

Wildfire Mitigation Plan Independent Evaluation

Prepared for:

Redding Electric Utility



Redding Electric Utility

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November 21, 2019

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DISCLAIMER

This report was prepared by Navigant Consulting, Inc., n/k/a Guidehouse Inc. (“Navigant”),¹ for Redding Electric Utility. The work presented in this report represents Navigant’s professional judgment based on the information available at the time this report was prepared. Navigant is not responsible for the reader’s use of, or reliance upon, the report, nor any decisions based on the report. **NAVIGANT MAKES NO REPRESENTATIONS OR WARRANTIES, EXPRESSED OR IMPLIED.** Readers of the report are advised that they assume all liabilities incurred by them, or third parties, as a result of their reliance on the report, or the data, information, findings and opinions contained in the report.

¹ On October 11, 2019, Guidehouse LLP completed its previously announced acquisition of Navigant Consulting Inc. In the months ahead, we will be working to integrate the Guidehouse and Navigant businesses. In furtherance of that effort, we recently renamed Navigant Consulting Inc. as Guidehouse Inc.

EXECUTIVE SUMMARY

Redding Electric Utility (REU) contracted with Navigant Consulting, Inc. n/k/a Guidehouse Inc. (Navigant) to engage in an independent evaluation of its Wildfire Mitigation Plan (Plan or WMP). This independent evaluation report (Report) describes the technical review and evaluation provided by Navigant. Navigant performed this evaluation in October and November 2019 and completed the Report on November 21, 2019. Navigant's project team reviewed detailed information related to the Plan and assessed REU's procedures related to the Plan.

The Plan was prepared as a response to Senate Bill (SB) 901, which was signed into law on September 21, 2018. SB 901 resulted in a number of provisions and directives, among which includes the requirement for electric utilities to prepare and adopt Plans within 2019 and revise and update the Plan annually thereafter. These requirements are codified in the California Public Utilities Code (PUC) Section 8387 for publicly-owned utilities (POUs).

Navigant evaluated the Plan based on the statutory requirements of PUC Section 8387 as it relates to POUs. This PUC Section was amended on July 12, 2019 as a result of the signing of California's Assembly Bill (AB) 1054 into law. The POUs are now subject to the guidance provided by the California Wildfire Safety Advisory Board² and mandatory cyclical reviews. The required elements for a WMP have not been modified by this new legislation. This Report meets REU's requirements under PUC Section 8387(c), which mandate an independent evaluation of REU's Plan. The Report was developed to satisfy the statutory requirement for public review. This Report underlies the required evaluation by the Board of Directors at a public meeting, scheduled for December 3, 2019. The Report includes the following:

- Background of the legislative history requiring WMPs and their independent evaluations
- Approach and methodology evaluating the Plan's comprehensiveness
- REU's Plan elements and their compliance with SB 901 and PUC Section 8387 WMP elements and directives
- An evaluation of the Plan's presented metrics to assess the effectiveness of the overall Plan
- Determinations and results

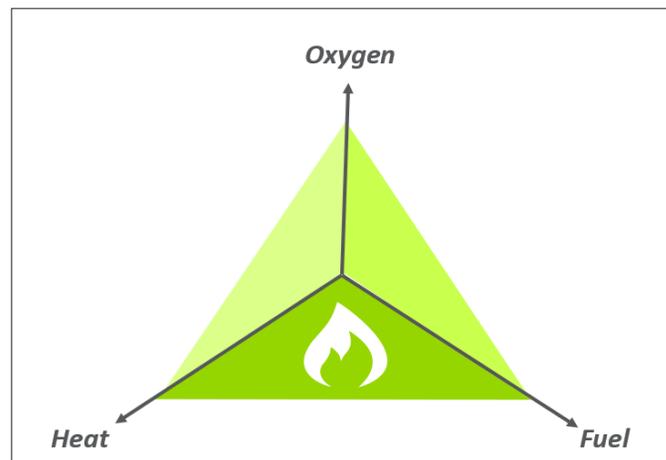
Based on relevant experience in grid hardening and resiliency, natural disaster response, prior experience in WMP development, and active tracking of wildfire legislative and regulatory proceedings Navigant has concluded that REU's WMP is comprehensive in accordance with PUC section 8387.

² Due for implementation in 2020.

1. BACKGROUND

In recent years, California has seen an increase in utility equipment-involved, catastrophic wildfires. The unique geographic profile of California and the impacts of climate change, including continued dry conditions, high winds, and elevated heat index risk from global rising temperatures, have led to elongated fire seasons. The state is also experiencing increased levels of vegetation fuel due to the wet winters, hotter summers following a seven-year drought, and past fire suppression efforts. This increasingly abundant dry vegetation is the leading driver of wildfires. The levels of dry vegetation fuel have been aggravated by a destructive bark beetle infestation that continues to impact the health of the state's forested areas, further increasing fire risk. These fuel-rich environments, coupled with intensified climatological conditions with high wind gusts and natural electrical infrastructure risks, produce the conditions conducive to potential wildfire ignition. The three attributes that provide optimal conditions for a fire ignition are illustrated through the graphic in Figure 1.

Figure 1: Fire Triangle



Disastrous wildfire threat is a well-known and shared priority among electric utilities in California. The recent spike in utility-involved wildfire incidents since the 2015 wildfire season and the significant financial and livelihood impacts associated with them have led to more formalized efforts to ensure safe operations of electric utility equipment and greater investment in wildfire mitigation efforts.³ Specifically, the state has approved legislation that strengthens governmental and regulatory oversight of wildfire prevention implementation activities, utility Wildfire Mitigation Plans (WMPs or Plans), and proper dispersal of state funds to wildfire victims. In an effort to minimize future devastating occurrences through risk-driven wildfire prevention, electric utilities, including cooperatives, were mandated, by Senate Bill (SB) 901 (Senator Bill Dodd, 2018), to prepare and annually adopt a WMP before January 1, 2020. This effort is foundational to the state's prioritized goal of minimizing the potential of devastating fires in future years.

1.1 SB 901 – Wildfire Mitigation Plans

On September 21, 2018, Governor Jerry Brown signed SB 901 into law. The bill directs electrical utilities to annually prepare WMPs that include several mitigation and response elements in each utility's strategies, protocols, and programs. Each electric utility is to prepare and adopt a comprehensive WMP before January 1, 2020. The requirements for publicly-owned utilities (POUs) are presented in Public

³ California Public Utilities Commission, 2019. "Fire Incident Data Reports for Investor-Owned Utilities," <https://www.cpuc.ca.gov/fireincidentsdata/>.

Utilities Code (PUC) Section 8387. Details relating to POU requirements are discussed in Section 2 of this WMP evaluation report (Report).

1.1.1 AB 1054 Statutory Modifications

On July 12, 2019, Governor Gavin Newsom signed Assembly Bill (AB) 1054 into law. This bill was developed with the consideration of the Governor's Strike Force effort to develop prioritized strategies to help the state achieve its decarbonization goals. AB 1054 aims to mitigate the intensity of wildfire impacts through several initiatives separate from those actions required of electric utilities. SB 901 directed the Office of Planning and Research to establish a Commission on Catastrophic Wildfire Cost Recovery (SB 901 Commission) with the goal of addressing utility wildfire liability, cost responsibility and victim support, and issues with insurance availability and affordability. On June 18, 2019, the SB 901 Commission presented to the state Legislature, findings and recommendations on the issues discussed at public workshops over the course of several months. This, in part with Governor Newsom's Wildfire Reform Package, resulted in legislation that culminated in the provisions listed in AB 1054.

