



**San Francisco**  
**Water Power Sewer**

Services of the San Francisco Public Utilities Commission

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**DATE:** June 6, 2022

**TO:** Commissioner Anson Moran, President  
Commissioner Newsha Ajami, Vice President  
Commissioner Sophie Maxwell  
Commissioner Tim Paulson

**FROM:** Dennis J. Herrera, General Manager

DJH

**RE:** Hetch Hetchy Capital Improvement Program Quarterly Report  
3<sup>rd</sup> Quarter / Fiscal Year 2021-2022

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Enclosed please find the Hetch Hetchy Capital Improvement Program (HCIP) Quarterly Report for the 3<sup>rd</sup> Quarter (Q3) of Fiscal Year (FY) 2021-2022. The primary intent of the report is to provide the Commission, stakeholders, and the public with a status summary of the HCIP based on data for the period of January 1, 2022 to March 31, 2022.

Attachment

**London N. Breed**  
Mayor

**Anson Moran**  
President

**Newsha Ajami**  
Vice President

**Sophie Maxwell**  
Commissioner

**Tim Paulson**  
Commissioner

**Dennis J. Herrera**  
General Manager

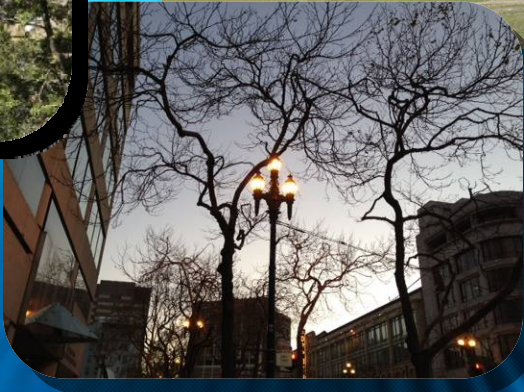
**OUR MISSION:** To provide our customers with high-quality, efficient and reliable water, power and sewer services in a manner that values environmental and community interests and sustains the resources entrusted to our care.



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San Francisco  
**Water Power Sewer**  
Services of the San Francisco Public Utilities Commission



## QUARTERLY REPORT

Hetch Hetchy Capital Improvement Program  
January 2022 – March 2022

Published: June 06, 2022

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**EXECUTIVE SUMMARY**

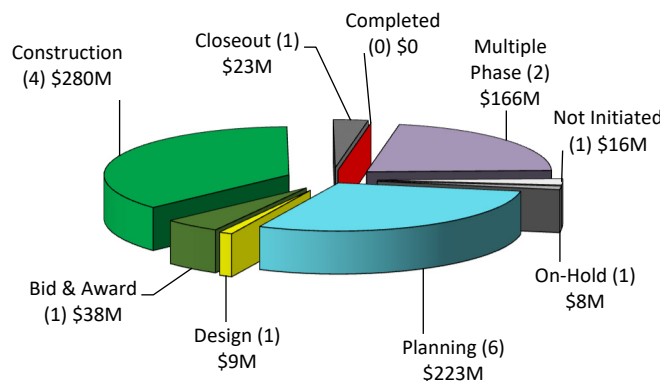
This quarterly report provides a summary update on the Hetch Hetchy Capital Improvement Program (HCIP) that is part of the larger Hetch Hetchy Water Capital Improvement Program. The primary intent of the report is to provide the Commission, stakeholders, and the public with a status summary of the HCIP based on data for the period of January 1, 2022 to March 31, 2022.

Starting with the HCIP in the first quarter (Q1) of fiscal year 2022 (FY22), the projects of the HCIP and each of their scopes, budgets, and schedules, match the Commission’s approved FY21-30 10-Year Capital Plan, specifically the FY21-30 10-Year Hetch Hetchy Water Capital Improvement Program (10-Year CIP), and serve as the FY22 baseline for the HCIP.

In this Q3 report, the forecasts for the HCIP projects’ scopes, costs, and schedules match the FY23-32 10-Year CIP that was presented to the Commission on February 8, 2022. Going forward, proposed changes to the approved projects and their baseline scopes, schedules, and budgets will continue to be presented for review and approval as part of the 10-Year CIP that is updated every two years and approved by the SFPUC Commission. The proposed revisions to the program will become the new baseline for project scopes, schedules, and budgets in the beginning of the new fiscal year, July 1 of each bi-annual year, following approval by both SFPUC Commission and the Board of Supervisors (BOS).

**Program Current Status:**

Overall steady progress continued on the program. As of the end of the reporting period, the status of the 17 HCIP projects (excluding the Project Development (PD) accounts) is as follows: one (1) project not initiated, one (1) project on-hold, eight (8) projects in planning, design or bid & award, four (4) projects in construction, two (2) projects that are multiple phases, and one (1) project in closeout.



**Approved Budget for Projects in Each Phase**

The following Tables provide a high-level summary of the cost and schedule status for this program (including the 3 PD accounts). The forecasted overruns in projects’ cost and schedule presented here,

## Hetch Hetchy Capital Improvement Program Quarterly Report

as noted above, match the 10 - Year CIP for FY23-32 which was presented to the Commission and approved during the quarter, on February 8, 2022. All project variances occurred in the first quarter of fiscal year 2021-2022, and there have been no new project cost or schedule variances forecasted during either this or last quarter.

Table A. Program Cost Summary

Program	Expenditures To Date (\$ Million) (A)	Current Approved Budget (\$ Million) (B)	Q3/FY21-22 Forecasted Costs (\$ Million) (C)	Cost Variance (\$ Million) (D = B - C)	Cost Variance Over Reporting Period * (\$ Million) (E)
<b>Program Total</b>	<b>\$151.53</b>	<b>\$807.30</b>	<b>\$852.81</b>	<b>(\$45.51)</b>	<b>-</b>

\* Negative number reflects cost increases since last quarter, and positive number reflects cost reduction since last quarter.

Table B. Current Approved vs. Current Forecast Schedule Dates

Program	Current Approved Project Start	Actual Start	Current Approved Completion	Current Forecast Completion	Schedule Variance (Months)
<b>Overall HCIP Program</b>	<b>11/08/10</b>	<b>11/08/10 ✓</b>	<b>05/25/37</b>	<b>10/30/35</b>	<b>18.8 Early</b>

### Program Key Updates:

The key updates for the HCIP include:

- For the SJPL Tesla Valve Replacement project, during this quarter, the new 66-inch diameter butterfly valve and the new 24-inch diameter butterfly valve were successfully installed during the 60-day Mountain Tunnel system shutdown and are currently in service.
- For the SJPL Valve and Safe Entry Improvements project, Phase 1A, the construction contract, HH-1005, was awarded on March 8, 2022. For Phase 1B, the 100% design was completed in February and the project team is working on the contract bid documents for advertisement next quarter.
- For the Moccasin Powerhouse Bypass Upgrades project, the alternatives analysis report (AAR) was approved by the Technical Steering Committee in February 2022. The preferred alternative is to move the bypass system to a location outside of the powerhouse and north of the Moccasin penstocks.

- For Moccasin Powerhouse (MPH) and Generator Step-Up (GSU) Rehabilitation, subproject A, HH-1003R, Moccasin Powerhouse (MPH) Generator Step-up (GSU) Transformer Installation, the new Delta Star GSU1 transformer was installed on the new oil containment foundation in March 2022 during the systemwide shutdown at the powerhouse. The new GSU1 relay panels were also tested and commissioned in March 2022. For subproject B, DB-121R2, MPH Generators Rehabilitation, 100% design drawings for Generator Rewind scope and 65% design drawings for the Relay Protection and Control Panels were submitted during the quarter. For subproject C, MPH Systems Upgrades, a task order for planning, design, and engineering support during construction was approved.
- For Transmission Lines 7/8 Upgrades project, the 100% design was completed during the quarter. The construction contract was advertised for bid on February 11; three bids were opened March 24. The contract is anticipated to be awarded next quarter.
- For the O’Shaughnessy Dam Outlet Works Phase 1 project, Subproject A (Bulkhead): During this quarter, an underwater inspection and cleaning of the corroded cast iron sealing surface were completed at one of the upper outlets. Work began on preparation of the specification and bid package for the design and construction of the bulkhead under a progressive-design-build approach.
- For the Mountain Tunnel Improvement project, Shutdown No. 1 was implemented between January and March, and the Mountain Tunnel was successfully shut down, dewatered, and brought back to service within the planned 60-day timeframe. This quarter’s progress included excavation to a depth of 100 feet and placement of initial lining in the Flow Control Facility (FCF) Shaft. The Priest Adit tunnel was excavated to a length of 200 feet, also with initial lining installed in the excavated section. Shutdown work inside the tunnel included a survey of the entire tunnel and of the siphon at South Fork, geological evaluation of the South Fork siphon, and installation of rock dowels at tie-in locations within the bypass tunnels and Priest Adit tunnel. The construction water treatment plant at Priest was commissioned and successfully used to treat construction water during the shutdown. A temporary water filtration plant was also successfully installed at Moccasin and was used to treat drinking water for Moccasin during the shutdown. Safety and road improvement work continued on Adit 8/9 road, Adit 5/6 road, South Fork road, and Rickson road.

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# Quarterly Report

## Hetch Hetchy Capital Improvement Program

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**HETCH HETCHY WATER AND POWER (HHWP)-  
WATER DIVISION CAPITAL IMPROVEMENT PROGRAMS**

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## INTRODUCTION

The Hetch Hetchy Water and Power (HHWP) Water Division is the division responsible for operating, managing, and maintaining the HHWP system and facilities. This includes water facilities that are part of the Regional Water System from Hetch Hetchy Reservoir, located in Yosemite National Park, to Alameda East Portal, located in Sunol Valley and power facilities located from Early Intake to Newark. The HHWP Water Division operates, manages, and maintains three impoundment reservoirs, three regulating reservoirs, four powerhouses, one switchyard, three substations, 170 miles of pipeline and tunnels, almost 50 miles of paved road, over 160 miles of transmission lines, watershed land, and right-of-way property. HHWP Water Division provides 85 percent of the San Francisco Public Utilities Commission (SFPUC) water supply for 2.7 million residential, commercial, and industrial customers in Alameda, Santa Clara, San Mateo,

and San Francisco counties. On average, HHWP Water Division generates about 1,650 gigawatt hours (GWH) of clean hydro-generated power annually. A majority of HHWP staff is based in Moccasin, CA, which is 140 miles east of San Francisco.

The HHWP Water Division's capital improvement programs are divided into two programs: Hetch Hetchy Capital Improvement Program (HCIP) and Renewal and Replacement (R&R). This report provides a quarterly status update on the HCIP, a group of capital improvement projects that are greater than \$5M in value and have been approved by the Commission as part of the SFPUC's 10-Year Capital Improvement Program. The status of the Hetch Hetchy R&R projects is reported annually in the Annual Report on Water Enterprise-Managed Capital Improvement Projects.

The map below shows the location of the assets and facilities associated with HHWP.



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**HETCH HETCHY CAPITAL IMPROVEMENT PROGRAM (HCIP)**

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## 1. PROGRAM DESCRIPTION

The Hetch Hetchy Capital Improvement Program (HCIP) is a multi-year group of capital projects to upgrade existing, aging infrastructure so that it will meet the challenges of today and the future. These projects will deliver improvements that enhance the SFPUC's ability to provide reliable, affordable, high quality water to its 2.7 million customers in an environmentally sustainable manner. The goals are to 1) provide capital improvements needed to cost-effectively ensure that water quality, seismic reliability, delivery reliability, and water supply objectives established for the Regional Water System facilities managed by HHWP are met, while 2) optimizing the benefits of HHWP power facilities operations. Ongoing development of the HCIP will sustain the Regional Water System's status as an unfiltered water source and a gravity-driven system.

The scope of HCIP is divided into three major project types: Water, Power, and Joint. The Water sub-program includes only asset improvements benefiting the SFPUC's water customers. The Power sub-program includes only asset improvements used to generate environmentally friendly hydroelectric energy. The Joint sub-program includes projects for assets that are used for both water delivery and power generation. In addition, projects in each sub-program of the HCIP have been further organized by asset type consisting of the following:

- Buildings - projects to provide safe and code compliant work spaces.
- Dams & Reservoirs - projects to improve assets used for storage and delivery of water to SFPUC customers, as well as for water storage for power generation.
- Mountain Tunnel - projects to address deficiencies with the Mountain Tunnel, a critical, non-redundant link in the Hetch Hetchy and Regional Water System that conveys water from

Kirkwood Powerhouse to Priest Reservoir.

