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

SAN FRANCISCO PUBLIC UTILITIES COMMISSION

2025 WILDFIRE MITIGATION PLAN

San Francisco Water Power Sewer
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ACRONYMS

AFDR	Adjective Fire Danger Rating
AGM	Assistant General Manager
AI	Artificial Intelligence
ANSI	American National Standards Institute
AVMWP	Annual Vegetation Management Work Plan
BES	Bulk Electric System
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
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

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
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
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 Electrical 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.[1]
OH	Overhead
PAL	Project Activity Level
PG&E	Pacific Gas & Electric
PIO	Public Information Officer
Plan	Wildfire Mitigation Plan (WMP)
PM	Preventative Maintenance
POU	Publicly Owned Utility
PRC	Public Resources Code

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

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

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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.

The SFPUC is committed to building, maintaining, and operating a safer and more resilient electrical grid. SFPUC-owned and operated electrical 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 elevated or extreme wildfire risk within the State of California where there is a higher risk for fires, caused by power lines, igniting, and spreading rapidly.

The SFPUC adopted the Wildfire Mitigation Plan (WMP or Plan) template recommended by the Wildfire Safety Advisory Board (WSAB) for the 2023 Plan comprehensive update; this built upon the successes and learnings of previous WMP programs and initiatives, and incorporated lessons learned to date from annual WMPs prepared since filing our initial approved Plan in 2019. This 2025 Plan update primarily updates the 2024 WMP which updated the 2023 WMP.

2. SUMMARY OF 2024 WILDFIRE MITIGATION ACTIVITIES

This section provides details on our programs and initiatives conducted in the calendar year 2024 to reduce the risk of a catastrophic fire caused by SFPUC assets.

2.1 Risk Assessment

In 2024, the SFPUC completed the pilot and validated the use of Technosylva's Wildfire Analyst™[2] application. After the pilot, SFPUC formally operationalized the 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. The use of the application informs personnel of areas of risk and if any operating restrictions and/or de-energization should be implemented.

The Wildfire Analyst™ application is explained in detail in Section 6.1.1.

2.2 Situational Awareness

In 2024 SFPUC continued to evaluate and augment its situational awareness capabilities by leveraging the Wildfire Analyst™ application.

Using Wildfire Analyst™, we have access to an integrated view of weather stations and High-Definition cameras hosted by PG&E through the ALERTCalifornia website. Many of these cameras point in the direction of our assets and will help to quickly identify hazardous conditions that could negatively impact our operations. Additionally, we now

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

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 (NWS), such as Extreme Fire Danger, Extreme Wind Warnings, Red Flag Warnings (RFW), and Excessive Heat Warnings on the base map.

2.3 Vegetation Management

In 2024, the HHW Vegetation Management Right of Way (VM ROW) Department continued to refine the use of ArcGIS Field Maps to accurately track and document tree and vegetation inspections. The Field Map application allows the inspector to plot trees using geographical position system latitudes and longitudes, as well as a customized form for tree species, type of treatment (trim, removal, grow-in, etc.), and set a remediation schedule. Using the data collected in Field Maps, a dashboard is generated to track vegetation inspection progress (see Section 6.4.8 for dashboard screenshot).

Using the internal E-Logger system, HHW tracks trends in power disruptions caused by vegetation. This allows for more informed decisions regarding vegetation management based on historical outage information caused by vegetation contact. In 2023, LiveEO delivered its first satellite vegetation imagery to SFPUC. The data was field verified, and we used the data to help identify areas for two large vegetation clearing projects around the electrical assets. Both projects were completed in 2024.

More details on the LiveEO product are provided in Section 6.4.7. The ROW Department is planning on using that data to ensure compliance, identify areas of potential tree work, and inform future trim needs.

2.4 Construction, Operations, and Maintenance

In the 2024 WMP, we reported on projects to upgrade the fire suppression system in two HHW powerhouses located in the HFTD. In late 2024, an additional fire suppression system project was identified in a third powerhouse. One project was completed and commissioned in early 2025. The design of the second and third project has been completed, and a formal contract is being developed for the construction phase. Once a

vendor is selected through a competitive bidding process, construction is forecasted to begin in calendar years 2026-27.

In 2024, HHW installed Hexion ArmorBuilt™ pole wrap on 117 distribution poles in the HFTD. These poles are in areas where access is limited due to terrain and the line(s) supply power to critical facilities. Hexion ArmorBuilt™ is, "[d]esigned to extend the lifespan of wood utility poles by protecting them from the effects of wildfire and rot."[3] The current plan is to wrap eighty-two (82) additional poles in the HFTD in 2025. Pole wrapping is also discussed in Section 6.3.2

2.5 Overarching Initiatives for the 2025 WMP

The 2023-2025 SFPUC WMP programs and initiatives are built upon leveraging the successes and lessons learned from previous Plans. Our primary goal continues to be to construct, operate, and maintain a safe and resilient electrical grid and continue to minimize the risk of our assets being the origin or contributing source for a catastrophic wildfire.

Our primary initiatives for the 2025 Plan are to:

1. Maintain compliance with Public Utilities Code (PUC) § 8387 and continue to mature our wildfire mitigation initiatives.
2. Continue to develop improvements to the Wildfire Analyst™ risk modeling software.
3. Continue to track metrics to inform the SFPUC on how the WMP programs and initiatives are performing.
4. Evaluate and assign priorities to system hardening options and create implementation time frames.

2.6 Wildfire Mitigation Operating and Capital Budgets

HHW'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

[3] armorbuilt-retrofit-sheet.pdf

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 received final approval by the San Francisco Board of Supervisors and Mayor on July 30, 2024.

HHW's approved Capital Budget for FY 2024-25 and FY 2025-26 and Ten-Year Capital Plan include investments in infrastructure projects intended to reduce the risk of wildfire as summarized below:

HHW-Renewal & Replacement 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 the annual vegetation management plans. Total approved 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 HHW Project. Projects will include reconductoring, increasing safe-clearance distances, undergrounding, and adding alternative power supplies at some locations to reduce HHWs overhead electrical line footprint. The project funds inspections, condition assessments, studies, designs, renewal and replacement, and construction of new microgeneration assets. Total approved Budget: $7,342,000.

The approved operating and capital budgets are published on the SFPUC website.[4]

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

3. OVERVIEW OF THE WILDFIRE MITIGATION PLAN

This Plan discusses the activities 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 2025 Plan update continues to build upon the previous year's 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).

3.1 Objectives of the Wildfire Mitigation Plan

This Plan provides a comprehensive overview of the SFPUC programs and initiatives that seek to minimize the risk that SFPUC electrical assets will not be the origin or contributing source for a catastrophic wildfire. 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 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".

This WMP addresses the following 17 requirements 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		

The primary objective of this WMP update is to explain how we are supporting our mission to adhere to PUC § 8387(a). The SFPUC has complied with its statutory obligation by annually submitting our WMP, as required by PUC § 8387(b)(1), and now submits our 2025 WMP update to the WSAB. This Plan is subject to public review and comments before final Plan approval by the SFPUC Commission.

3.2 Statutory Cross-Reference Table

Our Plan complies with PUC 8387 statutory requirements listed in Table 1. The table also provides a reference to where the requirements are described in the Plan (Plan Section column).

Table 1 – PUC § 8387 Statutory Requirements

PUC Code 8387	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.	3.1
(b)(2)	The wildfire mitigation plan shall consider as necessary, at minimum, all of the following:	
(b)(2)(A)	An accounting of the responsibilities of persons responsible for executing the plan.	4
(b)(2)(B)	The objectives of the wildfire mitigation plan.	3
(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.	6
(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.	8.1, 8.2 and 8.3
(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.	8.4
(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	6.11 and 6.14

	protocols, including impacts on critical first responders and on health and communication infrastructure.	
(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.	6.14.2
(b)(2)(H)	Plans for vegetation management.	6.4
(b)(2)(I)	Plans for inspections of the local publicly owned electric utility's or electrical cooperative's electrical infrastructure.	6.5, 6.6, 6.7 and 6.8
(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:	5
(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.	5.3
(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.	5.2
(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.	5.4 and 5.5
(b)(2)(L)	A methodology for identifying and presenting enterprise-wide safety risk and wildfire-related risk.	5
(b)(2)(M)	A statement of how the local publicly owned electric utility or electrical cooperative will restore service after a wildfire.	6.14.3
(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.	8.5
(b)(2)(N)(ii)	Identify any deficiencies in the wildfire mitigation plan or its implementation and correct those deficiencies.	8.7

(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.	6.4.12
(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 with all applicable rules, regulations, and standards, as appropriate.	4.2
(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 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.	9

3.3 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 Community Choice Aggregation (CCA) program[5] and serves CCSF municipal load through Hetch Hetchy Power, another division of the SFPUC. Additionally, the SFPUC provides retail drinking water and wastewater services to the City of San Francisco and wholesale water to three Bay Area counties.