AB 1054 includes directives to establish the Wildfire Safety Division at the California Public Utilities Commission (CPUC) and the state's Wildfire Safety Advisory Board. POUs will their WMPs by July 1 of each year starting in 2020 for review by and recommendations from the Wildfire Safety Advisory Board. No less than every three years, POUs are required to comprehensively update their WMPs. This change is included in this evaluation as a reference for future requirements.

1.1 Redding Electric Utility Plan Preparation

Redding Electric Utility (REU) is a department within the City of Redding. Its service territory is approximately 60 square miles. REU's primary goal is to provide safe, reliable, and economic electricity to its local community. As a POU, REU has no fiduciary obligations to shareholders and its actions and decisions are governed by the City Manager and the City Council and ultimately to the citizens of Redding.

REU prepared its first WMP pursuant to SB 901 directives. The Plan aims to address each of the required elements presented by PUC Section 8387 and ultimately reduce the risk of contributing to utility-involved wildfire events through Plan execution and metric tracking. The Plan also supports the City of Redding's City Objectives outlined in its Local Hazard Mitigation Plan. REU has posted its draft plan to its website for public review. REU reserves the right to modify the WMP until it is presented to and approved by City Council in December 2019.

1.1.1 Independent Evaluation Services

PUC Section 8387(c) directs POUs to procure services for an independent evaluation (IE) of the comprehensiveness of the WMP. In January 2020, upon commencement of the California Wildfire Safety Advisory Board, guidelines and further details related to the scope and timelines of future IEs will be discussed and reviewed. In its present⁴ form, the provisions of PUC Section 8387 state that the independent evaluator shall be experienced in "assessing the safe operation of electrical infrastructure" and will perform an assessment to determine the comprehensiveness of the Plan.⁵

REU sought out IE services to assess the comprehensiveness of its WMP pursuant to PUC Section 8387(c) prior to presenting the final WMP to City Council and contracted Navigant Consulting, Inc., n/k/a Guidehouse Inc. (Navigant) in October of 2019 to undertake an assessment of its Plan based on

⁴ The CPUC has just begun its investigation to develop a list of recognized independent evaluators by March of 2021.

⁵ It is recognized that this requirement does not yet include a clear definition of comprehensiveness.

Navigant's prior experience with assessing the safe operation of electrical infrastructure, including grid-hardening and WMPs, with an emphasis on electrical equipment, public, and personnel safety.

Emergent practices will materialize as evolving legislative action and technology advances continue to shape wildfire mitigation and safety efforts. Understanding this, Navigant performed a comparison of the wildfire mitigation investments undertaken by other utilities throughout California as well as relied on the team's experience in working directly with utilities to develop their WMPs and data collection practices along with prior experience related to grid hardening and electric safety assessments. This Report presents the results of Navigant's WMP IE. The following section describes the methodology in executing this evaluation.

Navigant Identification of Qualifications

Navigant provides IE services throughout the United States. Navigant's grid-related IE projects include storm hardening, wildfire mitigation, resiliency assessments, advanced technology suitability, among others. Our approach includes an evaluation of data considered, suitability of tracking metrics – both frequency and trends analysis - and an evaluation of key performance indicators. Navigant assesses the efficacy of tools for creating sufficient awareness and for effectiveness of understanding overall WMP's intended and actual impacts. Navigant also leverages experience developing "Metrics and Benefits Reporting Plans" to gauge cost-effectiveness of activities and alignment of plans to intentions. Navigant understands REU's publicly-owned business practices relative to IOUs, through our experience developing WMPs for two IOUs and our continued tracking of related CPUC dockets intended to refine strategies that carry an effective Plan.⁶

Navigant continues to track proceedings, pending legislation, and other developments surrounding utility wildfire risk. Our team remains active with WMP engagements across jurisdictions and risk profiles. As part of maintaining high acumen of prudent mitigation strategies, Navigant participates in forums focused on innovative wildfire mitigation strategies—further expanding our industry knowledge. Navigant provides thought leadership and advisory services related to WMP and other resiliency innovative technologies to the California Energy Commission and has supported their system hardening and fire prevention efforts since 2008. Additionally, Navigant's reach into grid resiliency and disaster-related hardening extends across the United States including island grids, such as Puerto Rico, recovering from recent, weather-related catastrophes.

⁶ Navigant provided technical services to Liberty Utilities (CalPeco Electric) and Bear Valley Electric Service (BVES) immediately prior to and within the 2019 calendar year. The services resulted in support of the development and filing of their respective WMPs to the CPUC on February 6, 2019. Navigant continued to support BVES in development of their Data Collection for WMP report, filed on July 30, 2019.

2. EVALUATION SCOPE AND APPROACH

At the time of this IE, the guidelines and requirements were not available to POUs regarding the structure or determination of comprehensiveness pursuant to PUC Section 8387(c). In lieu of this formalized directive, Navigant completed this evaluation based on industry standard practices, our experience developing and reviewing WMPs and other grid hardening activities, our active tracking of wildfire legislative and regulatory proceedings and, most importantly, a comparison of the specific criteria in PUC Section 8387(b)(2) to the specific wildfire-related plans outlined in REU’s WMP.

2.1 Evaluation Parameters

Figure 2 represents the attributes comprising the methodology and approach of the evaluation.

Figure 2: Contributing Factors to Evaluate the Plan



2.1.1 Provisional Requirements

As mentioned above, the requirement for electric utilities and corporations to develop WMPs emerged from the directives of SB 901 and associated statutory modifications. With respect to POUs, the nested subsections under PUC Section 8387(b)(2) outline the required elements to be included in the Plan. See Table 1 for the complete statutory compliance list.

Table 1: POU Requirements for the WMP

PUC Section 8387 <i>(as amended on July 12, 2019)</i>
<p>(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.</p>
<p>(b) (1) The local publicly owned electric utility or electrical cooperative shall, before January 1, 2020, 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.</p>
<p>(2) The wildfire mitigation plan shall consider as necessary, at minimum, all of the following:</p>
<p>(A) An accounting of the responsibilities of persons responsible for executing the plan.</p>
<p>(B) The objectives of the wildfire mitigation plan.</p>
<p>(C) A description of the preventive 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.</p>
<p>(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.</p>
<p>(E) A discussion of how the application of previously identified metrics to previous wildfire mitigation plan performances has informed the wildfire mitigation plan.</p>
<p>(F) Protocols for disabling reclosers and deenergizing portions of the electrical distribution system that consider the associated impacts on public safety, as well as protocols related to mitigating the public safety impacts of those protocols, including impacts on critical first responders and on health and communication infrastructure.</p>
<p>(G) Appropriate and feasible procedures for notifying a customer who may be impacted by the deenergizing of electrical lines. The procedures shall consider the need to notify, as a priority, critical first responders, health care facilities, and operators of telecommunications infrastructure.</p>
<p>(H) Plans for vegetation management.</p>
<p>(I) Plans for inspections of the local publicly owned electric utility's or electrical cooperative's electrical infrastructure.</p>
<p>(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:</p>
<p>(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.</p>
<p>(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.</p>
<p>(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.</p>
<p>(L) A methodology for identifying and presenting enterprise wide safety risk and wildfire-related risk.</p>

(M) A statement of how the local publicly owned electric utility or electrical cooperative will restore service after a wildfire.
(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:
(i) Monitor and audit the implementation of the wildfire mitigation plan.
(ii) Identify any deficiencies in the wildfire mitigation plan or its implementation, and correct those deficiencies.
(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.
(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.
(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.