- Powerhouses - projects to improve facilities at the Holm, Kirkwood, and Moccasin powerhouses.
- Roads & Bridges - projects intended to replace bridges that are utilized to access HHWP assets.
- Switchyard & Substations - projects to meet operational objectives for power, including reliability, regulatory compliance, and sustainability.
- Tunnels - projects to repair tunnels along the HHWP system (other than Mountain Tunnel).
- Water Conveyance - projects to enhance the reliability of water delivery through pipelines and penstocks, allowing for both delivery of water to SFPUC customers and delivery of water to powerhouses for power generation.

## 2. PROGRAM STATUS

This third (3<sup>rd</sup>) quarter report for FY2021-2022 presents the progress made on the HCIP between January 1, 2022 and March 31, 2022. As announced in the first (1<sup>st</sup>) quarter report for FY2021-2022, project scopes, budgets and schedules in the Commission's approved 10-Year Capital Plan for FY21-30, approved by the SFPUC Commission on February 11, 2020, serve as the approved baseline herein for comparison to current program and project scope, schedule, and budget forecasts. This baseline for comparison will remain the same until adoption of a new 10-Year CIP; the baseline will be updated with the changes in the adopted CIP at the start of the fiscal year following adoption.

There are seventeen (17) projects in the HCIP together with (3) project development (PD) accounts for program-level expenditures for each of the Water, Power, and Joint Programs. A description of each project and of each project development account is provided in the Appendix A of this Report.

The accrued PD expenditures are included in the Cost Summary in Table 3 in order to give an accurate report of the overall HCIP cost performance.

Figure 2.1 shows the total Approved Budget for all seventeen (17) projects in each phase of the program as of March 31, 2022 (PD accounts do not have phases and are not included in Figure 2.1). The number of projects currently in each phase is shown in parentheses.

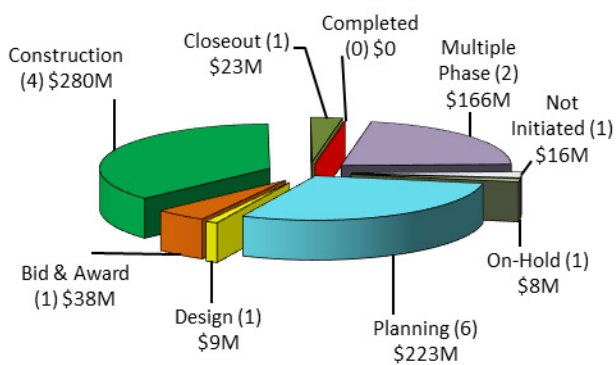


Figure 2.1 Approved Budget for Projects in Each Phase

Figure 2.2 shows the total number of projects in the following stages as of March 31, 2022: Pre-construction, Construction, and Post-construction.

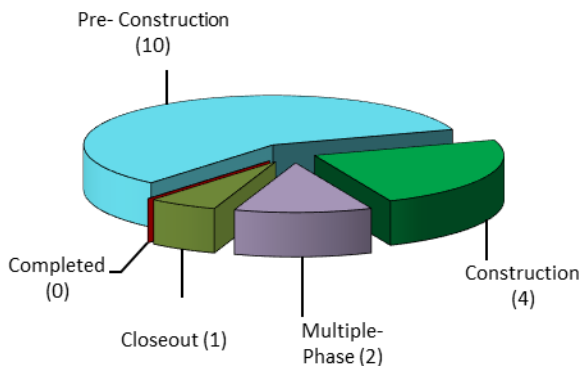


Figure 2.2 Number of Projects in Pre-construction, Construction, and Post-Construction

Figure 2.3 summarizes the environmental review status of the HCIP projects as of March 31, 2022. Environmental review is performed for projects under California Environmental Quality Act (CEQA).

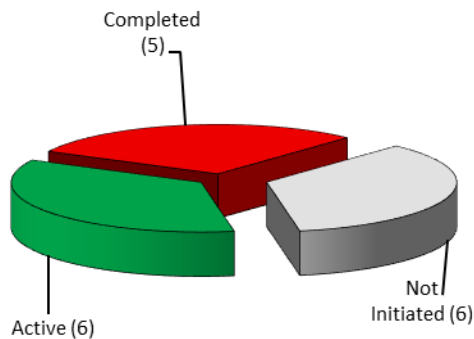


Figure 2.3 Program Environmental Review

### 3. PROGRAM COST SUMMARY

Table 3 provides an overall cost summary of the approved 17 HCIP projects and 3 HCIP PD accounts at the end of the quarter. It shows the Expenditures to Date, Current Approved Budget, Current Forecast Cost, the Cost Variance between the Approved and Forecast Costs, and the Cost Variance Over the Reporting Period. The Current Approved Budget for the HCIP under the FY21-30 CIP is \$807.30 million, while the HCIP Q3FY21-22 Forecasted Cost is \$852.81 million, which is \$45.51 million over the Approved Budget. This is the same program Cost Variance as last quarter.

Table 3. Cost Summary

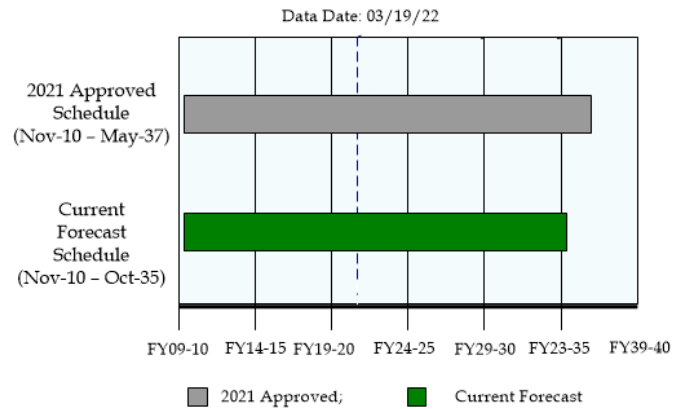
Subprograms	Expenditures To Date (\$ Million) (A)	Current Approved Budget (\$ Million) (B)	Q3/FY21-22 Forecasted Costs (\$ Million) (C)	Cost Variance (\$ Million) (D = B - C)	Cost Variance Over Reporting Period * (\$ Million) (E)
<b>Water Infrastructure</b>	<b>\$9.87</b>	<b>\$109.53</b>	<b>\$153.27</b>	<b>(\$43.74)</b>	-
Water Conveyance (Water)	\$5.93	\$102.66	\$146.40	(\$43.74)	-
Water Infrastructure Project Development	\$3.94	\$6.87	\$6.87	-	-
<b>Power Infrastructure</b>	<b>\$59.48</b>	<b>\$204.24</b>	<b>\$204.24</b>	-	-
Powerhouse	\$31.88	\$120.94	\$120.94	-	-
Switchyard & Substations (Power)	\$21.94	\$34.25	\$34.25	-	-
Transmission Lines	\$3.00	\$37.97	\$37.97	-	-
Power Infrastructure Project Development	\$2.65	\$11.09	\$11.09	-	-
<b>Joint Infrastructure</b>	<b>\$82.18</b>	<b>\$493.52</b>	<b>\$495.29</b>	<b>(\$1.77)</b>	-
Dams & Reservoirs (Joint)	\$9.88	\$167.45	\$184.13	(\$16.69)	-
Mountain Tunnel	\$64.40	\$238.22	\$238.22	-	-
Roads & Bridges (Joint)	\$1.37	\$44.29	\$29.37	\$14.92	-
Tunnels (Joint)	\$0.64	\$8.43	\$8.43	-	-
Utilities (Joint)	\$0.44	\$8.79	\$8.79	-	-
Joint Infrastructure Project Development	\$5.45	\$26.34	\$26.34	-	-
<b>Overall Program Total</b>	<b>\$151.53</b>	<b>\$807.30</b>	<b>\$852.81</b>	<b>(\$45.51)</b>	-

\* Negative number reflects cost increases since last quarter, and positive number reflects cost reduction since last quarter.

The overall program negative Cost Variance of \$45.51M in Table 3 can be attributed to the following factors, all of which were reported in the first quarterly report for fiscal year 2021-2022; there have been no new variances this or last quarter:

- \$43.74M negative variance is due to the following Water Infrastructure project:
  - o The 10035575 SJPL Valve and Safe Entry Improvements forecasted costs increased by \$43.74M.
- \$1.77M negative variance is due to the combined positive and negative variances in the following Joint Infrastructure projects:
  - o The 10032903 OSD Outlet Works Phase I forecasted cost increased by \$26.69M.
  - o The 10037351 Moccasin Dam Long-Term Improvements forecasted cost decreased by \$10.00M.
  - o The 10035086 Bridge Replacement (4 Bridges) forecasted cost decreased by \$14.92M.

**4. PROGRAM SCHEDULE SUMMARY**



**Figure 4. Program Schedule Summary**

Figure 4 and Table 4 compare the FY21 - 30 CIP Approved Schedule and the Current Forecast Schedule for the HCIP. As shown in Table 4, the overall HCIP is currently forecast to be completed in October 2035, which is 18.8 Months before the Approved Completion date of May 2037.

**Table 4. FY21-30 CIP Approved vs. Current Forecast Schedule Dates**

Sub-Program	2021 Approved Project Start	Actual Start	2021 Approved Completion	Current Forecast Completion	Schedule Variance (Months)
Water Infrastructure	11/08/10	11/08/10✓	06/30/31	06/28/30	12 Early
Power Infrastructure	05/29/12	05/29/12✓	06/30/31	10/30/35	52
Joint Infrastructure	10/03/11	10/03/11✓	05/25/37	06/29/35	22.9 Early
<b>Overall HCIP Projects</b>	<b>11/08/10</b>	<b>11/08/10✓</b>	<b>05/25/37</b>	<b>10/30/35</b>	<b>18.8 Early</b>

**5. BUDGET AND SCHEDULE TREND SUMMARY**

Starting with the Q1 FY21-22 Quarterly Report, a revised report format includes a new Table 5, titled Budget and Schedule Trend Summary. This Table 5 contains all approved HCIP projects that are active and in any of the planning, design, bid and award, or

construction phases of the project. The table excludes all Project Development accounts, as well as any projects that are either Not-Initiated, On-Hold, in Closeout or Completed.

During this Quarter (Q3 FY21-22), no major milestones were reached.