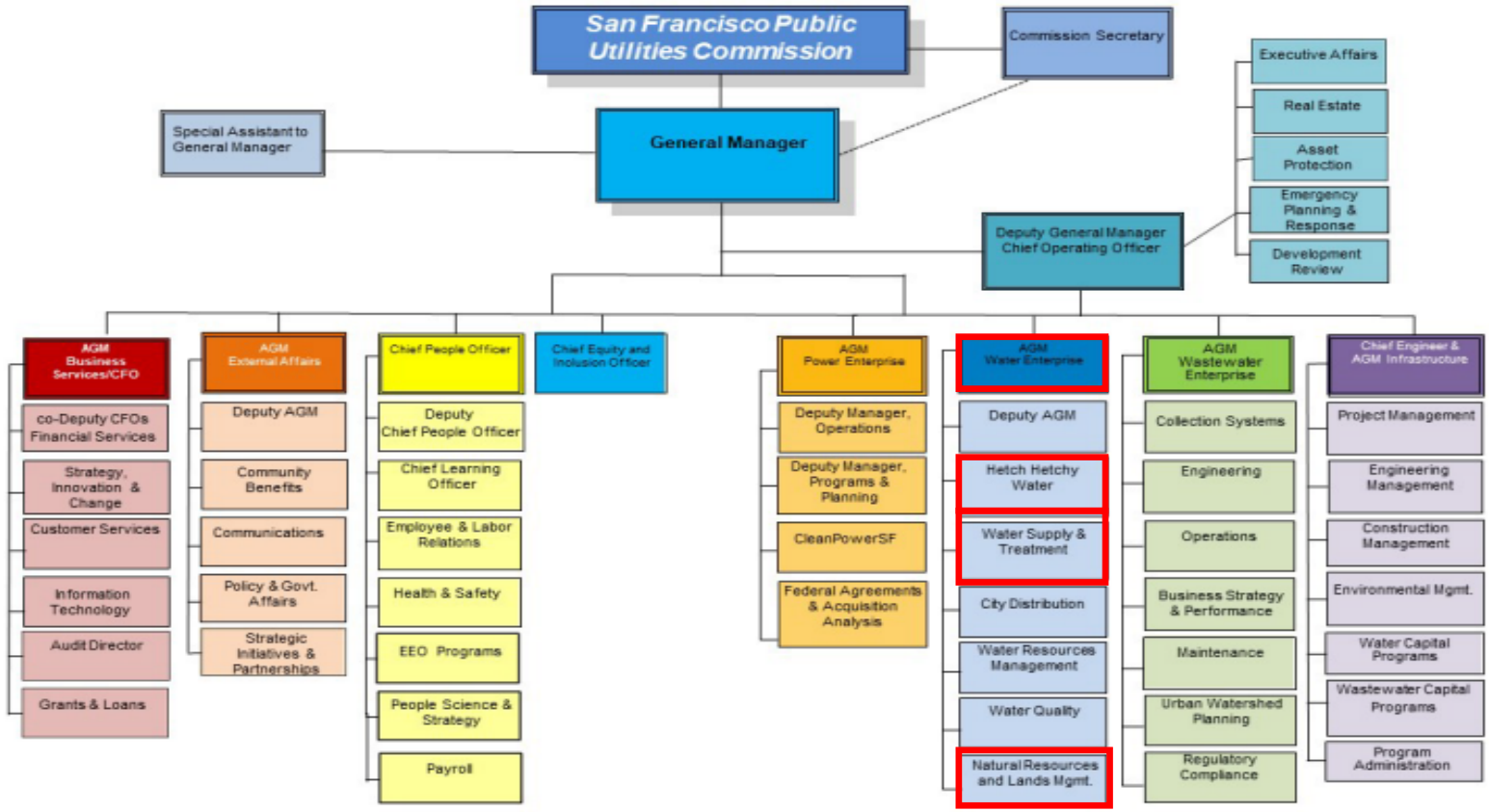
The SFPUC is comprised of six business functions, or enterprises, including the Water Enterprise. The Water Enterprise has six divisions, including Hetch Hetchy Water (HHW), Water Supply & Treatment Division (WSTD), and Natural Resources and Lands Management (NRLM) (Figure 2). HHW, WSTD, and NRLM have defined responsibilities

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

for managing and maintaining the electrical assets, and land on which they reside, which are described in this Plan. The Water Enterprise is responsible for the development, execution, and oversight of this WMP.

Figure 2 – SFPUC Organization

Organizational Chart as of June 2024



Note: AGM is Assistant General Manager, the person who leads an Enterprise or Bureau.

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, water transmission facilities, a switchyard and power distribution assets in Alameda and San Mateo counties. The SFPUC owns the watersheds above reservoirs in Alameda and San Mateo counties.

NRLM Division is responsible for managing, operating, and maintaining Bay Area lands and watersheds. NRLM does not operate and maintain electrical assets; however, they do perform vegetation management around the distribution poles and overhead lines in Alameda County and the Peninsula Watershed.

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[6] (BES). 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 2.

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.

[6] https://nercipedia.com/glossary/bulk-electric-system/

Table 2 – Context Setting Table SFPUC

Utility Name	**San Francisco Public Utilities Commission** All line lengths are defined as circuit 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[7]	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[8] (based on total area)	1% Wildland Urban Interface; 1% Wildland Urban Intermix; The percentages above refer to overhead transmission and distribution line miles.	

[7] 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.

[8] 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 circuit 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>Coast Range</td><td>Winter</td><td>30</td><td>W</td><td>60</td><td>E</td></tr>
<tr><td>Coast Range</td><td>Summer</td><td>20</td><td>W</td><td>30</td><td>W</td></tr>
<tr><td>Central Valley</td><td>Winter</td><td>10</td><td>W</td><td>20</td><td>E</td></tr>
<tr><td>Central Valley</td><td>Summer</td><td>5</td><td>W</td><td>10</td><td>W</td></tr>
<tr><td>Sierra Nevada Foothills</td><td>Winter</td><td>15</td><td>W</td><td>70</td><td>E</td></tr>
<tr><td>Sierra Nevada Foothills</td><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[9]</td><td>Overhead Dist.: 48.7 miles / 1,300 Distribution Poles
Overhead Trans.: 324.4 miles /834 Transmission Poles/Structures
Underground Dist.: 4.6 miles
Underground Trans.: 0 miles</td></tr>
<tr><td>Explanatory Note 1 - Methodology for Measuring “Miles”: Circuit Miles</td></tr>
<tr><td>Explanatory Note 2 – Description of Unique Ownership Circumstances:
The following distribution lines are where the SFPUC interconnects from PG&E lines to 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 Line</td></tr>
</table>

[9] In early 2025, we recalculated our overhead line mileage. All mileage is now listed as circuit miles.

Utility Name	San Francisco Public Utilities Commission All line lengths are defined as circuit miles
	(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] **N/A.**
SFPUC customers have ever lost service due to an IOU PSPS event?	**No**. If yes, then provide the following data for the calendar year 2024: Number of shut-off events: **1.** Customer Accounts that lost service for >10 minutes: 0. For prior response, average duration before service restored: N/A
SFPUC customers have ever been notified of a potential loss of service due to a forecasted IOU PSPS event?	**Yes.**
SFPUC has developed protocols to pre-emptively shut off electricity in response to elevated wildfire risks?	**Yes.**
SFPUC has previously preemptively shut off electricity in response to elevated wildfire risk?	Yes. Calendar year 2024: Number of shut-off events: **1.** Customer Accounts that lost service for >10 minutes: **0.** For prior response, average duration before service restored: **8 hours.**

3.4 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.

3.5 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 the industry's 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 wildfire.

3.6 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 resilience 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.

4. ROLES AND RESPONSIBILITIES

4.1 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 Table 3, the operating departments accountable for carrying out the various activities described in the Plan.

The HHW Fire Mitigation Specialist 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 bi-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 Fire Mitigation Specialist is also the primary SFPUC liaison with the California Municipal Utilities Association (CMUA) and attends the monthly CMUA-hosted Wildfire Preparedness, Response, and Recovery Working Group calls.

- 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.

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	Fire Mitigation Specialist	Fire Mitigation Specialist
Plan Review	HHW Division Manager;	NRLM Division Manager, WSTD Division Manager,
Plan Review	CCSF City Attorney's Office; and SFPUC Assistant General Manager of Water	CCSF City Attorney's Office; and SFPUC Assistant General Manager of Water
Plan Approval	SFPUC	SFPUC

SFPUC 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 wildfire.
- Ensure that evidence is appropriately preserved when a utility asset is suspected to be the cause or contributing source for the ignition of wildfire.
- Maintain adequate wildfire mitigation training programs for all relevant employees and, if applicable, SFPUC contractors.

4.2 WMP Adoption Process

This Plan 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 a week before the Commission meeting date[10]. 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 independent evaluator (IE) report(s)[11].

[10] See https://sfpuc.org/about-us/boards-commissions-committees/sfpuc-commission
[11] https://www.sfpuc.gov/about-us/policies-plans/wildfire-mitigation-plan

5. 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."

5.1 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, North American Electric Reliability Corporation (NERC) Operating Standards, National Electric Safety Code (NESC), and best practices utilized by other utilities with more mature wildfire mitigation programs.

In 2024, the SFPUC operationalized the use of Technosylva's Wildfire Analyst™ application to support our operations and planning groups as described in Section 6.1.1. The Wildfire Analyst™ application will be the foundational tool for forecasting and identifying fire weather risks, forecasting potential consequences of the fire, support de-energization decision-making, and support prioritizing risk reduction measures.

5.2 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,
- Vegetation type and density.

5.3 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. In 2024, HHW Moccasin Control Center staff assumed responsibility for monitoring de-energization thresholds and communicating fire weather risk events to WSTD staff for lines operated and maintained by WSTD.

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, a transformer replacement program, and brush clearing to comply with Public Resources Code (PRC) § 4292. These programs and other initiatives are further described in Section 6.

5.4 High Fire Threat District

The SFPUC participated in the development of the CPUC's Fire-Threat Map[12] 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

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

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 SFPUC assets are located within the proper fire-threat areas (Figure 4).