2.1.2 Industry Knowledge and Regulatory Proceedings

The state's priority towards abating future catastrophic wildfire events is demonstrated through aggressive measures, directing utilities to enhance their protocols for fire prevention, public communications, and response. That collection of information is presented in a comprehensive WMP. While POUs are directed to develop this Plan prior to January 1, 2020, Navigant recognizes that California utilities subject to CPUC jurisdiction have filed their respective Plans on February 6, 2019. Navigant has tracked docketed proceedings and maintains a presence in state activities and workshops surrounding wildfire prevention. Understanding that REU is not subject to CPUC regulations, the insight gained from this related experience is leveraged in assessing REU's Plan relative to its risk profile and industry position.

2.2 Evaluation Approach

To perform an assessment of the comprehensiveness of the Plan, Navigant used the following described approach.

2.2.1 Statutory Compliance

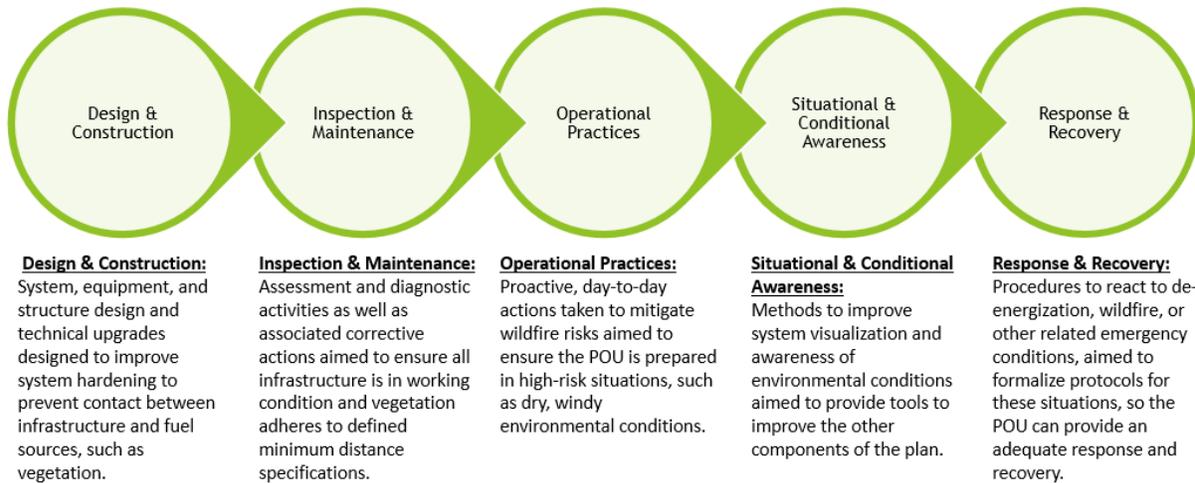
Navigant sought to determine compliance with the provisional requirements laid out in SB901 as codified in PUC Section 8387. The Plan's alignment with the statutory requirement is presented in Appendix A. REU's mitigation measures are not required to exceed the statutory requirements.

2.2.2 Industry Wildfire Mitigation Practices Comparison

Accepted practices for wildfire mitigation have been discussed and presented at numerous events, such as the Wildfire Technology Innovation Summit, held on March 20-21, 2019. Additionally, Plans approved by the CPUC have garnered significant insight from the industry at large. Navigant's understanding of an

effective Plan draws on comparisons from existing WMPs and industry practices and is summarized according to business practice categories described in Figure 3.

Figure 3: Mitigation Strategy Overview



Expertise in these critical elements facilitated Navigant’s review of the comprehensiveness of REU’s WMP. While not all of these strategies are present in or applicable to REU’s Plan, due to REU’s size, location, and operational characteristics, Navigant’s understanding of collected utility strategies demonstrated throughout the state are summarized below:

- **Inspection and maintenance of distribution transmission and substation assets** including conducting system patrols and ground inspections, using technological inspection tools, managing predictive and electrical preventative maintenance, and conducting vegetation inspections and management, vulnerability detection such as Light Detection and Ranging (LiDAR) inspection; and geospatial and topography identification, geographic information system (GIS) mapping data. A key component is identifying collected data elements through each program and understand how that data is used and shared to improve utility practices.
- **Vegetation management** that includes routine preventative vegetation maintenance; corrective vegetation management and off-cycle tree work; emergency vegetation clearance, prioritized for portions of the service territory the lie in high hazard zones, quality control processes; and resource protection plan, including animal and avian mitigation programs.
- **System hardening** that includes pole replacement, non-expulsion equipment, advanced fuses, tree attachment removal, less flammable transformer oil, covered wire and wire wrap, and undergrounding where cost beneficial.
- **Operational practices** including communications and mustering plans under varying degrees of wildfire risk. Plans to deactivate automatic reclosers, de-energization of “at risk” area powerlines based on type of facility (overhead bare conduction, high voltage, etc.), tree and vegetation density, available dry fuel, and other factors that make certain locations vulnerable to wildfire risk.
- **Situational awareness** including obtaining information from devices and sensors on actual system, weather and other wildfire conductivity conditions, two-way communication with agencies and key personnel. Programs such as online feeds and websites such as the National Fire Danger Rating System. Situational awareness should help achieve a shared understanding of actual conditions and serve to improve collaborative planning and decision making.

- **De-Energization actions** triggered and prioritized by forecasted extreme fire weather conditions; imminent extreme fire weather conditions; validated extreme fire weather conditions; and plans for re-energization when weather subsides to safe levels. Manual or automatic capabilities exist for implementation.
- **Advanced Technologies** including Distribution Fault Anticipation technology, tree growth regulators, pulse control fault interrupters, oblique and hyper-spectral imagery; advanced transformer fluids; advanced LiDAR, and advanced SCADA, to reduce electrical ignition while also helping to mitigate power outages and equipment damage.
- **Emergency Preparedness, Outreach and Response communications** before, during, and after emergencies including but not limited to engaging with key stakeholders that include critical facilities and served customers; local governments, critical agencies such as California Department of Forestry and Fire Protection (CAL FIRE), local law enforcement agencies and other first responders, hospitals, local emergency planning committees, other utility providers, California Independent System Operator, and the utility's respective Board. Coordination agreements such as Mutual Assistance should be leveraged. Community outreach plan should inform and engage first responders, local leaders, land managers, business owners and others.
- **Customer support programs** including financial assistance and support for low-income customers; billing adjustments; deposit waivers; extended payment plans; suspension of disconnection and non-payment fees; repair processing and timing; access to utility representatives; and access to outage reporting and emergency communications. Consideration of languages in addition to English. Identification of priority customers, such as first responders and local agencies, health care providers, water and telecommunication facilities, groups that assist children, elderly, mobility impaired, and other vulnerable populations.

2.2.3 Value Determination of Plan Metrics

Metrics for tracking the Plan's progress intend to allow the utility to refresh information as trends become clearer. Based upon the discussion included in the CPUC's Phase 2 of the SB 901 proceeding docket, interests in metric development and underlying data collection are beginning to take shape. While these determinations do not directly influence the public power sector, insight has been leveraged to employ effective metrics.⁷

⁷ CPUC Order Instituting Rulemaking to Implement Electric Utility Wildfire Mitigation Plans Pursuant to SB 901 (2018) (Rulemaking 18-10-007) https://apps.cpuc.ca.gov/apex/f?p=401:56:0::NO:RP,57,RIR:P5_PROCEEDING_SELECT:R1810007.