**Table 5. Budget and Schedule Trend Summary**

All Costs are shown in million

Project Name	Most Recent CIP Approved Budget		Project Initiation		CER		35% Design		95% Design		Awarded Construction <sup>1</sup>		Current Status	
	Approved Budget	Approved Completion	Forecasted Cost	Forecasted Completion	Forecasted Cost	Forecasted Completion	Forecasted Cost	Forecasted Completion	Forecasted Cost	Forecasted Completion	Forecasted Cost	Forecasted Completion	Forecasted Cost	Forecasted Completion
	a	b	c	d	e	f	g	h	i	j	k	l	m	n
<b>Water Infrastructure</b>														
10035574 - SJPL Tesla Valves Replacement	FY21-30		05/01/19		11/27/20		07/28/20		11/17/20		04/06/21		Q3 - FY21-22	
	\$3.7	12/30/22	\$7.4	06/28/24	\$7.4	06/28/24	\$7.4	06/28/24	\$7.4	06/28/24	\$3.7	12/30/22	\$3.7	12/30/22
10035575 - SJPL Valve and Safe Entry Improvement	FY21-30		7/1/2019		04/16/21		03/03/21 (Phase 1A), 05/28/21 (Phase 1B), 08/15/22 (Phase 2) & 12/30/21 (Phase 3)		07/14/21 (Phase 1A), 10/29/21 (Phase 1B), 02/15/23 (Phase 2) & 05/13/22 (Phase 3)		05/05/22 (Phase 1A), 09/25/22 (Phase 1B), 11/16/23 (Phase 2) & 01/15/23 (Phase 3)		Q3 - FY21-22	
	Phase 1A													
	Phase 1B Phase 2 Phase 3	\$98.9	03/13/28	\$95.3	07/01/25	\$95.3	07/01/25	\$98.9	03/13/28	\$142.7	03/13/28	TBD	TBD	\$142.7
<b>Power Infrastructure</b>														
10036809 - Moccasin Powerhouse Bypass Upgrades	FY21-30		09/18/20		11/07/22		02/24/23		12/26/23		02/28/25		Q3 - FY21-22	
	\$15.0	12/01/27	\$15.0	12/01/27	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	\$15.0	12/01/27
10014086 - Moccasin Powerhouse and GSU Rehabilitation	FY21-30		01/04/16		05/14/21		07/29/19 (Phase 1), 10/01/19 (Phase 2) & 9/28/22 (Phase 3)		09/09/20 (Phase 1), 05/12/22 (Phase 2) & 03/29/24 (Phase 3)		06/07/21 (Phase 1), 06/08/22 (Phase 2) & 10/02/24 (Phase 3)		Q3 - FY21-22	
	Phase 1													
	Phase 2 Phase 3	\$66.7	04/13/27	\$18.0	10/03/18	\$66.7	04/13/27	\$66.7	12/03/27	\$66.7	12/03/27	\$66.7	12/03/27	\$66.7
10014087 - Warnerville Substation Rehabilitation	FY21-30		09/01/15 (Phase 1), 7/01/20 (Phase 2a) & 01/01/21 (Phase 2b)		02/29/16 (Phase 1), 01/18/21 (Phase 2a) & 01/03/23 (Phase 2b)		04/01/16 (Phase 1), 04/22/21 (Phase 2a) & 09/01/23 (Phase 2a)		12/24/16 (Phase 1), 08/16/21 (Phase 2a) & 04/04/24 (Phase 2b)		11/26/18 (Phase 1), N/A (Phase 2a) & 02/03/25 (Phase 2b)		Q3 - FY21-22	
	Phase 1 (DB-127R)													
	Phase 2a Phase 2b	\$34.2	11/25/26	\$27.2	11/25/26	\$34.2	11/25/26	\$34.2	11/25/26	\$34.2	11/25/26	\$24.3	03/04/20	\$34.2
10035721 - Transmission Lines 7/8 Upgrades	FY21-30		07/01/19		12/07/20 <sup>2</sup>		03/19/21		09/24/21		10/03/22		Q3 - FY21-22	
	\$38.0	01/31/25	\$38.0	01/31/25	\$38.0	01/31/25	\$38.0	01/31/25	\$38.0	01/31/25	TBD	TBD	\$38.0	01/31/25
<b>Joint Infrastructure</b>														
10014088 - Moccasin Penstock	FY21-30		12/11/18		04/21/23		10/16/23		06/10/24		04/15/25		Q3 - FY21-22	
	\$47.3	02/28/28	\$13.2	12/31/24	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	\$47.3	02/28/28
10030758 - OSH Dam Access and Drainage Improvements	FY21-30		03/01/17		06/28/19		09/01/19		08/21/20		09/27/21		Q3 - FY21-22	
	\$4.0	02/28/23	\$5.8	02/26/21	\$5.8	02/26/21	\$5.8	02/11/22	\$5.8	12/16/22	\$4.0	02/28/23	\$4.0	02/28/23
10032903 - O'Shaughnessy Dam Outlet Works Phase I <sup>3</sup>	FY21-30		02/01/18		09/30/21 (Subproject A), Complete (Subproject B), 06/30/22 (Subproject C), 05/30/22 (Subproject D) & 05/30/22 (Subproject E)		05/31/22 (Subproject A), 05/31/22 (Subproject B) & 08/05/22 (Subproject C)		12/22/22 (Subproject A), 01/09/23 (Subproject B) & 11/01/22 (Subproject C)		07/18/23 (Subproject A), 08/17/23 (Subproject B) & 04/14/23 (Subproject C)		Q3 - FY21-22	
	Subproject A													
	Subproject B Subproject C Subproject D (Planning Only) Subproject E (Planning Only)	\$21.2	09/16/25	\$17.2	12/31/24	\$47.9	09/16/25	TBD	TBD	TBD	TBD	TBD	TBD	\$47.9
10037351 - Moccasin Dam Long-Term Improvements <sup>3</sup>	FY21-30		05/03/21		07/28/22		06/15/23		02/06/25		06/01/26		Q3 - FY21-22	
	\$83.2	07/01/27	\$83.2	07/01/27	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	\$73.2	06/30/28
10014115 - Cherry Dam Spillway - Short Term Improvements	FY21-30		03/01/21		09/30/22		02/01/23		09/27/23		08/20/24		Q3 - FY21-22	
	\$11.9	07/01/27	\$11.9	07/01/27	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	\$11.9	07/01/27

Project Name	Most Recent CIP Approved Budget		Project Initiation		CER		35% Design		95% Design		Awarded Construction <sup>1</sup>		Current Status	
	Approved Budget	Approved Completion	Forecasted Cost	Forecasted Completion	Forecasted Cost	Forecasted Completion	Forecasted Cost	Forecasted Completion	Forecasted Cost	Forecasted Completion	Forecasted Cost	Forecasted Completion	Forecasted Cost	Forecasted Completion
	a	b	c	d	e	f	g	h	i	j	k	l	m	n
10014114 - Mountain Tunnel Improvement Project	FY21-30		10/03/11		12/29/17		05/15/18		07/31/19		10/13/20		Q3 - FY21-22	
	\$238.2	06/03/27	\$114.0	12/30/21	\$246.1	12/31/26	\$238.2	12/31/26	\$238.2	12/31/26	\$238.2	06/03/27	\$238.2	06/03/27
10035086 - Bridge Replacement (4 - Bridges) Subproject 1 Subproject 2	FY21-30		02/27/20		10/31/22 (Subproject 1) & 02/28/23 (Subproject 2)		02/28/23 (Subproject 1) & 05/05/23 (Subproject 2)		09/29/23 (Subproject 1) & 01/12/24 (Subproject 2)		08/01/24 (Subproject 1) & 02/03/25 (Subproject 2)		Q3 - FY21-22	
	\$44.3	05/25/37	\$44.3	12/30/25	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	\$29.4	07/01/27
10014110 - Moccasin Wastewater Treatment Plant <sup>4</sup>	FY21-30		01/03/22		-		04/29/22		12/30/22		11/27/23		Q3 - FY21-22	
	\$8.8	04/07/26	\$8.8	04/07/26	-	-	TBD	TBD	TBD	TBD	TBD	TBD	\$8.8	04/07/26

**Footnotes:**

1. This represents forecast project cost and project completion date at the time of award of construction contract (or award of CM/GC contracts/packages).
2. This represents the date the Design Criteria Report (DCR) was finalized for Transmission Lines 7/8 Upgrade project. CER was not required for the project.
3. This represents that the 95% Design is actually 100% for Subproject A & B.
4. This represents that the project started during the Design Phase.

## 6. PROJECT PERFORMANCE SUMMARY\*

All costs are shown in \$1,000s as of 03/19/22

Project Name	Active Phase (a) (**)	CIP Approved Budget (b) (+)	Current Approved Budget (c) (++)	Current Forecast Cost (d)	Expenditures To Date (e)	Cost Variance (f= c - d) (+++)	% Cost Changes (g = f/c) (+++)	CIP Project Completion Date (h) (+)	Current Approved Completion (i) (++)	Current Forecast Completion (j)	Schedule Variance (Days) (k = i - j) (+++)
<b>Water Infrastructure</b>											
<b>Water Conveyance (Water)</b>											
10035574 - SJPL Tesla Valves Replacement	CN	\$ 3,740	\$ 3,740	\$ 3,740	\$ 2,051	-	0%	12/30/22	12/30/22	12/30/22	0
10035575 - SJPL Valve and Safe Entry Improvement	MP	\$ 98,924	\$ 98,924	\$ 142,662	\$ 3,879	(\$43,738)	-44%	03/13/28	03/13/28	03/13/28	0
<b>Power Infrastructure</b>											
<b>Powerhouse</b>											
10036809 - Moccasin Powerhouse Bypass Upgrades	PL	\$ 15,007	\$ 15,007	\$ 15,007	\$ 486	-	0%	12/01/27	12/01/27	12/01/27	0
10014086 - Moccasin Powerhouse and GSU Rehabilitation	MP	\$ 66,714	\$ 66,714	\$ 66,714	\$ 10,943	-	0%	04/13/27	04/13/27	12/03/27	(234)
<b>Switchyard &amp; Substations (Power)</b>											
10014087 - Warnerville Substation Rehabilitation	CN	\$ 34,248	\$ 34,248	\$ 34,248	\$ 21,945	-	0%	11/25/26	11/25/26	11/25/26	0
<b>Transmission Lines</b>											
10035721 - Transmission Lines 7/8 Upgrades	BA	\$ 37,969	\$ 37,969	\$ 37,969	\$ 3,002	-	0%	01/31/25	01/31/25	01/31/25	0

\* Exclude projects in closeout, completed, not initiated, on hold, deleted projects, and projects combined with other projects.

### \*\* Phase Status Legend

PL	Planning	DS	Design
BA	Bid & Award	CN	Construction
MP	Multiple-Phase		

### Footnotes:

- (+) **CIP Approved Budget and Project Completion Date:** The budget and schedule approved as part of 10-year CIP for FY21-30.
- (++) **Current Approved Budget and Schedule:** The budget and schedule approved as part of 10-year CIP for FY21-30, plus any additional budget and schedule changes approved by the Commission as part of construction contract award or/ and additional contingencies on construction contracts.
- (+++) **Negative number is reflecting cost overrun (Schedule Delay) and positive number is reflecting cost underrun (Ahead of Schedule).** Projects with a forecasted cost overrun greater than 10%, or forecasted delay of greater than 6 months or 10%, will be highlighted in grey.

Project Name	Active Phase (a) (**)	CIP Approved Budget (b) (+)	Current Approved Budget (c) (++)	Current Forecast Cost (d)	Expenditures To Date (e)	Cost Variance (f= c - d) (+++)	% Cost Changes (g = f/c) (+++)	CIP Project Completion Date (h) (+)	Current Approved Completion (i) (++)	Current Forecast Completion (j)	Schedule Variance (Days) (k = i - j) (+++)
<b>Joint Infrastructure</b>											
<b>Dams &amp; Reservoirs (Joint)</b>											
10014088 - Moccasin Penstock	PL	\$ 47,251	\$ 47,251	\$ 47,251	\$ 5,357	-	0%	02/28/28	02/28/28	02/28/28	0
10030758 - OSH Dam Access and Drainage Improvements	CN	\$ 3,952	\$ 3,952	\$ 3,952	\$ 2,331	-	0%	02/28/23	02/28/23	02/28/23	0
10032903 - O'Shaughnessy Dam Outlet Works Phase I	PL	\$ 21,206	\$ 21,206	\$ 47,894	\$ 1,469	(\$26,688)	-126%	09/16/25	09/16/25	09/16/25	0
10037351 - Moccasin Dam Long-Term Improvements	PL	\$ 83,176	\$ 83,176	\$ 73,176	\$ 297	\$ 10,000	12%	06/30/28	06/30/28	06/30/28	0
10014115 - Cherry Dam Spillway - Short Term Improvements	PL	\$ 11,861	\$ 11,861	\$ 11,861	\$ 425	-	0%	07/01/27	07/01/27	07/01/27	0
<b>Mountain Tunnel</b>											
10014114 - Mountain Tunnel Improvement Project	CN	\$ 238,219	\$ 238,219	\$ 238,219	\$ 64,403	-	0%	06/03/27	06/03/27	06/03/27	0
<b>Roads &amp; Bridges (Joint)</b>											
10035086 - Bridge Replacement (4 - Bridges)	PL	\$ 44,287	\$ 44,287	\$ 29,371	\$ 1,373	\$ 14,916	34%	05/25/37	05/25/37	07/01/27	3616

\* Exclude projects in closeout, completed, not initiated, on hold, deleted projects, and projects combined with other projects.

<b>** Phase Status Legend</b>			
PL	Planning	DS	Design
BA	Bid & Award	CN	Construction
MP	Multiple-Phase		

<b>Footnotes:</b>
(+) <b>CIP Approved Budget and Project Completion Date:</b> The budget and schedule approved as part of 10-year CIP for FY21-30.
(++) <b>Current Approved Budget and Schedule:</b> The budget and schedule approved as part of 10-year CIP for FY21-30, plus any additional budget and schedule changes approved by the Commission as part of construction contract award or/ and additional contingencies on construction contracts.
(+++) Negative number is reflecting cost overrun (Schedule Delay) and positive number is reflecting cost underrun (Ahead of Schedule). Projects with a forecasted cost overrun greater than 10%, or forecasted delay of greater than 6 months or 10%, will be highlighted in grey.



Project Name	Active Phase (a) (**)	CIP Approved Budget (b) (+)	Current Approved Budget (c) (++)	Current Forecast Cost (d)	Expenditures To Date (e)	Cost Variance (f= c - d) (+++)	% Cost Changes (g = f/c) (+++)	CIP Project Completion Date (h) (+)	Current Approved Completion (i) (++)	Current Forecast Completion (j)	Schedule Variance (Days) (k = i - j) (+++)
<b>Joint Infrastructure</b>											
<b>Utilities (Joint)</b>											
10014110 - Moccasin Wastewater Treatment Plant	DS	\$ 8,795	\$ 8,795	\$ 8,795	\$ 442	-	0%	04/07/26	04/07/26	04/07/26	0

\* Exclude projects in closeout, completed, not initiated, on hold, deleted projects, and projects combined with other projects.