Figure 3 – CPUC High Fire-Threat District Map

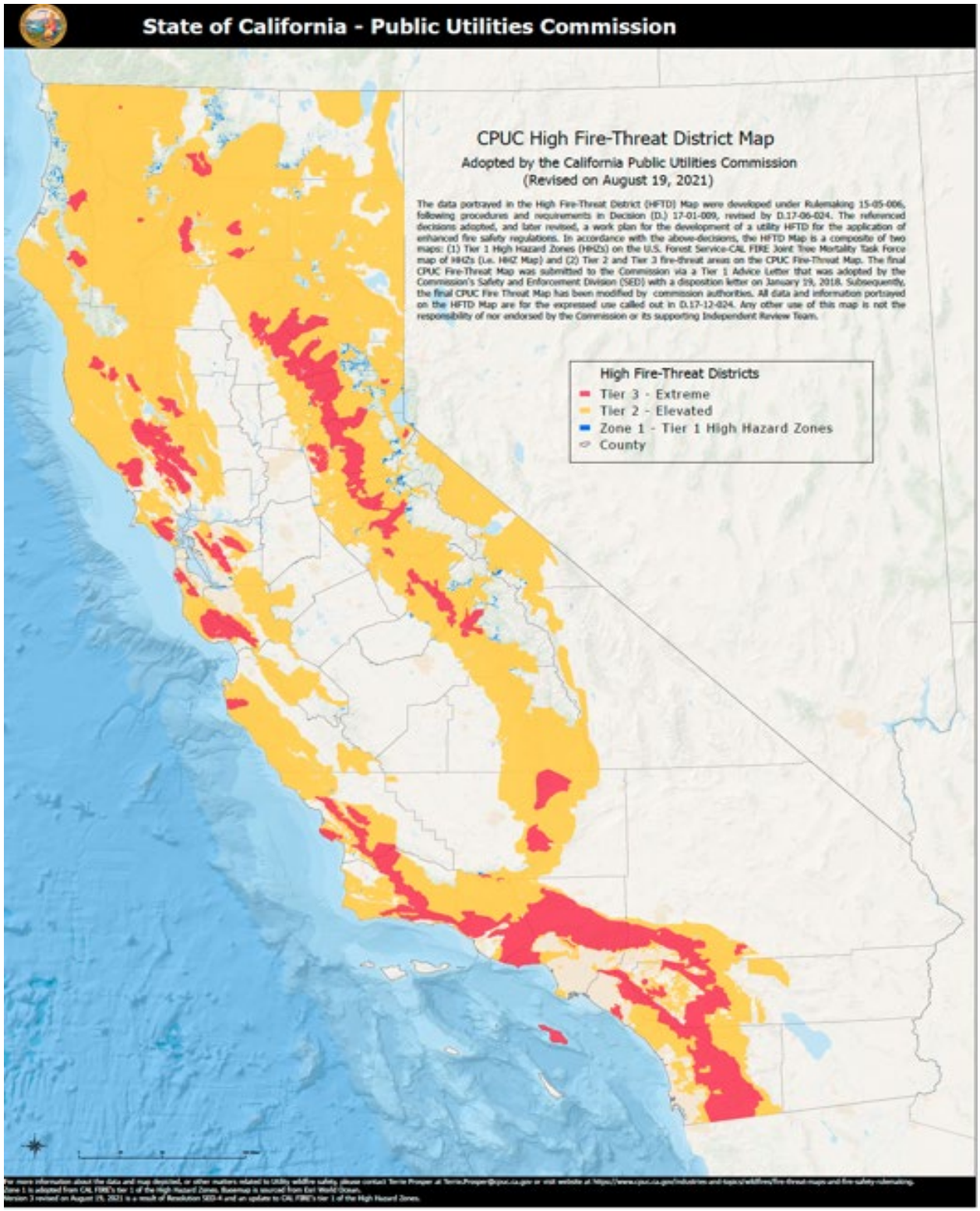
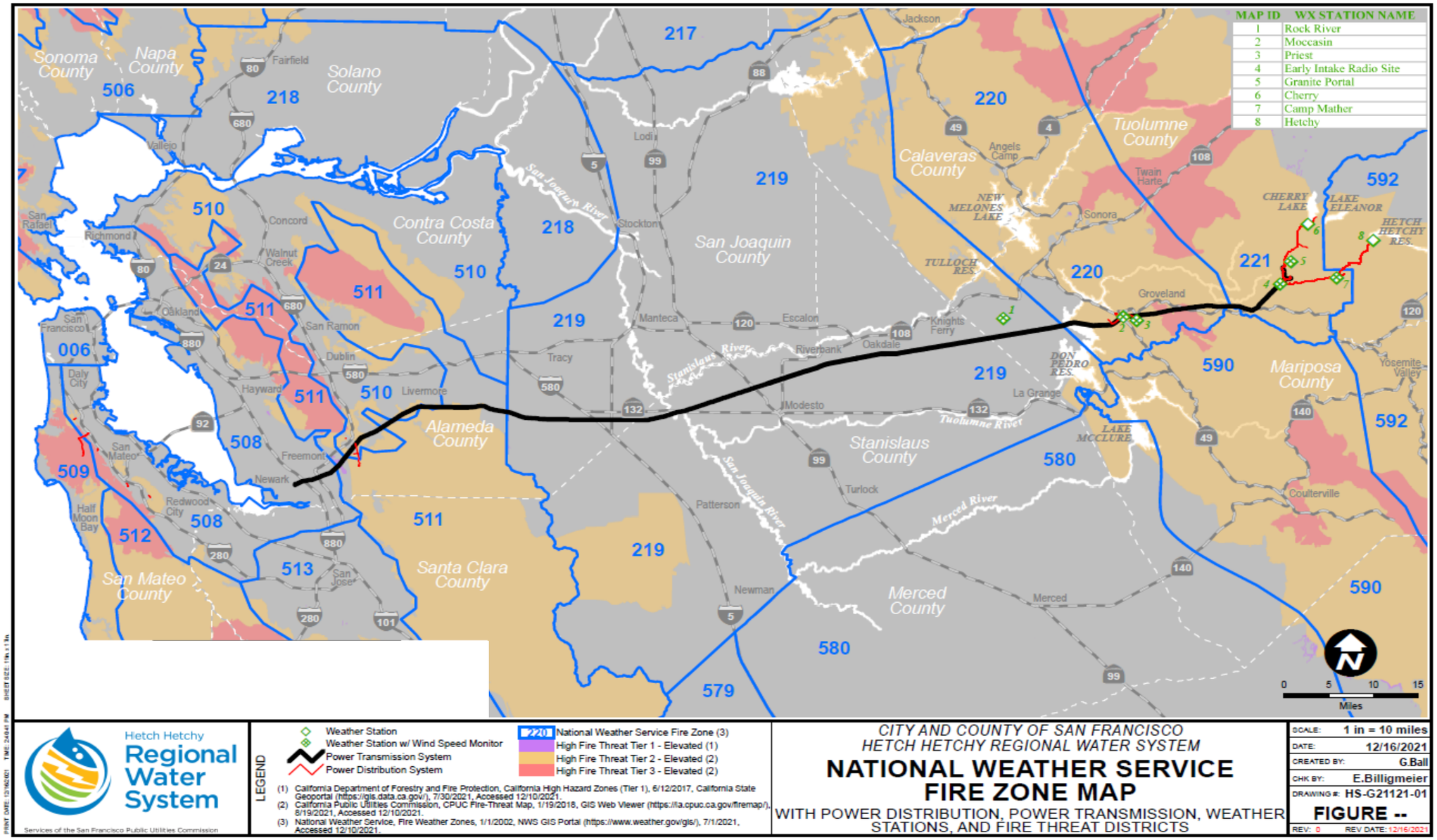


Figure 4 – SFPUC Electrical Assets and HFTDs



5.5 Changes to CPUC Fire Threat Map

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 2025 Plan update the SFPUC agrees with the existing CPUC HFTD boundaries and makes no recommendation for expanding or minimizing the current HFTD.

5.6 Climate Change / Weather Risks

The National Oceanic and Atmospheric Administration[13] (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.”

Climate change has significantly increased the frequency, intensity, and duration of wildfires in California. Rising temperatures, prolonged droughts, and shifting precipitation patterns have created drier conditions, causing vegetation to become more flammable. In the higher elevations reduced snowpack and earlier snowmelt also extend fire seasons well into winter months. Unpredictable winds, such as the Diablo winds, can cause rapid fire to spread. As climate change continues to progress, wildfire risks in California are expected to rise.

[13] https://climateresilience.ca.gov/overview/impacts.html/

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.

The SFPUC will continue collaborating with CMUA and other participating POUs in CMUA's Climate Change working group to evaluate future risks.

5.7 Extended Drought

Extended droughts are a reality for any utility operating in California. They will continue to play a decision-making role in the SFPUC's wildfire mitigation programs and activities. One of the SFPUC's missions is to deliver high quality drinking water to the residents of San Francisco. We monitor precipitation and snow forecasts closely to ensure we can meet customer deliveries. Since drought conditions are a part of California weather cycles, the SFPUC takes into consideration that when severe and extended drought conditions are present, the risk of large catastrophic wildfires also increase.

6. WILDFIRE PREVENTATIVE STRATEGIES

6.1 Situational Awareness

We continue to make significant advancements to enhance our ability to monitor forecast and real-time weather conditions to make daily operational decisions. This section describes our current situational awareness methods.

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

The Wildfire Analyst™ performs a wildfire 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 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. In October 2024, Technosylva made available an automated daily notification function within the Wildfire Analyst™ application. This function allows the SFPUC to set up distribution lists for daily FPI summary reports. The reports are generated each day before 6:00 am PST and distributed to users on the distribution list for operational planning.

To facilitate the SFPUC implementation of the Wildfire Analyst™ risk model, PG&E permitted the SFPUC and Technosylva to use PG&E FPI algorithms to develop the SFPUC risk indexes, as most of the SFPUC electrical assets are within the PG&E service territory. The benefit of PG&E sharing its 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.

6.1.2 Weather Monitoring

The SFPUC uses Technosylva and publicly available weather forecasts to support real-time operating decisions. In conjunction with the Wildfire Analyst™, 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 sends it 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 should be implemented or if lines should be de-energized for public safety.

In 2024, NRLM began using the Technosylva Wildfire Analyst™ to monitor weather for the Bay Area and Peninsula regions. This information is used to determine any operational restrictions for NRLM field staff. Weather conditions are distributed to staff through the Millbrae dispatch center via i-INFO[14].

In addition to the Wildfire Analyst™, HHW and NRLM staff monitor fuel (vegetation) conditions by accessing publicly available information provided by the NWS, United States Forest Service (USFS) daily Project Activity Level[15] (PAL) rating, Bureau of Land Management (BLM), NOAA, and CAL FIRE. SFPUC staff monitor the NWS for Red Flag Warnings.