3. REU WMP PLAN ELEMENTS

Navigant reviewed the Plan elements and determined whether the activities supported the intention to deploy an effective WMP. This determination incorporated individual elements as well as underlying data sources that further described data collection methodologies and implementation procedures to ensure measures are carried out and also tracked. This understanding also informs internal reviews and subsequent updates for future Plan iterations.

Navigant found that REU's WMP meets the statutory requirements of comprehensiveness PUC Section 8387. In this section, we review the WMP's elements and their purpose relative to the development and successful execution of the WMP. A table comparing each subsection of PUC Section 8387 to the significant sections of the WMP can be found in Appendix A.

3.1 Objectives and Overview of Preventative Strategies and Programs

PUC Section 8387

(B) The objectives of the wildfire mitigation plan.

(C) A description of the preventive 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.

REU has clearly stated objectives in its WMP in Section 2 of the WMP. REU's primary objective refers to minimizing the probability that REU's transmission and distribution system may be the origin or contributing source for the ignition of a fire as well as the protect the system from wildfire damage. The secondary objective is to improve the resiliency of REU's electric system by assessing new industry practices and technologies, improving fire response, and mitigating fire fuels located in the wildland urban interface (WIU) in REU service territory.

Section 2 and 5 of REU's Plan describe REU's four programs that will manage and implement eight strategies to mitigate wildfires. The four programs include:

- **REU's Wildfire Prevention & Improved Response:** An \$8 million program approved by Redding City Council in May 2019 for additional resources (i.e., staff, equipment, and training) for the Redding Fire Department and Community Services Department to enhance prevention and response efforts.
- **REU Technology Solutions:** REU is evaluating several technologies including cameras, aerial imagery, a city-wide communication platform, and automatic vehicle location to more effectively protect its infrastructure and customers.
- **REU Distribution 10-year Capital Improvement:** REU plans to implement numerous system improvements to mitigate wildfires, including additional remote controlled reclosers, steel poles, non-expulsive fuses, and undergrounding.
- **REU Emergency Operations:** This program focuses on REU's key functions for emergency management including Incident Command, Operations, Planning, Logistics, and Finance.

The strategies that fall under these programs include:

- Vegetation Management
- Enhanced Inspections
- Situational Awareness
- Operational Practices
- System Hardening
- Public Safety and Notification
- Reclosing and Deenergization
- Wildfire Response & Recovery

These programs and strategies are discussed in more detail in the sections below.

3.1.1 Risk Assessment & Drivers

PUC Section 8387

(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:

(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.

(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.

(L) A methodology for identifying and presenting enterprise-wide safety risk and wildfire-related risk.

Section 4 of REU's WMP discusses the risk analysis and risk drivers that guide the development of REU's wildfire prevention practices. REU identifies both system and operational risk and geographical and climate risk in this section. Extended drought, vegetation type and density, weather, high winds, terrain, low humidity, changing weather patterns, communities at risk, and fire history are listed as the primary risk drivers in this section. In future iterations, REU may want to consider more clearly delineating between risks and risk drivers in this section.

This section also sets forth REU's methodology for identifying enterprise-wide and wildfire-related risk, which includes conducting operational risk inventories, evaluating and prioritizing identified risks based on several criteria (e.g., severity, probability of occurrence, mitigation, and speed of onset), establishing a Risk Committee to oversee risk management, and analyzing historical outages and fires. REU focuses its wildfire mitigation efforts on areas of its service territory that are in Tier 2 and Tier 3 high fire threat areas on the CPUC's fire threat map.

REU also discusses the design and construction standards it is implementing to minimize fire risk in Section 4 of the WMP. REU has designed and constructed its facilities to meet or exceed relevant standards such as CPUC GO 95 and the National Electric Safety Code. REU is also considering revisions to its design and construction standards to include several wildfire mitigation enhancements, including arc suppression components, raptor framing, squirrel guards, tree wire, lightning arresters, and arc suppressing fusing, and remote controlled reclosers.

3.1.2 Asset Overview & Service Territory

PUC Section 8387

(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.

As described in Section 4 of the WMP, 50% of REU's service territory falls into CPUC Tier 2 and Tier 3 high fire threat areas, including 18,000 acres adjacent to REU equipment and facilities and 120 miles of overhead power lines. Appendix A of REU's WFMP provides a map with REU's Tier 2 and Tier 3 portions of its service territory.

In collaboration with Redding Fire Department (RFD) and CalFire, REU reviews the CPUC fire threat map annually to identify and communicate any adjustments based on changes in urban development and vegetation conditions in its service territory.

The REU plan has not identified any portion of its system which should be included in a higher risk zone than is currently established and is not making any recommendations to the expand the area of a high fire threat district.

3.1.3 Wildfire Prevention Strategies

PUC Section 8387

(F) Protocols for disabling reclosers and deenergizing portions of the electrical distribution system that consider the associated impacts on public safety, as well as protocols related to mitigating the public safety impacts of those protocols, including impacts on critical first responders and on health and communication infrastructure.

(H) Plans for vegetation management.

(I) Plans for inspections of the local publicly owned electric utility's or electrical cooperative's electrical infrastructure.

3.1.3.1 Disabling Reclosers

Section 5-G of REU's Plan states that it intends to make changes to its protection system during fire season so that faulted circuits do not attempt to reclose, but it does not provide any detail on what that protocol entails. This section should be updated to reflect the course of action required by System Operating Procedure *SOP-35 Operating During High Fire Threat Conditions* which is attached to the Plan as Appendix F. SOP-35 describes its recloser protocol for high fire threat conditions in detail. Specifically, SOP-35 states that, during Red Flag Warnings, REU will disable its reclosers via SCADA for the affected circuits in Tier 2 / Tier 3 areas. The Plan should refer to this procedure and its recloser policy for completion.

3.1.3.2 De-Energization Protocols

Section 5-G of the Plan states that REU will not pre-emptively shut off power during high fire threat periods due to community risks and because it plans to use real-time information and other mitigation strategies (e.g., vegetation management, additional RFD resources, system hardening, and situational

awareness) to avoid shutting off power. However, REU will shut off power when directed to by Redding Fire, Police, Cal Fire, and other emergency responding agencies.

3.1.3.3 Vegetation Management

Section 5-A of the Plan contains a summary description of REU's vegetation management practices and states the program's consistency with NERC Standard FAC-003-4 (for transmission-level facilities), Public Resources Code 4292-4293, California General Order 95 Rule 35.

REU has seven arborists and a contract for tree trimming services to complete its vegetation management work. REU's Wildfire Prevention and Improved Response Program has also increased staff, training, and equipment for RFD and public works to support additional fire fuels mitigation.

REU is also enhancing its vegetation management program to include 30-feet of vegetation control around its Power Plant and substations, increased easement clearings per CPUC guidance, coordination with customers for wider vegetation clearances, and funding from CARB to increase fire fuels mitigation.

3.1.3.4 Infrastructure Inspections

In Section 5-B of the Plan, REU currently patrols its system regularly and is planning for increased patrols. Additionally, REU conducts annual infrared (IR) patrol of overhead lines and substations, intrusive inspection of wood poles, annual helicopter inspections of 115 kV lines, and GIS data collection and sharing to inform inspections. It is also considering using unmanned aerial vehicles with IR or LIDAR and plans to increase inspections in high fire threat areas and after other disasters such as storms and snow events.

REU may want to consider referencing GO 165 in this section of the Plan either as a comparative practice, or if it uses this standard as guidance for system inspections.

