San Francisco Public Utilities Commission

Wildfire Mitigation Plan 2024

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[1] Cover photo courtesy of Robin Scheswohl – SFPUC Head Photographer

ACRONYMS	
AGM	Assistant General Manager
AI	Artificial Intelligence
ANSI	American National Standards Institute
AVMWP	Annual Vegetation Management Work Plan
BLM	Bureau of Land Management
BMP	Best Management Practice
CAISO	California Independent System Operator
CAL FIRE	California Department of Forestry and Fire Protection
CCA	Community Choice Aggregator
CCSF	City and County of San Francisco
Commission	San Francisco Public Utilities Commission (SFPUC)
CM	Corrective Maintenance
CMMS	Computerized Maintenance Management System. SFPUC utilizes Maximo (IBM™) as our enterprise CMMS.
CPUC	California Public Utilities Commission
CUEA	California Utilities Emergency Association
C5	SFPUC Climate Change Collaboration and Coordination Committee
DVMP	Distribution Vegetation Management Plan
e-Logger	Electronic Log used by Hetch Hetchy Water to collect, store, and distribute real-time data
ESF	Emergency Support Functions
ESO	Electrical Safety Orders, State of California

ACRONYMS	
ESRI	Environmental Systems Research Institute, Inc. A geographic information system software company.
FPI	Fire Potential Index
FAC-003	NERC Reliability Standard: Transmission Vegetation Management Program
FY	Fiscal Year
GO	CPUC General Order
HFT / HFTD	High Fire Threat / High Fire Threat District
HHWP	Hetch Hetchy Water and Power
HHWPP	Hetch Hetchy Water and Power Project, or HHWP Project
HHW	Hetch Hetchy Water. This Division of Hetch Hetchy Water and Power is managed by the Water Enterprise. Commonly referred to as Hetch Hetchy Water and Power.
HHZ	High Hazard Zone
HRRR	NOAA's High-Resolution Rapid Refresh Model
IAP	Incident Action Plan
IC	Incident Commander
ICS	Incident Command System
IE	Independent Evaluator
IOU	Investor-Owned Utility
ISA	International Society of Arboriculture
IVM	Integrated Vegetation Management
kV	Kilovolt (1,000 volts)
LiDAR	Light Detection and Ranging - Survey technology for the evaluation of existing overhead electrical lines

ACRONYMS	
LiveEO	Software that provides artificial intelligence satellite observation data specific to infrastructure assets, such as overhead electrical lines.
LTO	Licensed Timber Operator
Maximo	Maximo (IBM™) SFPUC's enterprise Computerized Maintenance Management System or CMMS
MID	Modesto Irrigation District
MVCD	Minimum Vegetation Clearance Distance
NEC	National Electric Code
NERC	North American Electric Reliability Corporation
NESC	National Electrical Safety Code
NIMS	National Incident Management System
NOAA	National Oceanic and Atmospheric Administration
NRF	National Response Framework
NRLM	Natural Resources and Lands Management, a division of the Water Enterprise.
NWS	National Weather Service
OEIS	Office of Energy Infrastructure Safety (or Energy Safety) – Ensures electrical utilities are taking effective actions to reduce utility-related wildfire risk.[2]
OH	Overhead
PAL	Project Activity Level
PG&E	Pacific Gas & Electric
PIO	Public Information Officer

[2] https://energysafety.ca.gov/who-we-are/about-energy-safety/

ACRONYMS	
Plan	Wildfire Mitigation Plan
PM	Preventative Maintenance
PMU	Phasor Measurement Unit
POU	Publicly Owned Utility
PRC	Public Resources Code
PSPS	Public Safety Power Shutoff
PUC	Public Utilities Code
QA/QC	Quality Assurance/Quality Control
QEW	Qualified Electrical Worker
RAWS	Remote Automatic Weather Station – Provides local weather data used primarily in fire management
RFW	Red Flag Warning – Issued by the National Weather Service when warm temperatures, very low humidity, and strong winds are forecasted and combined are expected to produce an increased risk of fire danger
ROW	Right of Way
RTAC	Real-Time Automatic Controller
SCADA	Supervisory Control and Data Acquisition
SEMS	Standardized Emergency Management System
SFPUC	San Francisco Public Utilities Commission
SRA	State Responsibility Area
SVWTP	Sunol Valley Water Treatment Plant
SWIFT	Southwest Interface Team
TRAQ	ISA Tree Risk Assessment Qualified

ACRONYMS	
TVMP	Transmission Vegetation Management Program
UC	Unified Command
USFS	United States Forest Service
VM	Vegetation Management
WMP	Wildfire Mitigation Plan
WMRA	Wildfire Mitigation & Recovery Analyst
WSAB	Wildfire Safety Advisory Board
WSTD	Water Supply & Treatment, a division of the Water Enterprise

1. EXECUTIVE SUMMARY

The San Francisco Public Utilities Commission's (SFPUC) mission is to provide our customers with high-quality, efficient, and reliable power, water, and sewer services in a manner that is inclusive of environmental and community interests and sustains the resources entrusted to our care.

We adopted the Wildfire Mitigation Plan (WMP or Plan) template recommended by the Wildfire Safety Advisory Board (WSAB) for our 2023 Plan comprehensive update, which builds upon the successes and learnings of our previous WMP programs and initiatives and incorporates lessons learned to date from annual WMPs prepared from 2020-2022. This 2024 Plan update consists primarily of updates to the 2023 WMP.

We are committed to building, maintaining, and operating a safer and more resilient electrical grid. SFPUC-owned and operated assets are described in Table 1 which includes transmission and distribution line assets, substations, and hydro generation with an allocation of assets within and outside the California Public Utilities Commission's (CPUC) designated High Fire Threat District (HFTD). HFTDs are areas considered to be of elevated or extreme wildfire risk within the State of California where there is a higher risk for power line fires igniting and spreading rapidly.

This WMP addresses the following 17 requirements as identified within the WSAB 2023 Advisory Opinion for Publicly Owned Utilities (POU) (Figure 1).

Figure 1 – WSAB WMP Requirements

A	Staff responsibilities	G	Community notification	L	Identify enterprise-wide risk
B	General objectives	H	Vegetation management	M	Restoration of service
C	Program descriptions	I	Infrastructure inspections	N(i)	Monitoring & auditing of WMPs
D	Evaluation metrics	J(i)	Grid design, construction & operation risks	N(ii)	Identifying and correcting deficiencies
E	Lessons learned, metrics application	J(ii)	Vegetation, topographic, & climate risks	N(iii)	Monitoring asset inspections
F	Protocols for reclosers, de-energization, and PSPS mitigation	K	Identification and expansion of higher wildfire threat areas		

1.1 Utility Overview and Context Setting Table

The SFPUC, a department of the City and County of San Francisco (CCSF), provides power to the residents and businesses of San Francisco through the CleanPowerSF[3] Community Choice Aggregation (CCA) program and serves CCSF municipal load through Hetch Hetchy Power. Additionally, the SFPUC provides retail drinking water and wastewater services to the City of San Francisco and wholesale water to three Bay Area counties.

The SFPUC is comprised of six business functions, or enterprises, including the Water Enterprise. The Water Enterprise has six divisions, including Hetch Hetchy Water (HHW), Water Supply & Treatment Division (WSTD), and Natural Resources and Lands Management (NRLM) (Figure 3). Each of these divisions has defined responsibilities for managing and maintaining the electrical assets described in this Plan. The Water Enterprise is responsible for the development, execution, and oversight of this WMP. The HHW, WSTD, and NRLM divisions of the Water Enterprise maintain and operate assets from Hetch Hetchy Reservoir in Yosemite National Park to the CCSF County line.

HHW is responsible for managing, operating, and maintaining the Hetch Hetchy Water and Power (HHWP) Project. The HHWP Project consists of power generation facilities, electric transmission and distribution assets, water storage and conveyance systems, roads, bridges, and ancillary facilities. These assets originate at the Hetch Hetchy Reservoir, located in Yosemite National Park, traverse the counties of Tuolumne, Mariposa, Stanislaus, and San Joaquin, and span to the East Bay communities of Sunol and Newark in Alameda County.

WSTD is responsible for managing, operating, and maintaining the Bay Area portion of the System which includes water storage, treatment, and water transmission facilities in Alameda and San Mateo counties. The SFPUC owns the watersheds above reservoirs in

[3] https://www.cleanpowersf.org/

Alameda and San Mateo counties. NRLM Division is responsible for managing, operating, and maintaining these watersheds.

The HHWP Project consists of four hydroelectric powerhouses (generator facilities). HHWP transmits this power through SFPUC-owned and operated 230 kV and 115 kV transmission lines to the Bulk Electric System. A portion of the transmission facilities are within Pacific Gas & Electric's (PG&E) and Modesto Irrigation District's (MID) service territory. A detailed breakdown of overhead lines in the HFTD is included in Table 1.

The SFPUC owns, operates, and maintains distribution lines operated at various voltage levels with distribution lines providing service to SFPUC-owned and operated facilities. Additionally, a small number of the SFPUC distribution facilities located within PG&E's service territory are connected to PG&E's primary distribution circuits. HHW manages, operates, and maintains the distribution lines within the HHWP Project. WSTD and NRLM manage, operate, and maintain distribution lines that serve SFPUC water treatment plants and facilities within SFPUC watersheds in the Bay Area. Detailed overhead circuit miles in the HFTD are included in Table 1.

Table 1 – Context Setting Table SFPUC

Utility Name	San Francisco Public Utilities Commission All line lengths are defined as line miles	
Service Territory Size	The SFPUC is primarily a generation (hydro) and transmission provider. The SFPUC has no defined "service territory" with boundaries like a traditional utility serving distribution load.	
Owned Assets	Generation, Transmission, and Distribution	
Number of Customers Served	Three (3) customer accounts served from a distribution line in Tier 2 HFTD and one (1) in the non-HFTD.	
Population Within Service Territory	N/A	
Customer Class Makeup	Number of Accounts	Share of Total Load (MWh)
	0% Residential; 0% Government; 0% Agricultural; 100% Small/Medium Business; 0% Commercial/Industrial	N/A
Service Territory Location/Topography[4]	4% Agriculture 27% Barren/Other 25% Conifer Forest 0% Conifer Woodland 0% Desert 3% Hardwood Forest 16% Hardwood Woodland 18% Herbaceous 0% Shrub 7% Urban 0% Water	
Service Territory Wildland Urban Interface[5] (based on total area)	1% Wildland Urban Interface; 1% Wildland Urban Intermix; The percentages above refer to overhead transmission and distribution line miles.	

[4] This data was determined by using the California Department of Forestry and Fire Protection, California Multi-Source Vegetation Layer Map, depicting WHR13 Types (Wildlife Habitat Relationship classes grouped into 13 major land cover types) *available at*: https://www.arcgis.com/home/item.html?id=b7ec5d68d8114b1fb2bfbf4665989eb3.

[5] This data was determined by using the definitions and maps maintained by the United States Department of Agriculture, as most recently assembled in *The 2010 Wildland-Urban Interface of the Conterminous United States*, *available at* https://www.fs.usda.gov/nrs/pubs/rmap/rmap_nrs8.pdf

<table>
<tr><th>Utility Name</th><th>San Francisco Public Utilities Commission
All line lengths are defined as line miles</th></tr>
<tr><td>Prevailing Wind Directions & Speeds by Season</td><td>Generally, the coast range has higher average wind speeds throughout the year, which are typically west, with strong east wind events in the winter. The Central Valley typically has lower average wind speeds, with a predominantly westly direction. The mountain region has moderate average wind speeds, also typically westly, with very strong eastly (Mono) wind events in the winter. In the table below, winter is considered from October-April and summer from May to September.
<table>
<tr><th></th><th></th><th colspan="2">Average</th><th colspan="2">Max</th></tr>
<tr><th>Region</th><th>Season</th><th>Wind Speed (mph)</th><th>Direction</th><th>Wind Speed (mph)</th><th>Direction</th></tr>
<tr><td rowspan="2">Coast Range</td><td>Winter</td><td>30</td><td>W</td><td>60</td><td>E</td></tr>
<tr><td>Summer</td><td>20</td><td>W</td><td>30</td><td>W</td></tr>
<tr><td rowspan="2">Central Valley</td><td>Winter</td><td>10</td><td>W</td><td>20</td><td>E</td></tr>
<tr><td>Summer</td><td>5</td><td>W</td><td>10</td><td>W</td></tr>
<tr><td rowspan="2">Sierra Nevada Foothills</td><td>Winter</td><td>15</td><td>W</td><td>70</td><td>E</td></tr>
<tr><td>Summer</td><td>15</td><td>W</td><td>20</td><td>W</td></tr>
</table></td></tr>
<tr><td rowspan="3">Miles of Owned Lines Underground and/or Overhead[6]</td><td>Overhead Dist.: 48.7 miles
Overhead Trans.: 324.4 miles
Underground Dist.: 4.55 miles
Underground Trans.: 0 miles</td></tr>
<tr><td>Explanatory Note 1 - Methodology for Measuring “Miles”: Line Miles</td></tr>
<tr><td>Explanatory Note 2 – Description of Unique Ownership Circumstances:
The following distribution lines are where the SFPUC interconnects to PG&E lines from SFPUC facilities. Bay Area region: San Andreas Lake Line (4.16 kV), Pilarcitos Line (4.16 kV), Sawyer Camp Line (4.16 kV), Crystal Springs</td></tr>
</table>

[6] In 2023, we began using the ESRI ArcGIS Utility Network model which increased the spatial accuracy of our lines, poles, and towers. We have updated the table to reflect the new line miles, as opposed to circuit miles.

Utility Name	San Francisco Public Utilities Commission All line lengths are defined as line miles
	Line (7.2 kV), Pulgas Line (4.16 kV). Central Valley region: Tesla Portal Line (12 kV).
Percent of Owned Lines in CPUC High Fire Threat Districts (percentages reflect overhead line length).	Overhead Distribution Lines as % of Total Distribution System (Inside and Outside Service Territory)
	Tier 2 Distribution: 88% Tier 3 Distribution: 9% Non-HFTD: 3%
	Overhead Transmission Lines as % of Total Transmission System (Inside and Outside Service Territory)
	Tier 2 Transmission: 27% Tier 3 Transmission: 2% Non-HFTD: 71%
	Explanatory Note 4 – Additional Relevant Context: [e.g., explain any difference from data reported in WMP due to different numerator used for this form]
Customers have ever lost service due to an IOU Public Safety Power Shutoff Event (PSPS)?	Yes Yes, SFPUC-owned, and operated facilities have been impacted. However, PG&E PSPS events do not interrupt the SFPUC's ability to supply power and water services. The SFPUC has backup generators for water treatment plants. The purpose of the SFPUC's power transmission line system is to deliver generation produced by the HHWP Project to the electric grid. The SFPUC transmission lines also feed one of two SFPUC water treatment plants. In the event the SFPUC had to de-energize the transmission lines that feed this water treatment plant, the portion of the transmission system outside of the HFTD would still be back fed from the electrical grid (PG&E). See Table 11
Customers have ever been notified of a potential loss of service due to a forecasted IOU PSPS event.	Yes Some SFPUC distribution circuits are served by PG&E lines as described above in the unique ownership circumstances section. The SFPUC is notified by PG&E before a PSPS event. The SFPUC has been assigned a PG&E representative. Both the SFPUC and PG&E have shared area contact representatives. See Section 5.10
Has developed protocols to pre-emptively shut-off electricity in response to elevated wildfire risks?	Yes See Section 5.10

Utility Name	San Francisco Public Utilities Commission All line lengths are defined as line miles
Has previously preemptively shut off electricity in response to elevated wildfire risk?	No, refer to Section 5.11 for de-energization protocols. If yes, then provide the following data for the calendar year 2023: Number of shut-off events: 0 Customer Accounts that lost service for >10 minutes: 0 For prior response, average duration before service restored: N/A

1.2 Statutory Cross-Reference Table

Our Plan complies with the PUC § 8387 statutory requirements listed in Table 2. The table also provides a reference to where the requirements are described in the Plan (Plan Section).