6.1.3 Weather Stations

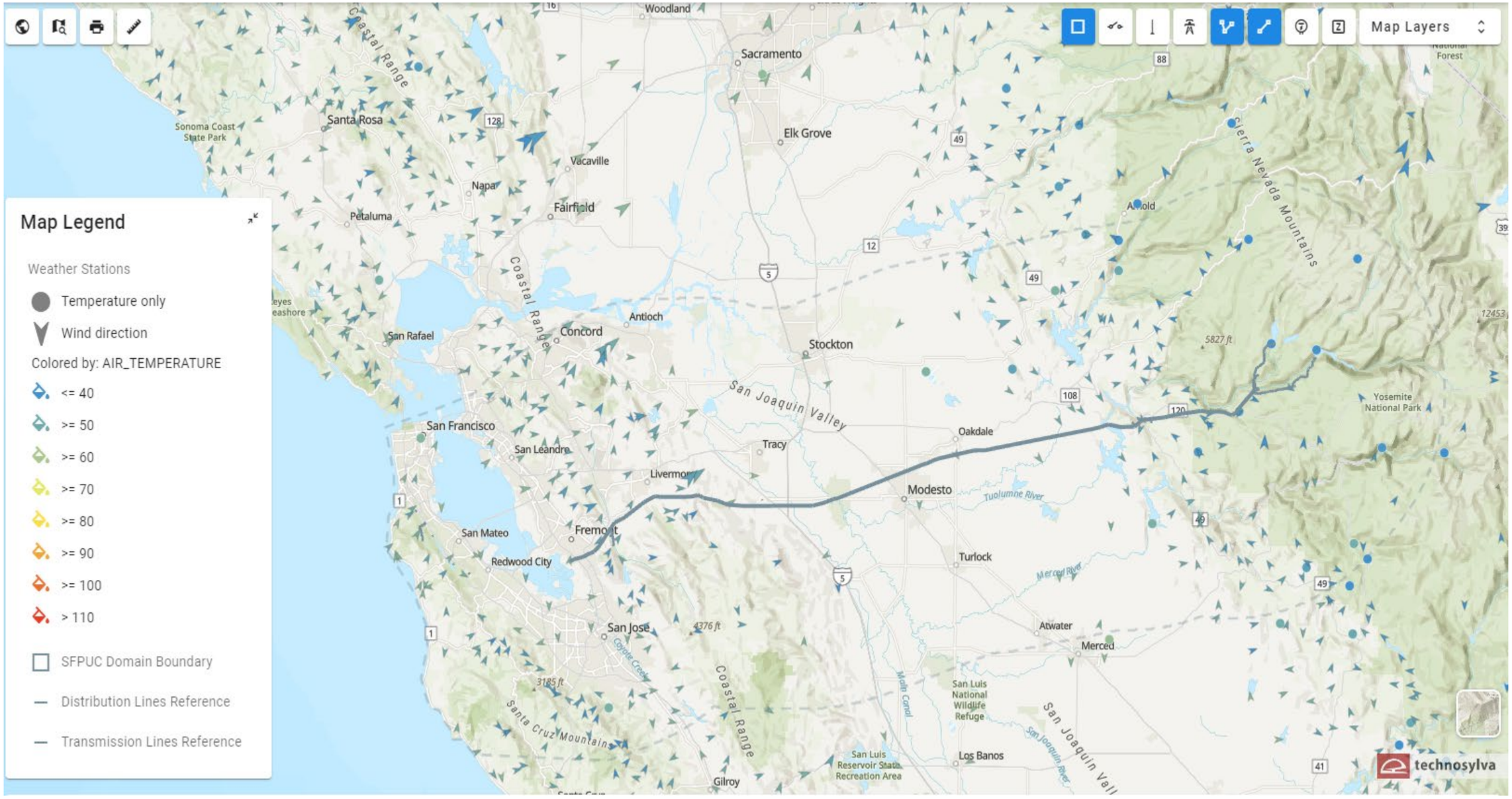
In addition to SFPUC-owned weather stations, the Wildfire Analyst™ application provides us access to over 300 PG&E or privately owned weather stations providing, at minimum, temperature, relative humidity, and wind speed readings. These weather stations are situated near SFPUC assets and up to a 25-mile buffer zone from those assets. Figure 5

[14] https://dashboard.i-info.com/

[15] 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).

shows a graphic of the weather station data now available to the SFPUC through the Wildfire Analyst™ application.

Figure 5 – Weather Stations



6.1.4 ALERTCalifornia Cameras[16]

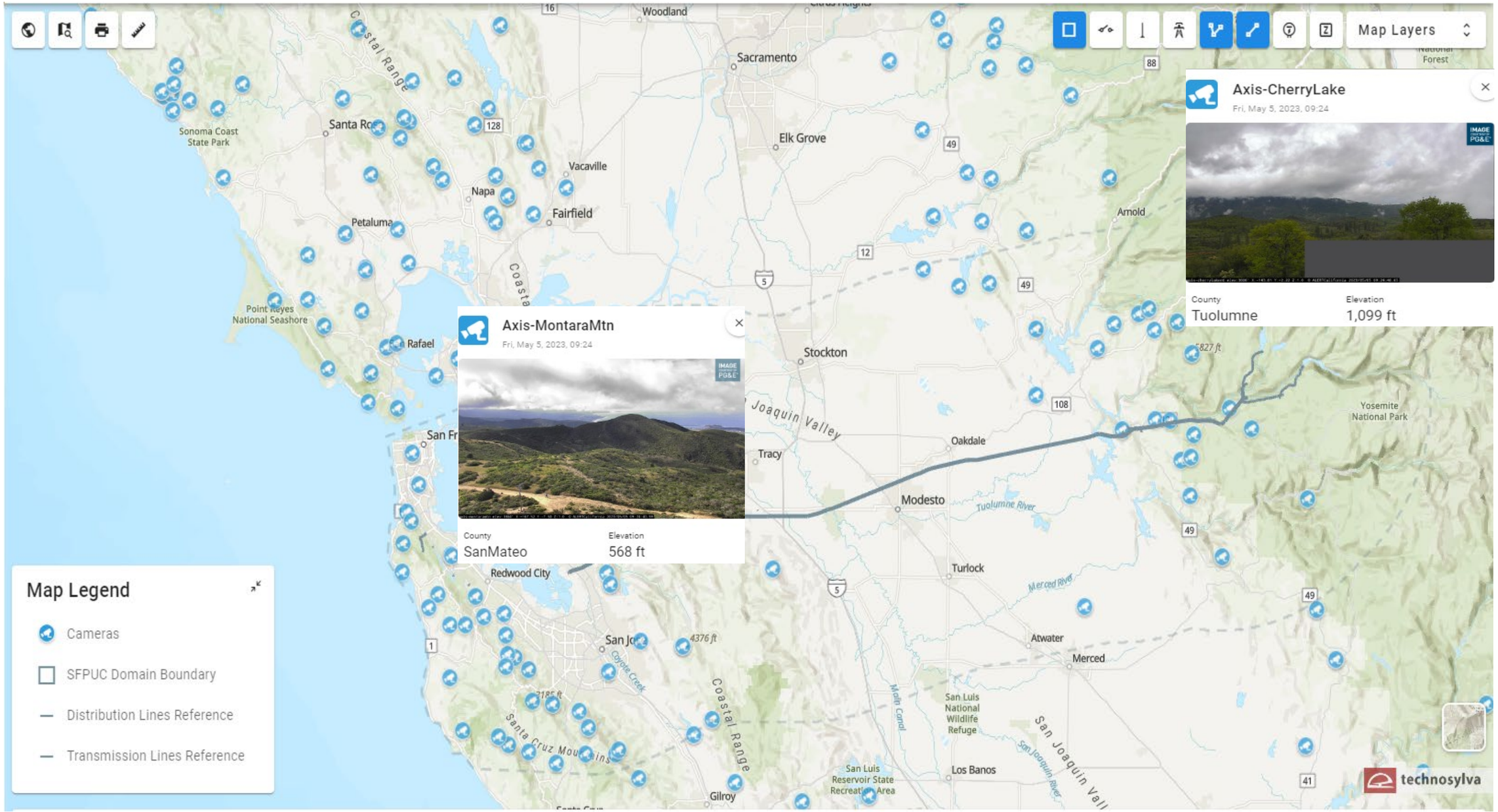
The Wildfire Analyst™ application has integrated the live feeds for the wildfire cameras, and we have access to over 100 cameras providing viewsheds of areas in proximity to SFPUC electrical assets. Figure 6 displays the cameras and live feeds available to the SFPUC in the Wildfire Analyst™ application.

In previous WMPs, the SFPUC reported on an ongoing project to install three additional ALERTCalifornia cameras at Poopenaut Peak near the O'Shaughnessy Dam site in Yosemite National Park, Burnout Ridge near Cherry Lake, and Intake Ridge near Kirkwood Powerhouse. 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 ALERTCalifornia cameras are an important situational awareness tool for HHW. To streamline the licensing and leasing process for these three cameras, HHW has decided to install and operate them internally, rather than going through a third-party vendor. We are currently in discussions with University of California San Diego (UCSD) regarding the technical and mechanical specifications HHW is required to have to design and integrate the cameras into the ALERTCalifornia platform.

Two of the three cameras are expected to be operational by the calendar year 2026. The SFPUC will continue to report our progress in future updates until the cameras become operational.

[16] ALERTCalifornia

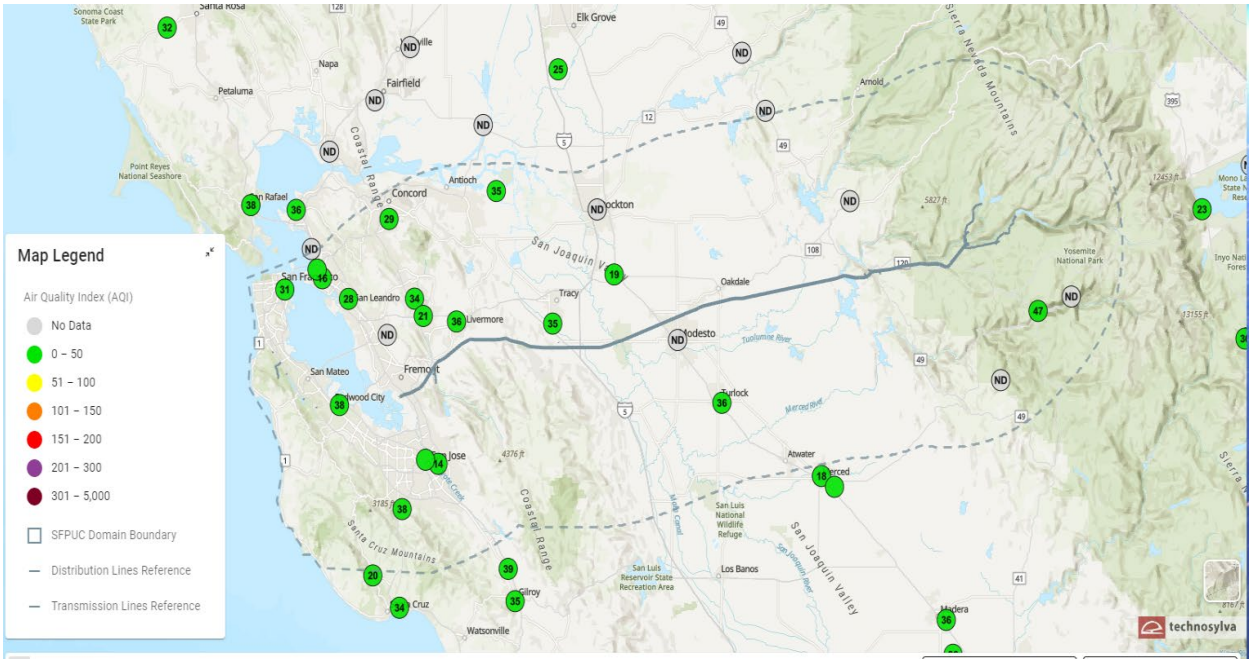
Figure 6 – ALERTCalifornia Cameras



6.1.5 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, to view 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