3.1.4 Response & Restoration

PUC Section 8387

(G) Appropriate and feasible procedures for notifying a customer who may be impacted by the deenergizing of electrical lines. The procedures shall consider the need to notify, as a priority, critical first responders, health care facilities, and operators of telecommunications infrastructure.

(M) A statement of how the local publicly owned electric utility or electrical cooperative will restore service after a wildfire.

3.1.4.1 Event Communication

REU established notification and communication plans as part of its Emergency Operations Program to coordinate with emergency response personnel and maintain open lines of communication with customers as described in Sections 3-D and 3-E of the Plan. If directed during an emergency, REU will coordinate with RFD and Redding Police Department (RPD) in conjunction with the joint dispatch agency, Shasta Area Communication Agency (SHASCOM) for notifications to communities if a public safety power shutoff is necessary. REU will also use social media and a web-based map to provide the public with more information on outages and estimated restoration times.

Section 5-F also states that REU is developing a communications protocol with Shasta County Health and Human Services for notifications to vulnerable groups and coordinating with RFD and RPD through its Emergency Operating Procedures and 24/7 Operations Center. In addition, REU plans to invest in a City-wide Communications Platform (including radios and supporting equipment) to ensure City Departments can communicate reliably without cross-channel interference.

3.1.4.2 Restoration

Restoration of Service is discussed in detail in Section 7 of the Plan. Additionally, REU maintains a standard operating procedure (SOP-28) that it follows for prioritizing activities for recovery and re-energization after a wildfire. REU uses a five-step approach (Assessment, Planning, Mobilize, Rebuild, and Restore) to restore service. It also has a prioritized list of facilities for restoration.

REU is also a member of the California Utility Emergency Association and the Western Energy Institute's Western Region Mutual Assistance Agreement. It would leverage mutual assistance as needed in the restore phase.

3.1.5 Metrics & Plan Monitoring

PUC Section 8387

- (A) An accounting of the responsibilities of persons responsible for executing the plan.

- (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.

- (E) A discussion of how the application of previously identified metrics to previous wildfire mitigation plan performances has informed the wildfire mitigation plan.

- (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:
 - (i) Monitor and audit the implementation of the wildfire mitigation plan.

 - (ii) Identify any deficiencies in the wildfire mitigation plan or its implementation, and correct those deficiencies.

 - (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.

3.1.5.1 Responsibilities of Persons Responsible for Executing the Plan

Section 3-B describes roles and responsibilities of individuals responsible for administration and implementation of the WFMP. The REU Director and City of Redding (COR) Fire Marshall's Office are responsible for oversight of the REU Wildfire Prevention and Improved Response Program. The ownership and technical support responsibilities are also identified for each program and wildfire prevention strategy plan. In addition, Section 3 describes REU's governance structure and coordination between city departments. Section 3 also sets forth the organizational structure of REU, REU's coordination with joint pole users, and coordination with other City of Redding departments including the RFP, RPD, the Public Works Department, the Community Services Department, and other Redding departments and administrators.

3.1.5.2 Metrics

Section 8-A of REU’s WMP provides REU’s proposed metrics to monitor the performance of its Plan. The metrics are intended to result in measurable, tracked results illustrating the efficacy of the Plan through to successful implementation. Tracking these metrics will also inform appropriate revisions and updates to the Plan in future years. There are no set standards for metric development as they remain unique to a utility’s approach in fire prevention and Plan execution.

The statutory requirements for the inclusion of metrics are found in PUC Section 8387(b)(2)(D) and (E) where utilities are directed to present these metrics and address how prior metrics impact the proposed metrics for the next version of the Plan. The two proposed metrics in REU’s 2019 WMP (shown in Table 5 below) serve as REU’s first version, providing no previous metrics with which to compare. This metrics represent REU’s approach to track fire ignitions and wires down related to its electrical infrastructure. The underlying assumptions suggest that monitoring the frequency and cause of ignition event will shape the direction of mitigation strategies as this information is collected and analyzed. These proposed metrics meet the statutory requirements and will assist in providing insight on the effectiveness of the Plan in future years. REU is also monitoring and tracking implementation of its plan through other means including the use of the online tool Smartsheets to manage projects started under or related to the WMP.

Table 2: REU Proposed Metrics

Specific metric	Indicator	Measure of effectiveness	Criteria
Wire down events	Count of events	No material increase	Any instance where an electric transmission or primary distribution conductor falls to the ground or on a foreign object. This metric will be further categorized into wires down inside and outside of High Fire Threat Areas.
Fire ignitions	Count of events	No material increase	<ul style="list-style-type: none"> (1) REU facility was associated with origin of the fire (2) Fire was self-propagating and of a material other than electrical and/or communication facilities (3) Resulting fire traveled greater than one linear meter from ignition point (4) REU has knowledge fire occurred

3.1.5.3 Monitoring and Auditing the Plan

REU plans to present its WMP to the Redding City Council on an annual basis and have an independent evaluator review the Plan. REU also states that it will encourage staff and external parties to identify plan deficiencies and report them to the Assistant Director of Utility Operations who will log them, assign staff to correct them, and present them at leadership meetings.

Regarding inspections, REU will perform them based on GO 95 cycles or fire mitigation recommendations. The Assistant Director of Utility Operations also plans to engage internal staff or a third party to review and audit its equipment and line inspection programs after the completion of the first six months of the plan. Any corrective actions identified through this audit will be assigned and tracked. The details of these efforts to comply with 8387(b)(2)(N) are elaborated in Section 8 B-E.

3.1.5.4 Annual Review

The WMP will be reviewed at least annually. The review will include assessments of the WMP’s programs and performance. As part of this process, REU will monitor and audit the implementation of the WMP,

identify and correct deficiencies, and monitor and audit the effectiveness of electrical line and equipment inspections, including inspections carried out by contractors. The findings of these audits will be presented at a public meeting of the Redding City Council.

4. INDUSTRY PRACTICES COMPARISON

In consideration of industry-accepted and demonstrated mitigation measures, Navigant provided a comparison against approved California utility Plans where comparable to REU's service territory, risk profile, and equipment within the HFTD Tier 2 and Tier 3 areas. Highlighted strategies for effective wildfire mitigation are represented in Table 2.

Covered Conductors

Covered conductors are any conductors (wires) protected by layers of insulation, making the conductors protected against inadvertent contacts. These wires are designed to withstand inadvertent contact with vegetation or other debris without starting a fire.

Throughout California, and in many areas of the country, the use of bare overhead wire has been the standard. Bare wire has demonstrated a high-level of reliability in adverse weather conditions such as lightning.

REU is evaluating current construction practices for overhead distribution lines in HFTD and will identify and implement new practices as part of their 10-year Capital Improvement Plan. REU currently plans to cover its equipment jumpers.

Disabling Reclosing Operations

Disabling reclosing refers to the ability to turn off the functionality of substation breakers and reclosers to attempt to isolate fault conditions and re-energize (turn back on) areas of the electric grid. Traditionally, electrical circuits were designed to automatically open and close to detect and isolate faults. In many cases, the relays would make two or three attempts to isolate a fault condition. Each reclosing attempt could cause an electrical spark, which could be a source of ignition. Disabling reclosing significantly reduces the number of potential ignition sources.

REU also maintains SOP-35 which is a protocol for operations during high fire threat conditions. In the event of a Red Flag Warning, this procedure includes disabling reclosers via SCADA for the circuits designated on Tier 2/Tier 3 high fire-threat area affected circuits. Automatic reclosers are then re-enabled via SCADA following the termination or cancellation of a Red Flag Warning issuance after reviewing the circuit reclosers for any applicable inhibit tags to prevent unintended operations.