Table 2 – PUC § 8387 Statutory Requirements

PUC 8387 Code	Compliance Requirements and Corresponding Plan Sections	Plan Section
(a)	Each local publicly owned electric utility and electrical cooperative shall construct, maintain, and operate its electrical lines and equipment in a manner that will minimize the risk of wildfire posed by those electrical lines and equipment.	All
(b)(1)	The local publicly owned electric utility or electrical cooperative shall, before January 1, 2020, and annually thereafter, prepare a wildfire mitigation plan. After January 1, 2020, a local publicly owned electric utility or electrical cooperative shall prepare a wildfire mitigation plan annually and shall submit the plan to the California Wildfire Safety Advisory Board on or before July 1 of that calendar year. Each local publicly owned electric utility and electrical cooperative shall update its plan annually and submit the update to the California Wildfire Safety Advisory Board by July 1 of each year. At least once every three years, the submission shall be a comprehensive revision of the plan.	1.3 & 1.5
(b)(2)	The wildfire mitigation plan shall consider as necessary, at minimum, all of the following:	

PUC 8387 Code	Compliance Requirements and Corresponding Plan Sections	Plan Section
(b)(2)(A)	An accounting of the responsibilities of persons responsible for executing the plan.	3
(b)(2)(B)	The objectives of the wildfire mitigation plan.	2
(b)(2)(C)	A description of the preventative strategies and programs to be adopted by the local publicly owned electric utility or electrical cooperative to minimize the risk of its electrical lines and equipment causing catastrophic wildfires, including consideration of dynamic climate change risks.	5
(b)(2)(D)	A description of the metrics the local publicly owned electric utility or electrical cooperative plans to use to evaluate the wildfire mitigation plan's performance and the assumptions that underlie the use of those metrics.	7.1 – 7.3
(b)(2)(E)	A discussion of how the application of previously identified metrics to previous wildfire mitigation plan performances has informed the wildfire mitigation plan.	7.4
(b)(2)(F)	Protocols for disabling reclosers and deenergizing portions of the electrical distribution system that consider the associated impacts on public safety, as well as protocols related to mitigating the public safety impacts of those protocols, including impacts on critical first responders and on health and communication infrastructure.	5.9 & 5.11
(b)(2)(G)	Appropriate and feasible procedures for notifying a customer who may be impacted by the de-energizing of electrical lines. The procedures shall direct notification to all public safety offices, critical first responders, health care facilities, and operators of telecommunications infrastructure with premises within the footprint of potential de-energization for a given event.	3.2 & 5.11.2
(b)(2)(H)	Plans for vegetation management.	5.5
(b)(2)(I)	Plans for inspections of the local publicly owned electric utility's or electrical cooperative's electrical infrastructure.	5.6.2 & 5.7.2
(b)(2)(J)	A list that identifies describes, and prioritizes all wildfire risks, and drivers for those risks, throughout the local publicly owned electric utility's or electrical cooperative's service territory. The list shall include, but not be limited, to both of the following:	4
(b) (2)(J)(i)	Risks and risk drivers associated with design, construction, operation, and maintenance of the local publicly owned electric utility's or electrical cooperative's equipment and facilities.	4.3

PUC 8387 Code	Compliance Requirements and Corresponding Plan Sections	Plan Section
(b)(2)(J)(ii)	Particular risks and risk drivers associated with topographic and climatological risk factors throughout the different parts of the local publicly owned electric utility's or electrical cooperative's service territory.	4.2
(b)(2)(K)	Identification of any geographic area in the local publicly owned electric utility's or electrical cooperative's service territory that is a higher wildfire threat than is identified in a commission fire threat map, and identification of where the commission should expand a high-fire threat district based on new information or changes to the environment.	4.4
(b)(2)(L)	A methodology for identifying and presenting enterprise-wide safety risk and wildfire-related risk.	4.1
(b)(2)(M)	A statement of how the local publicly owned electric utility or electrical cooperative will restore service after a wildfire.	5.11.3
(b)(2)(N)	A description of the processes and procedures the local publicly owned electric utility or electrical cooperative shall use to do all of the following:	
(b)(2)(N)(i)	Monitor and audit the implementation of the wildfire mitigation plan.	7.5
(b)(2)(N)(ii)	Identify any deficiencies in the wildfire mitigation plan or its implementation and correct those deficiencies.	7.6
(b)(2)(N)(iii)	Monitor and audit the effectiveness of electrical line and equipment inspections, including inspections performed by contractors, that are carried out under the plan, other applicable statutes, or commission rules.	5.5.12 & 7.7
(3)	The local publicly owned electric utility or electrical cooperative shall, on or before January 1, 2020, and not less than annually thereafter, present its wildfire mitigation plan in an appropriately noticed public meeting. The local publicly owned electric utility or electrical cooperative shall accept comments on its wildfire mitigation plan from the public, other local and state agencies, and interested parties, and shall verify that the wildfire mitigation plan complies will all applicable rules, regulations, and standards, as appropriate.	1.3
(3)(c)	(c) The local publicly owned electric utility or electrical cooperative shall contract with a qualified independent evaluator with experience in assessing the safe operation of electrical infrastructure to review and assess the comprehensiveness of its wildfire mitigation plan. The independent evaluator shall issue a report that shall be made available on	8

PUC 8387 Code	Compliance Requirements and Corresponding Plan Sections	Plan Section
	the internet website of the local publicly owned electric utility or electrical cooperative and shall present the report at a public meeting of the local publicly owned electric utility's or electrical cooperative's governing board.	

1.3 WMP Adoption Process

This Plan, at minimum, meets the requirements of PUC § 8387 for POUs. The public can comment on the WMP during a scheduled SFPUC Commission meeting, in which the Commission will review the WMP. The SFPUC Commission Secretary publishes all upcoming Commission agendas on its website[7] a week before the Commission meeting date. Additionally, each agenda item has time set aside for public comment. The SFPUC Commission and staff will consider all public comments for inclusion in the final version of the Plan. The meeting agenda includes a weblink to view the meetings live and a call-in number to ensure the public has an opportunity to comment on agenda items. The final approved WMP will be submitted to the WSAB and posted to the SFPUC website, which also includes prior years' WMPs and the independent evaluator (IE) report(s). The SFPUC had a favorable IE review of its 2023 Plan and posted it to the SFPUC external-facing website accessible to the public in compliance with PUC § 8387(b)(3)(c).

1.4 Wildfire Mitigation Funding

HHWP's proposed biennial Operating Budget for Fiscal Years FY 2024-25 and FY 2025-26 includes funding for wildfire mitigation initiatives and activities including vegetation management and tree-removal contracts, LiDAR flights to help gather and analyze data for potential threats to select overhead transmission and distribution system areas, and funding for software and wildfire-related equipment. The budget has been approved by the SFPUC Commission and is scheduled to be approved by the San Francisco Board of Supervisors on or around July 1, 2024.

Concurrent with the Operating Budget, is the Capital Budget and Ten-Year Capital Plan. HHWP's Capital Budget for FY 2024-25 and FY 2025-26 and Ten-Year Capital Plan

[7] https://sfpuc.org/about-us/boards-commissions-committees/sfpuc-commission

include investments in infrastructure projects intended to reduce the risk of wildfire as summarized below:

HHW-Renewal & Replacement (R&R) Wildfire Mitigation (Power) - This project funds wildfire mitigation vegetation management projects, including fuel breaks and Integrated Vegetation Management (IVM) projects to protect assets classified as “Power” only. The project does not fund annual vegetation management plans. Total Proposed Budget: $9,366,227.

HHW- R&R Power Distribution Line High-Risk Fire Reduction – This project will deliver electric distribution system capital improvements to reduce wildland fire risk on the HHWP Project. Projects will include reconductoring, increasing safe-clearance distances, undergrounding, and adding alternative power supplies at some locations to reduce HHWP's overhead electrical line footprint. The project funds inspections, condition assessments, studies, designs, renewal and replacement, and construction of new microgeneration assets. Total Proposed Budget: $7,342,000.

After approval by the San Francisco Board of Supervisors, the operating and capital budgets will be published on the SFPUC website.[8]

1.5 Purpose of the Wildfire Mitigation Plan

This Plan provides a comprehensive overview of the SFPUC programs and initiatives to minimize the risk that SFPUC electrical assets are not the origin or contributing source for a catastrophic wildfire. Additionally, it is the goal of the SFPUC to maintain compliance with our statutory obligation as specified in California PUC § 8387(a) which requires each local publicly owned electric utility and electrical cooperative to:

> “Construct, maintain, and operate its electrical lines and equipment in a manner that will minimize the risk of wildfire posed by those electrical lines and equipment. After January 1, 2020, each POU shall prepare a wildfire mitigation plan annually and shall submit the plan to the California Wildfire

[8] https://sfpuc.org/about-us/reports/operating-and-capital-budgets

> Safety Advisory Board (WSAB) on or before July 1 of that calendar year. Each POU shall update its plan annually and submit the update to the WSAB by July 1 of each year. At least once every three years, the submission shall be a comprehensive revision of the plan".

The SFPUC's primary objectives outlined in this WMP are to support our plan to construct, maintain, and operate our electrical facilities in a manner that minimizes the risk that SFPUC-owned and operated equipment is not the origin or contributing source for a catastrophic wildfire; and to provide for a more resilient and reliable grid. The SFPUC has complied with its statutory obligation regarding the annual submission of our WMP as required by PUC § 8387(b)(1) and now submits our 2024 WMP update to the WSAB. This Plan is subject to public review and comments before final Plan approval by the SFPUC Commission.

1.6 Organization of the Wildfire Mitigation Plan

This Plan includes the following elements:

Section 1 – Executive Summary
Section 2 – Objectives of the Wildfire Mitigation Plan
Section 3 – Roles and responsibilities
Section 4 – Wildfire Risk and Risk Drivers
Section 5 – Wildfire Preventative Strategies
Section 6 – Stakeholder Outreach and Engagement
Section 7 – Evaluating the Performance of the Plan
Section 8 – Independent Evaluator Report

1.7 Summary of Wildfire Mitigation Activities

This section provides details on our programs and initiatives aimed at reducing the risk of a catastrophic fire caused by SFPUC assets.

1.8 Risk Assessment

In 2023, we continued to test and validate Technosylva's Wildfire Analyst™[9] application. Technosylva is a leading provider of "advanced Geographic Information System (GIS) - enabled software solutions for wildfire protection planning and operational response, as well as firefighter and public safety". Technosylva is used by CAL FIRE, the CPUC, and most of California's investor-owned utilities (IOU). The Wildfire Analyst™ application performs a risk analysis on each SFPUC asset and generates a daily Fire Potential Index (FPI) rating for that asset. Additionally, it generates four different consequence risk metrics if an ignition were to occur at a specific asset. The four consequence risk metrics are (1) Fire Size Potential, (2) Population Impacted, (3) Buildings Threatened, and (4) Estimated Number of Buildings Destroyed. HHW has begun to pilot the application to support the field operation's daily work schedules and inform personnel of areas of risk and if any operating restrictions should be implemented. Once the pilot is complete, Wildfire Analyst™ will be operationalized within HHW, and staff will work to implement this for the NRLM and WSTD of the SFPUC Water Enterprise (WE).

The Wildfire Analyst™ application is explained in detail in Section 5.1.1.

1.9 Situational Awareness

In 2023 we continued to improve our situational awareness capabilities. We installed one SFPUC-owned weather station to monitor wind, air temperature, and relative humidity near a distribution line segment in the Tier 2 HFTD. We also collaborated closely with PG&E to gain access to their weather stations that are situated near SFPUC assets. These weather stations combined provide us the ability to monitor weather conditions near our assets throughout the entire area where SFPUC-owned and operated assets are located.

Using Wildfire Analyst™, we now have access to an integrated view of weather stations and High-Definition cameras. Many of these cameras point in the direction of our assets

[9] https://technosylva.com/products/wildfire-analyst/

and will help in quickly identifying hazardous conditions that could impact our operations. Additionally, we now have access to real-time active fire incident information for fires that could threaten our assets. The application will also overlay alerts from the National Weather Service, such as Extreme Fire Danger, Extreme Wind Warnings, Red Flag Warnings, and Excessive Heat Warnings on the base map.

1.10 Vegetation Management

In 2022, the HHW Vegetation Management Right of Way (VM ROW) Department implemented a data collection system for tracking vegetation trends. This includes the use of a dashboard to track vegetation inspection progress as well as the tree type and trim required (see section 5.4.10). Using the internal E-Logger system, HHW tracks trends in power disruptions caused by vegetation. This allows the division to make better decisions regarding vegetation management based on historical outage information caused by vegetation contact. In 2023, LiveEO delivered its first satellite vegetation imagery to SFPUC. More detail on the LiveEO product is provided in Section 5.4.8. The ROW Department is planning on using that data to ensure compliance, identify areas of potential tree work, and inform future trim needs.

1.11 Construction, Operations, and Maintenance

During the 2020-2022 Plan cycle, HHW initiated the following capital improvement projects related to wildfire mitigation:

A project to upgrade the Fire Suppression System in two HHW powerhouses located in the HFTD is currently in the planning stage. In the 2025 Plan update, we will provide a progress report on the status of this project.

1.12 Planned Initiatives for the 2023–2025 WMPs

The 2023-2025 SFPUC WMP programs and initiatives are built upon leveraging the successes and lessons learned during the 2020-2023 Plan updates. Our primary goal continues to be to construct, operate, and maintain a safe and resilient electrical grid and

continue to minimize the risk that our assets are not the origin or contributing source for a catastrophic wildfire.

Our primary initiatives for the 2024 Plan are to:

1. Maintain compliance with PUC § 8387 and continue to mature our wildfire mitigation initiatives.
2. Continue to develop and implement the Wildfire Analyst™ risk modeling software.
3. Leverage the Wildfire Analyst™ risk analysis tools to develop a more comprehensive risk-informed wildfire mitigation program.
4. Continue to track metrics to inform the SFPUC on how the WMP programs and initiatives are performing.
5. Evaluate and assign priorities to system hardening options and create implementation time frames.

2. OBJECTIVES OF THE WILDFIRE MITIGATION PLAN

This Plan details the initiatives and programs the SFPUC is undertaking or evaluating to reduce the risk of SFPUC assets being the origin or contributing source for catastrophic wildfires. This Plan revision continues to build upon the 2020-2023 WMP programs and initiatives focusing on three primary objectives as listed below. Additionally, it is the goal of the SFPUC to maintain compliance with our statutory obligation as specified in PUC § 8387(a).

2.1 Minimizing Sources of Ignition

The first objective is to continue to evaluate prudent and cost-effective improvements to our physical assets, operations, and training to minimize the risk of SFPUC assets being the origin or contributing source for a catastrophic wildfire. Programs being evaluated or currently implemented include, but are not limited to, evaluating strategic system hardening, increased situational awareness capabilities by adding more strategically

placed weather stations, leveraging the existing California network of high-definition mountaintop cameras, evaluating enhanced vegetation management opportunities, and as a measure of last resort, proactive de-energization of lines during critical fire weather conditions. We will continue to evaluate wildfire risk reduction tools, processes, and utility best practices, and implement them over time through Plan evaluation and metric analysis.

2.2 Improve Grid Reliability and Resiliency

The second objective of the SFPUC's wildfire mitigation programs and initiatives is to improve the reliability and resiliency of the SFPUC-owned and operated electric facilities. In addition to reducing wildfire ignition risks, programs such as grid hardening, and enhanced vegetation management provide additional benefits such as improved reliability and resiliency. We will continue to assess industry best practices and new technologies that could help reduce the likelihood of a disruption in service due to planned or unplanned events and expedite grid recovery efforts following a significant event, such as a wildfire.

2.3 Measuring Plan Effectiveness

The third objective of the SFPUC's wildfire mitigation programs and initiatives is to measure the effectiveness and performance of the programs and initiatives as described in this Plan. We will monitor the performance of our Plan, such as a continued decline in equipment failures or vegetation contacts and make Plan modifications as necessary to improve the safety, reliability, and resiliency of the SFPUC system. This Plan will also help determine if more cost-effective measures could produce the same or better results to reduce the risk of SFPUC electrical assets being the origin or contributing source of a catastrophic wildfire.

3. ROLES AND RESPONSIBILITIES

3.1 POU Organizational Chart and Specific Responsibilities.

This section identifies the SFPUC management staff responsible for the development, approval, and implementation of this Plan and lists, in Figure 2, the operating departments accountable for carrying out the various activities described in the Plan.

The Wildfire Mitigation and Recovery Analyst (WMRA) is the lead of the SFPUC's Wildfire Mitigation Planning Group (WMPG) comprised of managers and field staff from HHW, NRLM, and WSTD. The group's purpose is to review and monitor the progress of the SFPUC wildfire mitigation programs, monitor the effectiveness of the Plan, and coordinate wildfire mitigation projects, activities, and best practices across all SFPUC divisions. The group meets monthly, with an agenda prepared before each meeting and the opportunity for each member to provide discussion topics. The SFPUC divisions responsible for performing wildfire mitigation activities cover a significant geographical area. The coordination of work performed by this planning group has proven to be an efficient and effective way to share resources, provide project updates, and coordinate programs to ensure the SFPUC consistently complies with all local, state, federal, and regulatory requirements in a continuous effort to reduce the risk of SFPUC assets being the origin or contributing source for a catastrophic wildfire. The WMRA is also the primary SFPUC liaison with the CMUA for all wildfire mitigation discussions.

- The SFPUC has the responsibility for approving this Plan.
- The SFPUC Assistant General Manager (AGM) of the Water Enterprise has overall accountability for developing and implementing the Plan.