6.2 Design and Construction Standards

The SFPUC meets the requirements of CPUC GOs 95[17], 165[18], 174[19], NERC Transmission Vegetation Management Program FAC-003, and applicable NESC guidelines to construct, maintain, and operate a safe, reliable, and resilient grid. The

[17] GO 95 – Overhead Electric Line Construction
[18] GO 165 – Inspection Cycles for Electric Distribution Facilities
[19] GO 174 – Rules for Electric Utility Substations

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”. The new language in the standard 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 standards require that any new construction in HFTDs 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. The lines we have identified that provide power to critical infrastructure were overlaid with the HFTD boundaries and Wildfire Analyst™ zones to determine the potential wildfire hazard severity. This also informed us where system hardening measures would be of most benefit during replacement.

6.3 System Hardening

In 2024, the SFPUC continued assessments and studies for the following system hardening options:

6.3.1 Replace Wood Poles

The SFPUC has updated its Overhead Distribution Construction Standards to state that when replacing poles in the HFTD, consideration should be given to replacement with composite poles and composite cross-arms.

6.3.2 Pole Wrap

In 2024, HHW installed Hexion ArmorBuilt™ pole wrap on 117 distribution poles in the HFTD. These poles are in areas where access is limited due to terrain. Hexion

ArmorBuilt™ is "[d]esigned to extend the lifespan of wood utility poles by protecting them from the effects of wildfire and rot."[20] The current plan is to wrap eighty-two (82) additional poles in the HFTD in 2025.

6.3.3 Replace Overhead Copper Conductor

Overhead circuits in the HFTD with copper conductors were inspected with no issues found requiring immediate remediation. Copper conductors will be replaced as the equipment otherwise requires replacement or upgrades.

6.3.4 Replacement of Non-Exempt Equipment

Approximately 15% of SFPUC distribution poles, including those located in non-HFTD areas, support non-exempt equipment as defined in CAL FIRE's California Power Line Fire Prevention Field Guide[21].

Over the past three years, HHW has been working on replacing non-exempt equipment with exempt equipment on distribution poles. HHW has identified 81 initial poles that we will focus on replacing non-exempt equipment with exempt equipment. The first project in Tier 2 HFTD is scheduled to start in May 2025.

A project to address an additional 39 poles is expected to start in September 2025. Long lead times for procuring equipment has made timing of construction a challenge. The work for these projects will be performed by both HHW line crews and contractors. All work will have a high degree of oversight for safety and quality control.

6.3.5 Avian Protection

In 2023, our Overhead Distribution Construction Standards were 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.

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[20] armorbuilt-retrofit-sheet.pdf
[21] CAL FIRE's California Power Line Fire Prevention Field Guide

6.3.6 Overhead to Underground Conversion

A current HHW project to extend an underground water pipe to deliver water to a backpacker's camp in Yosemite National Park was reassessed in November 2024 to also include undergrounding approximately 1,200 feet of overhead 22 kV distribution line. The geotechnical evaluation for the project will begin in spring of 2025 with construction anticipated to begin in March or April of 2026.

6.3.7 Alternate Generation Source

During the 2020-2022 Plan updates the SFPUC initiated a study to evaluate the feasibility of placing remote generator units at various locations to provide power for some remote sites. The overall goal is to support the future removal of overhead lines or to minimize the impacts of de-energization. Based on the results of the feasibility study, SFPUC has selected a candidate micro-hydro project to be included in the next 10-Year Capital Budget. The budget is scheduled to be reviewed by the SFPUC Commission in February 2026, and adopted by the Board of Supervisors in June 2026. SFPUC will provide updates to the project in the 2025-2028 WMP updates.

6.4 Vegetation Management

The SFPUC considers vegetation management the keystone of its wildfire mitigations. Previous wire down events were primarily from downed trees and branches. Trimming and removal of trees and vegetation has reduced these events and has been cost-effective. 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 (TVMP Revision 6). SFPUC exceeds vegetation management industry standards by removing trees and brush from outside of our ROW to reduce the possibility of these becoming a fire risk, setting vegetation trimming thresholds to account for 3 or more years of growth, versus a reactive trimming that just keeps the vegetation out of the regulated non-compliance zone, which is based on voltage. By utilizing the IVM principals, non-compatible vegetation is selectively thinned

or applied with herbicide, which benefits the growth of lower risk tree and brush species. Transmission-level facilities comply with NERC FAC-003, where applicable. For both transmission and distribution level facilities, the SFPUC meets or exceeds the following standards:

- California PRC[22] §§§ 4291, 4292, and 4293
- CPUC General Order (GO) 95 Rule 35[23]
- CPUC GO 95 Appendix E Guidelines to the Rule 35[24]
- CPUC GO 174[25]
- CAL FIRE's Power Line Fire Prevention Field Guide – 2021
- American National Standards Institute (ANSI) A300

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).

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22 https://leginfo.legislature.ca.gov/faces/codes_displayText.xhtml?lawCode=PRC&division=4.&title=&part=2.&chapter=3.&article

23 https://ia.cpuc.ca.gov/gos/go95/go_95_rule_35.html

24 https://ia.cpuc.ca.gov/gos/GO95/go_95_appendix_e-guidlines.html

25 https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M031/K879/31879476.PDF

Figure 8 – Example Distribution ROW

The HHW Right-of-Way (ROW) VM labor crew is made up of one laborer supervisor, one operating engineer, two certified arborist, and five laborers. 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.

Additionally, HHW hires 12 to 15 seasonal employees 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). NRLM maintains the vegetation around the WSTD facilities and distribution poles and lines in San Mateo and Alameda County.

6.4.1 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 AVMWP 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.

6.4.2 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, 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 4 provides the annual number of corrective maintenance work orders issued and the number completed. The most common corrective maintenance identified in 2024 was the trimming or removal of hazard trees and orchard trees near transmission lines and towers in the Central Valley, which is a non-HFTD. The HHW ROW intersects through many miles of farm and orchard land in the Central Valley. HHW inspectors and the ROW Permit Liaison consistently work with the farmers to educate them on maintaining proper planting distance from our transmission ROW. A challenge we face is keeping an updated contact database for all the property owners. Ownership can change and often those who plant the orchards may not necessarily be the owner(s). We strive to contact each landowner before any trees need to be trimmed or removed.

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
2024	17	17

6.4.3 Vegetation Inspections / Distribution Lines

All vegetation patrols in proximity to distribution lines within the HFTD meet the requirements of CPUC GO 95. The HHW distribution lines are annually patrolled and inspected by ground and air for vegetation clearances. The HHW arborist performs ground inspections. The aerial inspections include the line crew (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 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 corrective maintenance work order prescriptions to the NRLM tree crews for mitigation.

The power Distribution Vegetation Management Plan (DVMP) establishes 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, 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 5 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
2024	10	10

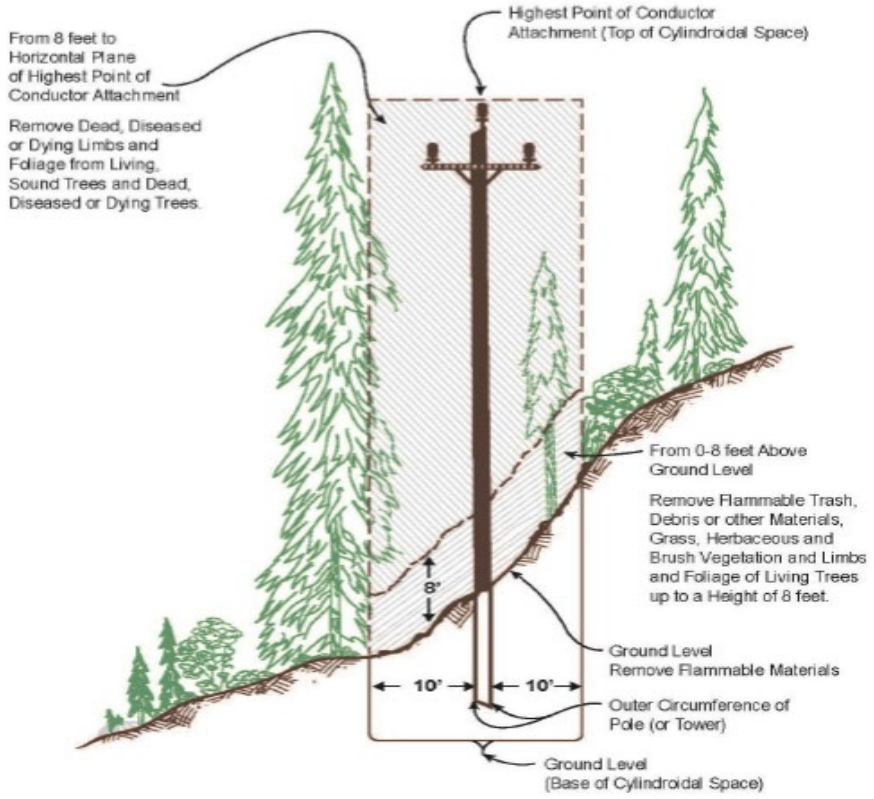
6.4.4 Vegetation Inspections / Substations, Switchyards, Powerhouses, and Habitable Structures

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.