REU's approach to disabling reclosing is appropriate and consistent with the practices of other utilities.

Non-Expulsive Fuse Devices

Fuses (Fusing) refer to protective devices that defend the distribution system from faulted or damaged lines and equipment. REU plans to use non-expulsive fuses in its HFTDs. It also plans to revise its construction standards to implement arc suppression components, raptor framing, squirrel guards, tree wire, and lightning arresters. This is consistent with the practices being performed by the other utilities in the state.

4.1 Mitigation Strategies Assessment

The following describes the scoring determinations of the benchmarking practice. Navigant weighed strategies that have been demonstrated globally, as well as from those proposed by state utilities. As expressed in Figure 4, this benchmarking practice supports efforts to determine the Plan's comprehensiveness when investigating the mitigation measures proposed in REU's WMP. This

assessment is designed to confirm prudent measures as proposed by REU and did not result in any material findings that would result in non-compliance or lack of comprehensive Plan elements.

Figure 4: Determinations for Benchmarking



Meets the state requirements and aligns with the identified benchmarking practices



The Plan does not effectively describe the mitigation measure to warrant a sound determination or the strategy does not align with the presented best practice strategy. For the purpose of this evaluation, exploratory considerations of proposed best practice measures would fall under this category.



The strategy does not apply to REU or their risk exposure to wildfire events

The selected strategies represented in Table 2 include both statutory requirements that exist as industry standards for POUs as well as accepted industry practices within the state.

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Table 2 Industry Practice Strategy Comparison Matrix

Identified Practice Strategy	Mitigation Rationale	Redding Applicability	Plan Elements	Determination	
<i>Situational Awareness / Weather Conditions</i>					
Investing or investigating in opportunities to procure weather stations for instantaneous weather condition reporting	Having access to internal mechanisms to track fire conditions (high wind, dry conditions, high heat), will aid in responding to and preventing potential fires by enacting related protocols during fire watch conditions	Especially in HFTD, weather stations would allow REU personnel to have access to real-time monitoring of these areas	REU does not have its own weather stations.		REU does not have its own weather stations.
Instantaneous weather conditions web-based portal and GIS data sharing capabilities; weather monitoring	Real-time, weather update tracking allows deepened awareness of the conditions that may lead to a spark or ignition. The weather station servers are able to capture and record several weather and meteorological attributes, allowing forecasting scenarios and learning experiences from high-risk events. The presentation and visualization of this data through GIS monitoring applications will assist future risk models and fire prevention planning	Weather stations should have the ability to capture and interpret the information sent in real-time for operations that warrant mitigation measures.	<p>Through its Technology Solutions Program, REU plans to install an estimated 40 cameras (both fixed and mobile through Unmanned Aerial Vehicles) to provide live feeds to the Department Operations Center (DOC) or command staff. The UAVs will use Forward Looking Infrared Radar (FLIR) technologies to locate hot spots in REU distribution lines. The cameras will also provide real-time information on weather conditions.</p> <p>Per SOP-35, REU also receives immediate emails from NWS when weather alerts for high fire threat conditions are issued. REU staff on duty then log this alert in a Distribution Log and notify the Fire Weather Group.</p>		REU's addition of 40 fixed and mobile cameras with advanced detection capabilities will capture real-time weather information to inform operational response to wildfire threat conditions.

Identified Practice Strategy	Mitigation Rationale	Redding Applicability	Plan Elements	Determination	
Cameras with night vision mode capability atop of electrical structures	Visual inspections can be enhanced through the use of cameras with high definition and night vision capabilities. This measure improves response times in addressing risk incidents and de-energization	REU has facilities within HFTD that would benefit from additional visibility into the regions with greatest threat of ignition or fire spread. This may also be helpful in remote areas of the foothills.	The cameras included in REU's Technology Solutions Program will leverage fire watch systems with a triple optical sensing unit, control and detection software that performs self-diagnostics and smoke detection.		REU's cameras in remote areas of the foothills may improve visual inspections in Tier 2 and Tier 3 areas.
System Hardening / Design & Construction					
Replacing bare wires with covered conductors	Covered wire is a well-demonstrated prevention method to sparks / ignitions during severe weather conditions. Several utilities are employing pilot programs of covered wire replacement of distribution lines, prioritizing HFTD for implementation.	REU has an applicable overhead distribution line within the HFTD that would benefit from additional hardening such as covered wire replacement for existing, legacy bare wire.	REU states that it is evaluating current construction practices for overhead distribution lines in HFTD and will identify and implement new practices as part of their 10-year Capital Improvement Plan. REU currently plans to cover its equipment jumpers, but not the lines because it reduces their ampacity.		While REU does not plan to cover its lines in the HFTD, it does plan to cover its equipment jumpers.

Identified Practice Strategy	Mitigation Rationale	Redding Applicability	Plan Elements	Determination	
<p>New or planned electrical lines (distribution and transmission) that are designed to withstand working loads under the stress above design standards to address high wind speeds</p>	<p>As new capital infrastructure plans are developed, it would be prudent to consider resilient design standards that can withstand sustained winds and gusts that occur during Red Flag Warning periods.</p>	<p>New line construction standards are taken into consideration in accordance with GO95.</p>	<p>REU states that they are evaluating current construction practices for overhead distribution lines in HFTD and will identify and implement new practices.</p>		<p>While under consideration as part of the overhead line rebuild and new construction standards, the WMP does not provide any details related to implementing design standards for high wind pole loading within the HFTD.</p>
<p>Steel or composite poles swapped out for wood poles, at minimum, within the HFTD or fireproofing wooden poles (fire resistant material coating)</p>	<p>When considering pole replacement strategies, when applicable, composite or steel poles can reduce the risk that wood poles present. At minimum, fire retardant material can be coated to temporarily enhance the ability to prevent fire spread or impact the stability of the structure under fire threat.</p>	<p>While pole remediation activities exist, such as additional clearing, coring to test structural integrity, and coating mechanisms, when new poles are considered for high fire severity zones, more resilient designs should be a consideration.</p>	<p>REU plans to install steel poles (or convert to underground) as 115kV transmission poles in Tier 2 and Tier 3 areas reach the end of their useful life. REU also has a stockpile of modular steel poles to replace poles in the event of an emergency.</p>		<p>REU is swapping out wood poles for steel poles as they reach the end of their useful life or in an emergency.</p>

Identified Practice Strategy	Mitigation Rationale	Redding Applicability	Plan Elements	Determination
<p>Pole loading assessment and remediation</p>	<p>Carry out programs that address pole loading issues and inspections that would result in remediation to infrastructure.</p>	<p>REU must comply with PRC 4292 for pole clearing activities for vegetation risk and should also maintain awareness of the decay and structural integrity of aged or impacted poles within the service territory.</p> <p>General Order 165 is considered a "best practice" by many public owned utilities. GO 165 Section III A (5) defines "Intrusive" inspection as one involving movement of soil, taking samples for analysis, and/or using more sophisticated diagnostic tools beyond visual inspections or instrument reading.</p>	<p>REU has a wood pole inspection and treatment program. All wood poles with operating devices are cleared of vegetation within a 10-foot radius. Poles are identified for replacement are done so on a priority basis depending upon the level of deterioration.</p>	<p>REU complies with PRC 4292 for managing vegetation risk.</p> <p>REU also conducts an intrusive wood pole inspection program in alignment with best practices.</p>