Figure 2 – SFPUC Organization

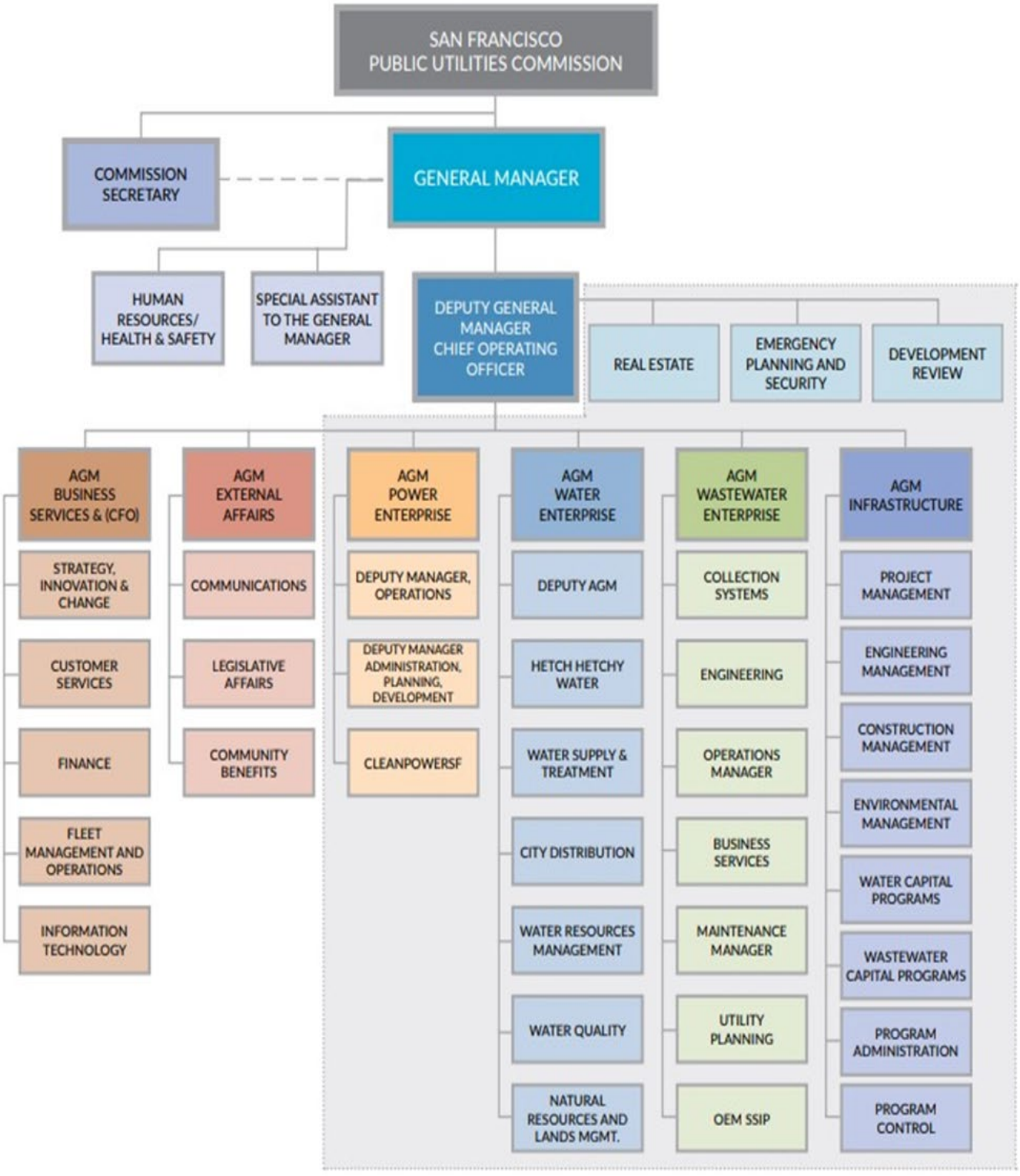


Table 3 – Plan Activities Roles and Responsibilities

Activity	HHW Division: All SFPUC Transmission Facilities; and Distribution Facilities Located within Tuolumne, Stanislaus, Mariposa, and San Joaquin Counties	WSTD and NRLM Divisions: Distribution Facilities Located in Alameda and San Mateo Counties
Transmission Line Vegetation Clearance Inspections	HHW Right of Way Manager; and Vegetation Manager	N/A
Distribution Line Vegetation Clearance Inspections	HHW Right of Way Manager; and Vegetation Manager	NRLM and Peninsula Area Manager
Vegetation Management and Removal	HHW Operations and Maintenance Manager	NRLM Manager
Transmission Asset Inspections Transmission Line Maintenance	HHW Power Generation & Transmission Manager	N/A
Distribution Asset Inspections	HHW Power Generation & Transmission Manager	HHW Power Generation & Transmission Manager
Distribution Line Operations and Maintenance Inspections	HHW Power Generation & Transmission Manager	WSTD Maintenance Section Manager and HHW Power Generation & Transmission Manager
Substation Inspections; Recloser Policy; and De-energization	HHW Operations and Maintenance Manager	HHW Operations and Maintenance Manager
Plan Coordination and Updates	WMRA	
Plan Review	HHW Division Manager;	NRLM Division Manager, WSTD Division Manager,
	CCSF City Attorney's Office; and SFPUC Assistant General Manager of Water	
Plan Approval	SFPUC	

SFPUC utility staff have the following responsibilities regarding fire prevention, response, and investigation:

- Conduct work in a manner that will minimize the risk of ignition for a utility-caused wildfire.
- Take all reasonable and practicable actions to prevent and suppress fires resulting from SFPUC electric facilities.
- Coordinate with federal, state, and local fire management personnel to ensure that appropriate preventative measures are in place.
- Immediately report fires, pursuant to specified procedures.
- Take corrective action when observing or having been notified that fire protection

measures have not been properly installed or maintained.

- Ensure compliance with relevant federal, state, and industry-standard requirements.
- Ensure that relevant incident data is appropriately and timely collected when a utility asset is suspected to be the cause or contributing source for the ignition of the wildfire.
- Ensure that evidence is appropriately preserved when a utility asset is suspected to be the cause or contributing source for the ignition of the wildfire.
- Maintain adequate wildfire mitigation training programs for all relevant employees and, if applicable, SFPUC contractors.

3.2 Coordination with Critical Infrastructure Sectors

The US Cybersecurity & Infrastructure Security Agency states that "There are 16 critical infrastructure sectors whose assets, systems, and networks, whether physical or virtual, are considered so vital to the United States that their incapacitation or destruction would have a debilitating effect on security, national economic security, national public health or safety, or any combination thereof"[10]

The SFPUC considers all critical infrastructure sectors of critical importance to the safety and health of our SFPUC employees, and communities that could be impacted by an SFPUC risk event impacting any critical infrastructure sectors. Coordination activities between SFPUC and the following sectors are described in the sections:

- Water and Wastewater Systems sector.
- Communications sector.
- Healthcare and Public Health sector.

3.2.1 Coordination with Water Utilities/Department

The SFPUC does not provide electric service to any non-SFPUC-owned and operated water department customers, nor does it impact any non-SFPUC-owned and operated

[10] https://www.cisa.gov/critical-infrastructure-sectors

water facilities. All SFPUC-owned and operated water facilities have redundant power supplies to maintain operations during a planned or unplanned power outage. Internal SFPUC communications during emergencies are described in the SFPUC Emergency Operations Plan.

3.2.2 Coordination with Communication Infrastructure Providers

The SFPUC supplies power to two cellular towers owned and operated by an independent wireless provider. During planned or unplanned interruptions of the SFPUC lines that could impact these cellular sites, the SFPUC will communicate with the wireless provider on the expected timing and duration of the outage. Both sites have backup generators to avoid disruption to services during planned and unplanned outages.

3.2.3 Coordination with Healthcare and Public Health sector / Hospitals

Not applicable. The SFPUC does not provide service to any public health facilities.

3.3 Standardized Emergency Management System

The SFPUC is Standardized Emergency Management System (SEMS) and National Incident Management System (NIMS) compliant and utilizes the Incident Command System (ICS) structure to respond to local and regional emergencies. The SFPUC has staff that are trained to fulfill certain roles under the ICS and can be integrated into an ICS structure.

Currently, the SFPUC does not initiate our ICS structure during Red Flag Warnings. When critical fire weather is forecasted, the powerhouse control center will dispatch Qualified Electrical Workers to patrol power lines and standby for potential de-energization. The control center maintains constant communication with SFPUC management regarding changing weather conditions to monitor for and execute a de-energization event if those triggers are met.

3.4 Mutual Assistance Agreements

The SFPUC is a member of the California Utilities Emergency Association (CUEA), which

plays a key role in ensuring communications between utilities during emergencies and has agreements in place to support utilities requesting mutual assistance. The SFPUC also participates in the Western Energy Institute's Western Region Mutual Assistance Agreement, which is a mutual assistance agreement covering utilities across several Western states.

4. WILDFIRE RISKS AND RISK DRIVERS

The Office of Energy Infrastructure Safety (OEIS) defines risk as "a measure of the anticipated adverse effects from a hazard considering the consequences and frequency of the hazard occurring."

4.1 Enterprise-Wide Safety Risks

The SFPUC's risk evaluation approach leverages the institutional knowledge of our personnel familiar with the historical events that previously impacted our operations. Our risk reduction approach is designed to meet the requirements of industry-recognized standards (i.e., CPUC GOs, NERC Operating Standards, NESC Codes), and best practices utilized by other utilities with more mature wildfire mitigation programs.

In Q4 of 2022, the SFPUC procured Technosylva's Wildfire Analyst™ application to support our operations and planning groups as described in Section 5.1.1. The Wildfire Analyst™ application will be the foundational tool for identifying risks and predicting potential consequences and will support prioritizing risk reduction measures.

We plan to continue developing and formalizing our risk evaluation approach to minimize the risk that our assets could be the origin or contributing source for a catastrophic wildfire.

4.2 Risks and Risk Drivers Associated with Topographic and Climatological Risk Factors

We own electrical assets in higher elevations of the Sierra Nevada Mountain range, through the San Joaquin Valley, and into the lower elevation San Francisco Peninsula region.

Our primary topographic and climatological risk drivers identified for wildfire risk are:

- Extended drought;
- Lack of early fall rains;
- Hot temperatures;
- High winds;
- Steep terrain; and
- Vegetation type and density.

4.3 Risks and Risk Drivers Associated with Design, Construction, Operations, and Maintenance

The SFPUC has excellent system reliability and does not experience a high volume of risk events that could be the source of ignition for a catastrophic wildfire. HHW tracks planned and unplanned overhead transmission and distribution outages through e-Logger. We are working on a process to track planned and unplanned outages for the WSTD distribution lines. We will use this information to track outage causes and identify trends throughout the SFPUC system.

The SFPUC has identified vegetation contact as our number one risk. Heavy snowstorms in early 2023 caused two green trees to fail in the Tier 2 HFTD and contact a 22 kV circuit. No ignitions resulted from these two incidents. Both trees were inspected and found to comply with our VM standard and outside the ROW.

Our maintenance programs contribute to minimizing the risk of equipment failure. Other programs to improve system reliability and reduce wildfire risk include replacing CAL FIRE non-exempt equipment with CAL FIRE-approved exempt equipment, transformer replacement program, and brush clearing to comply with Public Resources Code (PRC) § 4292. These programs and other initiatives are further described in Section 5.

4.4 High Fire Threat District

The SFPUC participated in the development of the CPUC's Fire-Threat Map[11] which designates a High-Fire Threat District (HFTD) (Figure 3). The CPUC describes the HFTD as follows:

1. Tier 1 High Hazard Zones (HHZs) on the U.S. Forest Service-CAL FIRE joint map of Tree Mortality HHZs ("Tree Mortality HHZ Map").
   a. The Tree Mortality HHZ Map is an off-the-shelf map. Tier 1 HHZs are zones near communities, roads, and utility lines, and are a direct threat to public safety.
2. Tier 2 and Tier 3 fire-threat areas on the CPUC Fire-Threat Map.
   a. Tier 2 fire-threat areas outline areas where there is an elevated risk (including likelihood and potential impacts on people and property) from utility-related wildfires.
   b. Tier 3 fire-threat areas outline areas where there is an extreme risk (including likelihood and potential impacts on people and property) from utility-related wildfires.

In the map development process, the SFPUC reviewed the proposed boundaries of the fire-threat areas and confirmed that, based on local conditions and historical fire data. All our assets are located within the proper fire-threat area (Figure 4).

[11] https://www.cpuc.ca.gov/industries-and-topics/wildfires/fire-threat-maps-and-fire-safety-rulemaking

Figure 3 – CPUC High Fire-Threat District Map

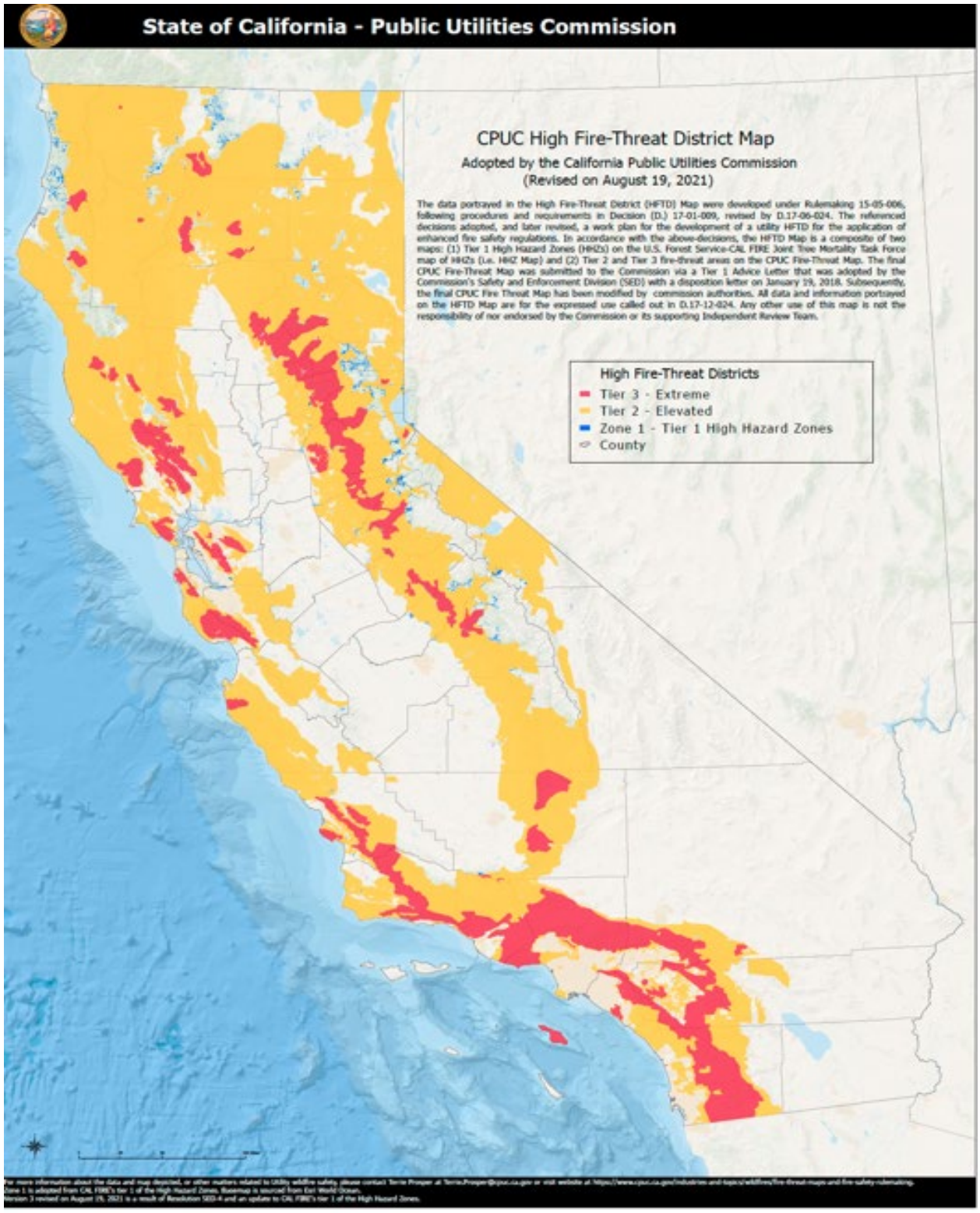
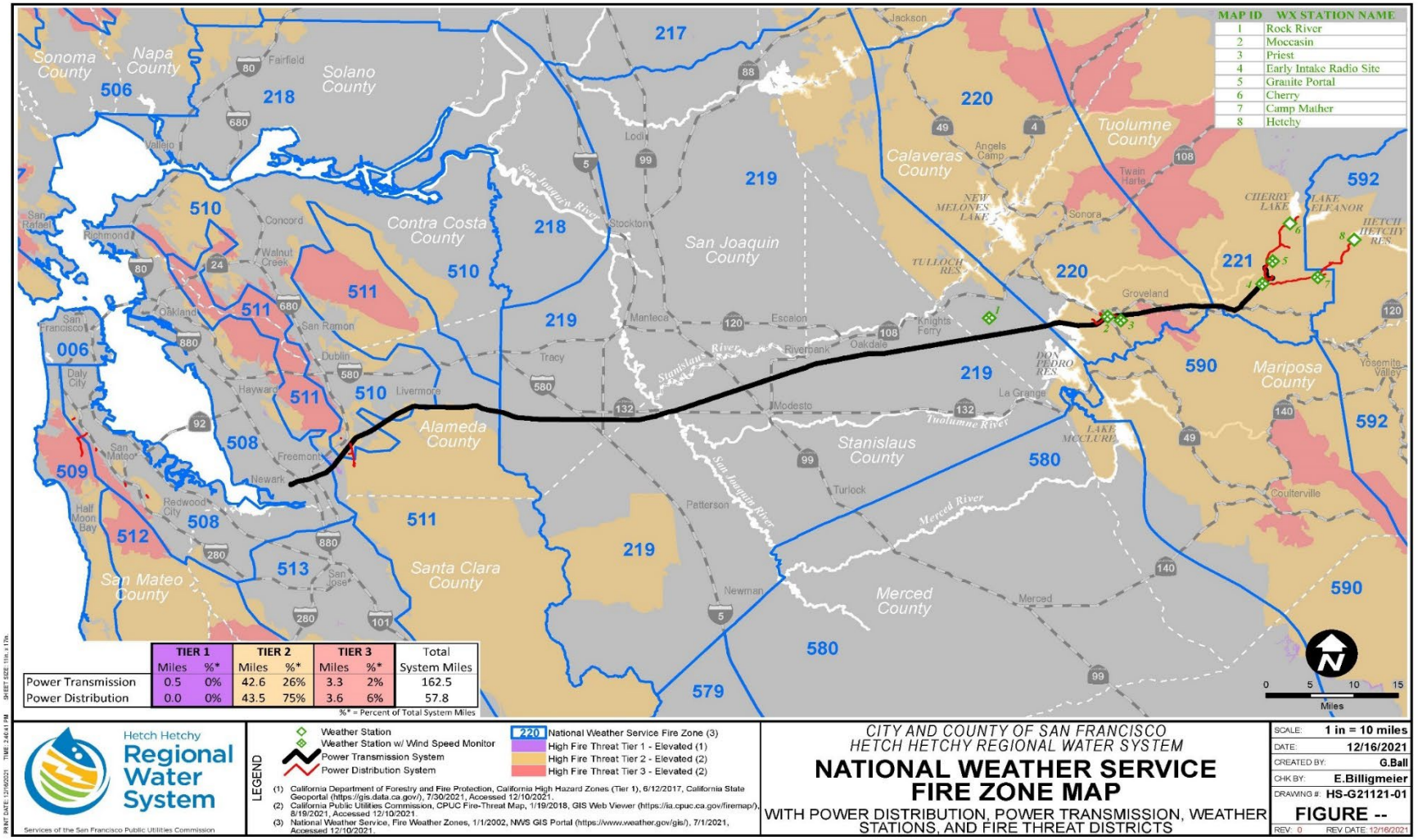


Figure 4 – SFPUC Electrical Assets and HFTDs



4.5 Changes to CPUC Fire Threat Map

The SFPUC has not identified any areas near our electrical assets that are of higher or less wildfire threat than is identified in the CPUC fire threat map.

