace Valley Pipeline Intake, Peace Valley Pipeline Intake Embankment, and Peace Valley Pipeline

The Peace Valley Pipeline begins at the earth and rockfill Peace Valley Pipeline Intake Embankment, and extends about 5.5 miles to the Warne Power Plant penstock. The Peace Valley Pipeline Intake is formed by the Peace Valley Pipeline Intake Embankment **Figure 5**. The Peace Valley Pipeline is entirely underground extending to the Warne Penstock.



Figure 5. Peace Valley Pipeline Intake Embankment

## Gorman Bypass Channel

In the event of a Peace Valley Pipeline outage or should scheduled SWP water flow exceed the Peace Valley Pipeline's capacity, the water is routed through the Gorman Bypass Channel **Figure 6**, which connects the Lower Quail Canal to Pyramid Lake, bypassing the Peace Valley Pipeline and Warne Power Plant.



Figure 6. Gorman Bypass Channel Looking Northwest

Warne Power Plant and Switchyard

Warne Power Plant **Figure 7**, an aboveground, steel-reinforced, concrete powerhouse, is located at the northern (upstream) end of Pyramid Lake, at the terminus of the Peace Valley Pipeline. The power plant has two 38,250 kW Fuji Electric Pelton type turbines, each connected to a Toshiba generator. Each turbine has a rated head of 650 feet. The two, three-phase Toshiba electric generators each have a capacity of 39,100 kilovolt-amperes (kVA). The power plant has an installed capacity of 74,290 kW.



Figure 7. Warne Power Plant and Switchyard

The Warne Switchyard **Figure 7** is located immediately adjacent to the Warne Power Plant.

## Warne Transmission Line

The Warne Transmission Line **Figure 8** is a 2.95-mile-long, single-circuit, 220-kV transmission line constituting the portion of Southern California Edison's Transmission line that connects with the Warne Switchyard **Figure 7**. The line is owned and operated by Southern California Edison.



Figure 8. Warne Transmission Line

## Primary Project Roads and Trails

For the purpose of the FERC relicensing process, a Primary Project Road or Trail is any road or any trail that is identified in the license as a project facility, is used almost exclusively to access the project, is within the project boundary, and is exclusively operated and maintained by the Co-licensees as a project feature. This includes roads and trails associated with recreation facilities, but does not include designated parking areas that are considered part of the facility or features for which the parking area is provided.

These Primary Project Roads or Trails are part of the New License P-2426 boundary. For the Warne Power Development, the existing license does not include any Primary Project Roads and only one Primary Project Trail – the Quail Lake Fishing Access Path.

The Co-licensees are not adding new Primary Project Trails. However, under the New License P-2426, 22 Primary Project Roads will be included in the Warne Power Development boundary.

#### **Recreation Facilities**

Recreational amenities at the Quail Lake Day Use Area include a shoreline access path, gravel parking area, and three portable restrooms. Only non-waterbody contact recreation is allowed at the Quail Lake Day Use Area. No other recreation facilities are associated with the Warne Power Development.

## IV. CASTAIC POWER DEVELOPMENT

The features and facilities of the Castaic Power Development described in the following sections include:

- (1) Pyramid Dam and Lake
- (2) Angeles Tunnel and Surge Chamber
- (3) Castaic Penstocks
- (4) Castaic Power Plant and Switchyard
- (5) Elderberry Forebay Dam, Forebay, and Outlet
- (6) Storm Bypass Channel and Check Dams
- (7) Castaic Transmission Line
- (8) Primary Project Roads and Trails
- (9) Pyramid Lake Recreation Facilities

DWR manages the operation and maintenance of all existing Project facilities upstream of the Angeles Tunnel Surge Chamber including the Pyramid Lake recreation facilities.

LADWP manages the operation and maintenance of all existing Project facilities downstream of the Angeles Tunnel, including the Angeles Tunnel Surge Chamber. There are no recreation facilities within this portion of the Castaic Power Development. Public access to Castaic Power Plant and Elderberry Forebay is not permitted.

#### Pyramid Dam and Lake

Pyramid Dam, at the southern end of Pyramid Lake, is a 1,090-foot-long zoned earth and rockfill dam. Water can be released from Pyramid Lake into Pyramid reach through two spillways and a low-level outlet. The spillways are located on the right abutment of Pyramid Dam. **Figure 9** shows Pyramid Dam and spillways.



Figure 9. Pyramid Dam, Spillway, and Low-Level Outlet

Pyramid Lake serves as an upper reservoir and regulated storage for the Castaic Power Plant. The reservoir has a normal maximum surface area of 1,269.0 acres, a shoreline length of 21 miles, and a maximum depth of approximately 265.4 feet. **Figure 10** shows Pyramid Lake.