<b>** Phase Status Legend</b>		
<b>PL</b>	Planning	<b>DS</b> Design
<b>BA</b>	Bid & Award	<b>CN</b> Construction <b>MP</b> Multiple-Phase







<b>Footnotes:</b>
<b>(+)</b> CIP Approved Budget and Project Completion Date: The budget and schedule approved as part of 10-year CIP for FY21-30.
<b>(++)</b> Current Approved Budget and Schedule: The budget and schedule approved as part of 10-year CIP for FY21-30, plus any additional budget and schedule changes approved by the Commission as part of construction contract award or/ and additional contingencies on construction contracts.
<b>(+++)</b> Negative number is reflecting cost overrun (Schedule Delay) and positive number is reflecting cost underrun (Ahead of Schedule). Projects with a forecasted cost overrun greater than 10%, or forecasted delay of greater than 6 months or 10%, will be highlighted in grey.

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## 7. PROJECT STATUS REPORT

### 10035574 - SJPL Tesla Valves Replacement

**Project Description:** The 2018 approved scope for this project is to replace four large diameter butterfly valves, namely TUV 101, 201, 301 and 401, inside the Tesla Valve Vault so that each of the four San Joaquin Pipelines (SJPL) can be safely isolated and shut down individually for inspection and repair work without shutting down the entire SJPL system. This project will also improve safety for entry into the pipelines for maintenance and inspection purposes. After the planning phase of the related project SJPL Valve and Safe Entry Improvement (Project 10035575) it was recommended that the scope of SJPL Tesla Valve Replacement be reduced, to focus on completing the replacement of TUV101 only. The remainder of the work (i.e. TUV 201, 301 and 401) has been added to the scope of SJPL Valve and Safe Entry Improvement (Project 10035575) to expedite improvements for TUV101 during the planned winter shutdown from January to February 2022 to facilitate necessary maintenance work for SJPL No. 1 during the remainder of 2022. The installation of TUV201, 301 and 401 will proceed together with the upgrade work proposed under SJPL Valve and Safe Entry Improvement, in 2023 and 2024.

<b>Program:</b> Water Infrastructure		<b>Project Status:</b> Construction		<b>Environmental Status:</b> Completed	
<b>Project Cost:</b>			<b>Project Schedule:</b>		
Approved		\$3.74 M	Approved May-19		Dec-22
Forecast		\$3.74 M	Forecast May-19		Dec-22
Actual		\$2.05 M	Project Percent Complete: 67.8%		
					
<b>Key Milestones:</b>	<b>Environmental Approval</b>	<b>Bid Advertisement</b>	<b>Construction NTP</b>	<b>Construction Final Completion</b>	
<b>Current Forecast</b>	08/26/20✓	N/A	04/06/21✓	05/31/22	

**Progress and Status:**

In this quarter, the new 66-inch diameter butterfly valve and the new 24-inch diameter butterfly valve were successfully installed during the 60-day Mountain Tunnel system shutdown; the valves were subsequently put into service. The contractor is addressing punch-list items, including the exterior coating of the 24-inch butterfly valve. It is expected that the contractor will achieve final completion next quarter.



*New 66-Inch Butterfly Valve*

**Issues and Challenges:**







None at this time.

10035575 - SJPL Valve and Safe Entry Improvement

**Project Description:** The San Joaquin Pipelines (SJPLs) consist of three parallel pipelines approximately 48 miles long (completed in 1932, 1953, and 1968, respectively) that cross the San Joaquin Valley from the Oakdale Portal of the Foothill Tunnel on the east end to the Tesla Portal of the Coast Range Tunnel (CRT) on the west. Portions of a fourth pipeline have also been constructed consisting of 6.4 miles of pipe downstream of Oakdale and 11 miles upstream of Tesla. The hydraulic gradient on the SJPLs was limited by surge stacks/towers at Oakdale portal (~825 ft) and Tesla portal (~500 ft). The pipelines were intended to be shut down at Oakdale.

As part of the SFPUC's Water System Improvement Program (WSIP), the Emery and Pelican crossover vaults were installed and the Roselle crossover vault was modified to allow for flows between SJPLs and isolation of SJPL segments for inspection and maintenance. In addition, the Tesla Valve House (TVH) and Tesla Treatment Facility (TTF) were added upstream of the Tesla surge tower. Like the SJPLs, the crossover vaults and Tesla facilities are rated for the maximum pressures that should occur under normal operating conditions. However, the pipelines and pipeline segments still need to be shut down from the upstream end. Closure of multiple in-line valves or all TTF UV reactor valves can over-pressurize the pipelines. As in the original design, complete shutdown of the SJPL system must be done at Oakdale.

The objective of this project is to allow safe entry into any and all sections of the SJPLs for inspection and maintenance while the remainder of the system stays in operation. The scope and budget of installing the TUV201, 301 and 401 butterfly valves has been transferred from project SJPL Tesla Valve Replacement project (10035574) and added to SJPL Valve and Safe Entry Improvement.

<b>Program:</b> Water Infrastructure	<b>Project Status:</b> Multiple Phase	<b>Environmental Status:</b> Active
<b>Project Cost:</b>		<b>Project Schedule:</b>
Approved  \$98.92 M	Approved Jul-19  Mar-28	
Forecast  \$142.66 M	Forecast Jul-19  Mar-28	
Actual  \$3.88 M	Project Percent Complete: 7.9%	
		

Key Milestones:	Environmental* Approval	Bid* Advertisement	Construction* NTP	Construction* Final Completion
<b>Current Forecast</b>	(A) 01/27/22✓ (B) 01/27/22✓ (C) 01/27/22✓ (D) 12/06/22	(A) 12/25/21✓ (B) 04/25/22 (C) 06/01/23 (D) 07/12/22	(A) 05/05/22 (B) 09/25/22 (C) 11/16/23 (D) 01/15/23	(A) 09/30/24 (B) 06/30/24 (C) 05/24/27 (D) 08/01/24

\* (A) Phase 1A - Pipeline 2 Tesla & Oakdale Entry Improvements - HH-1005; (B) Phase 1B - Pipelines 3&4 Tesla & Oakdale Entry Improvements HH-1006; (C) Phase 2 -Pelican, Roselle, Emery and P4] Entry Improvements; and (D) Phase 3 - Tesla Surge Stack.

**Progress and Status:**

This project is divided into four (4) sub-projects, as specified in the above footnote. For Phase 1A, on March 8, the Commission approved award of construction contract HH-1005. Notice to Proceed (NTP) is anticipated next quarter. For Phase 1B, the 100% design was completed in February; the project team continued to work on the contract bid documents. It is anticipated that the construction contract (HH-1006) will be advertised next quarter approximately one month

behind schedule; the delay is not anticipated to impact coordination of planned work with future system shutdowns. For Phase 2, design is expected to start next quarter. For Phase 3, the 65% design milestone was achieved this quarter.

**Issues and Challenges:**

As previously reported, the forecasted cost is greater than the approved budget due to scope refinements to further improve safe entry and due to resequencing of construction so as to minimize the impact on water delivery. No new variances rose during the quarter.

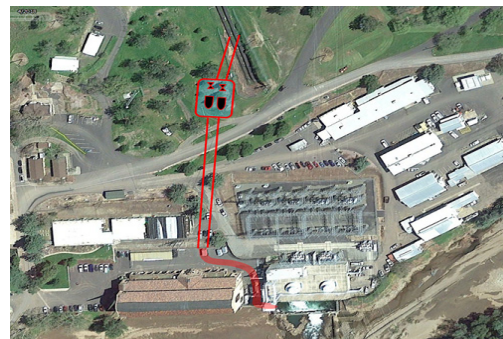
**10036809 - Moccasin Powerhouse Bypass Upgrades**

**Project Description:** Hetch Hetchy water deliveries are conveyed from Priest Reservoir to Moccasin Powerhouse (MPH) through the Moccasin Penstocks. At MPH, water passes through two hydroelectric turbines where energy is converted from high-pressure water into electricity. When electricity is not being produced, the water deliveries are directed around the turbines by two bypass valves that dissipate up to 305 million gallons per day (mgd) at 560 pounds per square inch (psi) of water energy. In the past, short-term use of the bypass system has resulted in significant vibration and cavitation damage to the bypass valves. Long-term use (greater than two to five days) could lead to major mechanical damage or failure, leading in turn to the potential of interruption of water deliveries to San Francisco. This project will provide a reliable hydraulic bypass and energy dissipation system for conveying water around the turbines to the Moccasin Reservoir Bypass Pipeline, allowing for increased operating flexibility for HHWP to meet scheduled water deliveries even when MPH, Moccasin Switchyard, or power Transmission Lines #3 and #4 are curtailed.

<b>Program:</b> Power Infrastructure		<b>Project Status:</b> Planning		<b>Environmental Status:</b> Not Initiated	
<b>Project Cost:</b>			<b>Project Schedule:</b>		
Approved		\$15.01 M	Approved Sep-20		Dec-27
Forecast		\$15.01 M	Forecast Sep-20		Dec-27
Actual		\$0.49 M	Project Percent Complete: 6.6%		
<b>Key Milestones:</b>	<b>Environmental Approval</b>	<b>Bid Advertisement</b>	<b>Construction NTP</b>	<b>Construction Final Completion</b>	
<b>Current Forecast</b>	08/26/24	08/27/24	02/28/25	06/02/27	

**Progress and Status:**

The consultant submitted the draft Alternative Analysis Report (AAR) in January 2022. The AAR was approved by the Technical Steering Committee on February 17, 2022. The project team is proceeding to the Conceptual Engineering Report. The preferred alternative is to move the bypass system to a location outside of the powerhouse and north of the Moccasin penstocks.



PREFERRED ALTERNATIVE







*Moccasin Powerhouse Bypass preferred alternative location*

**Issues and Challenges:**

The construction cost estimate for the preferred alternative is \$16.6M to \$21.6M, approximately 100% to 145% higher than the original construction estimate of \$8.8M. The project team will evaluate the effect of this increase on the total project budget and will update forecasts next quarter.

10014086 - Moccasin Powerhouse and GSU Rehabilitation

**Project Description:** The two Moccasin Powerhouse generators were completed in 1969 and generate a combined maximum output of 110 megawatts. Both generator units have exceeded their life expectancy and are in need of repair in order to continue operating reliably. The objective of this project is to replace stator cores and coils. The scope of work also includes rehabilitation of the rotor field poles with new pole cores and re-insulated field coils, replacement of the rotor pole/rim tail connection system with a new T-tail connection system, and supply of a new rotor rim for each generator following inspection and testing. The project will also include replacement of two generator step-up transformers (GSUs) with new oil containment barriers, and remaining plant work including: replacing 480V switchgear, 13.8kV switchgear, motor control centers, main control boards, protective relays, and cooling water piping.

<b>Program:</b> Power Infrastructure	<b>Project Status:</b> Multiple Phase	<b>Environmental Status:</b> Active
<b>Project Cost:</b>		<b>Project Schedule:</b>
Approved  \$66.71 M	Approved Jan-16  Apr-27	
Forecast  \$66.71 M	Forecast Jan-16  Dec-27	
Actual  \$10.94 M	Project Percent Complete: 16.8%	
		

Key Milestones:	Environmental* Approval	Bid* Advertisement	Construction* NTP	Construction* Final Completion
<b>Current Forecast</b>	(A) 09/28/20✓ (B) 09/28/20✓ (C) 09/28/22	(A) 11/20/20✓ (B) 10/30/20✓ (C) 04/01/24	(A) 06/07/21✓ (B) 06/08/22 (C) 10/02/24	(A) 05/23/23 (B) 06/17/24 (C) 06/07/27

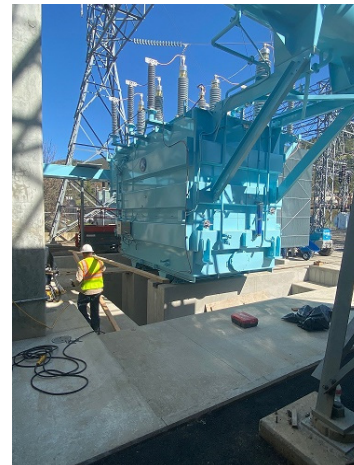
\* (A) Moccasin Powerhouse Generator Step-Up (GSU's) Transformers HH-1003R was re-advertised on 1/14/21; (B) Moccasin Powerhouse Generators Rewind – DB-121R2; and (C) Moccasin Powerhouse Systems Upgrade.

**Progress and Status:**

This project is divided into 3 subprojects, as specified in the above footnote. For subproject A, HH-1003R, Moccasin Powerhouse (MPH) Generator Step-up (GSU) Transformer Installation, the new Delta Star GSU1 transformer was moved from the spare slot outside the Powerhouse and installed on the new oil containment foundation inside the Powerhouse in March. Partial utilization is expected early next quarter. For subproject B, DB-121R2, MPH Generators Rehabilitation, both the 100% design drawings for miscellaneous generator rewind items and the 65% design drawings for the Relay Protection and Control Panels were received during the quarter. Construction Notice to Proceed (NTP) is scheduled for late next quarter. For subproject C, MPH Systems Upgrades, the task order for consultant planning, design, and engineering support during construction was approved. The Planning Phase kickoff meeting is scheduled for early next quarter.