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Identified Practice Strategy	Mitigation Rationale	Redding Applicability	Plan Elements	Determination	
<p>Expulsion fuse device change out to current-limiting (non-expulsive) fuses</p>	<p>Traditional fuses pose a fire risk due to the ignited material that can be expelled. Best practices for mitigating this risk is to change out these fuses with non-expulsive fuses</p> <p>A protective device coordination study achieves an optimum balance between equipment protection and selective isolation that is consistent with the operating requirements of power systems.</p>	<p>High fire threat areas would benefit from the replacement of traditional fuses with ones that minimize sparks and arcs</p> <p>Electrical systems use fuses and circuit breakers to protect electrical equipment. Equipment failures and other anomalies may cause a short circuit. Risks are reduced within High Fire Threat Areas when a short circuit impacts only that portion of the system where the failure occurs.</p>	<p>REU has included non-expulsive fuses of up to 60amps in its 10-year Capital Improvement Plan.</p>		<p>REU plans to use non-expulsive fuses in its HFTDs. It also plans to revise its construction standards to implement arc suppression components, raptor framing, squirrel guards, tree wire, and lightning arresters.</p>
<p>Tree attachment removals</p>	<p>This practice involves the removal of electrical infrastructure fastened to trees for infrastructural support but can be a source of ignition. The removal of these legacy devices may reduce electrical spark risk.</p>	<p>REU does not have any tree attachments for which to consider</p>	<p>REU does not have any tree attachments for which to consider.</p>		<p>This mitigation strategy does not apply to REU's existing equipment</p>

Identified Practice Strategy	Mitigation Rationale	Redding Applicability	Plan Elements	Determination
<i>Vegetation Management</i>				
<p>Routine vegetation inspections in accordance with: Public Resources Code (PRC) 4292 & 4393, FAC 003-4, General Order (GO) 95 Rule 35 and Appendix E, and ANSI A300</p>	<p>State and federal compliance for vegetation management and inspection, as well as California Public Utilities Commission GO 95, which is accepted as industry standard amongst all utilities. (Community and investor owned).</p>	<p>PRC sections 4293 and 4293; FAC 003-4; GO 95 is required by the CPUC for investor owned utilities. As a publicly owned utility, REU meets the standards of PRC sections 4292, 4293 and the GO 95 Appendix E guidelines</p>	<p>REU indicates meeting or exceeding the required vegetation management standards. It has seven arborists and a contract for tree trimming services as needed to perform this work.</p>	<p>REU meets or exceeds the requirements for routine vegetation inspections and deploys industry best practices.</p>
<p>LiDAR Technology for vegetation management inspections</p>	<p>Where foot patrols or normal helicopter patrols are insufficient to evaluate the right-of-way (ROW) clearance, utilities use LiDAR technology to identify trees along the ROW border that can potentially contact with lines during high wind events.</p>	<p>LiDAR is demonstrated as an effective tool for transmission level inspection of dense vegetation within the corridor and adjacent to the easement area.</p>	<p>REU plans to use unmanned aerial vehicles during high fire threat days for early detection and infrared inspection of hard to reach areas.</p>	<p>REU plans to use unmanned aerial vehicles during high fire threat days for early detection and infrared inspection of hard to reach areas.</p> <p>REU also inspects its 115kV transmission lines using helicopter patrols.</p>

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Identified Practice Strategy	Mitigation Rationale	Redding Applicability	Plan Elements	Determination	
<p>Hazardous tree/vegetation identification and removal protocols and programs</p>	<p>Recording and tagging trees that pose risks to adjacent electrical equipment or are dead/dying are considered prudent efforts for vegetation management practices</p>	<p>Within the high fire risk area, danger trees could pose a greater potential to catch on fire or contribute to fire spread. Addressing, through identification and surveying, as well as implementing remediation activities will result in further wildfire risk reduction</p>	<p>REU works with customers as needed to remove hazardous vegetation and trees. Customers not allowing clearing must sign form to refuse service. REU will also work with adjacent customers to get approval for wider clearance of their land, which could include tall, diseased, and leaning trees that appear to be at risk of falling into REU lines. REU will coordinate with RPD and RFD as necessary if clearing is refused. The utility also has a 30-foot clearance perimeter around its Power Plant and substations, additional clearances in easements, and no vertical coverage above REU sub-transmission lines.</p>		<p>REU routinely identifies trees and removes them if they have potential of falling into lines.</p>
<p>Off-Cycle / Call-in vegetation removal or corrective work, especially during the fire season</p>	<p>Off-cycle practices of vegetation inspection and management</p>	<p>Within REU's service territory and particularly within the high fire risk area, impact trees could pose a greater potential to catch on fire or contribute to fire spread. Addressing, through identification and surveying, as well as implementing remediation activities will result in further wildfire risk reduction</p>	<p>REU has hired 19 additional fire fighters and 3 workers to expand its vegetation management and improve fire response.</p>		<p>REU performs increased evaluation of and management of vegetation within the HFTD. This is in line with industry practices</p>
<p>Emergency Response & Recovery</p>					

Identified Practice Strategy	Mitigation Rationale	Redding Applicability	Plan Elements	Determination
<p>Notify critical facilities and public safety partners, which may include first responders, incident origin law enforcement, acute health care facilities, essential service providers, related governing local and state agencies, adjacent jurisdictions, vulnerable populations, and the Independent System Operator (ISO) (for transmission level de-energization).</p>	<p>Following a sequence of events in contacting public safety partners and impacted community facilities will enable quicker response in reacting to an emergency event (such as a wildfire or de-energization). Utilities should describe their processes to notify critical facilities as it applies to their service territory and impacted communities as well as grid operators.</p>	<p>Notification practices targeting key stakeholders are crucial during emergency events such as storms and wildfires.</p>	<p>REU has several communication pathways in an emergency event, including coordinating with RFD/RPD through REU's 24/7 Operations Center, coordinating with RFD/RPD through the REU EOP, coordinating with RFD/RPD in conjunction with the joint dispatch agency (Shasta Area Communication Agency) for notification to community that requires PSPS, developing a communications protocol with Shasta County Health and Human Services for notifications to vulnerable groups, expanding social media use, and providing a web-based map for the public to see outages and restoration times.</p>	<p>The notification process to critical facilities and public safety partners is articulated in the WMP.</p>

Identified Practice Strategy	Mitigation Rationale	Redding Applicability	Plan Elements	Determination
<p>Incident Command Team / Emergency Operations frameworks in the event a de-energization event or wildfire incident occurs</p>	<p>Using the State Emergency Management System (SEMS) framework, which is determined on the Federal Emergency Management Agency (FEMA) structure for incident command protocols will ensure prepared and adequately trained staff to respond in effective communication manners as well as respond to risk events in a sequence of effective procedures</p>	<p>REU leverages the SEMS framework in designing emergency response protocols. A designated team or group of individuals should have the ability to relay information and make informed decisions during emergency response events.</p>	<p>As mandated by both SEMS and NIMS, REU utilizes the Incident Command System (ICS) to manage response activities in the field.</p> <p>Specifically, REU has SOP-200 which is an Emergency Operations Program that includes an ICS framework. REU has Operations, Planning & Intelligence, Logistics, and Finance Units per an ICS structure. This procedure would be used in the event of de-energization or a wildfire incident. It also trains on this procedure twice a year.</p>	<p>REU has an ICT / Emergency Operations framework.</p>