Figure 10. Pyramid Lake Looking South

## Angeles Tunnel and Surge Chamber

The Angeles Tunnel supplies Pyramid Lake water to the Castaic Penstocks that provide water to Castaic Power Plant in the generating mode and return water to the reservoir from Elderberry Forebay when the power plant is operating in pumping mode. The Angeles Tunnel is 7.2 miles long.

The associated surge chamber is 383 feet in height. A juncture structure connects the surge chamber to the Angeles Tunnel. **Figure 11** shows the surge chamber.



Figure 11. Angeles Tunnel Surge Chamber, Castaic Penstocks, Castaic Switchyard, and Castaic Power Plant from the East Looking West

## Castaic Penstocks

The Castaic Penstock assembly for the six units in Castaic Power Plant includes six 2,400-foot-long steel penstocks serving the six powerhouse units (Units 1 through 6). Unit 7 in the power plant is served by a separate penstock. **Figure 11** shows the penstocks.

## Castaic Power Plant and Switchyard

The Castaic Power Plant **Figure 11**, an aboveground/underground, steel-reinforced, concrete powerhouse, is located on the northern (upstream) end of Elderberry Forebay and is a pumping-generating plant with the ability to pump water back to Pyramid Lake when it is economical to do so. Elderberry Forebay serves as an afterbay or lower reservoir for Castaic Power Plant while in generating mode and as a forebay while in pumping mode.

Pyramid Lake serves as the upper reservoir of the power plant when the Castaic Power Plant is in generating mode.

Castaic Power Plant has six Voith Siemens Hydro, reversible pump/turbines and motor/generators, each with a capacity of 250,000 kVA. The six Francis units have a combined authorized installed generating capacity of 1,275,000 kW. In addition, the Castaic Power Plant includes one Alstom Pelton-type pump starting turbine unit (Unit 7) with a capacity of 70,000 kVA.

LADWP uses Castaic Power Plant to generate and to store energy when it determines it is the most economical and beneficial to the citizens of Los Angeles. Castaic Power Plant generates electricity when extra power is needed in the Los Angeles area. In addition, water is pumped from Elderberry Forebay to Pyramid Lake to store excess power, normally to support system stability and reliability when there is excess intermittent generation. The power plant pumps water from Elderberry Forebay back into Pyramid Lake for storage until it is needed for power generation.

The Castaic Switchyard **Figure 11** is a fenced switchyard located adjacent to the powerhouse.

#### Elderberry Forebay Dam, Forebay, and Outlet

Elderberry Forebay Dam **Figure 12**, is a 1,990-foot-long dam. Elderberry Forebay Dam forms Elderberry Forebay, which is located directly below Castaic Power Plant and serves as an afterbay when Castaic Power Plant is generating power and as a forebay when the plant is pumping water back to Pyramid Lake.



Figure 12. Elderberry Forebay Dam and Elderberry Forebay Looking East

Besides pump-back water to Pyramid Lake, water from Elderberry Forebay passes downstream into Castaic Lake, a non-Project facility via a spillway and an outlet.

The Elderberry Forebay Outlet Tower at Elderberry Forebay Dam consists of both highlevel and low-level facilities **Figure 13**.



Figure 13. Elderberry Forebay Outlet Tower looking Upstream into Elderberry Forebay from Elderberry Forebay Dam

#### Storm Bypass Channel and Check Dams

The Storm Bypass Channel is on Castaic Creek above Elderberry Forebay and includes a series of three check-dam basins with a total area of approximately 21 acres. The check-dam basins capture sediment runoff during high flow events to reduce the continued accumulation of sediment near the power plant and ensure the sustained efficiency of the Castaic Power Plant operation. **Figure 14** shows the Storm Bypass Channel and Check Dams.



Figure 14. Storm Bypass Channel and Check Dams

## Castaic Transmission Line

The existing Project includes the 11.4-mile, 230-kV Castaic Transmission Line that delivers energy from the Castaic Switchyard to the Haskell Junction substation, and transmits energy to the Castaic Power Plant when the reversible turbine generating equipment is in the pump-back operating mode. **Figure 11** shows the Castaic Transmission Line.

## Primary Project Roads and Trails

The existing license for the Castaic Power Development does not include any Primary Project Roads or Trails other than those associated with recreation facilities.

The Co-licensees are not adding new Primary Project Trails. However, under the New License P-2426, 77 Primary Project Roads will be included in the Castaic Power Development boundary.