**Issues and Challenges:**







Subproject B: The potential risk of delayed materials delivery due to the recent backlog of container ships in the California ports will be evaluated during the next few quarters. No new variances in schedule were forecast in the quarter.



*Installation of MPH GSU1 Transformer*

**10014087 - Warnerville Substation Rehabilitation**

**Project Description:** This project is based on the need to extend the useful life of the Warnerville Substation and meet reliability requirements of NERC/WECC and PG&E Intertie Agreements. The upgrades include replacing three existing 3 phase transformer with two larger rated transformers. Other upgrades include new 115kV and 230kV disconnect switches and breakers; new Control Room, perimeter fence, relays and controls; improvement to the grading and grounding system.

<b>Program:</b> Power Infrastructure	<b>Project Status:</b> Construction	<b>Environmental Status:</b> Active
<b>Project Cost:</b>		<b>Project Schedule:</b>
Approved  \$34.25 M	Approved Sep-15  Nov-26	
Forecast  \$34.25 M	Forecast Sep-15  Nov-26	
Actual  \$21.94 M	Project Percent Complete: 77.8%	
		

Key Milestones:	Environmental* Approval	Bid* Advertisement	Construction* NTP	Construction* Final Completion
<b>Current Forecast</b>	(A) 03/31/16✓ (B) 07/07/23	(A) 01/24/17✓ (B) 09/06/24	(A) 10/05/17✓ (B) 02/03/25	(A) 03/31/24 (B) 05/04/26

\* (A) Warnerville Substation Phase 1 – DB-127R; (B) Warnerville Substation Phase 2.

**Progress and Status:**

The project team, in coordination with the City Attorney’s office, is working to close out the contract DB-127R, Warnerville Substation Rehabilitation. The design was completed last quarter for the “breaker failure contingency plan” that supports emergency replacement of any breakers that fail until they can be replaced; however, the contracting strategy for this work that would only be needed if a failure occurs is still being determined.

Contract HH-1008 Warnerville Substation Rehabilitation Phase 2 will be a design-bid-build contract. The task order scope of work for engineering services during planning, design, and construction was negotiated during the quarter.



Typical 230KV SF6 Breaker to be Installed as Part of Phase 2

**Issues and Challenges:**







None at this time.

**10035721 - Transmission Lines 7/8 Upgrades**

**Project Description:** This project develops the scope of work, design, and contract documents necessary to bid, award, and manage the reconductoring contract. Reconductoring will include replacement of the existing 115kV conductors on Lines 7/8 from Warnerville to Standiford substations, resulting in improved transmission tower stability, and resolved clearance detections.

The project will be partially funded by independent power generators interconnecting on the California Independent System Operator (CAISO).

<b>Program:</b> Power Infrastructure	<b>Project Status:</b> Bid and Award	<b>Environmental Status:</b> Completed
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<b>Project Cost:</b>		<b>Project Schedule:</b>	
Approved 	\$37.97 M	Approved Dec-19 	Jan-25
Forecast 	\$37.97 M	Forecast Dec-19 	Jan-25
Actual 	\$3.00 M	Project Percent Complete: 15.7%	
			

Key Milestones:	Environmental Approval	Bid Advertisement	Construction NTP	Construction Final Completion
Current Forecast	11/04/21✓	02/11/22✓	10/03/22	06/28/24

**Progress and Status:**

Significant progress was achieved in the Design and Bid / Award phases with the completion of the 100% Plans and Specification and bid documents. The Project was advertised on February 11, and the three bids received were opened March 24. The Engineers Estimate was stated at \$28M. The project is anticipated to be awarded in the next quarter.

**Issues and Challenges:**

None at this time.








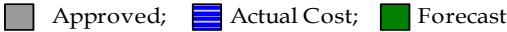
*Transmission Line 7/8 Tower 508S Looking North*



**10014088 - Moccasin Penstock**

**Project Description:** Moccasin Penstock was built in the early 1920's and conveys Hetch Hetchy water nearly one mile from Moccasin Tunnel to the Moccasin Powerhouse. Moccasin penstock serves as the sole link in conveying water from Priest Reservoir to Moccasin Reservoir, from which water is routed to the San Francisco Public Utilities Commission (SFPUC) customers. The lower 1,084-foot section of welded steel pipe replaced the original penstocks when the new Moccasin Powerhouse was completed in the 1960s. The upper 4,000 feet of penstock dates to 1924 and has been in service for more than 97 years. Previous condition assessments have identified deficiencies including corrosion, coating damage, lining degradation, leakage, aggregate expansion, cracks in the concrete anchor blocks and saddles, vulnerability of the hammer forged steel pipe sections. The objective of this project is to enhance the reliability of water delivery and extend the life of the penstock system for another 50 to 100 years.

<b>Program:</b> <a href="#">Joint Infrastructure</a>	<b>Project Status:</b> <a href="#">Planning</a>	<b>Environmental Status:</b> <a href="#">Active</a>
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<b>Project Cost:</b>		<b>Project Schedule:</b>	
Approved 	\$47.25 M	Approved Feb-16 	Feb-28
Forecast 	\$47.25 M	Forecast Feb-16 	Feb-28
Actual 	\$5.36 M	Project Percent Complete: <a href="#">12.1%</a>	
			

Key Milestones:	Environmental Approval	Bid Advertisement	Construction NTP	Construction Final Completion
Current Forecast	10/07/24	10/08/24	04/16/25	08/24/27

**Progress and Status:**

A field visit to kick off the Needs Assessment phase was held during the quarter, on January 19. A workshop, to present the identified needs to Hetch Hetchy Water & Power, was held on February 10. A study was initiated to evaluate the condition of the penstock manway opening and to assess the need for any security measures for the facility.

**Issues and Challenges:**

None at this time.









*Site visit inside West Portal Valve House*

10030758 - OSH Dam Access and Drainage Improvements

**Project Description:** The O’Shaughnessy Dam is located 140 miles east of San Francisco, CA in Yosemite National Park, Tuolumne County. The dam, a concrete curved gravity structure, is located on the Tuolumne River across the steep-walled Hetch Hetchy Valley. The interior workings of the dam contain valves and appurtenances that must be accessed for operations and maintenance. This project includes improvements for safe access, as well as mitigation of excess interior water leakage through drainage improvements, for the Ladder Wells, Galleries, Inclined Stairways, Control Room, and Diversion Tunnel.

The project was reduced in scope of work in 2020 to meet the existing approved budget. The new project will be advertised as O’Shaughnessy Dam-Fall Protection Improvements and Spillway Access to complete the reduced scope of work.

Improvements that were not included in this revised project, such as drainage improvements, will be included in the OSH Dam Outlet Works Phase 1 project.

<b>Program:</b> Joint Infrastructure		<b>Project Status:</b> Construction		<b>Environmental Status:</b> Completed (CatEx)	
<b>Project Cost:</b>			<b>Project Schedule:</b>		
Approved		\$3.95 M	Approved Mar-17		Feb-23
Forecast		\$3.95 M	Forecast Mar-17		Feb-23
Actual		\$2.33 M	Project Percent Complete: 64.7%		
					
<b>Key Milestones:</b>	<b>Environmental Approval</b>	<b>Bid Advertisement</b>	<b>Construction NTP</b>	<b>Construction Final Completion</b>	
<b>Current Forecast</b>	07/16/20✓	03/18/21✓	09/27/21✓	08/21/22	

**Progress and Status:**

The exterior ladder to the spillway invert, including fall protection, was completed during this quarter. The inclined stairway steel and anchorage remediation is 95% complete. Work in the Control Room was completed during this quarter, including construction of new gaskets for manhole covers and the secure sealing of electrical boxes. Substantial completion for the construction contract is anticipated next quarter.

**Issues and Challenges:**

None at this time.






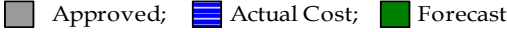


*Exterior Ladder and Fall Protection to Spillway Invert*

**10032903 - O'Shaughnessy Dam Outlet Works Phase I**

**Project Description:** O'Shaughnessy Dam (OSH) was completed in 1923 and raised in 1938. The original outlet works including gates and valves have been in services for more than 98 years. Inspections, condition assessments, and studies concluded that improvements and refurbishments of the outlet works system are needed to ensure safety and reliability. The work will be implemented in two phases. This project is to cover the Phase 1 work. The O'Shaughnessy Dam Outlet Works Phase 1 Project addresses the identified deficiencies of the existing outlet works system at OSH. Phase 1 will include four projects: (1) supply and installation of nine new bulkheads; (2) refurbishment of twelve existing slide gates; (3) rehabilitation of existing drum gates to replace the seals, replace the hinges and rivets, recoating the gates, and repair the spillway concrete; and (4) installation of a new diversion pipe isolation butterfly valve.

The existing control gates and valves are essential features for dam safety and reservoir operation. The project is needed to maintain safe and reliable operation of these aging assets. Failure or malfunction of these gates and valves will affect dam safety and result in reduction of storage and reduction of water deliveries to SFPUC customers.

<b>Program:</b> Joint Infrastructure	<b>Project Status:</b> Planning	<b>Environmental Status:</b> Active
<b>Project Cost:</b>		<b>Project Schedule:</b>
Approved 	\$21.21 M	Approved Feb-18  Sep-25
Forecast 	\$47.89 M	Forecast Feb-18  Sep-25
Actual 	\$1.47 M	Project Percent Complete: 15.6%
		

Key Milestones:	Environmental* Approval	Bid* Advertisement	Construction* NTP	Construction* Final Completion
<b>Current Forecast</b>	(A) 01/03/23 (B) 12/30/22 (C) 05/31/23	(A) 03/01/23 (B) 04/03/23 (C) 12/01/22	(A) 09/01/23 (B) 10/02/23 (C) 06/01/23	(A) 03/14/25 (B) 06/28/24 (C) 03/27/25

\* (A) Bulkhead; (B) Access and Drainage; (C) Instream Flow Release

**Progress and Status:**

Subproject A (Bulkhead): During this quarter, peer review for the bulkhead design concept was completed. The proposed bulkhead concept was found to be acceptable. An underwater inspection, and development of methods for cleaning the corroded cast iron sealing surface, were completed at one of the upper outlets during the quarter. Work began on preparation of the specification and bid package for the design and construction of the bulkhead under a progressive-design-build approach. Subproject B (Access & Drainage): A Job Order Contract for a closed-circuit television (CCTV) inspection of the existing dam drain system is being finalized. Subproject C (Instream Flow Release Valve Replacement): Preparation of both the Needs Assessment Report/Alternatives Analysis Report

(NAR/AAR) and of the planning phase environmental assessment for the Instream Flow Release (IFR) Valve Replacement Project continued during the quarter.





**Issues and Challenges:**

As noted the past two quarters, the current planning phase design and construction cost estimate is higher than in the approved budget due to the following: 1) added scope of IFR valves replacement and dam gallery access and drainage improvements; 2) scope refinement and greater detail in the most recent construction cost estimate for the new bulkhead system. The scope now specifies additional inspections, underwater modification of the existing slots and corroded inlet surfaces, and installation of the bulkheads using divers. No part of the cost variance is new this quarter.

**10037351 - Moccasin Dam Long-Term Improvements**

**Project Description:** The flow capacity of the existing spillway is inadequate to protect the Moccasin Dam against overtopping and erosion from severe flood events. The dam almost overtopped during the March 2018 storm event when flows were released from the auxiliary spillway and caused significant damage to the auxiliary spillway. The surrounding areas and the upstream diversion dam also sustained damage from the flood. This project is needed for dam safety. The objective of this project is to increase the spillway flow capacity to allow safe passage of flood flows without overtopping the dam and to protect the associated facilities within the Moccasin reservoir boundary against flood damages. The estimated project cost is \$83.2 million and is within the current 10-year CIP FY 21-30. Construction is scheduled for 2025-2027.

<b>Program:</b> <a href="#">Joint Infrastructure</a>	<b>Project Status:</b> <a href="#">Planning</a>	<b>Environmental Status:</b> <a href="#">Not Initiated</a>
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<b>Project Cost:</b>		<b>Project Schedule:</b>	
Approved	 \$83.18 M	Approved May-21	 Jun-28
Forecast	 \$73.18 M	Forecast May-21	 Jun-28
Actual	\$0.30 M	Project Percent Complete: <b>1.7%</b>	

 Approved;  Actual Cost;  Forecast

Key Milestones:	Environmental Approval	Bid Advertisement	Construction NTP	Construction Final Completion
Current Forecast	01/29/26	01/26/26	07/27/26	12/30/27

**Progress and Status:**

The engineering consultant began work on the conceptual engineering for a new concrete lined auxiliary spillway and control structures.