For the 2024 Plan update the SFPUC agrees with the existing CPUC HFTD boundaries and makes no recommendation for expanding or minimizing the current HFTD.

4.6 Climate Change / Weather Risks

The National Oceanic and Atmospheric Administration[12] (NOAA) describes climate change as, “Any significant change in the measures of climate for extended periods, usually over decades or longer. This includes major, long-term changes in temperature, precipitation, humidity, ocean heat, wind patterns, sea level, sea ice extent, and other factors, and how these changes affect life on Earth.”

NOAA also states that “Global temperatures rose about 1.98°F (1.1°C) from 1901 to 2020, but climate change refers to more than an increase in temperature. It also includes sea level rise, changes in weather patterns like drought and flooding, and much more. Things that we depend upon and value — water, energy, transportation, wildlife, agriculture, ecosystems, and human health — are experiencing the effects of a changing climate.”

Previously, the SFPUC evaluated climate studies and findings reported by the SFPUC Climate Change Collaboration and Coordination Committee (C5). However, the C5 was discontinued in 2023.

Moving forward the SFPUC will continue collaborating with CMUA and other participating POUs in CMUA’s Climate Change working group to evaluate future risks.

4.7 Extended Drought

The SFPUC’s service territory has experienced extended periods of drought over the years. A state of emergency due to severe drought conditions was declared by the

[12] https://www.noaa.gov/explainers/what-s-difference-between-climate-and-weather

Governor of California in 2021. Drought in combination with dryness and other factors can create an ideal situation for the ignition and rapid spread of wildfires. This changed in late 2022 and early 2023 when there was record rain and snow accumulation. In March 2023 California Governor Newsom signed Executive Order N-5-23 which reduced some of the water use restrictions put in place during the original emergency proclamation in 2021. As a result of the record rain and snow in 2023, the SFPUC is evaluating the impacts of the increased rainfall and snowpack on vegetation growth and wildfire risk.

5. WILDFIRE PREVENTATIVE STRATEGIES

5.1 Situational Awareness

We continue to make significant advancements to enhance our ability to monitor forecasted and real-time weather conditions. This section describes the various programs we continue to develop for situational awareness.

5.1.1 Technosylva Wildfire Analyst™ / Fire Potential Index (FPI)

In 2022 the SFPUC acquired the Wildfire Analyst™ application as our situational awareness tool and risk modeling application. Throughout 2023, we continued to work with Technosylva to refine the application. We had anticipated that the application would be implemented in the third quarter of 2023; however, we are still working on integrating the application throughout the SFPUC Divisions which are responsible for wildfire mitigation activities. We are continuing to use the NOAA's High-Resolution Rapid Refresh (HRRR) model and other publicly available weather data, as well as the Wildfire Analyst™ with the long-term goal of using the Wildfire Analyst™ exclusively by the end of this WMP three-year cycle. We will continue to provide progress reports in each year's WMP update. Technosylva's Wildfire Analyst™ application is the foundation for understanding and evaluating wildfire risk within our areas of operation. Technosylva is a leading provider of "advanced GIS-enabled software solutions for wildfire protection planning and operational response, as well as firefighter and public safety." Technosylva is used by CAL FIRE, the CPUC, and most of California's investor-owned utilities (IOU).

The Wildfire Analyst™ performs a risk analysis on each SFPUC asset and produces a Fire Potential Index (FPI) rating for that asset. Additionally, the Wildfire Analyst™ produces four different consequence risk metrics if an ignition were to occur at a specific asset. The four consequence risk metrics are (1) Fire Size Potential, (2) Population Impacted, (3) Buildings Threatened, and (4) Estimated Number of Buildings Destroyed.

This tool, in conjunction with existing critical fire weather monitoring tools, will initially be used to support HHW field operations' daily work schedules and inform personnel of areas of risk and if any operating restrictions should be implemented. HHW continues to evaluate the Wildfire Analyst application, and upon completion of the pilot phase, will be implemented by NRLM and WSTD to inform their daily operations.

PG&E supported the SFPUC in the implementation of the Wildfire Analyst™ risk model. PG&E permitted the SFPUC and Technosylva to use the PG&E FPI algorithms to develop the SFPUC risk indexes, as all the SFPUC electrical assets are within the PG&E service territory. The benefit of PG&E sharing their FPI data is that using the same data sources will allow the SFPUC to have an FPI model consistent with the PG&E FPI model which has been tested and validated.

5.1.2 Weather Monitoring

The SFPUC uses publicly available weather data including weather forecasts to support real-time operating decisions. HHW obtains wind speed conditions using forecast models from NOAA's High-Resolution Rapid Refresh (HRRR), generating average and peak wind forecasts for the next 24-hour operating period. The automated process generates an hourly email with the forecast and is sent to HHW operations managers. Wind and weather data is reviewed daily and used to support operational strategies for the HHW overhead electrical lines to determine if any operational restrictions or if lines should be de-energized for public safety.

NRLM/WSTD monitors weather through the National Weather Service (NWS), NOAA, and other publicly available weather services. This information is used to determine any

operational restrictions for NRLM/WSTD field staff. Weather conditions are distributed to staff through the Millbrae dispatch center via i-INFO[13].

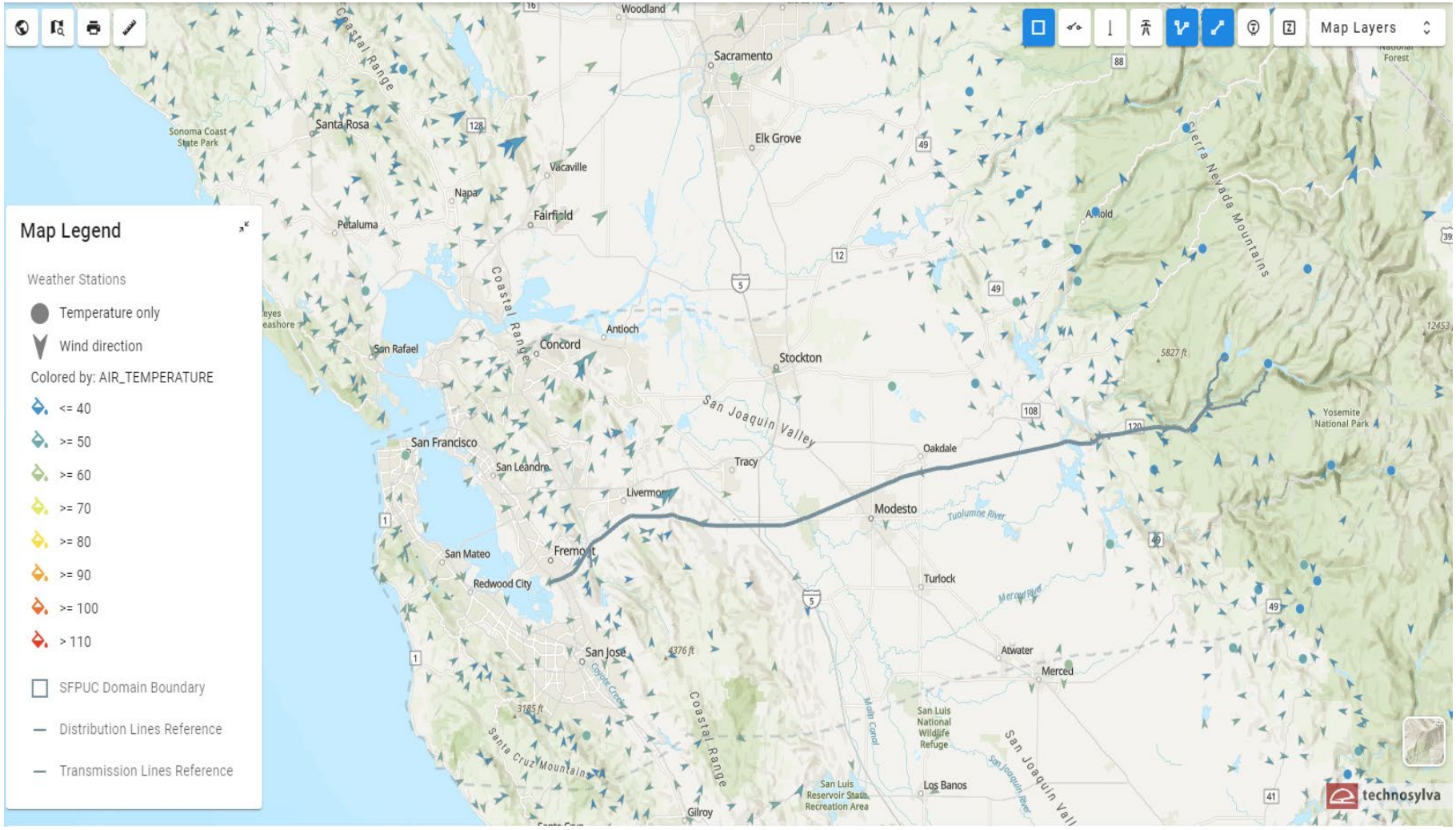
HHW and NRLM/WSTD staff use publicly available weather forecasts and monitor fuel (vegetation) conditions by accessing publicly available information provided by the NWS, USFS's daily Project Activity Level[14] (PAL) rating, Bureau of Land Management, NOAA, and CAL FIRE. SFPUC staff monitor the NWS for Red Flag Warnings.

5.1.3 Weather Stations

In addition to SFPUC-owned weather stations, the Wildfire Analyst™ application provides us access to approximately 325 PG&E or privately owned weather stations providing, at minimum, temperature, relative humidity, and wind speed readings. These weather stations are situated near SFPUC assets and up to a 25-mile buffer zone from those assets. Figure 5 shows a graphic of the weather station data now available to the SFPUC through the Wildfire Analyst™ application.

[13] https://dashboard.i-info.com/
[14] Project Activity Level is a decision support tool designed to help fire and timber resource managers establish the level of industrial precaution for the following day. This tool utilizes outputs from the National Fire Danger Rating System (NFDRS).

Figure 5 – Weather Stations



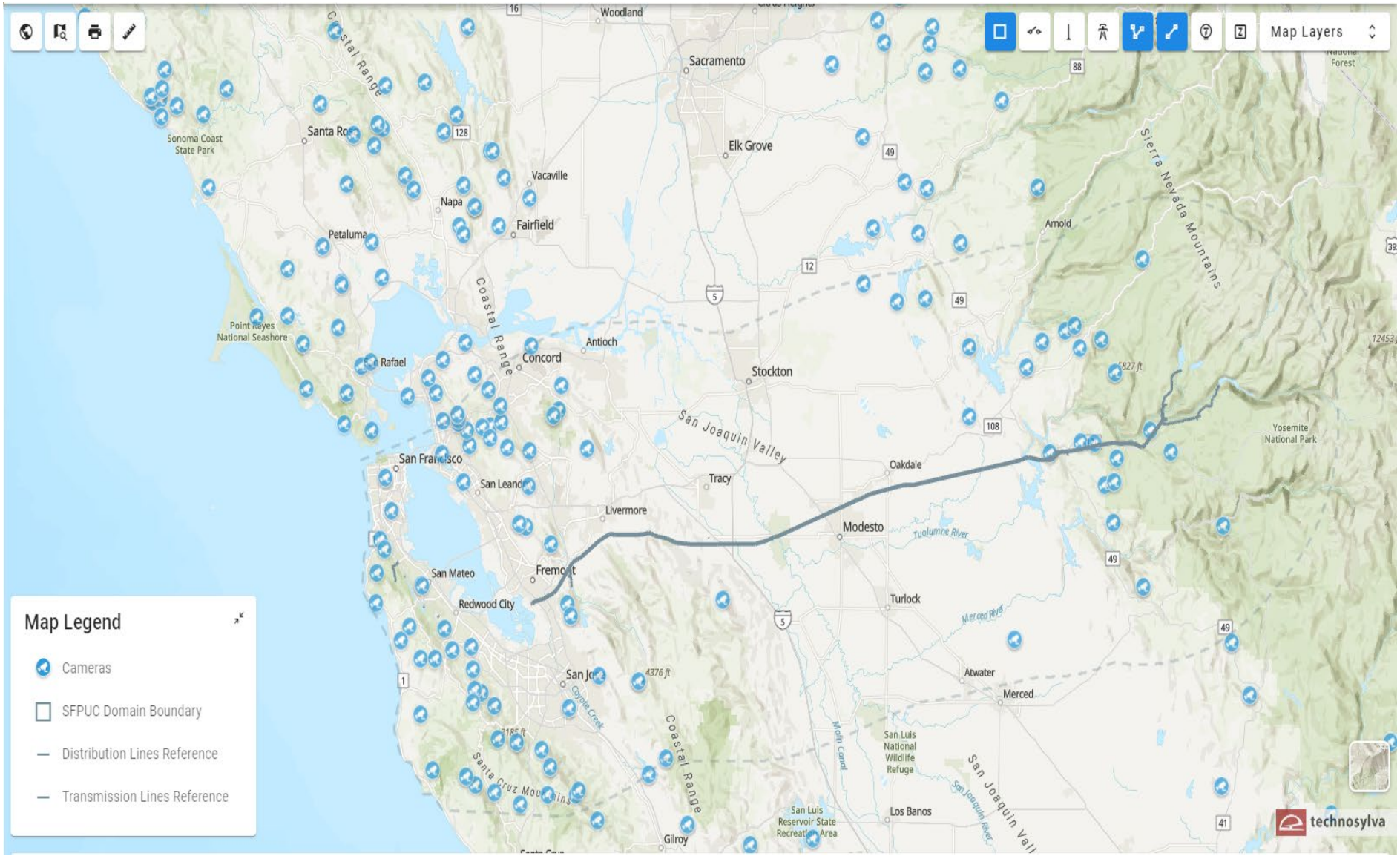
5.1.4 Wildfire Cameras

The SFPUC partnered with PG&E and a communications provider to install two high-definition cameras on SFPUC towers located within the HFTD. The camera imagery can be viewed through the ALERTWildfire website[15]. With the implementation of the Wildfire Analyst™, we have access to approximately 110 cameras providing viewsheds of areas in proximity to SFPUC assets. Figure 6 displays the cameras and live feeds available to the SFPUC in the Wildfire Analyst™ application.

Camera installations at Poopenaut Peak near the O'Shaughnessy Dam site in Yosemite National Park, Burnout Ridge near Cherry Lake, and Intake Ridge near Kirkwood Powerhouse are still pending environmental and engineering review. These areas are in Tier 2 and 3 HFTDs where the SFPUC operates overhead lines. The increased monitoring of the area will enhance our situational awareness, and these cameras will be added to the Wildfire Analyst™ application. The licensing process for these sites is complex due to different land ownership rights and review processes. Internal reviews of equipment, space, and power are ongoing. We will continue to report our progress in future updates until the cameras become operational.

[15] https://www.alertwildfire.org/

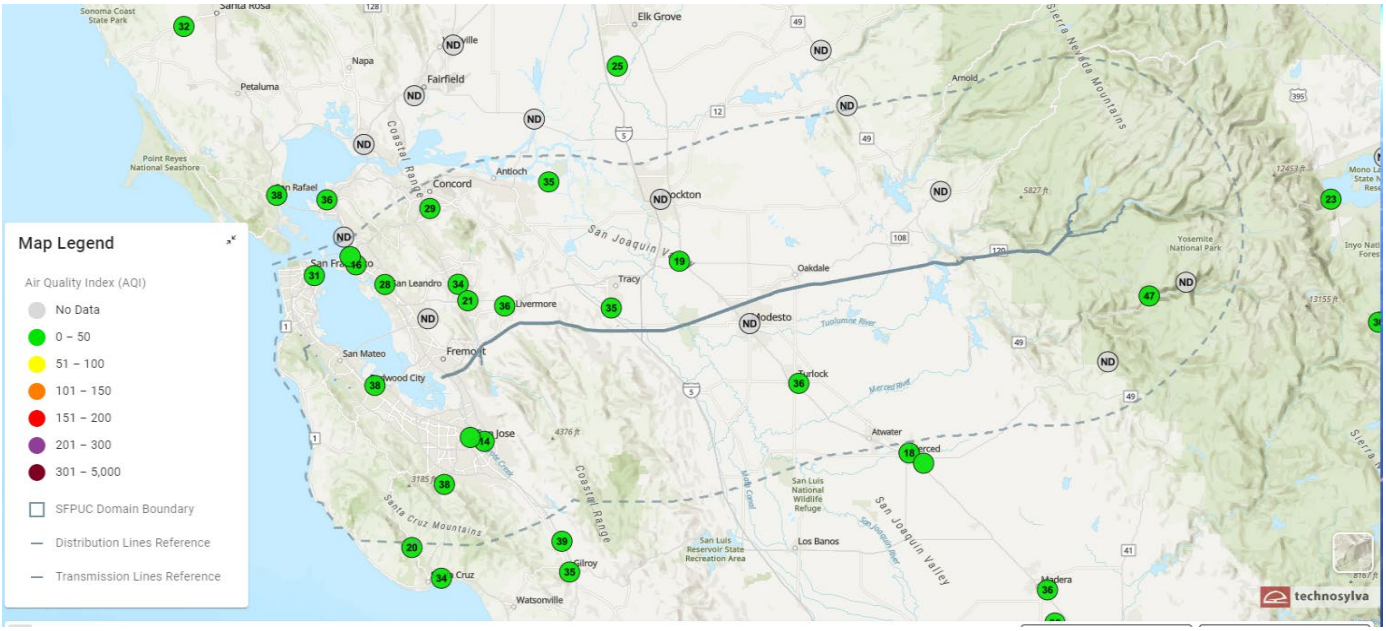
Figure 6 – Wildfire Cameras



5.1.5 Air Quality Monitoring

Air quality is monitored for staff safety, especially when nearby wildfire smoke or other known air quality pollutants are present. We use services such as PurpleAir.com which accesses air quality index monitors in all SFPUC regions. Additionally, the Wildfire Analyst™ product also has an air quality alert module, which can be used to supplement other data sources (Figure 7).