6.4.5 Firebreak 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). 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 Firebreak Clearance Requirements



6.4.6 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)[26].

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

6.4.7 Satellite Vegetation Monitoring

Following the pilot satellite imagery project in 2023, SFPUC determined that the LiveEO[27] data was satisfactory and delivered expediently over LiDAR, allowing faster assessment and remediation of trees and vegetation. In 2024, HHW renewed their contract with LiveEO for an additional 3-years. LiveEO is 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 AI is applied to satellite data, which identifies and locates hazard trees within the SFPUC's overhead electrical line footprint.

In the fall of 2024, HHW received our second delivery of vegetation data from LiveEO. Staff from the HHW ROW Department met with LiveEO to review the data and suggest product enhancements that will help to interpret the data and make more informed decisions. HHW will use this data to track trends on growth and future vegetation work needs. It will also provide auditing data by examining the change from the first delivery to the second. HHW also shares satellite imagery information with the NRLM vegetation management team and consults with them on any areas where vegetation may be a concern. SFPUC will receive the next set of data in the Summer of 2025.

6.4.8 Vegetation Management Dashboard

SFPUC tracks vegetation inspections using ArcGIS Field Map across the transmission and 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.

The modules display overall inspection progress by miles for both transmission and distribution and further separate inspection tracking by distribution and transmission,

[27] LiveEO Website

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 trees are the most common trees requiring trimming or removal, with topping being the most common remediation.

Figure 10.1 – Vegetation Management Dashboards

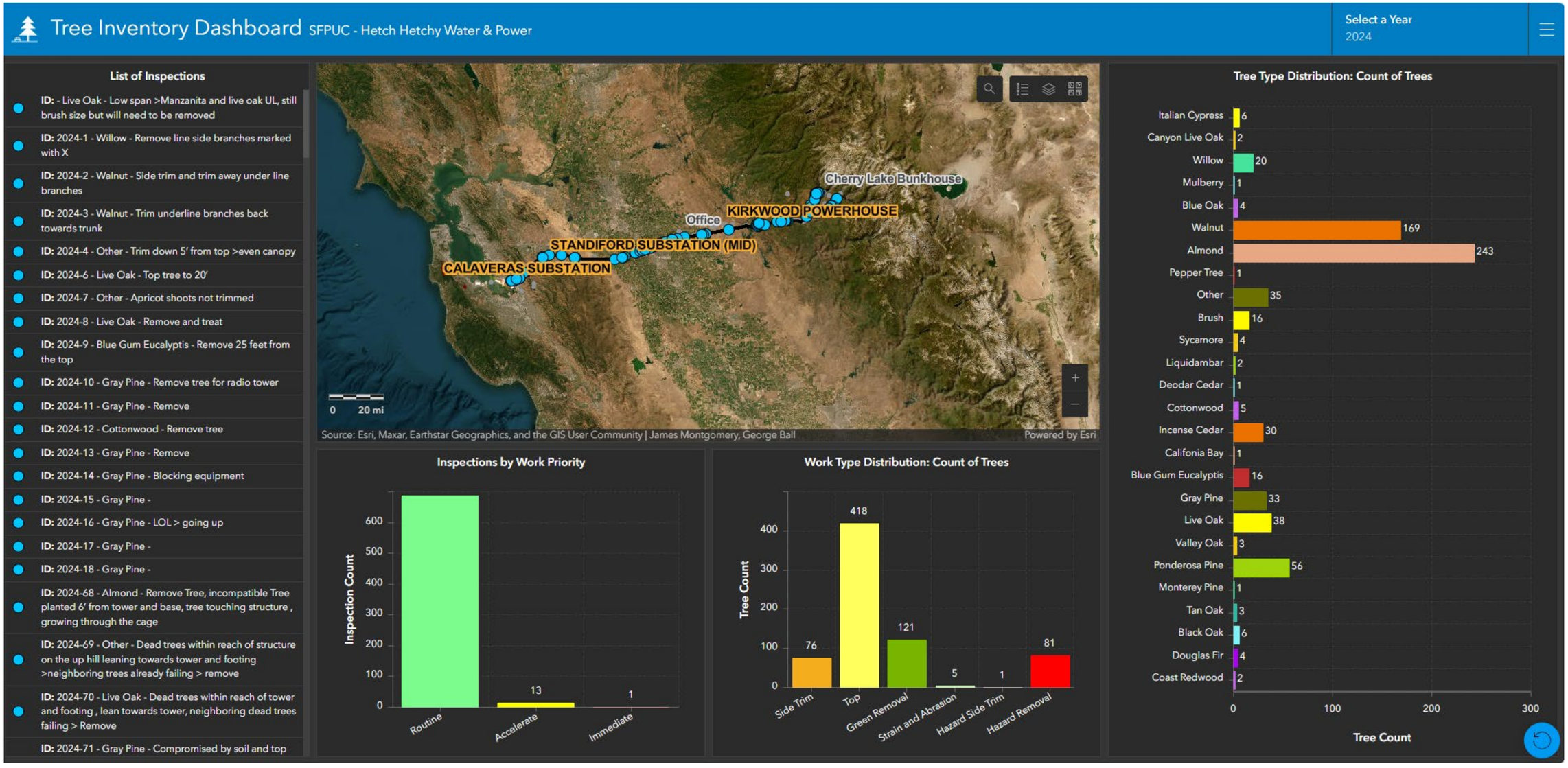
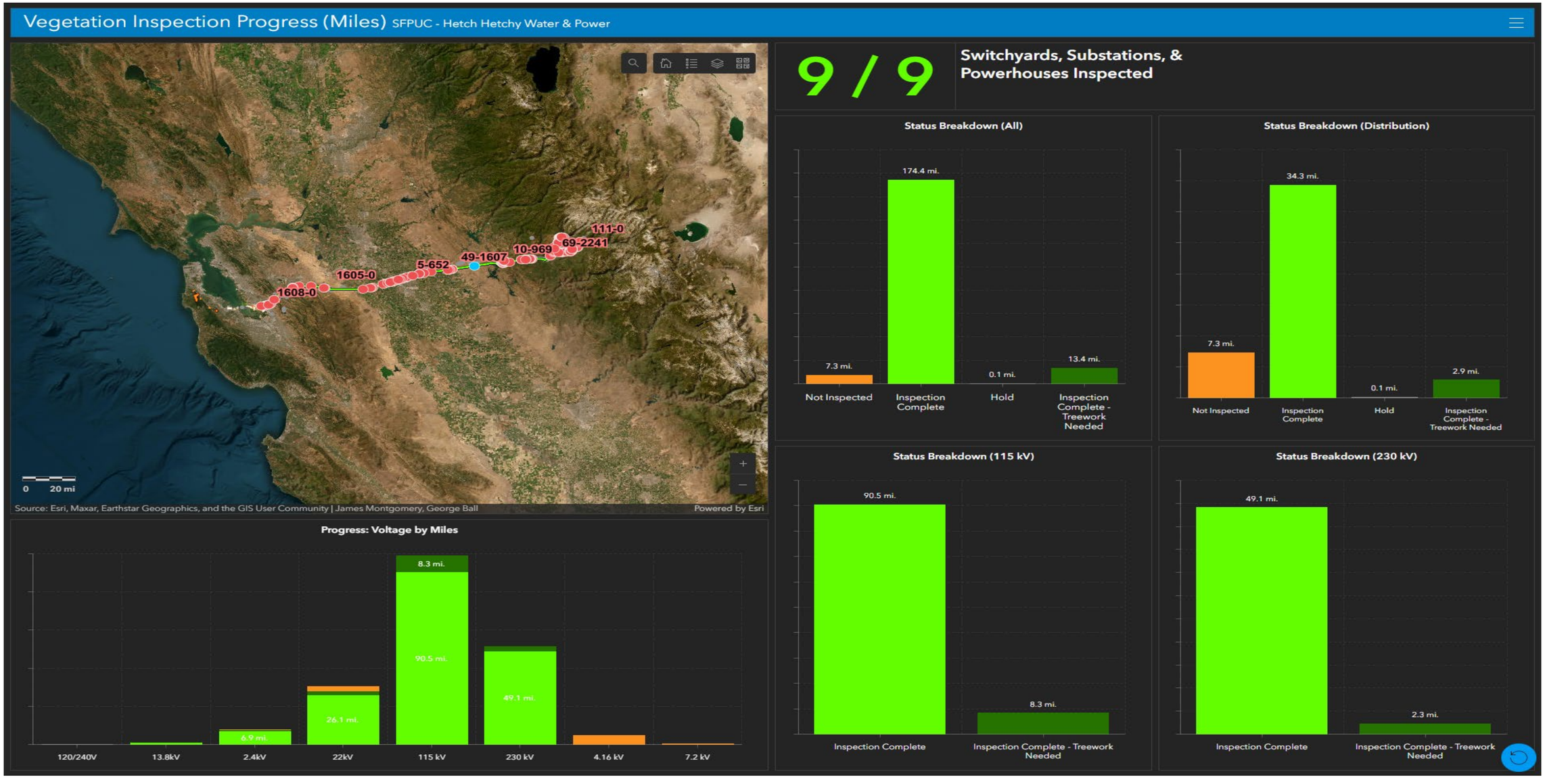


Figure 10.2 – Vegetation Management Dashboards



6.4.9 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.

6.4.10 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.

6.4.11 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[28] and are Licensed Timber Operators (LTOs)[29] with an "A" license or have an LTO available as a subcontractor.

To date, SFPUC has awarded seventeen projects under the master as-needed contracts for a total cost of $5,328,076. These projects range from removing brushes near watersheds and replanting desirable vegetation to the removal of hazard trees along the transmission and distribution ROW. All seventeen projects were completed to satisfactory standards. Most of the removed trees and vegetation are chipped and distributed across the project landscape. Herbicide is used where appropriate based on NRLM environmental review to ensure the herbicides conform with the SFPUC list of approved herbicides and pesticides. Additional projects are being planned for 2025 and will commence after nesting bird season has concluded.