## Pyramid Lake Recreation Facilities

Pyramid Lake recreation facilities include: (1) Los Alamos Campground; (2) Emigrant Landing Day Use Area; (3) Yellow Bar, Bear Trap, Serrano, and Spanish Point Boat-in Picnic Areas; (4) two floating toilets; (5) Vaquero Day Use Area; (6) entrance stations at Emigrant Landing and Vaquero Day Use Areas; (7) potable water supply to Emigrant Landing and Los Alamos Campground; (8) two offices in the administrative building at Emigrant Landing; (9) two administrative trailer pads at Los Alamos Campground; and (10) the Vista del Lago Visitor Center.

These facilities are associated with, and are adjoining or near to, Pyramid Lake (Castaic Power Plant's upper reservoir).

## V. PROTECTION, MITIGATION, AND ENHANCEMENT (PM&E) MEASURES

From September 2015 through February 2020, the Co-licensees conducted 22 field studies within the project boundary, and 29 meetings with various Stakeholders. The purpose of these field studies and meetings was to collaboratively develop and agree upon certain PM&E measures that the Co-licensees would include in the New License P-2426 and that the Stakeholders would support. The following Stakeholders participated in one or more of the meetings, site visits, or conference calls:

- Federal Agencies
  - Angeles National Forest
  - Federal Energy Regulatory Commission (FERC)
  - Los Padres National Forest
  - o San Bernardino National Forest
  - U.S. Bureau of Land Management (BLM)
  - U.S. Department of Agriculture, Forest Service (USFS)
  - U.S. Department of Commerce, National Oceanic Atmospheric and Administration, National Marine Fishery Service (NMFS)
  - U.S. Department of Homeland Security, Federal Emergency Management Agency (FEMA)
  - U.S. Department of the Interior, Fish and Wildlife Service (USFWS)
  - o U.S. Department of the Interior, National Parks Service (NPS)
  - U.S. Environmental Protection Agency (EPA)
- State Agencies
  - CA Department of Fish and Wildlife (CDFW)
  - CA Department of Parks and Recreation, Office of Historic Preservation (SHPO)
  - CA State Water Resources Control Board (SWRCB)
- Los Angeles County, Department of Parks and Recreation
- Native American Tribes
  - Fernandeño Tataviam Band of Mission Indians
  - o Gabrielino/Tongva Nation
  - Tejon Indian Tribe
  - Morongo Band of Mission Indians
- Nongovernmental organizations
  - American Whitewater
  - Cal Trout, Inc.
  - Castaic Lake Water Agency
  - Center for Biological Diversity
  - Los Angeles Kayak Club
  - Metropolitan Water District of Southern California
  - United Water Conservation District
  - o State Water Contractors

Initially, a total of 37 PM&E measures were proposed by the various Stakeholders. However, after careful examination of the measures and subsequent review by FERC, the Co-licensees included 12 PM&E measures in the license application for the purpose of protecting resources against impacts from continued operation and maintenance of the Project, mitigating any such impacts that would result from the Project, and enhancing resources that could be affected by the Project. The Co-licensees proposed no changes to existing Project Operation and Maintenance (O&M), other than the proposed 12 PM&E measures for inclusion in the New License P-2426.

The following is a brief summary of the 12 PM&E Measures:

#### Geology and Soils (GS)

#### Measure GS1, Implement the Erosion and Sediment Control Plan

The Co-licensees will, within one year after license issuance, implement the Erosion and Sediment Control Plan that includes measures to control sedimentation and erosion when stabilizing slopes affected by the Project.

#### Water Resources (WR)

#### Measure WR1, Implement Pyramid Lake Water Surface Elevations

To facilitate general recreation use at Pyramid Lake, the Co-licensees will maintain the water surface elevation (WSE) in Pyramid Lake as follows:

- The Co-licensees will not lower the WSE below an elevation of 2,560 feet.
- The Co-licensees will not lower or raise the WSE by more than 8 feet each day (i.e., from midnight to midnight each day).
- The Co-licensees will not lower or raise the WSE by more than 14 feet during each 7-day period (i.e., midnight to midnight, beginning at midnight on Sunday).

Co-licensees will maintain a minimum storage of no less than 27,000 acre-feet (AF) in Pyramid Lake, except in an emergency.

#### Measure WR2, Implement a Hazardous Materials Management Plan

The Co-licensees will, within one year after license issuance, implement a Hazardous Materials Management Plan that includes measures to manage hazardous materials, including response and clean-up of hazardous materials spills.