Figure 7 – Air Quality Monitors



5.2 Design and Construction Standards

The SFPUC meets or exceeds the requirements of CPUC GOs 95, 165, 174, North American Electric Reliability Corporation (NERC) Transmission Vegetation Management Program FAC-003, and applicable National Electric Safety Codes (NESC) to construct, maintain, and operate a safe, reliable, and resilient grid. The SFPUC has effective legacy programs for construction, inspections, and maintenance of transmission, distribution, generation, and substation assets within the HFTD and taking corrective action within

specified timeframes for all issues that require remediation.

In 2023, HHW revised its “Overhead Distribution Construction Standards” policy. New language in the policy states that all new pre-planned construction shall be built to provide maximum clearances (based on raptor construction principles), PRC § 4292 compliance, and SFPUC wildfire mitigation requirements to provide phase separation and maximum long-term durability. The policy further states that any new construction in an HFTD shall have CAL FIRE-approved exempt equipment and infrastructure hardening. Composite cross-arms, pole wrap, and composite poles should be considered during the job planning phase.

To support more risk-informed decisions for the construction and maintenance of our electrical assets, the Wildfire Analyst™ application was used to help inform the updated Overhead Distribution Construction Standards policy. The lines we have identified as "Critical Assets” were overlaid with the HFTD boundaries and Wildfire Analyst™ zones to determine the potential wildfire hazard severity. This also informed us where pole hardening measures would be of most benefit during replacement.

5.3 System Hardening

In 2023, the SFPUC continued assessments and studies for the following system hardening options:

- Increasing the number of stand-by generators.
- Installation of fast-reacting protective relays.
- Replacement of existing copper conductor with aluminum.
- Replacement of PRC § 4292 non-exempt equipment.
- Removal of overhead lines,
    - Overhead to underground conversion; and
    - Micro-hydropower.

Table 4 lists each of the above stated options and an analysis of the level of effort, risk reduction, actions the implementation would resolve, and secondary issues that would be

mitigated or would need to be addressed before construction begins. The narrative includes additional information on each of these options as well as the next steps to be accomplished over the 2024-2025 Plan updates.

Table 3 – SFPUC Wildfire Mitigation Strategies

Strategy	Public Safety Risk	Actions	Secondary Issues
Status Quo	Reduced	✓ De-energize 22.9 kV circuits during high-risk weather conditions. ✓ Activate standby generators at selected Comm Sites & up-country dams.	▪ Operating cost to send a line crew to operate the switch and observe for fire watch. ▪ Operating cost of line crew to patrol lines before re-energizing.
Shortest Path to reduce wildfire risk	Additional Reduction	✓ De-energize 22.9 kV circuits during high-risk weather conditions	▪ Same as above
		✓ Increase the number of standby generators at Comm Sites & up-country dams—OSH Compound Standby Generator Project (underway), Poopenaut Pass Comm Site Standby Generator (new). Increase fuel storage for increased generator run-time at all locations.	▪ Increases maintenance costs to auto-test and perform preventative maintenance on larger standby generator fleet. ▪ Increases fuel costs and demand for red diesel and propane.
		✓ Install fast-reacting protective relays to sense and open circuits faster to prevent an energized line from touching the ground and starting a fire.	▪ Risk reduction dependent on existing power protection infrastructure and may require electric protection system upgrades not yet scoped.
Moderate Path to reduce wildfire risk	Moderate Reduction	✓ Install CAL FIRE approved exempt equipment	▪ Vegetation removal beneath equipment not required to maintain compliance.
		✓ Replace conductors with Aluminum	▪ Increased risk to cross-arm and pole breakage
May include actions above		✓ Underground existing 22.9 kV overhead conductors.	▪ Multiple pull boxes to be field located. ▪ Pole/pad mounted switches/disconnects still required. ▪ Must maintain vegetation above ROW underground ducts.

			▪ Running ducts under road surface increases lengths and # of pull boxes.
Longest Path to reduce wildfire risk	Significant Reduction	✓ Install distributed generation at critical sites, e.g., solar/batteries, industrial battery banks, micro-hydro AND de-energize 22.9 kV overhead distribution during lower fire risk periods.	▪ Increases maintenance costs on distributed generation assets.
May include actions above		✓ Install distributed generation at critical sites, e.g., solar/batteries, industrial battery banks, micro-hydro (Cherry Valley Dam &/or O'Shaughnessy Dam) AND decommission existing 22.9 kV overhead distribution lines.	▪ Increases maintenance costs on distributed generation assets. ▪ Decommissioning (removal) of overhead lines. ▪ Reduced Operations & Maintenance costs due to decommissioned lines. ▪ SFPUC facilities at Poopenaut Pass, Burnout Ridge, Intake Radio Site, Cherry/Eleanor Pump Station, Granite Portal Valve house, OSH Compound, Cherry Camp/Pump will require new dedicated power supply. ▪ CCSF Camp Mather will require a new dedicated power supply. ▪ 3rd Party sites at NPS Kiosk and Evergreen will require new dedicated power supply. ▪ ROW maintenance is still required for fiber/wire overhead communication cables.

5.3.1 Replace Wood Poles

We are not considering a programmatic replacement of wood poles with ductile or steel poles within the 2023-2025 Plan updates. However, we have updated our Overhead Distribution Construction Standards policy to state that when replacing poles in the HFTD consideration should be given to replacement with composite poles and composite cross-arms.

5.3.2 Replace Overhead Copper Conductor

HHW leadership has elected to not move forward with a stand-alone copper conductor replacement project. However, the copper conductors will be replaced with aluminum conductors as the equipment otherwise requires replacement or upgrades.

5.3.3 Replacement of Non-Exempt Equipment

Approximately 15% of SFPUC distribution poles, including those located in non-HFTD areas, support non-exempt equipment defined in CAL FIRE's California Power Line Fire Prevention Field Guide.

HHW contracted with a firm to complete a load study on distribution assets to identify at-risk facilities, such as overloaded transformers, undersized fuses, etc. HHW has reviewed the results of the study and has begun putting together an equipment list for replacement, such as exempt non-expulsion fuses and lightning arrestors.

5.3.4 Avian Protection

In 2023, the Overhead Distribution Construction Standards policy was updated to include a section addressing raptor-safe construction and wildlife protection. The policy states that bird and raptor protection shall be a primary consideration in the design of new and reconstructed distribution facilities.

5.4 Overhead to Underground Conversion

In September 2020, the SFPUC commissioned a consultant to perform three studies to assess the construction costs of undergrounding three existing overhead electrical distribution lines located in the HFTD. The final analysis shows that the project is physically infeasible in some locations due to terrain and geology (steep canyons and granite); however, for the areas where undergrounding is shown as physically feasible the SFPUC determined other system hardening options described in this section of the WMP would provide a greater cost-benefit versus undergrounding.

5.4.1 Micro-hydropower (Overhead Line Removal)

During the 2020-2022 Plan updates the SFPUC initiated a study to evaluate the feasibility of placing micro-hydropower generation units at Cherry and O'Shaughnessy Reservoirs to provide power for these remote sites. The overall goal of adding micro-hydro units would be to reduce the SFPUC's overhead distribution line miles within the HFTD.

During the 2023-2025 Plan updates, the matrix shown in Table 4 will be refined to analyze and assign priorities and implementation timeframes to the various system hardening studies and reports that have been generated over the 2020-2022 Plan updates. The SFPUC intends to prioritize the replacement of non-exempt equipment, installation of pole wrap, and replace wooden poles and cross arms that have reached the end of their service life with fiberglass.

5.5 Vegetation Management

The SFPUC meets or exceeds the industry standards for vegetation management around transmission lines, distribution lines, and substation facilities, and maintains compliance with the SFPUC internal Hetch Hetchy Water and Power Transmission Vegetation Management Program plan (TVMP Revision 5.2). For transmission-level facilities, the SFPUC complies with NERC FAC-003, where applicable. For both transmission and distribution level facilities, the SFPUC meets or exceeds the following standards:

- California PRC §§§ 4291, 4292, and 4293
- CPUC GO 95 Rule 35
- CPUC GO 95 Appendix E Guidelines to the Rule 35
- CPUC GO 174
- CAL FIRE's Power Line Fire Prevention Field Guide – 2021

These VM standards significantly increase the vegetation clearances required within the HFTD. The recommended "time-of-trimming" guidelines in CPUC GO 95 do not establish a mandatory standard for vegetation clearances but provide helpful guidance to utilities.

We use specific knowledge of tree growth rates and tree species to determine the appropriate time-of-trimming clearance in each circumstance.

The SFPUC performs VM with two groups: 1) the HHW group, inspects and maintains vegetation on the HHWP Project from O'Shaughnessy Dam to Newark; and 2) the NRLM group inspects and maintains vegetation in proximity to distribution facilities in and around the Bay Area region (see Figure 8).

Figure 8 – Distribution ROW

At HHW a certified arborist with the following certifications, International Society of Arboriculture (ISA) Certified Arborist, ISA Certified Utility Arborist, and ISA Tree Risk Assessment Qualified (TRAQ) completes the inspections. The HHW Right-of-Way (ROW) VM labor crew is made up of one laborer supervisor, one operating engineer, one certified arborist, and five laborers.

In late December 2023, HHW hired a second arborist. This position will take on the responsibility of performing the annual transmission and distribution line vegetation clearance inspections and inspecting clearances around substations, switchyards, and habitable structures. Additionally, we hire 12 to 15 temporary seasonal Watershed Workers to remove undesirable vegetation around SFPUC facilities. These positions usually start work in early June and end in October.

The NRLM VM crew is comprised of three arborists and three to five seasonal watershed workers responsible for the Alameda and Peninsula Watershed. Two registered professional foresters support the work (one for the Alameda Watershed and one for the Peninsula Watershed).

5.5.1 Annual Vegetation Management Work Plan

Vegetation Management work across the ROW is planned and scheduled annually. VM activities are listed and described in the Annual Vegetation Management Work Plan (AVMWP) to ensure VM work is conducted as scheduled. The annual work plan is reviewed quarterly and modified as needed in response to changing conditions or findings from vegetation inspections. The work plan identifies the facilities inspected the previous year, proposed work, and completed work. The SFPUC uses Maximo (IBM™) to generate VM work orders. Maximo is a computerized asset and maintenance management system (CMMS) for managing our programmatic maintenance and repair program. Preventative maintenance work orders for detailed transmission and distribution line inspections and substation inspections are managed through Maximo.

5.5.2 Vegetation Inspections / Transmission Lines

A detailed ground inspection (patrol) of all vegetation near 230 kV transmission lines, both in the HFTD and non-HFTD, is performed annually. Inspection details, including the name of the inspector and date and line section, are documented in ArcGIS Field Maps, and noted on the HHW AVMWP. These ground inspections identify all conditions where vegetation may encroach within the Minimum Vegetation Clearance Distance (MVCD) for energized facilities before the next scheduled predictive control treatment. Attention is

given to visual assessments of trees within the strike zone of energized facilities to identify tree defects that could cause a tree, or parts of a tree, to fall directly onto overhead high-voltage conductors. Individual trees undergo additional inspections of a detailed 360-degree visual evaluation to determine the presence, significance, and severity of tree defects and risks.

The HHW 115 kV Transmission Vegetation Management Plan (115 kV VMP) provides detailed program objectives with clearly assigned roles and responsibilities for HHW staff.

Like the 230 kV, the 115 kV TVMP follows the AVMWP. The HHW ROW Manager creates the AVMWP and identifies the facilities managed and any proposed work forecasted, with start and completion dates.

The SFPUC will inspect the 115 kV transmission system annually for vegetation clearances. Inspection details, including the name of the inspector and date and line section, are documented in ArcGIS Field Maps, and noted on the HHW AVMWP. Additional corrective maintenance observed during the daily course of work by the Line Crew, Vegetation Management Crew, and Watershed Keepers will be submitted to the Asset Management work group for a corrective maintenance work order.

Table 5 provides the annual number of corrective maintenance work orders issued, and the number completed. The most common corrective maintenance identified in 2023 was the trimming or removal of orchard trees near transmission lines and towers in the Central Valley, which is a non-HFTD. The HHW ROW group has been working to increase communication of permitting requirements for orchard owners near the transmission ROW to reduce grow-in problems and the removal of orchard owner crops.

Table 4 – Vegetation Corrective Maintenance Work Orders for 230 kV/115 kV

Year	Number of Work Orders	Total Completed
2020	16	16
2021	22	22
2022	25	25
2023	16	16

5.5.3 Vegetation Inspections / Distribution Lines

All vegetation patrols in proximity to distribution lines within the HFTD meet or exceed the requirements of CPUC GO 95. The HHW distribution lines are patrolled and inspected on the ground and aerially annually for vegetation clearances. The HHW arborist performs the ground inspections. The aerial inspections include the line crew (Qualified Electrical Worker – QEW) and the ROW Vegetation Management crew. The inspections serve dual purposes: (1) to allow the line crew to inspect the distribution lines and equipment for any corrective line maintenance required, and (2) to allow the arborist and VM crew to inspect for vegetation that may be encroaching within the MVCD which may require corrective maintenance work.

The NRLM certified arborist performs annual inspections of vegetation in proximity to WSTD distribution lines in the Alameda and Peninsula Watersheds. The arborist submits any corrective maintenance work order prescriptions for the NRLM tree crews for mitigation.

The power Distribution Vegetation Management Plan (DVMP) establishes the protocols for the AVMWP. The AVMWP is created by the ROW Manager and identifies the facilities to be managed and any proposed work, with start and completion dates. When work is identified, a work order is created in Maximo and assigned to the appropriate crew.

Inspection details, including the inspector's name and the date and line section, are documented using Maximo and noted on the HHW AVMWP. The HHW Line Crew, Vegetation Management Crew, and Watershed Keepers report additional corrective

maintenance observed during daily work to the ROW VM Manager to generate a corrective maintenance work order through Maximo.

Table 6 provides the annual number of corrective distribution maintenance work orders issued, and the number completed. The most common VM corrective maintenance along the distribution lines was tree trimming and removals to ensure compliance with GO 95 Rule 35.

Table 5 – Vegetation Corrective Maintenance Work Orders for Distribution

Year	Number of Work Orders	Total Completed
2020	43	43
2021	26	23
2022	21	24
2023	6	6

5.5.4 Vegetation Inspections / Substations, Switchyards, Powerhouses, and Habitable Structures

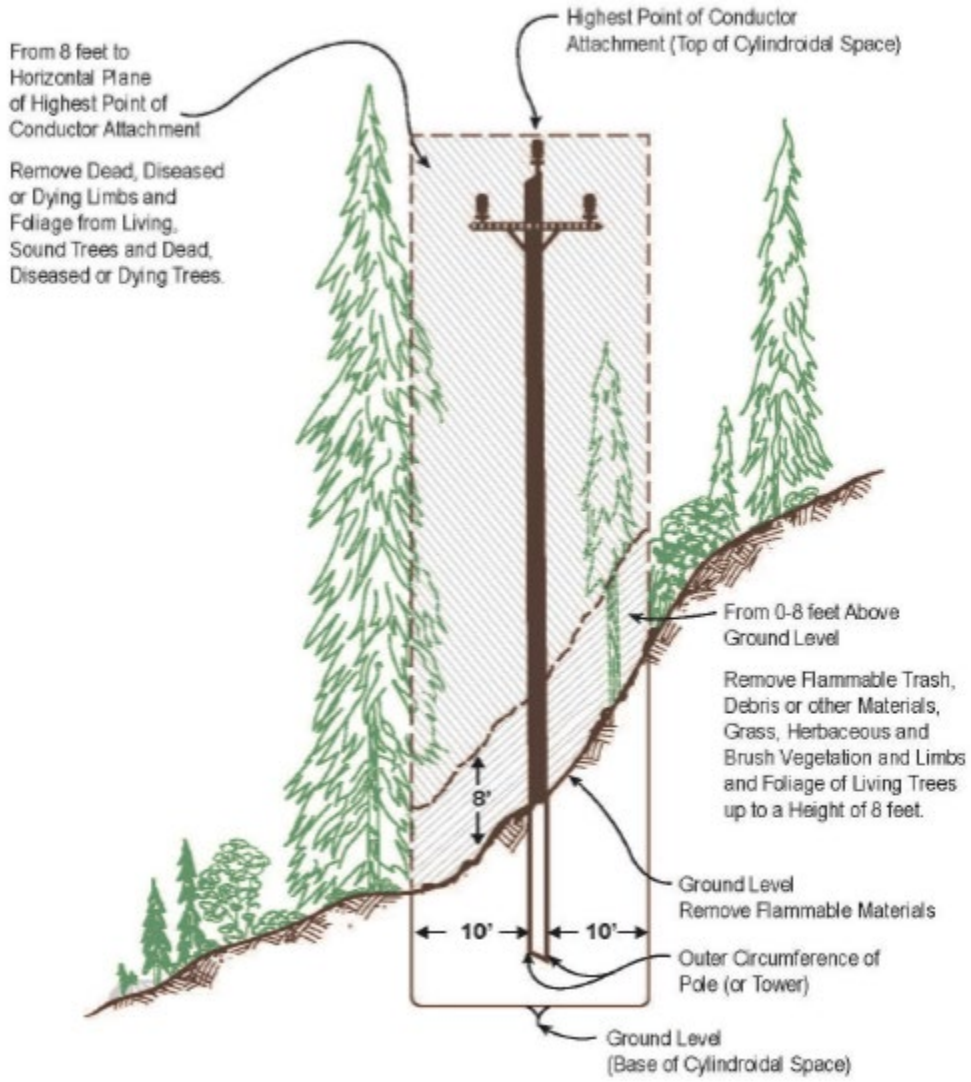
The SFPUC performs annual PRC § 4291 defensible space inspections around substations, switchyards, powerhouses, and habitable structures including jointly operated substations with a neighboring utility. We use a CAL FIRE-developed inspection form attached to the inspection work order. Any follow-up work is documented on the inspection work order and a follow-up work order is created for the vegetation management crew to trim or remove any vegetation that is non-compliant. The powerhouses and switchyards are inspected twice each year, once during the annual overhead conductor inspection and again when they are inspected for PRC § 4291 compliance.