[28] https://www.contractorsischool.com/learning-resources/c49-tree-and-palm-contractors-license-2024
[29] https://www.fire.ca.gov/what-we-do/natural-resource-management/forest-practice/licensed-timber-operators

In 2024, CAL FIRE, in partnership with NLRM, conducted over 61 acres of prescribed burns in 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 the Tier 2 HFTD. For a third year, CAL FIRE implemented prescribed burns as part of a 700-acre fuels reduction project, which is planned to take place through 2030. Figure 12 shows the completed controlled burn area in 2024, and Figure 12 shows the previous year's burn areas.

Figure 11 – 2024 NRLM/CAL FIRE Prescribed Burn Area

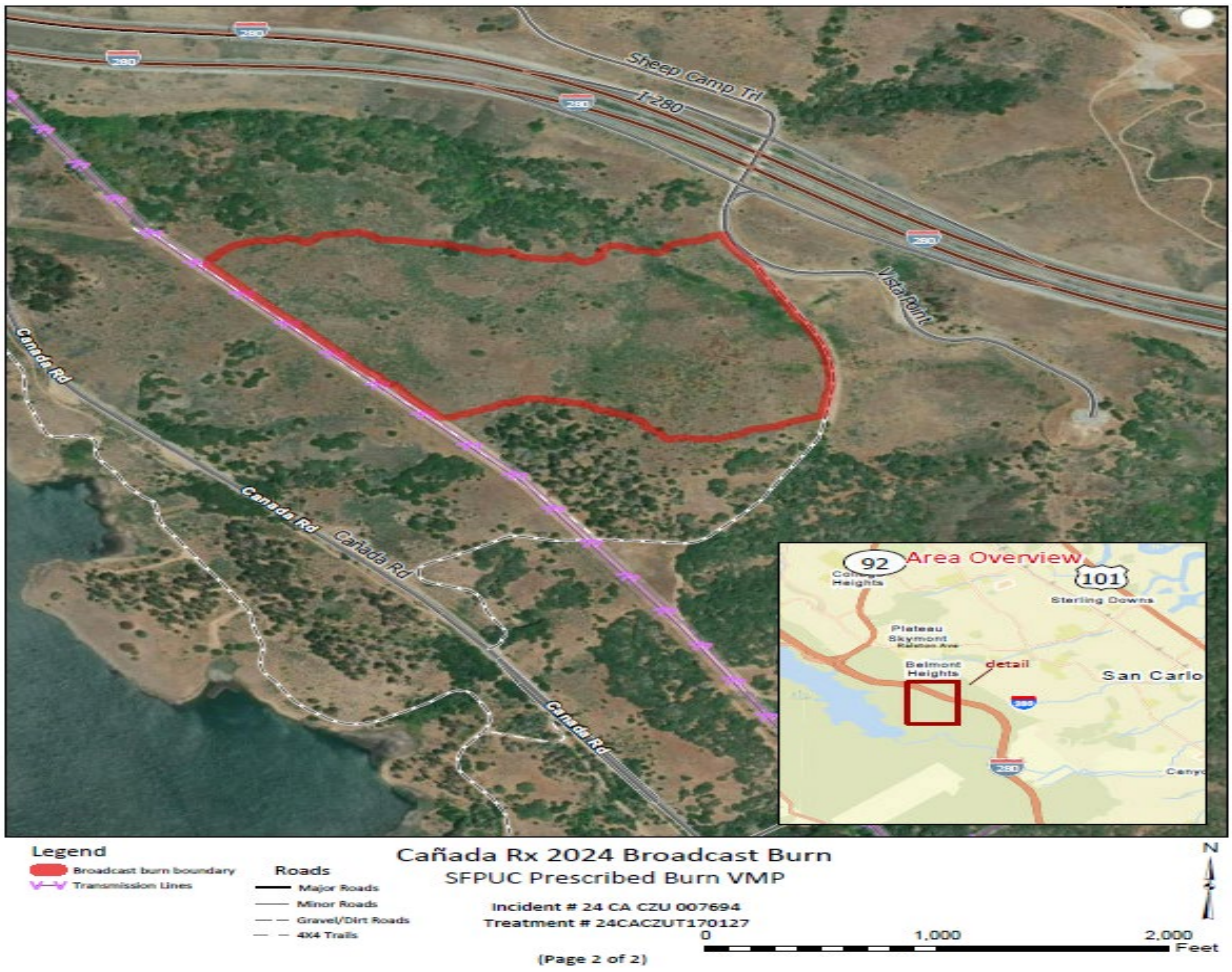
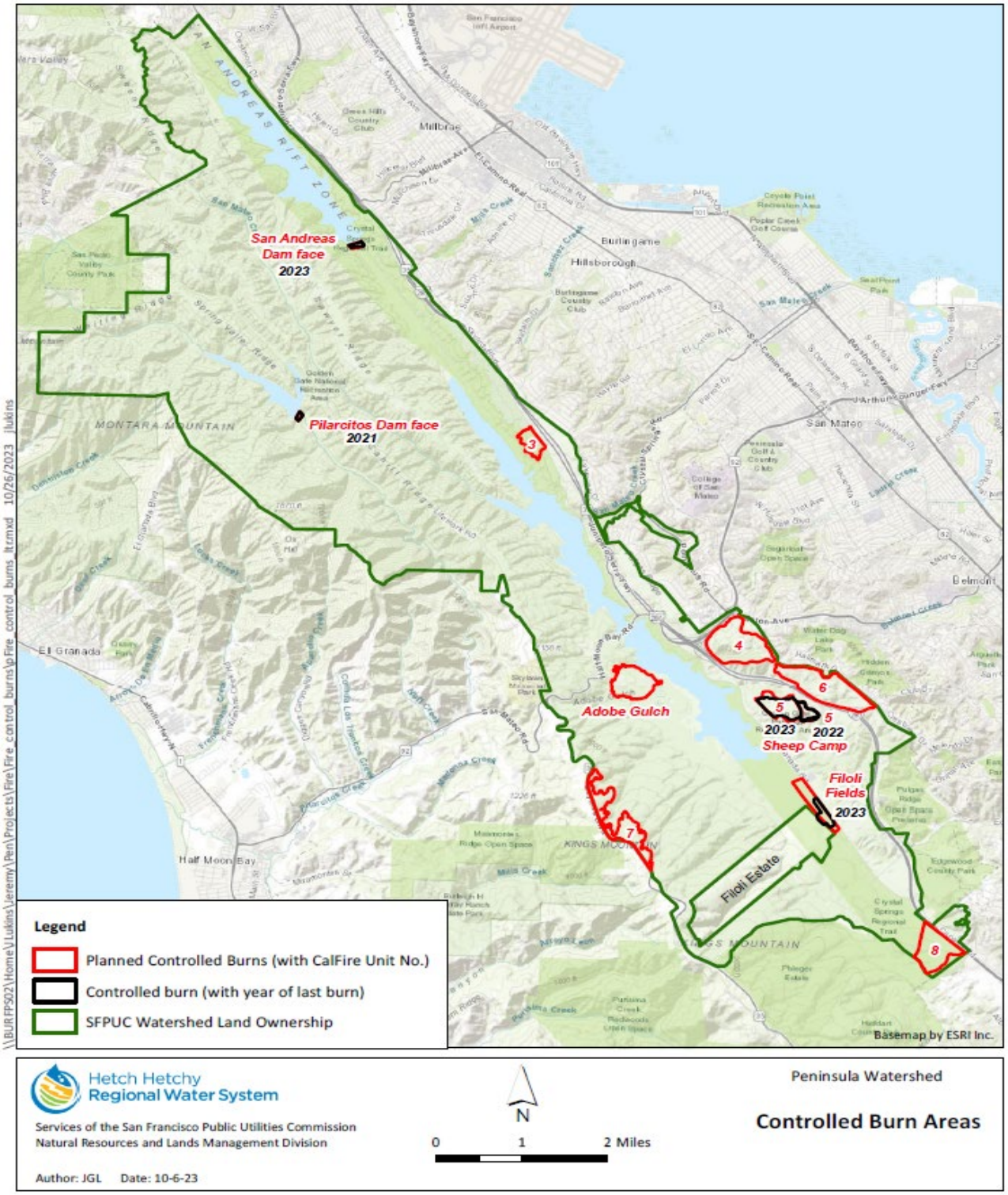


Figure 12 Previous NRLM/CAL FIRE Control Burn Areas



6.4.12 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 and transmission 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 American National Standards Institute (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.

The auditor will evaluate the quality of the inspection and the VM work when completed. All VM work shall comply with 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 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.

6.5 Overhead Asset Inspections

The SFPUC meets the minimum inspection requirements provided in CPUC GO 165 and CPUC GO 95 Rule 18. The SFPUC inspects overhead electric facilities using the requirements in these rules as a guide.

6.5.1 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.

6.5.2 Transmission Inspections and Maintenance

SFPUC owns and maintains transmission structures/assets as described in Table 2. 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 transmission 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 6 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 6 – Transmission Tower Inspections

Year	Detailed Inspections		Corrective Maintenance Work Orders	
	Scheduled	Complete	Scheduled	Complete
2019	180	180	49	27[30]
2020	180	180	28	28
2021	114	114	40	28[31]
2022	140	140	96	94[32]
2023	153	153	29	31
2024	98	98	11	11

6.6 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.

6.6.1 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 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

[30] The remaining 22 work orders were completed in 2020, in addition to the 28 reported.
[31] The remaining 12 work orders were completed in 2022, in addition to the 96 reported.
[32] The two remaining work orders were created in late December 2022. The completion status will be reported in the 2024 WMP update.

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

6.7 Distribution Inspection and Maintenance

The SFPUC meets the minimum inspection requirements of CPUC GO 165[33] and GO 95, Rule 18 for distribution lines. GO 165 establishes minimum requirements for electrical

[33] https://docs.cpuc.ca.gov/PUBLISHED/GENERAL_ORDER/159182.htm

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 for remediation. Table 7 shows the number of corrective maintenance work orders issued in 2024 and prior years versus the number completed. The SFPUC has inventoried all distribution poles in Maximo.