**Issues and Challenges:**

None at this time.








*Moccasin Dam Existing Auxiliary Spillway*

**10014115 - Cherry Dam Spillway - Short Term Improvements**

**Project Description:** A spillway release from Cherry Dam in 2010 caused a landslide, blockage of the spill channel, and extensive erosion in the close proximity of the dam’s right abutment. In addition, it caused flooding of the Cherry Power Tunnel Adit, and flooding of a campground further downstream. Engineering studies determined that significant long-term improvements to increase the spillway flow capacity are needed to maintain dam safety. The objective of this project is to re-establish containment for the breached spill channel section and to protect the downstream slope of the existing embankment dam from uncontrolled releases and erosion in the interim until the long-term improvements are implemented. Construction is scheduled for 2025-2026. The estimated project cost of \$11.9 million is within the current 10-year CIP FY 21-30.

<b>Program:</b> <a href="#">Joint Infrastructure</a>	<b>Project Status:</b> <a href="#">Planning</a>	<b>Environmental Status:</b> <a href="#">Not Initiated</a>
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<b>Project Cost:</b>		<b>Project Schedule:</b>	
Approved 	\$11.86 M	Approved Mar-21 	Jul-27
Forecast 	\$11.86 M	Forecast Mar-21 	Jul-27
Actual 	\$0.42 M	Project Percent Complete: <a href="#">7.3%</a>	

 Approved;  Actual Cost;  Forecast

Key Milestones:	Environmental Approval	Bid Advertisement	Construction NTP	Construction Final Completion
Current Forecast	08/15/24	03/29/24	10/31/24	12/31/26

**Progress and Status:**

The engineering consultant continued work on the alternative analysis for the Cherry Dam Spillway Short-Term Improvements. The alternatives will include grading and erosion protection for dam safety and downstream public safety. The alternatives analysis was delayed to further consider project performance criteria, and is scheduled to complete in June 2022.

**Issues and Challenges:**







None at this time.



*Cherry Valley Dam and Spillway*

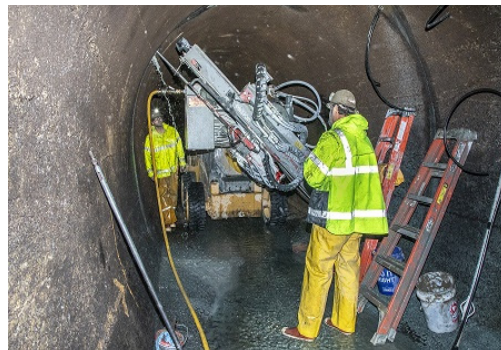
10014114 - Mountain Tunnel Improvement Project

**Project Description:** Mountain Tunnel conveys the SFPUC water supply from Kirkwood Powerhouse to Priest Reservoir. Mountain Tunnel has been in service since 1925. Due to its age, deferred maintenance, and construction deficiencies in the early 1900s, sections of the tunnel lining have deteriorated, some extensively. This project provides design and construction of major tunnel repair and rehabilitation work, adit and tunnel entry improvements, access road improvements, and installation of a new flow control facility at Priest Reservoir to ensure that the tunnel can reliably provide drinking water to customers for the next 100 years. The flow control structure and isolation valves will also be used to isolate the tunnel from Priest Reservoir during tunnel shutdowns. This will allow the reservoir to remain full and not backwater for over 8 miles into the dewatered tunnel. The full reservoir provides more supply water for safely extending the tunnel shutdowns to longer durations of 100 days for construction inside the tunnel. These longer outages will reduce the need for more typical 60-day outages and shorten the overall duration of the construction schedule. .

<b>Program:</b> Joint Infrastructure		<b>Project Status:</b> Construction		<b>Environmental Status:</b> Completed	
<b>Project Cost:</b>			<b>Project Schedule:</b>		
Approved		\$238.22 M	Approved Oct-11		Jun-27
Forecast		\$238.22 M	Forecast Oct-11		Jun-27
Actual		\$64.40 M	Project Percent Complete: 32.6%		
					
<b>Key Milestones:</b>	<b>Environmental Approval</b>	<b>Bid Advertisement</b>	<b>Construction NTP</b>	<b>Construction Final Completion</b>	
<b>Current Forecast</b>	01/14/20✓	11/13/19✓	01/29/21✓	12/03/26	

**Progress and Status:**

Shutdown No. 1 was implemented between January and March, and the Mountain Tunnel was successfully shut down, dewatered, and brought back to service, within the planned 60-day timeframe. This quarter’s progress included excavation to a depth of 100 feet and placement of initial lining in the Flow Control Facility (FCF) Shaft. The Priest Adit tunnel was excavated to a length of 200 feet, also with initial lining installed in the excavated section. Shutdown work inside the tunnel included survey of the entire tunnel and of the siphon at South Fork, geological evaluation of the South Fork siphon, and installation of rock dowels at tie-in locations within the bypass tunnels and Priest Adit tunnel. The construction water treatment plant at Priest was commissioned and successfully used to treat construction water during the shutdown. A temporary water filtration plant was also successfully installed at Moccasin and was used to treat drinking water for Moccasin during the shutdown. Safety and road improvement work continued on Adit 8/9 road, Adit 5/6 road, South Fork road, and Rickson road. Partnering meetings were held; additionally, a meeting with the Dispute Resolution Board (DRB) was held to familiarize the DRB with the project. An SFGOV TV



*Installing Rock Dowels inside the Tunnel at the New Priest Adit Tie-in Location during Shutdown No. 1*






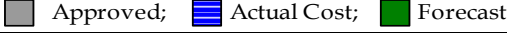
crew filmed various project worksites during the shutdown and are now finalizing a “virtual tour” of project highlights. Planning for Shutdown No. 2 is taking place on a continuous basis.

**Issues and Challenges:**

None at this time.

**10035086 - Bridge Replacement (4 - Bridges)**

**Project Description:** HHWP is responsible for maintaining 14 bridges located in the Cherry, Eleanor, and Hetch Hetchy region. Condition assessments in 2013 and 2016 determined that, four of these bridges require substantial rehabilitation or replacement: Lake Eleanor Dam Bridge, O’Shaughnessy Adit Access Bridge, Cherry Lake Road Bridge (public access), and Early Intake Bridge (public access). The project will be funded in 2 phases. The first phase will include planning, design and construction of Eleanor Dam Bridge and O’Shaughnessy Adit Access Bridge. The planning, design and construction of the Early Intake Bridge and Cherry Lake Road Bridge will be under Phase 2.

<b>Program:</b> Joint Infrastructure	<b>Project Status:</b> Planning	<b>Environmental Status:</b> Not Initiated
<b>Project Cost:</b>		<b>Project Schedule:</b>
Approved  \$44.29 M	Approved Feb-20  May-37	
Forecast  \$29.37 M	Forecast Feb-20  Jul-27	
Actual  \$1.37 M	Project Percent Complete: 45.7%	
		

Key Milestones:	Environmental* Approval	Bid* Advertisement	Construction* NTP	Construction* Final Completion
<b>Current Forecast</b>	(A) 12/29/23 (B) 07/31/24	(A) 10/31/23 (B) 08/01/24	(A) 08/01/24 (B) 02/03/25	(A) 12/31/25 (B) 01/29/27

\* (A) Lake Eleanor Dam Bridge; and (B) O’Shaughnessy Adit Access Bridge.

**Progress and Status:**

For Lake Eleanor Dam Bridge, the engineering consultant continued work during the quarter on the alternatives study for rehabilitation of the existing bridge. For the O’Shaughnessy Adit Access Bridge, two workshops were held with Hetch Hetchy Water & Power during the quarter, in February and March 2022, for the project team to present the developed alternatives. The project team is using the Geotechnical Interpretative Report completed last quarter to inform the alternatives analysis.



Lake Eleanor Dam Bridge







**Issues and Challenges:**

As noted last quarter, the variances between the approved budget and schedule and the forecasted budget and schedule are due to division of the project into two phases, with the planning, design and construction of the Lake Eleanor Dam Bridge and O’Shaughnessy Adit Access Bridge within the first phase and funded in the FY21-30 10-Year CIP; the funding for the planning, design and construction of the other two of the four bridges has been deferred until after 2030. The forecasted completion for the two bridges is decreased from the approved completion date of May 2037 to a revised completion date of January 2027. No new variances arose during the quarter.

**10014110 - Moccasin Wastewater Treatment Plant**

**Project Description:** The Moccasin Wastewater Treatment Plant (WWTP) project proposes to replace the community’s aging treatment plant. Moccasin’s treatment plant was installed in the 1970s and has been in continuous service since that time. Wastewater generated by the Moccasin community, powerhouse, and related facilities flows to this treatment plant. The treatment facility currently serving Moccasin was a “package plant” that was manufactured off-site, transported to Moccasin, and installed in 1977. At more than 44-years old, the Moccasin treatment plant has reached the end of its useful service life, and is becoming increasingly maintenance intensive. Additionally, Moccasin has no backup treatment; accordingly, failure of the plant would have significant consequences.

This project will replace the existing wastewater treatment facilities with a Sequence Batch Reactor (SBR) plant. The proposed SBR “package plant” is to be a two-train facility. Each train would have a capacity of 12,000 gallons per day to accommodate average daily dry-weather flow. The new plant would continue to treat wastewater to secondary standards. The new plant will be provided with upgraded screening, flow monitoring, flow equalization, SCADA instrumentation, and automation features. The package plant would be manufactured off-site, trucked to Moccasin, and then installed beside the current plant. The existing plant must serve the Moccasin community while the new plant is being installed and would remain in operation during construction. The proposed project is limited to the treatment plant only and does not include improvements either upstream or downstream of the plant.

<b>Program:</b> <a href="#">Joint Infrastructure</a>	<b>Project Status:</b> <a href="#">Design</a>	<b>Environmental Status:</b> <a href="#">Not Initiated</a>
<b>Project Cost:</b>		<b>Project Schedule:</b>
Approved 	\$8.79 M	Approved Sep-21  Apr-26
Forecast 	\$8.79 M	Forecast Jan-22    Apr-26
Actual 	\$0.44 M	Project Percent Complete: <a href="#">6.6%</a>
		

Key Milestones:	Environmental Approval	Bid Advertisement	Construction NTP	Construction Final Completion
<b>Current Forecast</b>	11/14/23	05/09/23	11/28/23	09/09/25

**Progress and Status:**

The project commenced design phase during the quarter with a consultant under contract to the SFPUC submitting an approved proposal to support the project during design and construction phases. Notice To Proceed to the contractor is expected to issue in April.

**Issues and Challenges:**

None at this time.



### 8. On-Going Construction\*

The following table reflects active construction contract(s) with an original contract amount greater than \$1M.

Construction Contract	Schedule			Budget		Variance (Original - Forecast)		Actual % Complete
	NTP Date	Approved Construction Final Completion	Current Forecast Construction Final Completion*	Approved Contract Cost	Current Forecast Cost*	Schedule (Cal. Days)	Current Forecast Cost	
<b>Power Infrastructure</b>								
10014086 - Moccasin Powerhouse Transformers Installation - HH-1003R	06/07/21	05/23/23	05/23/23	\$ 3,653,575	\$ 3,653,575	-	-	42.9%
10014086 - Moccasin Powerhouse Generator Rehab - DB-121R2	06/21/21	06/17/24	06/17/24	\$ 28,898,986	\$ 28,898,986	-	-	5.0%
10014087 - Warnerville Switchyard - DB-127R **	10/05/17	07/09/19	03/31/24	\$ 14,591,450	\$ 14,591,450	(1,727)	-	90.0%
<b>Joint Infrastructure</b>								
10030758 - OSH Dam Access & Drainage Improvement - HH-1002R	09/27/21	08/21/22	08/21/22	\$ 1,648,556	\$ 1,648,556	-	-	60.6%
10014114 - Mountain Tunnel Improvement - HH-1000R	01/29/21	12/03/26	12/03/26	\$ 152,870,508	\$ 152,870,508	-	-	17.0%

Program Total for On-Going Construction	Approved Contract Cost	Current Forecast Cost*	Variance	
			Cost	Percent
	\$ 201,663,075	\$ 201,663,075	-	-

Note:

\* The Current Forecast Cost and Current Forecast Construction Final Completion include all approved, pending, and potential change orders.

\*\* The contract is funded with both CIP and non-CIP funds, but only the CIP funded amount is reflected.