5.5.5 Fire Break Clearance Requirements

The SFPUC meets the requirements of PRC § 4292. Poles that are identified as having

non-exempt equipment (e.g., expulsion fuses, lightning arrestors, etc.) have annual preventative maintenance work orders to clear the base of the pole of all flammable materials and vegetation with a 10-foot radial circle down to bare mineral soil as well as removing all limbs and foliage up to a height of eight feet (Figure 9). The SFPUC maintains an inventory in Maximo of all poles that host both exempt and non-exempt equipment, including equipment types such as cut-outs, switches, and lightning arrestors.

Figure 9 – PRC § 4292 Fire Break Clearance Requirements[16]



[16] Image taken from pg. 37 of the CAL FIRE California Power Line Fire Prevention Field Guide 2021 Edition

5.5.6 Herbicide Use

Herbicide treatments for the 230 kV ROW, where the ROW intersects with Stanislaus, Mariposa, and Tuolumne counties, follow the SFPUC ROW Integrated Vegetation Management Policy, supported by the San Francisco Planning Department's Preliminary Mitigated Negative Declaration for Rights of Way. The use of herbicides on SFPUC property and ROW is strictly controlled by the CCSF and San Francisco's Integrated Pest Management Ordinance (Chapter 3 of the San Francisco Environment Code)[17].

5.5.7 Light Detection and Ranging (LiDAR)

In FY 2022-23 and 2023-24, we budgeted LiDAR flights to be performed on an alternating schedule with transmission lines flown one year and distribution lines the following year. The data from the 2022 LiDAR flight has been received and has been processed as a GIS layer in the Field Maps application. Inspectors actively validate this LiDAR information while performing inspections and mark trees for removal or trimming based on the field conditions. We are delaying the next LiDAR flight, which was planned for 2023, as we integrate the LiveEO satellite imagery into our inspection routines.

5.5.8 Satellite Vegetation Monitoring

HHW executed a contract with LiveEO, a software company that provides artificial intelligence (AI) satellite observation data specific to infrastructure assets, such as overhead electrical lines. We were most interested in the vegetation management capabilities given the increased turnaround time for LiDAR data. LiveEO's artificial intelligence is applied to satellite data which identifies and locates hazard trees within the SFPUC's overhead electrical line footprint.

With the increased number of satellites in orbit, a utility can get a complete overview of tree location and condition in near real-time. In January 2024, HHW received the first data deliverable from LiveEO. This data has been integrated into ArcGIS Field Maps application and field inspectors are using the data to help verify compliance and assess

[17] https://codelibrary.amlegal.com/codes/san_francisco/latest/sf_environment/0-0-0-160

potential fall-in trees. LiveEO will be providing data twice a year for the next three years. The data is also shared with NRLM vegetation management for use during inspections in the Peninsula and Alameda watersheds.

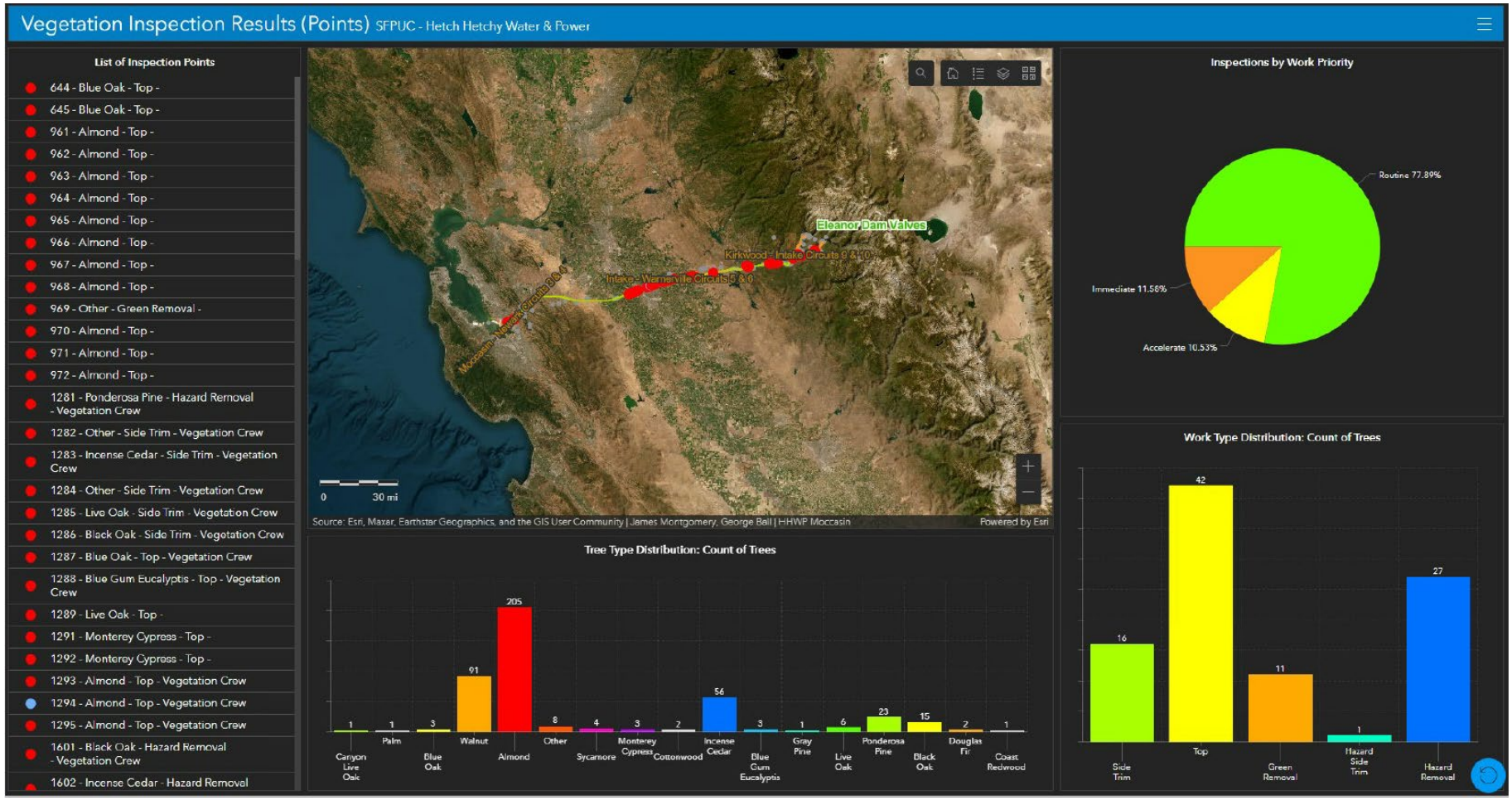
5.5.9 Vegetation Management Dashboard

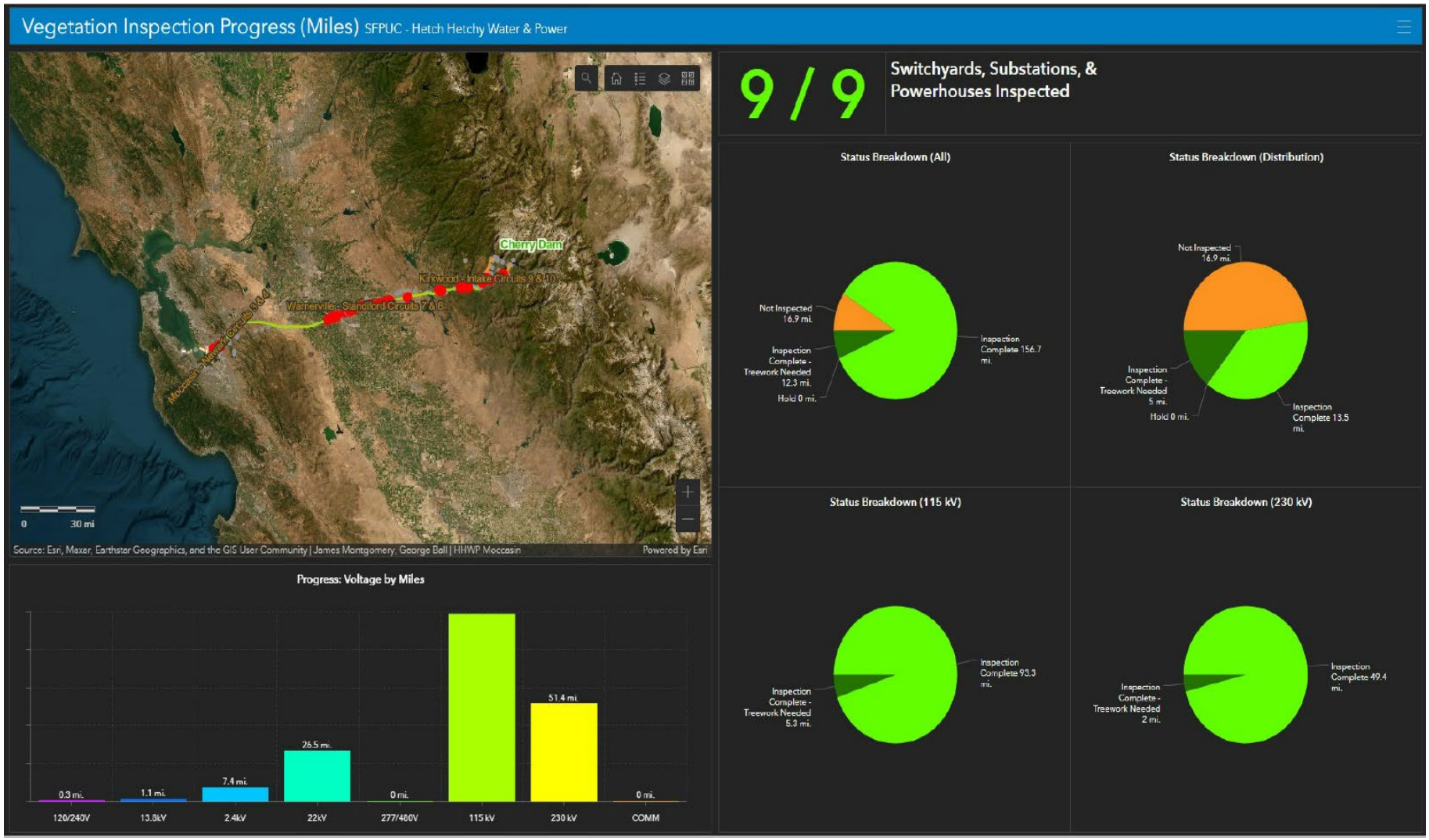
HHW tracks vegetation inspections across the 230 kV and 115 kV transmission systems and the 22 kV and 2.4 kV distribution systems using an ArcGIS Field Maps collection program that is displayed in a dashboard format. The dashboard displays an “at-a-glance” summary of the vegetation inspection progress as well as data on the type (top, side trim, hazard removal, etc.) of vegetation treatment required. The dashboard (Figure 10) displays data captured in a calendar year. Calendar Year 2023 is the second year ArcGIS Field Maps was used to capture the entire year of vegetation inspections.

The modules display overall inspection progress by miles for both transmission and distribution and further separate inspection tracking by distribution and transmission, switchyards, substations, and powerhouses. HHW regularly reviews the dashboard to analyze important ROW trends including inspections by work priority and count of trees by work type to reduce high-priority and hazard tree work. As the dashboard illustrates, walnut and almond trees are the most common trees requiring trimming or removal. The majority of these are outside the HFTD and adjacent to our 230 kV and 115 kV transmission lines through the Central Valley.

In 2023, NRLM began utilizing this dashboard for tracking vegetation management in the Peninsula watershed. Both HHW and NRLM have aligned their data collection forms so each Division is tracking the same information when performing vegetation inspections.

Figure 10 – Vegetation Management Dashboard




Vegetation Inspection Progress (Miles) SFPUC - Hetch Hetchy Water & Power
Cherry Dam
Kirkwood - Intake Circuits 9 & 10
Warnerville - Standford Circuits 7 & 8
Moccasin - Tesla Circuits 3 & 4
0
30 mi
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community | James Montgomery, George Ball | HHWP Moccasin
Powered by Esri
9 / 9
Switchyards, Substations, & Powerhouses Inspected
Status Breakdown (All)
Not Inspected 16.9 mi.
Inspection Complete - Treework Needed 12.3 mi.
Hold 0 mi.
Inspection Complete 156.7 mi.
Status Breakdown (Distribution)
Not Inspected 16.9 mi.
Inspection Complete - Treework Needed 5 mi.
Hold 0 mi.
Inspection Complete 13.5 mi.
Progress: Voltage by Miles
0.3 mi.
1.1 mi.
7.4 mi.
26.5 mi.
0 mi.
51.4 mi.
0 mi.
120/240V
13.8kV
2.4kV
22kV
277/480V
115 kV
230 kV
COMM
Status Breakdown (115 kV)
Inspection Complete - Treework Needed 5.3 mi.
Inspection Complete 93.3 mi.
Status Breakdown (230 kV)
Inspection Complete - Treework Needed 2 mi.
Inspection Complete 49.4 mi.

5.5.10 Integrated Vegetation Management (IVM)

The SFPUC has a ROW IVM Policy that applies to the entire SFPUC 230/115 kV transmission ROW, and the distribution ROW. The IVM is considered the utility industry's best management practice (BMP) by federal and state land management agencies.

5.5.11 Wood and Slash Management

The SFPUC has two master as-needed tree service contracts that cover projects in the Central Valley going east to O'Shaughnessy Dam and projects in the Bay Area and Peninsula areas. The firms under contract hold D49 Tree Service Contractor Licenses and are Licensed Timber Operators (LTOs) with an "A" license or have an LTO available as a subcontractor.