#### Measure AR1, Implement Pyramid Reach Flow Releases (DWR Only)

DWR will continue to maintain minimum flow requirements from Pyramid Lake into Pyramid reach. This measure is identical to the Pyramid Lake portion of Article 52 in the existing Project license, with the exception that the multiplier for estimating the ungaged flow into Pyramid Lake has been updated based on current GIS and hydrologic methods.

#### Measure AR2, Implement Pyramid Lake Fish Stocking

The Co-licensees will, beginning in the first full calendar year after license issuance and annually thereafter during the stocking season (October 1 to May 30), stock Pyramid Lake with a target of 20,000 pounds of catchable trout (i.e., approximately two fish per pound). This poundage is an average annual target that may fluctuate slightly from year to year. The average will be measured as a five-year running average to ensure consistent stocking over the term of the New License P-2426. The Co-licensees, after consultation with the California Department of Fish and Wildlife (CDFW), will stock the fish at appropriate times of the year, which are anticipated to typically be at least two events per month between October 1 and May 30 of each year. The fish stocking events will occur at the Emigrant Landing Boat Launch. The Co-licensees may contract with CDFW or one or more State-registered private fish hatcheries to raise and plant the fish.

## Terrestrial Resources (TR)

## Measure TR1, Implement an Integrated Vegetation Management Plan

The Co-licensees will, within one year after license issuance, implement an Integrated Vegetation Management Plan that includes measures for controlling non-native plant species, protecting special-status species, and re-vegetating disturbed areas.

# *Measure TR2*, Implement a Sensitive Aquatic and Terrestrial Wildlife Management Plan

The Co-licensees will, within one year after license issuance, implement a Sensitive Aquatic and Terrestrial Wildlife Management Plan that includes protections to wetland and riparian habitats, and known occurrences of sensitive species, procedures for preconstruction surveys prior to non-routine Project activities, and pesticide measures.

#### Recreation Resources (RR)

#### Measure RR1, Implement a Recreation Management Plan

The Co-licensees will, within one year after license issuance, implement a Recreation Management Plan that provides guidance for the management and operations of Project recreational facilities, including periodic use monitoring, the modification of Project recreation facilities, and a schedule for implementing modifications.

#### Land Use (LU)

#### Measure LU1, Implement a Fire Prevention and Response Plan

The Co-licensees will, within one year after license issuance, implement a Fire Prevention and Response Plan that provides measures for preventing, reporting, and investigating Project-related wildfires.

#### Measure LU2, Implement a Project Safety Plan

The Co-licensees will continue to implement a Project Safety Plan that provides measures for installing and maintaining signs, lights, sirens, and other devices at Project facilities. This measure is similar to Articles 60 and 402 in the existing license.

#### Visual Resources (VR)

#### Measure VR1, Implement a Visual Resources Management Plan

The Co-licensees will, within one year after license issuance, implement a Visual Resources Management Plan, within one year after license issuance, that includes measures to reduce the visual contrast of Project facilities.

#### Cultural Resources (CR)

#### Measure CR1, Implement a Historic Properties Management Plan

The Co-licensees will, within one year after license issuance, implement a Historic Properties Management that provides specific actions and processes to manage historic properties.

## VI. General Integrated Licensing Process Flow Chart and Schedules



## Integrated Licensing Process Flow Chart

30\* = Timeframe - Calendar days between each activity

## Post Final License Application (FLA) Filing Schedule



## FERC P-2426 Relicensing Schedule

# South SWP Hydropower Relicensing FERC Project No. 2426

#### 2017

Deadline to file

stakeholders

- NOI/PAD 1/31/2017 FERC scoping meeting
- and site visits Develop Study Plans in coordination with

#### 2019

- File updated study reports
- Consultation with stakeholders
- · Begin developing environmental protection, mitigation, and enhancement measures
- Preliminary Licensing Proposal
- (5 months prior to application filing)
- Prepare Final Application
- Prepare Draft Biological Assessments

2013	2014	2015	2016	2017	2018	2019	2020	2021	
<ul> <li>2013-2015</li> <li>Collect information to describe project and existing environment</li> </ul>			2016 → Target to file Notice of Intent (NOI) / PAD (5 1/2 vrs before license		2018  Conduct stu File initial s	2018 • Conduct studies • File initial study reports		2020-2022 File Application before 1/31/2020 Comment on NEPA document	

- agencies, tribes, and uiy stakeholders
- Hire technical relicensing consultant
- Develop preliminary study plan proposals
- Compile information for Pre-Application Document (PAD)
- Preliminary discussions with agencies, tribes and stakeholders
- expiration)
- Initiate scoping
- stakeholders
- Prepare IS/MND document
- File 401 Cert application
- License Expires 1/31/2022

## END OF DOCUMENT