9. PROJECTS IN CLOSEOUT

Project Title	Current Approved Construction Phase Completion	Actual Construction Phase Completion	Current Approved Construction Phase Budget	Construction Phase Expenditures To Date*
<b>Power Infrastructure</b>				
<b>Powerhouse</b>				
10014075 - Holm and Other Powerhouse Projects	05/14/21	05/14/21	\$ 15,327,522	\$ 12,869,573
<b>TOTAL</b>			\$ 15,327,522	\$ 12,869,573

## 10. COMPLETED PROJECTS

*There are no completed projects*

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**APPENDICES**

**A PROJECT DESCRIPTIONS**

**B APPROVED PROJECT LEVEL SCHEDULES / BUDGETS**

**C LIST OF ACRONYMS**

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## APPENDIX A. PROJECT DESCRIPTIONS

The project titles and descriptions are updated according to the approved 10-year CIP for FY21-30.

### HETCH HETCHY CAPITAL IMPROVEMENT PROGRAM (HCIP)

#### WATER INFRASTRUCTURE

##### 10035574 - SJPL Tesla Valves Replacement

The 2018 approved scope for this project is to replace four large diameter butterfly valves, namely TUV 101, 201, 301 and 401, inside the Tesla Valve Vault so that each of the four San Joaquin Pipelines (SJPL) can be safely isolated and shut down individually for inspection and repair work without shutting down the entire SJPL system. This project will also improve safety for entry into the pipelines for maintenance and inspection purposes. After the planning phase of the related project SJPL Valve and Safe Entry Improvement (Project 10035575) it was recommended that the scope of SJPL Tesla Valve Replacement be reduced, to focus on completing the replacement of TUV101 only. The remainder of the work (i.e. TUV 201, 301 and 401) has been added to the scope of SJPL Valve and Safe Entry Improvement (Project 10035575) to expedite improvements for TUV101 during the planned winter shutdown from January to February 2022 to facilitate necessary maintenance work for SJPL No. 1 during the remainder of 2022. The installation of TUV201, 301 and 401 will proceed together with the upgrade work proposed under SJPL Valve and Safe Entry Improvement, in 2023 and 2024.

##### 10035575 - SJPL Valve and Safe Entry Improvement

The San Joaquin Pipelines (SJPLs) consist of three parallel pipelines approximately 48 miles long (completed in 1932, 1953, and 1968, respectively) that cross the San Joaquin Valley from the Oakdale Portal of the Foothill Tunnel

on the east end to the Tesla Portal of the Coast Range Tunnel (CRT) on the west. Portions of a fourth pipeline have also been constructed consisting of 6.4 miles of pipe downstream of Oakdale and 11 miles upstream of Tesla. The hydraulic gradient on the SJPLs was limited by surge stacks/towers at Oakdale portal (~825 ft) and Tesla portal (~500 ft). The pipelines were intended to be shut down at Oakdale.

As part of the SFPUC's Water System Improvement Program (WSIP), the Emery and Pelican crossover vaults were installed and the Roselle crossover vault was modified to allow for flows between SJPLs and isolation of SJPL segments for inspection and maintenance. The intent was to increase operational flexibility and the overall reliability of the SJPL System. In addition, the Tesla Valve House (TVH) and Tesla Treatment Facility (TTF) were added upstream of the Tesla surge tower. Like the SJPLs, the crossover vaults and Tesla facilities are rated for the maximum pressures that should occur under normal operating conditions. However, the pipelines and pipeline segments still need to be shut down from the upstream end. Closure of multiple in-line valves or all TTF UV reactor valves can over-pressurize the pipelines. As in the original design, complete shutdown of the SJPL system must be done at Oakdale.

The objective of this project is to allow safe entry into any and all sections of the SJPLs for inspection and maintenance while the remainder of the system stays in operation. The project objective is not to upgrade the entire SJPL system to the maximum possible static or transient pressures, nor to upgrade all components in vaults to prevent possible flooding of the vaults. However, the proposed surge tower will protect the entire SJPL system from high static and transient pressure caused by operation of valves at Tesla Treatment Facility. The scope and budget of installing the TUV201, 301 and 401 butterfly valves has been transferred from project SJPL Tesla Valve Replacement project (10035574) and added to

SJPL Valve and Safe Entry Improvement.

### **10014072 - WATER ONLY/PROJECT DEVELOPMENT**

The Project Development (PD) Account captures Program level expenditures. There are four types of charges that will be allocated to the PD Account: 1) charges for task orders for overall program management and project prioritization tasks, where the costs should be distributed over all Capital Improvement Program (CIP) Projects; 2) charges for Infrastructure and Hetchy staff performing program level tasks including: capital plan development, budget management (including fund management, and cost reallocations), and quarterly report generation tasks, where the costs should be distributed over all CIP Projects; 3) charges for portal support for the existing SharePoint Portal (includes document management and project dashboard reporting); and 4) charges for work outreach programs.

### **POWER INFRASTRUCTURE**

#### **10036809 - Moccasin Powerhouse Bypass Upgrades**

Hetch Hetchy water deliveries are conveyed from Priest Reservoir to Moccasin Powerhouse (MPH) through the Moccasin Penstocks. At MPH, water passes through two hydroelectric turbines where energy is converted from high-pressure water into electricity. When electricity is not being produced, the water deliveries are directed around the turbines by two bypass valves that dissipate up to 305 million gallons per day (mgd) at 560 pounds per square inch (psi) of water energy. In the past, short-term use of the bypass system has resulted in significant vibration and cavitation damage to the bypass valves. Long-term use (greater than two to five days) could lead to major mechanical damage or failure, leading in turn to the potential of interruption of water deliveries to San Francisco. This project will

provide a reliable hydraulic bypass and energy dissipation system for conveying water around the turbines to the Moccasin Reservoir Bypass Pipeline, allowing for increased operating flexibility for HHWP to meet scheduled water deliveries even when MPH, Moccasin Switchyard, or power Transmission Lines #3 and #4 are curtailed.

#### **10036810 - Kirkwood Powerhouse Bypass Upgrades**

Hetch Hetchy water deliveries are conveyed through the Canyon Tunnel to the Canyon Portal Valvehouse. Water then enters the Kirkwood Penstock and drops 1,245 feet in elevation to the Kirkwood Powerhouse (KPH). At KPH, water passes through three hydroelectric turbines where energy is converted from high-pressure water into electricity, producing a maximum output of 124 megawatts at a maximum flow of 1,408 cubic feet per second. When electricity is not being produced, the water deliveries are directed around the turbines through a separate bypass system consisting of a spherical guard valve and a 90-degree needle valve for flow control. Based on a condition assessment of KPH performed in 2010, existing control problems limit operation of the bypass needle valve to no more than 70% open. An inspection of the bypass valve and dissipation structure in 2016 indicated that the stainless steel dissipator had failed, causing damage at the base of a steel shaft column leading to the bypass tunnel. Repairs to the dissipator, bypass draft tube, and bypass chamber were completed in 2017, but the steel lining protecting the bypass chamber's concrete walls and floor subsequently failed after bypass usage. Additional repairs were made to the steel lining of the bypass in 2019 under the HH-991 2018 Mountain Tunnel Interim Repairs construction contract. Long-term use (greater than two to five days) could lead to major mechanical damage or failure, leading to potential interruption of water deliveries to



San Francisco. This project will provide a reliable hydraulic bypass and energy dissipation system for conveying water around the turbines to the KPH Bypass Chamber and Mountain Tunnel, allowing for increased operating flexibility for Hetch Hetchy Water & Power (HHWP) to meet scheduled water deliveries when KPH is not generating electricity.

#### **10014075 - Holm and Other Powerhouse Projects**

This project provided funding for Holm Powerhouse (HPH) Unit 2 upgrades and other items under \$1 million involving power generation renewal and equipment replacement. The upgrade and rehabilitation of HPH Unit 2 included 13.8 Kv equipment upgrades, addition and integration of a generator breaker, replacement of two 13.8kV feed breakers, replacement of Unit 2 Main Control Board, and any necessary tasks to match Unit 2 to Unit 1. System integration work was done to integrate exciter, governor Programmable Logic Controllers (PLC), and Generator 2 PLCs into the existing plant control and Supervisory Control and Data Acquisition (SCADA) system. Additionally, this project included upgrades to turbine and generators and to alternating current stations, intended to extend the life of the unit by 20 years. Lastly, the project upgraded the existing oil containment systems at Kirkwood Powerhouse (KPH) and HPH to prevent oil discharge into the environment. The existing oil-water separators were replaced, and other modifications were made to the powerhouse interiors and to the transformer decks, to discourage contaminated discharges into the adjacent streams. A monitoring system was installed to alert HHWP of excessive leakage and the need to manually pump oil containment vessels. Failure of the oil containment systems at the powerhouses would likely result in environmental contamination, fines, additional regulatory

exposure, and the need for rehabilitation and cleanup.

#### **10014086 - Moccasin Powerhouse and GSU Rehabilitation**

The two Moccasin Powerhouse generators were completed in 1969 and generate a combined maximum output of 110 megawatts. Both generator units have exceeded their life expectancy and are in need of repair in order to continue operating reliably. The objective of this project is to replace stator cores and coils. The scope of work also includes rehabilitation of the rotor field poles with new pole cores and re-insulated field coils, replacement of the rotor pole/rim tail connection system with a new T-tail connection system, and supply of a new rotor rim for each generator following inspection and testing. The project will also include replacement of two generator step-up transformers (GSUs) with new oil containment barriers, and remaining plant work including: replacing 480V switchgear, 13.8kV switchgear, motor control centers, main control boards, protective relays, and cooling water piping.

#### **10014087 - Warnerville Substation Rehabilitation**

This project is needed to extend the useful life of the Warnerville Substation and meet reliability requirements of NERC/WECC and PG&E Intertie Agreements. The upgrades include replacing three existing 3 phase transformer with two larger rated transformers. Other upgrades include new 115kV and 230kV disconnect switches and breakers; new Control Room, perimeter fence, relays and controls; improvement to the grading and grounding system.

#### **10035721 - Transmission Lines 7/8 Upgrades**

The SFPUC electric transmission lines 7/8 conveys power from Warnerville Substation to Modesto Irrigation District's (MID) Standiford Substation. The SFPUC must accommodate additional power flowing across its

transmission system due to grid interconnection requests from independent power generators interconnecting on the California Independent System Operator (CAISO). This is a requirement for SFPUC and HHWP obligations as a neighboring provider of electric transmission service.

Studies performed by the SFPUC indicate the principal impact to its system is an overload of 115kV Lines 7&8 between HHWP Warnerville Substation and MID Standiford Substation under contingency conditions if interconnections are made without modification to the system's capacity. Without modifications, the SFPUC and HHWP transmission system could face reliability issues. Reconductoring also resolves multiple locations where the clearance between the existing conductors and the ground or structures does not meet current safe clearance regulations.

This project develops the scope of work, design, and contract documents necessary to bid, award, and manage the reconductoring contract. Reconductoring will include replacement of the existing 115kV conductors on Lines 7/8 from Warnerville to Standiford substations, resulting in improved transmission tower stability, and resolved clearance detections.

The project will be partially funded by independent power generators interconnecting on the California Independent System Operator (CAISO).

### **10014092 - POWER ONLY/PROJECT DEVELOPMENT**

The Project Development (PD) Account captures Program level expenditures. There are four types of charges that will be allocated to the PD Account: 1) charges for task orders for overall program management and project prioritization tasks, where the costs should be distributed over all Capital Improvement Program (CIP) Projects; 2) charges for Infrastructure and Hetchy staff performing

program level tasks including: capital plan development, budget management (including fund management, and cost reallocations), and quarterly report generation tasks, where the costs should be distributed over all CIP Projects; 3) charges for portal support for the existing SharePoint Portal (includes document management and project dashboard reporting); and 4) charges for work outreach programs.

## **JOINT INFRASTRUCTURE**

### **10014088 - Moccasin Penstock**

Moccasin Penstock was built in the early 1920's and conveys Hetch Hetchy water nearly one mile from Moccasin Tunnel to the Moccasin Powerhouse. Moccasin penstock serves as the sole link in conveying water from Priest Reservoir to Moccasin Reservoir, from which water is routed to the San Francisco Public Utilities Commission (SFPUC) customers. The lower 1,084-foot section of welded steel pipe replaced the original penstocks when the new Moccasin Powerhouse was completed in the 1960s. The upper 4,000 feet of penstock dates to 1924 and has been in service for more than 97 years. Previous condition assessments have identified deficiencies including corrosion, coating damage, lining degradation, leakage, aggregate expansion, cracks in the concrete anchor blocks and saddles, vulnerability of the hammer forged steel pipe sections. The objective of this project is to enhance the reliability of water delivery and extend the life of the penstock system for another 50 to 100 years.