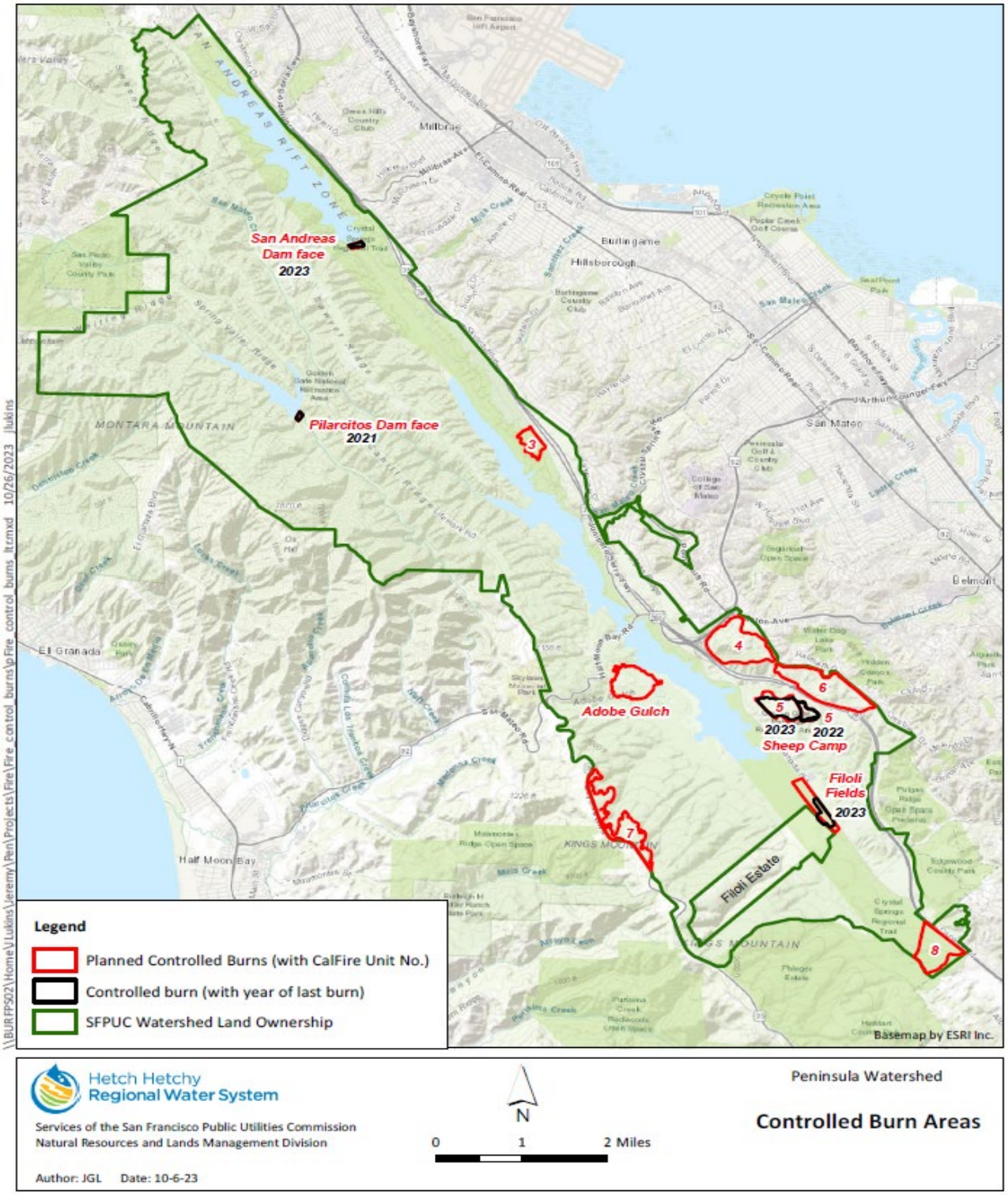
To date, the SFPUC has awarded seven projects under the Master As-Needed contracts for a total cost of $1,690,400. These projects range from removing brush near watersheds to the removal of hazard trees along the transmission and distribution ROW. All seven projects were completed to satisfactory standards. Three additional projects were awarded in 2023 to perform additional vegetation management in the Peninsula and Alameda watersheds and along the 230 kV transmission ROW in Tuolumne County. These new projects were all completed in 2023 to satisfactory standards. Additional projects are being planned for 2024.

CAL FIRE, in partnership with NLRM, conducted over 100 acres of prescribed burns in 2023, on the Peninsula Watershed (see Figure 11). The primary objectives of the burns were to reduce brush densities and fuels within the Highway 280 corridor and the Wildland Urban Interface, manage non-native and invasive weeds in grasslands, and promote habitat enhancement while reducing brush encroachment in native grasslands.

The project areas were in a Tier 2 HFTD. This was the second year implementing prescribed burns as part of a 700-acre fuels reduction project with CAL FIRE, which is planned to take place through 2030. Figure 12 shows the completed controlled burn areas and planned burn areas.

Figure 11 – 2023 NRLM Prescribed Burn Area

Figure 12 NRLM Control Burn Areas



5.5.12 Quality Assurance/Quality Control (QA/QC)

HHW performs Quality Assurance / Quality Control (QA/QC) on its VM work on both transmission and distribution facilities. VM performed by contractors undergoes a separate QA/QC process. During this process 5% of the distribution system VM work shall be audited annually and the findings reported to the ROW manager. The auditor will evaluate the quality of the inspection as well as the VM that was completed. All VM work shall comply with ANSI A300 standards and applicable regulatory requirements. The audit shall document the assets audited, auditor, date, and details of findings. This process aims to identify areas for improvement and facilitate the training based on the findings to improve the quality of the DVMP.

Five percent of the 115 kV system shall undergo an audit, and the results shall be documented and reported to the ROW manager. The auditor will evaluate the quality of the inspection and the VM work when completed. All VM work shall comply with American National Standards Institute (ANSI) A300 standards and regulatory requirements. The audit shall document the assets audited, auditor, date, and details of findings. This process aims to identify areas for improvement and facilitate the training based on the findings to improve the quality of the 115 kV TVMP.

HHW VM work performed under contract is monitored by our internal Construction Inspectors. At least one inspector is at the job site daily to ensure work is being performed to the SFPUC standards and safety protocols are being followed. A final job walkthrough is required before the project can be deemed complete and payment is issued.

When VM work is performed in the Peninsula and Alameda watersheds (NRLM), the Project Manager is onsite at each job to ensure the work is being performed to SFPUC standards and safety protocols are being followed. All specifications must be met for payment to be issued to the contractor.

5.6 Overhead Asset Inspections

The SFPUC meets the minimum inspection requirements provided in CPUC GO 165, CPUC GO 95 Rule 18, and CPUC GO 174. The SFPUC inspects overhead electric

facilities using the requirements in these rules as a guide.

5.6.1 Work Order Documentation

The SFPUC documents asset inspection results in Maximo including findings that require remediation. Follow-up remediation work is prioritized based on SFPUC personnel assessment and tracked via Maximo until the work order is closed out.

5.6.2 Transmission Inspections and Maintenance

The SFPUC owns and maintains a total of 834 transmission structures. Detailed ground inspections are performed over a five-year cycle. Detailed ground inspections consist of checking the condition of access roads and gates, tower numbers, tower danger signs, tower concrete footings, grounding condition, steel tower members (checking for rust and condition of metal), and powerline tree and limb encroachments.

Aerial patrols of all 834 structures are performed annually by the HHW Line Crew and consist of a visual inspection of tower members and related hardware, dampers, conductors, and insulators. Thermal infrared scans of tower equipment are performed on an annual basis. Any defects or deficiencies discovered through these patrols are reported to the Planning work group and a work order to correct the issue is generated through Maximo. See Table 7 for annual detailed transmission tower inspections scheduled and completed, and the corrective maintenance orders generated and completed. The transmission system's most common corrective maintenance work orders were to replace tower numbers and danger signs.

Table 7 – Transmission Tower Inspections

Year	Detailed Inspections Scheduled/Completed		Corrective Maintenance Work Orders Scheduled/Completed	
	Scheduled	Complete	Scheduled	Complete
2019	180	180	49	27[18]
2020	180	180	28	28
2021	114	114	40	28[19]
2022	140	140	96	94[20]
2023	153	153	29[21]	29
Total	767 (out of 834 Towers)			

5.7 Asset Maintenance

Under applicable industry standards, we perform the following asset inspections and maintenance of transmission, distribution, and substation facilities. Preventative maintenance work orders for detailed inspections and corrective work are managed through Maximo.

5.7.1 Hot or Cold Wash

The SFPUC conducts annual preventative maintenance by performing hot or cold wash of overhead line towers, insulators, switches, and equipment in substations/switchyards. The purpose of washing is to remove contaminants from the insulators and other

[18] The remaining 22 work orders were completed in 2020, in addition to the 28 reported.
[19] The remaining 12 work orders were completed in 2022, in addition to the 96 reported.
[20] The two remaining work orders were created in late December 2022. The completion status will be reported in the 2024 WMP update.
[21] The two remaining work orders were completed in early 2023. The total number of new work orders in 2023 was 27.

associated hardware, which reduces the likelihood of tracking or arcing, which could degrade the equipment and ultimately lead to failure (Figure 13). The assignment and completion of hot or cold washing work orders are tracked in Maximo. The line crew supervisor verifies the completion of the work orders.

Figure 13 – HHW Line Crew Hot Washing

5.7.2 Distribution Inspection and Maintenance

The SFPUC meets or exceeds the minimum inspection requirements of CPUC GO 165 and GO 95, Rule 18 for distribution lines. GO 165 establishes minimum requirements for electrical distribution facilities regarding inspections (patrols, detailed, and intrusive inspections), condition ratings, schedule, remediation of corrective actions, and reporting and record-keeping to ensure safe and reliable electrical service. The SFPUC contracts with a helicopter vendor to patrol distribution lines annually with the SFPUC QEW. During the aerial patrols, the QEW looks at the tops of the poles for rot and damage. Intrusive pole inspections are performed on a 10-year cycle. Corrective maintenance work orders

are created during the inspection and assigned a priority. Table 8 shows the number of corrective maintenance work orders issued in 2023, versus the number completed. The SFPUC has inventoried all distribution poles in Maximo.

Table 8 – Corrective Maintenance for Distribution System

Year	Number of Work Orders	Total Completed
2019	4	4
2020	37	37
2021	30	26
2022	14	12[22]
2023	7[23]	7

5.7.3 Drone Inspections

In 2022, HHW purchased a professional-grade drone to perform damage inspections during emergencies where access may be limited due to road damage or snow. In 2023, HHW ran a pilot project to use the drone for distribution pole inspections. The drone camera is capable of 200x zoom which allows the drone to be flown a safe distance from the overhead conductors. Based on the clarity and detail of the images, the pilot proved to be successful, and discussions are in place to formalize routine drone inspections on specific distribution segments in the HFTD that are difficult to access. We will continue to perform annual helicopter inspections as the drone has limited flight distances based on battery capacity and safety. Figure 14 illustrates the capabilities of drone images.

[22] The two outstanding work orders were issued in late 2022. Completion status will be included in the 2024 WMP update.
[23] The two outstanding work orders from 2022 were completed in early 2023. The total numbers of new work orders in 2023 is 5.

Figure 14 – Drone Photo of the Distribution System

5.7.4 Powerhouse/Substation/Switchyard Inspections and Maintenance

The SFPUC meets or exceeds the requirements of CPUC GO 174, Rules for Electric Utility Substations. The SFPUC performs detailed substation/switchyard inspections monthly (Table 9) and records findings and completion dates in Maximo. Any maintenance or repairs are reported to the Planning team and a corrective maintenance work order is generated in Maximo. WST inspected the Crystal Springs Substation in 2023 and recently completed preventative maintenance. WST has a process underway for the 2024 inspection.

Table 9 – Substation/Switchyard Inspections

2023 Calendar Year GO 174 Substation/Switchyard Inspections				
Month	Moccasin	Intake	Warnerville	Calaveras
Jan	1/03/2023	1/06/2023	1/03/2023	1/13/2023
Feb	2/07/2023	2/03/2023	2/04/2023	2/04/2023
Mar	3/07/2023	3/08/2023	3/06/2023	3/02/2023
Apr	4/18/2023	4/06/2023	4/15/2023	4/01/2023
May	5/09/2023	5/03/2023	5/05/2023	5/03/2023
June	6/13/2023	6/07/2023	6/03/2023	6/03/2023
July	7/11/2023	7/06/2023	7/08/2023	7/01/2023
Aug	8/23/2023	8/03/2023	8/04/2023	8/04/2023
Sep	9/14/2023	9/02/2023	9/02/2023	9/02/2023
Oct	10/03/2023	10/06/2023	10/07/2023	10/02/2023
Nov	11/08/2023	11/01/2023	11/04/2023	11/02/2023
Dec	12/05/2023	12/05/2023	12/01/2023	12/02/2023

Preventative Maintenance work orders are set up in Maximo. Table 10 below shows the asset, equipment, and frequency of infrared inspections.

Table 10 – Infrared Inspections

Asset	Equipment	Frequency
Powerhouses	Connectors, Switches, and Circuit Breakers	Annual
Powerhouses	13.8 kV bus way between GSU and Switchgear	3 Month
Switchyards/Substations	Connectors, Switches, and Circuit Breakers	Annual
Towers	Test Shoes, Connectors, and Splices	Annual
Transmission Line Segments	Test Shoes, Connectors, and Splices	Annual
Poles	Transformers	Bi-Monthly

5.7.5 Defensible Space Inspections

HHW performs annual preventative maintenance defensible space inspections that conform with PRC § 4291 around buildings and structures. These inspections include areas around substations, switchyards, and powerhouses. Vegetation is removed around facilities to maintain, at minimum, a 100 ft. radius of defensible space.

5.7.6 Asset Management

In 2023 the SFPUC completed a comprehensive audit to ensure all transmission, distribution, and substations assets are documented in Maximo. One of the major accomplishments of this initiative was updating the database with a current count of all primary and secondary distribution poles with height, class, installation date, and installed equipment, including if the poles support telecom equipment.

5.8 Workforce Training

The SFPUC has implemented complementary training programs for our workforce to support a safer work environment, ensure continuous improvement, and help reduce the risk of our facilities being the origin or contributing source for the ignition of a catastrophic wildfire.

5.8.1 Basic Fire Training

Each spring, HHW requires all staff to attend a basic fire training workshop. The training consists of basic fire training regarding minimizing potential fire dangers, practicable actions to suppress fires, the importance of reporting fires, basic fire safety, and the use of fire mitigation and suppression equipment, including hand tools, fire extinguishers, and water pumps. The training is conducted by retired CAL FIRE captains with extensive background in fire prevention and basic immediate mitigation actions. This training supports the increased fire preparedness and response capabilities of the HHW field staff and other support staff.

5.8.2 NRLM/WSTD First Responder Training

NRLM/WSTD hosts an annual first responder meeting for agencies with emergency response responsibilities in Alameda and Santa Clara counties. The purpose of this meeting is to coordinate emergency communications protocols, share information on upcoming projects, and provide an outlook for the fire season. Representatives include CAL FIRE, Alameda and Santa Clara County Sheriff's Office, California Highway Patrol, PG&E, East Bay Regional Park District, Fremont and Santa Clara counties Fire Department, and the California Department of Fish and Wildlife.

5.8.3 VM Training

VM training is conducted on an annual basis for ROW VM crew(s). The training covers all current vegetation clearance regulations per GO 95 Rule 35, PRC §§§ 4291, 4292, 4293, and NERC FAC-003.

5.9 Recloser Policy

The SFPUC utilizes automatic reclosers for system reliability. Reclosers are used to attempt to automatically restore service following a risk event that results in the recloser operating. For certain types of faults, the automatic operation of the recloser could introduce a higher degree of risk for ignition of a wildfire during elevated or extreme fire weather conditions.

The SFPUC will disable all automatic reclosers when the Adjective Fire Danger Rating (AFDR) condition changes to "High." The automatic reclose function will remain off until the AFDR condition is reporting "Low", usually following the onset of fall/winter precipitation, and the burn environment is no longer conducive to large wildfires.

When a risk event occurs during periods when reclosing is disabled, field personnel will perform an aerial or ground inspection of the line, from the recloser to the end of the line, prior to restoring service. If a fault (failure) is identified, it will be repaired or made safe before re-energizing the line.

Due to the limited number of SFPUC circuits or circuit segments within the HFTD there are no reliability or customer impacts due to the reclosers being disabled.

The SFPUC will continue with the current process for disabling reclosers until the Wildfire Analyst™ risk model is tested and validated to establish daily operating conditions. The goal is to use the Wildfire Analyst™ FPI output to inform operational decisions including when to disable and enable the automatic reclose function of reclosers.

5.10 Operational / Emergency Response Procedure

The SFPUC has three primary methods for being notified of a system event. When the SFPUC learns of a system event they will dispatch the appropriate field personnel to investigate.

1. Notification via the SFPUC Supervisory Control and Data Acquisition (SCADA) system.

    a. The Control Center personnel will dispatch the appropriate field personnel to investigate the cause of the SCADA alarm.

2. Notification by personnel when the issue is identified on a patrol.

    a. When an issue of concern that requires immediate attention is identified on a field patrol, the issue will be remediated as follows:

        i. Immediate remediation if the issue poses or could pose a threat to public safety, or

        ii. If the issue does not pose a threat to public safety, it will be reported to the Planning team and a work order will be generated through Maximo to correct the issue.

3. First responder agency.

    a. The SFPUC will dispatch field personnel anytime they are requested by a first responder agency.

When critical fire weather is forecasted or an RFW is issued by the NWS, the powerhouse control center will dispatch QEWs to patrol power lines and standby for potential de-energization. The control center stays in constant communication with SFPUC management regarding changing weather conditions to monitor for and execute a de-energization event if those triggers are met.

During wildfire events, the SFPUC assigns a Liaison Officer to coordinate with emergency response agencies and local government agencies. If the wildfire is near SFPUC assets, an Incident Command Post or Emergency Operations Center is activated, and an ICS organization is used to manage the operational periods of the event.

5.11 De-energization for Public Safety

During critical fire weather conditions, the SFPUC may, as a measure of last resort, de-energize transmission and/or distribution lines to reduce the risk that SFPUC facilities could be the origin or contributing source for the ignition of a catastrophic wildfire. This strategy has minimal impacts on SFPUC operations, and minimal impacts on the SFPUC's water delivery operations to the Bay Area, hydro generation operations, interconnected utilities, and the California Independent System Operator (CAISO) grid.

The SFPUC continues to evaluate the de-energization criteria other utilities use in decision-making processes and leverage best practices most applicable to the fire risks associated with SFPUC facilities. The SFPUC currently considers CAL FIRE and USFS fire danger ratings, NWS weather forecasts including RFWs, real-time sustained wind speeds and wind gusts, temperature, and relative humidity as inputs for deciding when to de-energize a line for public safety. Additionally, the weather forecast, and fuel information described below, relating to potential fire risk conditions are automatically provided via email notifications to HHW staff as additional inputs to inform decisions to de-energize HHW facilities:

1. Adjective Fire Danger Indices (i.e., 'Low' 'Moderate', 'High', 'Very High', and 'Extreme') at Mount Elizabeth.

2. Average wind speed and maximum wind gust gridded forecasts. Obtained from High-Resolution Rapid Refresh Model 3-km, hourly resolution, issued once per hour.

When the thresholds specified below are met, an email message is generated automatically and is sent to the HHW Moccasin Control Center mailing list and additional HHW staff. These thresholds are comprised of:

1. Wind thresholds; either of two conditions:
   a) Hourly sustained wind speeds greater than 25 mph, or
   b) Wind gusts greater than 45 mph.
2. Adjective Fire Danger Rating of any severity greater than 'Low' (i.e., 'Moderate', 'High', 'Very High', or 'Extreme').