Table 7 – Corrective Maintenance for Distribution System

Year	Number of Work Orders	Total Completed
2019	4	4
2020	37	37
2021	30	26
2022	14	12[34]
2023	7[35]	7
2024	20	11[36]

6.7.1 Drone Inspections

In 2024, SFPUC continued to use the drone on an as-needed basis, when requested by the line crew. The drone camera is capable of 200x zoom, which allows the drone to be

[34] The two outstanding work orders were issued in late 2022. Completion status will be included in the 2024 WMP update.
[35] The two outstanding work orders from 2022 were completed in early 2023. The total numbers of new work orders in 2023 are 5.
[36] One work order was in progress at the time this report was written. The remaining nine work orders are going through environmental review before work can start. These will be completed in calendar year 2025.

flown a safe distance from the overhead conductors. Based on the clarity and detail of the images, the pilot proved to be successful, and we continue to evaluate a routine inspection schedule on specific distribution segments in the HFTD that are difficult to access on foot. 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.

Figure 14 – Drone Photo of the Distribution System

6.8 Powerhouse / Substation / Switchyard Inspections and Maintenance

SFPUC meets the requirements of CPUC GO 174, Rules for Electric Utility Substations. The SFPUC performs detailed substation/switchyard inspections monthly (Table 8) 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 2024 and recently completed preventative maintenance to replace rusted hardware with stainless steel.

Table 8 – Substation/Switchyard Inspections

2024 Calendar Year GO 174 Substation/Switchyard Inspections

Month	Moccasin	Intake	Warnerville	Calaveras
Jan	1/04/2024	1/03/2024	1/04/2024	1/05/2024
Feb	2/07/2024	2/07/2024	2/09/2024	2/03/2024
Mar	3/12/2024	3/06/2024	3/01/2024	3/03/2024
Apr	4/16/2024	4/03/2024	4/06/2024	4/03/2024
May	5/16/2024	5/02/2024	5/04/2024	5/05/2024
June	6/04/2024	6/21/2024	6/08/2024	6/07/2024
July	7/02/2024	7/03/2024	7/06/2024	7/06/2024
Aug	8/13/2024	8/07/2024	8/04/2024	8/04/2024
Sep	9/12/2024	9/04/2024	9/07/2024	9/05/2024
Oct	10/09/2024	10/03/2024	10/05/2024	10/03/2024
Nov	11/08/2024	11/06/2024	11/03/2024	11/03/2024
Dec	12/17/2024	12/02/2024	12/05/2024	12/01/2024

Preventative Maintenance work orders are set up in Maximo. Table 9 below shows the assets, equipment, and frequency of infrared inspections.

Table 9 – 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

6.9 Asset Management

All transmission, distribution, and substation assets are documented in Maximo with a current count of all primary and secondary distribution poles with height, class, installation date, and installed equipment, including whether the poles support telecom equipment.

6.10 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.

6.10.1 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 two retired CAL FIRE captains with extensive background in fire prevention and basic immediate suppression actions. This training

supports the increased fire preparedness and response capabilities of the HHW field staff and other support staff.

6.10.2 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.

6.10.3 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.

6.11 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.

6.12 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 a 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.

6.13 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.

The SFPUC does not initiate our ICS structure during RFWs. When critical fire weather is forecasted to meet or exceed internal thresholds, the powerhouse control center will dispatch QEWs 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.

Our coordination and response to external PSPS events is discussed in Section 6.14.

6.14 De-energization for Public Safety

During critical fire weather conditions, the SFPUC may 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 SFPUC 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 HRRR Model 3-km, hourly resolution, issued once per hour.
3. Wildfire Analyst™ Fire Potential Index.

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 Indices 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 6.14.3.

In 2024, the SFPUC de-energized one circuit for public safety. This circuit was within the footprint of an IOU PSPS event. Historical outage dates for public safety de-energization events are listed in Table 10.

Table 10 – De-Energization Events for Public Safety

Year	Name of Circuit	Dates of Outages	Number of Customers Served by Circuit	Number of Customers Affected
2020	KPH to OSH 22 kV line	6/25/2020	0	0
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
2024	Calaveras Substation 22 kV Distribution Line	10/18/2024	0[37]	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 could deenergize the source feed to SFPUC distribution line segments, impacting SFPUC facilities. WSTD coordinates with PG&E before, during, and after a PG&E initiated PSPS

[37] The de-energized line supplies SFPUC load, no external customers were affected.

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 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 can be challenging. To prevent miscommunication and prepare internally, the SFPUC is 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. SFPUC communicates with PG&E before a PSPS event and can mobilize generators to those facilities that do not have permanent standby generators. Most recent communication challenges have been around PG&E planned maintenance outages, which are sometimes scheduled, and cancelled at the last minute, after SFPUC staff have readied operationally to accommodate the outage (generators, staffing, etc.).

6.14.1 Impacts on Public Safety

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

6.14.2 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.

6.14.3 Restoration of Service

During an IOU PSPS or SFPUC 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 Authority 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.

7. STAKEHOLDER OUTREACH AND ENGAGEMENT

7.1 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"[38].

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 sectors.

7.1.1 Water and Wastewater Systems Sectors

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 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.

7.1.2 Communications Sector

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

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

on the expected timing and duration of the outage. Both sites have backup generators to avoid disruption to services during planned and unplanned outages.

7.1.3 Healthcare and Public Health Sectors

Not applicable. The SFPUC does not provide services to any healthcare or public health facilities.

7.2 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),[39] 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 firebreak 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 (Figure 15) stationed at Columbia Airport, approximately 22 miles from the SFPUC Moccasin Powerhouse / Switchyard / Control

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

Center. 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.

Figure 15 – CAL FIRE Firehawk Helicopter

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.

7.3 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™ risk forecast tool as mentioned in Section 6.1.1.

7.4 California Municipal Utilities Association (CMUA) Collaboration

CMUA hosts a monthly working group call, specific to the development of the WMPs. SFPUC actively participates in these calls, along with other POUs.

7.5 Mutual Assistance Agreements

The SFPUC is a member of the California Utilities Emergency Association (CUEA), which plays a key role in ensuring communication 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.

8. EVALUATING THE PERFORMANCE OF THE PLAN

8.1 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 Table 11.

Table 11 – Outcome and Performance Metrics[40]

Outcome Metrics

Metric	Metric Description	2019	2020	2021	2022	2023	2024
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	Completed 8/14/2024
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	Completed 9/16/2024
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	Completed 9/17/2024

Performance Metrics

1	Reportable ignitions in the HFTD associated with SFPUC electric facilities (see Section 8.2)	0	1	1	0	0	0

[40] SFPUC will be adopting the CMUA metrics tables in the 2026 Comprehensive Revision.

2	Number of times a circuit or circuit segment is de-energized within the HFTD	1	1	7	0	0	1
3	Wire down in HFTD	1	2	1	0	2[41]	0
4	Wire down outside HFTD	0	0	0	0	1[42]	0

[41] 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

[42] 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.

8.2 Metric 1: Reportable 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.

8.3 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.

8.4 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 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 2024, the SFPUC transmission and distribution systems performed exceptionally well and experienced favorable system reliability. There were no ignition events in 2024 attributed to SPFUC distribution assets. The SFPUC will continue to monitor metrics and evaluate trends that may require 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.

8.5 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 of SFPUC facilities being 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.

8.6 Corrective Action Program

The SFPUC is 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.

8.7 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 informs our metrics. For example, after analyzing early iterations of the Plan we realized we needed to ensure all our inspections, 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.

9. 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.

The last IE report was submitted to SFPUC's Commission in 2023, along with the request for final approval of the 2023 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[43].

The SFPUC's Plan is updated annually and will be evaluated by an IE every three years when comprehensive updates to the Plan are made. The next IE review is scheduled for the 2026 comprehensive WMP update.

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

APPENDIX 1 – REVISION LOG

Section	Title	Description
Table of Contents	List of Figures	Added List of Figures
Table of Contents	List of Tables	Added List of Tables
2.	Summary of 2024 Wildfire Mitigation Activities	All sub-sections updated to include 2024 major accomplishments and 2025 overarching initiatives
3.	Overview of the Wildfire Mitigation Plan	2024 WMP Section 2 now Section 3 of the 2025 WMP
3.2	Statutory Cross-Reference Table	Updated Table 1 “Plan Section” column with updated section numbers and hyperlinks
3.3	Utility Overview and Context Setting Table	Updated for consistent reporting of “circuit miles”.
5.7	Extended Drought	Revised narrative
6.1.1	Technosylva Wildfire Analyst™ / Fire Potential Index	Updated narrative to provide 2024 progress on implementation of application
6.1.2	Weather Monitoring	Updated narrative to provide 2024 program progress
6.1.4	ALERTCalifornia Cameras	Change name of program from ALERTWildfire to ALERTCalifornia and updated narrative to provide 2024 progress
6.3.1	Replace Wood Poles	Updated narrative with 2024 progress
6.3.2	Pole Wrap	New section added
6.3.3	Replace Overhead Copper Conductor	Updated narrative to provide program update
6.3.4	Replacement of Non-Exempt Equipment	Undated narrative to provide 2024 progress
6.3.6	Overhead to Underground Conversion	Added a new project to underground 1,200 feet of distribution line.
6.3.7	Alternate Generation Source	Updated status of initiative
6.4.2	Vegetation Inspections / Transmission Lines	Updated Table 4 with 2024 data
6.4.3	Vegetation Inspections / Distribution Lines	Updated Table 5 with 2024 data
6.4.7	Satellite Vegetation Monitoring	Updated narrative to provide project update
6.4.11	Wood and Slash Management	Updated narrative to provide project update
6.5.2	Transmission Inspections and Maintenance	Updated Table 6 and added 2024 data
6.7	Distribution Inspection and Maintenance	Updated Table 7 with 2024 data
6.7.1	Drone Inspections	Updated narrative to provide project update
6.8	Powerhouse/Substation/Switchyard Inspections and Maintenance	Updated Table 7 with 2024 data
6.14	De-Energization for Public Safety	Added Fire Potential Index as an input for de-energization decisions. Updated Table 10 with 2024 data
7.6	SFPUC and PG&E Collaboration	Updated narrative to include PG&Es updated FPI model.
8.1	Metrics and Assumptions for Measuring Plan Performance	Updated Table 11 with 2024 data