### **10030758 - OSH Dam Access and Drainage Improvements**

The O'Shaughnessy Dam is located 140 miles east of San Francisco, CA in Yosemite National Park, Tuolumne County. The dam, a concrete curved gravity structure, is located on the Tuolumne River across the steep walled Hetch Hetchy Valley. The interior workings of the

dam contain valves and appurtenances that must be accessed for operations and maintenance. This project includes improvements for safe access, as well as mitigation of excess interior water leakage through drainage improvements, for the Ladder Wells, Galleries, Inclined Stairways, Control Room, and Diversion Tunnel. The project was reduced in scope of work in 2020 to meet the existing approved budget. The new project will be advertised as O'Shaughnessy Dam-Fall Protection Improvements and Spillway Access to complete the reduced scope of work. Improvements that were not included in this revised project, such as drainage improvements, will be included in the OSH Dam Outlet Works Phase 1 project.

#### **10032903 - O'Shaughnessy Dam Outlet Works Phase 1**

O'Shaughnessy Dam (OSH) was completed in 1923 and raised in 1938. The original outlet works including gates and valves have been in services for more than 98 years. Inspections, condition assessments, and studies concluded that improvements and refurbishments of the outlet works system are needed to ensure safety and reliability. The work will be implemented in two phases. This project is to cover the Phase 1 work. The O'Shaughnessy Dam Outlet Works Phase 1 Project addresses the identified deficiencies of the existing outlet works system at OSH. Phase 1 will include four projects: (1) supply and installation of nine new bulkheads; (2) refurbishment of twelve existing slide gates; (3) rehabilitation of existing drum gates to replace the seals, replace the hinges and rivets, recoating the gates, and repair the spillway concrete; and (4) installation of a new diversion pipe isolation butterfly valve. The existing control gates and valves are essential features for dam safety and reservoir operation. The project is needed to maintain safe and reliable operation of these aging assets. Failure or malfunction of these gates and valves will affect dam safety and

result in reduction of storage and reduction of water deliveries to SFPUC customers.

#### **10037351 - Moccasin Dam Long-Term Improvements**

The flow capacity of the existing spillway is inadequate to protect the Moccasin Dam against overtopping and erosion from severe flood events. The dam almost overtopped during the March 2018 storm event when flows were released from the auxiliary spillway and caused significant damage to the auxiliary spillway. The surrounding areas and the upstream diversion dam also sustained damage from the flood. This project is needed for dam safety. The objective of this project is to increase the spillway flow capacity to allow safe passage of flood flows without overtopping the dam and to protect the associated facilities within the Moccasin reservoir boundary against flood damages. The estimated project cost is \$83.2 million and is within the current 10-year CIP FY 21-30. Construction is scheduled for 2025-2027.

#### **10014115 - Cherry Dam Spillway - Short Term Improvements**

A spillway release from Cherry Dam in 2010 caused a landslide, blockage of the spill channel, and extensive erosion in the close proximity of the dam's right abutment. In addition, it caused flooding of the Cherry Power Tunnel Adit, and flooding of a campground further downstream. Engineering studies determined that significant long-term improvements to increase the spillway flow capacity are needed to maintain dam safety. The objective of this project is to re-establish containment for the breached spill channel section and to protect the downstream slope of the existing embankment dam from uncontrolled releases and erosion in the interim until the long-term improvements are implemented. Construction is scheduled for 2025-2026. The estimated project cost of \$11.9 million is within the current 10-year CIP FY

21-30.

### **10014114 - Mountain Tunnel Improvement Project**

Mountain Tunnel conveys the SFPUC water supply from Kirkwood Powerhouse to Priest Reservoir. Mountain Tunnel has been in service since 1925. Due to its age, deferred maintenance, and construction deficiencies in the early 1900s, sections of the tunnel lining have deteriorated, some extensively. This project provides design and construction of major tunnel repair and rehabilitation work, adit and tunnel entry improvements, access road improvements, and installation of a new flow control facility at Priest Reservoir to ensure that the tunnel can reliably provide drinking water to customers for the next 100 years. The flow control structure and isolation valves will also be used to isolate the tunnel from Priest Reservoir during tunnel shutdowns. This will allow the reservoir to remain full and not backwater for over 8 miles into the dewatered tunnel. The full reservoir provides more supply water for safely extending the tunnel shutdowns to longer durations of 100 days for construction inside the tunnel. These longer outages will reduce the need for more typical 60-day outages and shorten the overall duration of the construction schedule.

### **10035086 - Bridge Replacement (4 Bridges)**

HHWP is responsible for maintaining 14 bridges located in the Cherry, Eleanor, and Hetch Hetchy region. Condition assessments in 2013 and 2016 determined that, four of these bridges require substantial rehabilitation or replacement: Lake Eleanor Dam Bridge, O'Shaughnessy Adit Access Bridge, Cherry Lake Road Bridge (public access), and Early Intake Bridge (public access). The project will be funded in 2 phases. The first phase will include planning, design and construction of Eleanor Dam Bridge and O'Shaughnessy Adit Access Bridge as well as the planning and

design of the other two bridges. The construction of the Early Intake Bridge and Cherry Lake Road Bridge will be under Phase 2.

### **10014108 - Canyon Tunnel Rehabilitation**

Canyon Tunnel was built over 45 years ago. A condition assessment was performed on the tunnel in 2009 and the tunnel is in generally good condition, with the exception of the Hetchy Adit, a tunnel access point. Temporary repairs have been made to the plug at this adit twice (once in 1989 and once in 2009), but permanent repairs are needed to reduce leakage and increase reliability of the system. The project scope includes installation of a new reinforced concrete plug downstream of the existing plug.

### **10014110 - Moccasin Wastewater Treatment Plant**

The Moccasin Wastewater Treatment Plant (WWTP) project proposes to replace the community's aging treatment plant. Moccasin's treatment plant was installed in the 1970s and has been in continuous service since that time. Wastewater generated by the Moccasin community, powerhouse, and related facilities flows to this treatment plant. The treatment facility currently serving Moccasin was a "package plant" that was manufactured off-site, transported to Moccasin, and installed in 1977. At more than 44-years old, the Moccasin treatment plant has reached the end of its useful service life, and is becoming increasingly maintenance intensive. Additionally, Moccasin has no backup treatment; accordingly, failure of the plant would have significant consequences.

This project will replace the existing wastewater treatment facilities with a Sequence Batch Reactor (SBR) plant. The proposed SBR "package plant" is to be a two-train facility. Each train would have a capacity of 12,000 gallons per day to accommodate average daily dry-weather flow.

The new plant would continue to treat wastewater to secondary standards. The new plant will be provided with upgraded screening, flow monitoring, flow equalization, SCADA instrumentation, and automation features. The package plant would be manufactured off-site, trucked to Moccasin, and then installed beside the current plant. The existing plant must serve the Moccasin community while the new plant is being installed and would remain in operation during construction. The proposed project is limited to the treatment plant only and does not include improvements either upstream or downstream of the plant.

#### **10014116 - JOINT - PROJECT DEVELOPMENT**

The Project Development (PD) Account captures Program level expenditures. There are four types of charges that will be allocated to the PD Account: 1) charges for task orders for overall program management and project prioritization tasks, where the costs should be distributed over all Capital Improvement Program (CIP) Projects; 2) charges for Infrastructure and Hetchy staff performing program level tasks including: capital plan development, budget management (including fund management, and cost reallocations), and quarterly report generation tasks, where the costs should be distributed over all CIP Projects; 3) charges for portal support for the existing SharePoint Portal (includes document management and project dashboard reporting); and 4) charges for work outreach programs.

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## APPENDIX B. Hetch Hetchy Improvement Projects Approved Project Level Schedules/Budgets

Project Name	Approved Budget	Start	Finish	012	FY2013	FY2014	FY2015	FY2016	FY2017	FY2018	FY2019	FY2020	FY2021	FY2022	FY2023	FY2024	FY2025	FY2026	FY2027	FY2028	FY2029	FY2030	
				F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
<b>Hetchy Capital Improvement Projects</b>	<b>\$807,296,327.49</b>	<b>03-Oct-11</b>	<b>25-May-37</b>																				
<b>Water Infrastructure</b>	<b>\$109,533,203.01</b>	<b>26-Mar-12</b>	<b>30-Jun-31</b>																				
10035574 SJPL Tesla Valves Replacement	\$3,740,000.00	01-May-19	30-Dec-22																				
10035575 SJPL Valve and Safe Entry Improvement	\$98,924,000.00	01-Jul-19	13-Mar-28																				
10014072 WATER ONLY/PROJ DEV	\$6,869,203.00	26-Mar-12	30-Jun-31																				
<b>Power Infrastructure</b>	<b>\$204,242,684.48</b>	<b>29-May-12</b>	<b>30-Jun-31</b>																				
10014075 Holm and Other Powerhouse Projects	\$23,061,080.48	03-Sep-13	30-Dec-21																				
10014086 Moccasin Powerhouse and GSU Rehabilitation	\$66,713,635.00	04-Jan-16	13-Apr-27																				
10036809 Moccasin Powerhouse Bypass Upgrades	\$15,007,000.00	18-Sep-20	01-Dec-27																				
10036810 Kirkwood Powerhouse Bypass Upgrades	\$16,157,000.00	01-Jul-20	23-Oct-30																				
10014087 Wamerville Substation Rehabilitation	\$34,248,428.00	01-Sep-15	25-Nov-26																				
10035721 Transmission Lines 7/8 Upgrades	\$37,969,000.00	02-Dec-19	31-Jan-25																				
10014092 POWER ONLY/PROJDEVELP	\$11,086,541.00	29-May-12	30-Jun-31																				
<b>Joint Infrastructure</b>	<b>\$493,520,440.00</b>	<b>03-Oct-11</b>	<b>25-May-37</b>																				
10014088 Moccasin Penstock	\$47,251,363.00	01-Feb-16	28-Feb-28																				
10014110 Moccasin Wastewater Treatment Plant	\$8,794,549.00	01-Sep-21	07-Apr-26																				
10032903 O'Shaughnessy Dam Outlet Works Phase I	\$21,206,000.00	01-Feb-18	16-Sep-25																				
10014108 Canyon Tunnel Rehabilitation	\$8,428,813.00	03-Feb-14	13-Jan-25																				
10014114 Mountain Tunnel Improvement Project	\$238,218,951.00	03-Oct-11	03-Jun-27																				
10030758 OSH Dam Access and Drainage Improvements	\$3,952,211.00	01-Mar-17	28-Feb-23																				
10037351 Moccasin Dam Long-Term Improvements	\$83,175,822.00	03-May-21	30-Jun-28																				
10014115 Chery Dam Spillway - Short Term Improvements	\$11,860,965.00	01-Mar-21	01-Jul-27																				
10035086 Bridge Replacement (4 - Bridges)	\$44,287,000.00	27-Feb-20	25-May-37																				
10014116 JOINT - PROJECT DEVELOPMENT	\$26,344,766.00	25-Jun-12	30-Jun-31																				

**APPENDIX C. LIST OF ACRONYMS**

<b>AAR</b>	Alternative Analysis Report
<b>CAISO</b>	California Independent System Operator
<b>CATEX</b>	Categorical Exemption
<b>CEQA</b>	California Environmental Quality Act
<b>CER</b>	Conceptual Engineering Report
<b>CIP</b>	Capital Improvement Program
<b>CRT</b>	Coast Range Tunnel
<b>DB</b>	Design, Build
<b>DCR</b>	Design Criteria Report
<b>FCF</b>	Flow Control Facility
<b>FY</b>	Fiscal Year
<b>GSU</b>	Generator Step-Up
<b>GWH</b>	Gigawatt Hours
<b>HCIP</b>	Hetch Hetchy Capital Improvement Program
<b>HH</b>	Hetch Hetchy
<b>HHWP</b>	Hetch Hetchy Water and Power
<b>HPH</b>	Holm Powerhouse
<b>IFR</b>	Instream Flow Release
<b>JOC</b>	Job Order Contract
<b>KPH</b>	Kirkwood Powerhouse
<b>MGD</b>	Million Gallons per Day
<b>MID</b>	Modesto Irrigation District
<b>MPH</b>	Moccasin Powerhouse
<b>NAR</b>	Needs Assessment Report
<b>NERC</b>	North American Electric Reliability Corporation
<b>NTP</b>	Notice to Proceed
<b>OSH</b>	O'Shaughnessy Dam
<b>PD</b>	Project Development
<b>PG&amp;E</b>	Pacific Gas and Electric Company
<b>PLC</b>	Programmable Logic Controllers
<b>PSI</b>	Per Square Inch
<b>R&amp;R</b>	Renewal and Replacement
<b>SBR</b>	Sequence Batch Reactor
<b>SCADA</b>	Supervisory Control and Data Acquisition
<b>SFPUC</b>	San Francisco Public Utilities Commission
<b>SJPL</b>	San Joaquin Pipeline
<b>TTF</b>	Tesla Treatment Facility
<b>TUV</b>	Tesla Ultra Violet
<b>TVH</b>	Tesla Valve House
<b>WSIP</b>	Water System Improvement Program
<b>WWTP</b>	Wastewater Treatment Plant