HHW staff will evaluate the above weather information and based on operating experience and historical system performance, decide if de-energizing electrical facilities for public safety is warranted. If it is decided to de-energize transmission and/or distribution facilities, HHW staff will direct the operations personnel to de-energize determined facilities.

The HHW staff will continue monitoring the critical fire weather conditions. When fire risk conditions improve, they will direct operations personnel to begin the process to re-energize the facilities as outlined in Section 5.11.3 – Restoration of Service.

In 2023, the SFPUC did not de-energize any circuits for public safety. Historical outage dates for public safety de-energization events are listed in Table 11.

Table 11 – De-Energization Events for Public Safety

Year	Name of Circuit	Dates of Outages	Number of Customers Served by Circuit	Number of Customers Affected	Measures Taken, or Planned to Be Taken, to Reduce the Need for and Impact of Future de-energization for safety of Circuit(s)
2020	KPH to OSH 22 kV line	6/25/2020	0	0	1. Circuit feeds SFPUC loads with no customer impacts. Proactive de-energization is currently used and preferred as the primary wildfire risk mitigation measure. 2. The SFPUC is evaluating the cost and feasibility of converting this portion of the overhead circuit to underground. 3. The SFPUC is evaluating the cost and feasibility of building a remote microgrid at the load center(s) and removing the overhead facilities.
2021	KPH to OSH 22 kV line	Jan 26-31, Mar 29-30, Apr 27-28, Jul 29-30, Jul 30-31, Sep 9-11, Oct 12-13,	0	0	
2022	N/A	No Events	0	0	
2023	N/A	No Events	0	0	

PG&E is the source feed to some SFPUC distribution line segments in the Peninsula and Bay Area that provide electrical service to SFPUC-owned and operated facilities. These lines are maintained by WSTD. A PG&E initiated PSPS in the Peninsula and Bay area that are the source feed to SFPUC distribution line segments will impact SFPUC facilities

due to a PG&E-initiated PSPS. WSTD coordinates with PG&E before, during, and after a PG&E initiated PSPS event. When PG&E notifies WSTD that a PSPS will be initiated on the source feed to WSTD line segments, WSTD will request HHW line crews to de-energize the WSTD lines. Upon termination of the PSPS PG&E will notify the SFPUC who will patrol and re-energize the SFPUC line segments.

The SFPUC has provided a list of SFPUC-owned critical facilities to PG&E with the associated contact person(s). PG&E and the SFPUC have exchanged company representative contact information for communication during a potential PSPS event. Several SFPUC staff also have access to the PG&E PSPS Portal and can review pertinent information in real time. SFPUC staff can also participate in coordination calls that occur during an active PG&E PSPS.

Communications with PG&E before, during, and after a PG&E-initiated PSPS have continued to improve over time. The SFPUC is also very proactive and will often contact the PG&E representative before PG&E makes notifications regarding a potential PSPS. The SFPUC has a combination of permanent and mobile backup generators for locations identified as having the potential for being impacted by a PG&E PSPS. The SFPUC communicates with PG&E before a PSPS event and can mobilize generators to those facilities that do not have permanent standby generators.

5.11.1 Impacts on Public Safety

The SFPUC has not identified any impacts on public safety when the SFPUC de-energizes power lines during critical fire weather events.

5.11.2 Customer Notification Protocols

The SFPUC is primarily a generation and transmission provider that transmits SFPUC-generated hydropower over our transmission network and into the CAISO market. Other than the three retail customers, the SFPUC distribution system serves all SFPUC-owned and operated loads (facilities). Two customers are connected directly to the distribution system, and one is connected to the transmission system. The two customers served by

the distribution line are located within the HFTD and have backup generators. The third customer is in the non-HFTD and is served through the transmission system.

The SFPUC uses internal notification protocols when critical fire weather conditions are met or forecasted to be met. The HHW control center notifies affected entities by phone and email for both planned and unplanned outages.

5.11.3 Restoration of Service

During a PSPS or de-energization event, SFPUC leadership will continue to monitor critical fire weather conditions throughout the region. When critical fire weather conditions subside, the Division leadership will give an “all clear” to begin the process of returning the lines to service. Staff must conduct an entire line patrol, from the point of de-energization to the end of the line, to ensure the line is safe to energize. Line patrols will be conducted via helicopter, vehicle, or foot, depending on weather conditions and access to facilities. Priority for patrols and restoration will be given to the transmission system first, followed by the distribution system, or as determined by operational needs.

The SFPUC maintains a contract task order with a helicopter service and can call on them to conduct aerial patrols. Using a helicopter for patrols significantly reduces the time required to complete a patrol, provided weather conditions have improved enough for safe flight operations. Following a wildfire, we will restore service when it is safe for staff to access the damaged area(s). The SFPUC will not access burn areas until the agency having jurisdiction (i.e., CAL FIRE, USFS, local fire agency) grants permission to enter the burn area to conduct a damage assessment. Following a full damage assessment, if required, we will perform repairs, and restoration will proceed following established priority and restoration procedures.

6. STAKEHOLDER OUTREACH AND ENGAGEMENT

6.1 Fire Agency (First Responder) Collaboration

The SFPUC continues to collaborate with multiple stakeholders to assess areas where there is or could be a risk for a catastrophic wildfire. This work supports our continuous effort to improve wildfire mitigation strategies and enhance fire safety throughout the region. The SFPUC participates as a partner on the USFS Southwest Interface Team (SWIFT),[24] a partnership that includes CAL FIRE, BLM, Tuolumne County, and private landowners. SWIFT is a group comprised of a variety of government and external partners that work collaboratively to create fire-adapted communities. SWIFT meets every month and, since 1999, has planned and implemented wildfire protection activities within the 132,000-acre (~206 sq. mi.) area of southern Tuolumne County and western Mariposa County. Additionally, they cooperatively plan and implement strategic fire fuel break systems designed to reduce the threat of loss of life, property, and resources in the southern Tuolumne and western Mariposa County wildland-urban interface.

In Alameda and San Mateo counties, the SFPUC organizes an annual first responder liaison meeting in coordination with CAL FIRE to supplement ongoing communication with all first responders, including the county sheriff's office and local fire departments. The SFPUC watershed lands in these two counties are State Responsibility Areas (SRA), and SFPUC staff are in regular communication with local CAL FIRE staff throughout the calendar year.

The SFPUC continues collaboration with CAL FIRE's Tuolumne-Calaveras Unit which owns and operates a Firehawk helicopter stationed at the Columbia Airport, approximately 22 miles from the SFPUC Moccasin Powerhouse / Switchyard / Control Center (Figure 15). The primary benefit of the Firehawk helicopter is the increased water carrying capacity of up to 800 gallons. If a wildland fire ignites near SFPUC assets, the Firehawk helicopter could be deployed and arrive within minutes and conduct an initial attack to reduce fire spread potential.

[24] https://www.fs.usda.gov/detail/stanislaus/home/?cid=stelprd3810191

Figure 15 – CAL FIRE Firehawk Helicopter

The SFPUC developed a Fire Dipping Strategy procedure that is shared with CAL FIRE, Yosemite National Park, and the USFS. The purpose and scope of the procedure is to provide a reservoir dipping strategy that considers both water quality and firefighting efforts. The SFPUC owns and operates drinking water reservoirs for the City of San Francisco and the Bay Area. Fire response agencies use these reservoirs to pull water during fire suppression activities. Because of water quality risks, the SFPUC has ensured that partner agencies understand the benefits and risks and require the appropriate staff to be contacted before dipping from SFPUC reservoirs.

6.2 SFPUC and PG&E Collaboration

The SFPUC owns and operates critical water, power, and sewer facilities across multiple counties in Northern California. The SFPUC transmission system has interconnections with the California transmission grid via PG&E's electrical grid. PG&E and the SFPUC maintain ongoing dialogue regarding potential PG&E actions that could impact SFPUC facilities.

PG&E continues to support the SFPUC in the implementation of the Wildfire Analyst™ modeling tool. PG&E gave permission to the SFPUC and Technosylva to use the PG&E FPI algorithms to develop the SFPUC risk indices. Since the majority of SFPUC electrical assets are within the PG&E service territory, the benefit of PG&E sharing their FPI data is that using the same data sources will allow the SFPUC to have an FPI model consistent with the PG&E FPI[25] model which has been tested and validated.

6.3 California Municipal Utilities Association (CMUA) Collaboration

The CMUA established six working groups to support the POUs in the development of the WMPs by sharing information and utility best practices in the areas listed below. The SFPUC participated in the working sessions of each work group:

1. Metrics Working Group
2. Vegetation Management Working Group
3. Asset Management Working Group
4. Grid Design and System Hardening Working Group
5. Risk Modeling Working Group
6. Climate Change Working Group

[25] See PG&E's 2023-2025 WMP Section 8.3.6, Fire Potential Index (Rev 4, dated January 8, 2024). *Available* at 2023-2025 Wildfire Mitigation Plans (pge.com)

7. EVALUATING PERFORMANCE OF THE PLAN

7.1 Metrics and Assumptions for Measuring Plan Performance

We track the following performance and outcome metrics for the transmission and primary distribution system to measure the performance and effectiveness of our Plan in reducing the risk of SFPUC facilities being the origin or contributing source for the ignition of a catastrophic wildfire. In 2022, we adopted the outcome and performance metrics recommended by the WSAB, and in 2023 we adopted the performance and outcome metrics categories developed by CMUA in coordination with the WSAB. The current metrics data goes back to 2019. Outcome and performance metrics are included below in Tables 12 and 13.

Table 12 – Outcome and Performance Metrics

Metric	Metric Description	2019	2020	2021	2022	2023
Outcome Metrics						
1	Vegetation inspections were completed in an HFTD (Through a combination of aerial and ground inspections).	Completed 9/5/2019	Completed 7/1/2020	Completed 7/6/2021	Completed 7/22/2022	Completed 7/19/2023
2	Transmission Line Inspections – aerial	Completed 9/5/2019	Completed 7/1/2020	Completed 7/6/2021	Completed 7/22/2022	Completed 7/19/2023
3	Distribution Line Inspections – aerial	Completed 9/5/2019	Completed 7/1/2020	Completed 7/6/2021	Completed 7/22/2022	Completed 7/19/2023
Performance Metrics						
1	Reportable ignitions in the HFTD associated with SFPUC electric facilities (see Section 9.4)	0	1	1	0	0
2	Number of times a circuit or circuit segment is de-energized within the HFTD	1	1	7	0	0

Metric	Metric Description	2019	2020	2021	2022	2023
3	Wire down in HFTD	1	2	1	0	2[26]
4	Wire down outside HFTD	0	0	0	0	1[27]

7.2 Metric 1: Fire Ignitions

For purposes of this metric, a fire ignition must meet the following criteria:

1. SFPUC facility was associated with the ignition of the fire.
2. The fire was self-propagating and of material other than electrical and/or communication facilities.
3. The resulting fire traveled greater than one linear meter from the ignition point.
4. SFPUC has knowledge that the fire occurred.

7.3 Metric 2: Wires Down

The second metric is the number of SFPUC transmission or primary distribution wires down. For purposes of this metric, a wire-down event includes any instance where an electric transmission or primary distribution conductor falls to the ground or onto a foreign object. We differentiate this metric into wires down "inside" and "outside" a HFTD.

7.4 Impact of Metrics on Plan

The SFPUC continues to document and monitor metrics to measure the performance of the WMP to reduce the risk that SFPUC facilities will be the origin or contributing source

[26] Heavy snowstorms in early 2023 caused two green trees to fail in the Tier 2 HFTD and contact a 22 kV circuit. No ignitions resulted in these two incidents since there was multiple feet of snow on the ground. Both trees were inspected and found to be within compliance

[27] On April 10, 2023, a small private aircraft crashed into the 230 kV transmission line in the Central Valley. First responders provided medical care and extinguished small spot fires caused by aircraft fuel. This accident occurred in a non-HFTD.

of a catastrophic wildfire. The SFPUC will continue to evaluate system performance and identify additional metrics to measure the fire risk reduction gained year after year.

During the 2023 Plan update, the SFPUC transmission and distribution systems performed exceptionally well and experienced favorable system reliability. There were no ignition events in 2023 attributed to SPFUC distribution assets. The SFPUC will continue to monitor metrics and evaluate trends that may require a review and possible revision to construction, inspection, and/or maintenance standards. The SFPUC also monitors incidents and root cause analysis at other utilities to determine if the SFPUC is at risk for a similar type of event and put measures in place to minimize the risk of similar events occurring throughout the SFPUC overhead electrical assets.

7.5 Monitoring and Auditing the Plan

SFPUC staff continuously monitor projects and metrics outlined in this WMP to identify areas of improvement with the continuous goal of reducing the risk that SFPUC facilities will be the origin or contributing source of a catastrophic wildfire. Execution of hardening projects, proactive inspection programs, preventative maintenance programs, and data collected will inform the SFPUC staff of system improvements and areas that need additional attention.

The SFPUC is committed to operating a safe and reliable power grid while reducing the risk of SFPUC facilities being the source of ignition for a catastrophic wildfire.

7.6 Corrective Action Program

We are committed to making our Plan effective and robust. We also understand that identifying gaps and areas for improvement in our Plan is a continuous process, learned through experience and monitoring industry best practices. As our WMP continues to mature, we will make changes to our Plan to integrate new policies, strategies, changes in technology, or identify previously unidentified risks. We will continue to correct any gaps or deficiencies in a timely manner. Changes will be incorporated into our Plan and submitted to the SFPUC Commission for approval annually and subsequently submitted to the WSAB.

7.7 Monitoring the Effectiveness of the Plan

We strive for continuous improvement to reduce the risk of SFPUC facilities being the origin or contributing source of a catastrophic wildfire. We will continuously monitor and evaluate the wildfire mitigation efforts described in our Plan and pursue improvements in our ongoing goal of providing safe and reliable water and power to the region.

As our WMP has matured we have made changes to how we categorize and track wildfire mitigation work which inform our metrics. For example, after analyzing early iterations of the Plan we realized we needed to ensure all our inspection, preventative, and corrective maintenance work orders for assets were flagged as a wildfire mitigation activity to accurately track compliance and work completion, thus improving the validity of the data used to make improvements to our processes and this Plan.

8. INDEPENDENT EVALUATOR REPORT

PUC § 8387(c) requires the SFPUC to contract with a qualified IE with experience in assessing the safe operation of electrical infrastructure to review and assess the comprehensiveness of this Plan.

In 2023 the SFPUC engaged the services of an IE to review and assess the comprehensiveness of our 2023 WMP comprehensive revision. The IE was a former investor-owned utility executive with 40 years of electric operations experience, who led the team to evaluate the SFPUC WMP. The IE team determined the SFPUC 2023 WMP was comprehensive and met all the requirements of PUC § 8387.

The IE report was submitted to SFPUC's Commission in 2023, along with the request for final approval of the SFPUC WMP. The IE presented his favorable report to the SFPUC Commission at a Commission meeting. The Commission adopted both the WMP and IE Report[28].

The SFPUC's Plan is updated annually and will be evaluated by an IE every three years

[28] Resolution 23-0134, available at San Francisco Public Utilities Commission (sharefile.com)

when comprehensive updates to the Plan are made. The next IE review is scheduled for the 2026 comprehensive WMP update.

APPENDIX 1 – REVISION LOG

Date	Location	Description
May 2024	Acronym Table	Added new acronyms to the table.
	Table 1	Recalculated line miles and overhead line percentages within the HFTD.
	Section 1.3	Renamed section to WMP Adoption Process.
	Section 1.4	Updated budget numbers for Wildfire Mitigation Funding.
	Section 1.7.3	Added language regarding satellite vegetation monitoring.
	Section 3	Updated language to provide clarity on the wildfire mitigation roles and responsibilities for each SFPUC Division.
	Section 4.3	Re-wrote this section to provide clarity on risks and risk drivers associated with design, construction, operations, and maintenance.
	Section 4.6	Added new language explaining the change to the SFPUC Climate Change program.
	Section 5.1.1	Added new language to further explain the Technosylva Wildfire Analyst FPI.
	Section 5.1.6	Removed this section on fire mitigation/suppression equipment. Equipment has been purchased and inventoried.
	Section 5.2	Updated Design and Construction Standards language
	Section 5.3.1	Updated language on wood pole replacement.
	Section 5.3.2	Updated language on replacing overhead copper conductor.
	Section 5.3.4	Updated language on Avian Protection.
	Table 5	Updated numbers for 2023.
	Table 6	Updated numbers for 2023.
	Section 5.3.6	Updated language for vegetation inspections around substations, switchyards, powerhouses, and habitable structures.
	Section 5.3.10	Updated language on LiDAR data.
	Section 5.5.9	Updated language on vegetation management dashboard.
	Figure 10	Added new screenshots for 2023 vegetation management dashboard.
	Section 5.5.11	Updated language on wood and slash management.
	Figures 11 and 12	Added new graphics to show prescribed fire boundaries.
	Section 5.5.12	Added new QA/QC program descriptions.

	Table 7	Updated numbers for 2023.
	Table 8	Updated numbers for 2023.
	Section 5.7.3	Added this new section on drone inspections.
	Table 9	Updated numbers for 2023.
	Table 10	Updated numbers for 2023.
	Table 11	Updated numbers for 2023.
	Section 7.1	Updated metrics for 2023.
	Section 7.6	Updated language for the corrective action plan.
	Section 8	Added link to 2023 SFPUC WMP Commission Resolution.