Identified Practice Strategy	Mitigation Rationale	Redding Applicability	Plan Elements	Determination
<p>Coordination with stakeholder agencies/entities with routine meetings to discuss emergency preparedness needs and areas of improvement, etc.</p>	<p>Communicating with vested stakeholders during wildfire mitigation activities, PSPS events, and general strategy development will help drive efforts to better align with the risk profile of the utility's service and asset territory. These efforts should occur throughout the year and wildfire mitigation plan planning process</p>	<p>The City of Redding has planning, communication, and coordination obligations pursuant to SEMS. The City maintains an All Hazards Emergency Operations Plan that includes REU. The City also works closely with the Shasta County Sheriff's Office of Emergency Services (OES) and coordinates with Federal, State, and local agencies. The OES coordinates and maintains the Emergency Operation Center (EOC) and assists with disaster training and emergency plan preparation.</p> <p>REU works closely with the EOC and other City departments to assure effective communications and coordination.</p>	<p>In coordination with other City departments, REU trains on its Emergency Operations Program procedure twice a year. REU also works closely with RFD and other Departments on programs such as the REU Wildfire Prevention & Improved Response Program. As part of its Technology Solutions Program, REU plans to enhance its City-wide Communications Platform (e.g., radios and supporting equipment), which will allow City Departments to communicate reliably without cross-channel interference.</p> <p>REU is also a member of the California Utility Emergency Association and participates in the Western Energy Institute's Western Region Mutual Assistance Agreement.</p>	<p>The efforts could be extended to develop an emergency management plan specific to wildfire emergencies.</p>

Identified Practice Strategy	Mitigation Rationale	Redding Applicability	Plan Elements	Determination	
<i>De-Energization & Recloser Operations</i>					
<p>Disabling reclosers through blocking reclosing operations (distribution level) in the HFTD during the fire season and/or during Red Flag Warnings issued by the National Weather Service (or as fire risk potential designates)</p>	<p>Disabling reclosing reduces the number of potential ignition events during a fault condition</p>	<p>Reclosing operations should be defined within the Plan as per statute. Operational best practices align with having settings that align with fire potential weather conditions to prevent potential ignition</p>	<p>REU developed and maintains SOP-35 which is a protocol for operations during high fire threat conditions. In the event of a Red Flag Warning, this procedure includes disabling reclosers via SCADA for the circuits designated on Tier 2 and Tier 3 affected circuits.</p>	●	<p>REU provides a protocol for recloser operations during Red Flag Warnings.</p>

Identified Practice Strategy	Mitigation Rationale	Redding Applicability	Plan Elements	Determination
<i>Internal Operations and Inspection Practices</i>				
<p>Ground patrol as well as aerial inspection practices</p>	<p>Routine ground patrols are implicit practices in equipment and vegetation inspection protocols. Increasing the frequency, especially in the HFTD, presents as effective preventative measures and ensures the integrity of electrical equipment. Aerial inspections, by way of helicopters, will lead to greater coverage of the service territory and areas adjacent to required clearances</p>	<p>Ground patrols are a required strategy in ensuring safe and reliable delivery of electricity. When access concerns arise, aerial inspections provide better coverage in surveying and inspecting electrical equipment throughout the utility service territory</p>	<p>REU conducts ground patrols, annual infrared patrols of overhead lines and substations, intrusive inspection of wood poles, and annual inspections of 115 kV lines by helicopter.</p>	<p>REU performs annual inspections of its equipment. It is also exploring the use of UAVs with IR and possibly LIDAR capability in high fire threat areas. It is also seeking to implement a UAV inspection program.</p>
<p>Wildfire Infrastructure Protection Teams</p>	<p>An internal team to help coordinate efforts to ensure the Plan is being followed as well as coordinating efforts to enhance the Plan's strategies and quality check that activities are being performed and tracked aligning with the Plan</p>	<p>An internal team to prepare and protect physical aspects of the electric system as well as ensure effective mitigation measures are carried out would be a prudent activity to pursue</p>	<p>REU works with other departments of the City to mitigate the threat of wildfires, including fire, CalFire, police, public works, and more.</p> <p>The Assistant Director of Operations at REU will be responsible for enhancing the Plan and ensuring programs and strategies are being managed effectively.</p>	<p>As REU further develops its Wildfire Mitigation Plan, development of Wildfire Infrastructure Protection Teams should be considered.</p>

Identified Practice Strategy	Mitigation Rationale	Redding Applicability	Plan Elements	Determination
<p>Infrared corona scanning and high definition imagery technology for inspection practices along with visual inspections</p>	<p>Infrared and ultraviolet (Corona) light cameras are typically mounted to helicopters with special attention to splices, conductor connection/attachment points, and insulators for a detailed visual of electrical equipment</p>	<p>Infrared is an accepted practice that enables better awareness of the utility's equipment</p>	<p>REU conducts annual infrared patrols of overhead lines and substations to detect problems before they reach the point of failure</p>	<p>The use of infrared scanning is appropriate for the nature of the REU distribution system.</p>

5. RESULTS & DISCUSSION

Navigant concluded this assessment on November 21, 2019. Over the course of reviewing REU's WMP and supporting documentation, Navigant captured takeaways and findings that align the Plan with state laws and effective wildfire measure demonstration. REU's Plan appropriately responds to each of the required elements of PUC Section 8387, which is detailed in Appendix A. The following describes the assessment and resulting findings of the Plan's proposed and established mitigation measures as it applies to safe, reliable operation of all electric infrastructure and wildfire prevention and response.

Report Conclusions

After internal review of the latest version of the WMP and associated data collection products, Navigant concludes this Report with the following:

1. REU's WMP aligns appropriately with PUC Section 8387 and includes all required elements.⁸
2. REU's Plan is determined to be comprehensive as described throughout this Report.

⁸ Following acceptance of this Report, REU will post the Report and results online for public view. The Report is scheduled for presentation to the City Council at a public meeting in December 2019. Accomplishing these follow-up tasks will meet all required statutory provisions up until presenting the final WMP to the City Council.

APPENDIX A. STATUTORY COMPLIANCE MATRIX

Required Statutory Element	Plan Section Reference(s)	REU Plan Elements (Summarized)	Meets Section Elements (Determination)
<p>(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.</p>			
<p>(b) (1) The local publicly owned electric utility or electrical cooperative shall, before January 1, 2020, 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.</p>			
<p>(2) The wildfire mitigation plan shall consider as necessary, at minimum, all of the following:</p>			
<p>(A) An accounting of the responsibilities of persons responsible for executing the plan.</p>	<p>Section 3-B, p. 8</p>	<p>Section 3-B describes roles and responsibilities of individuals responsible for administration and implementation of the WFMP.</p> <p>The REU Director and City of Redding (COR) Fire Marshall's Office are responsible for oversight of the REU Wildfire Prevention and Improved Response Program. The ownership and technical support responsibilities are also identified for each program and wildfire prevention strategy plan. In addition,</p>	<p>Yes</p>

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		Section 3 describes REU's governance structure and coordination between city departments.	
(B) The objectives of the wildfire mitigation plan.	Section 2 A-D, pp. 5-7	REU clearly identifies four specific objectives of the WFMP. The objectives specifically identify minimizing risk of catastrophic wildfire caused by electrical equipment, maintaining electric service and improving system resilience, implementing effective wildfire mitigation programs, and monitoring the effectiveness of the plan and revising mitigation methods as needed.	Yes
(C) A description of the preventive 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.	Section 2-C, pp. 5-7 Section 5 A-L, pp. 13-18	REU's WFMP identifies 8 wildfire prevention strategies and 4 programs.	Yes
(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.	Section 8-A, p. 22	The WFMP includes language describing two metrics (fire ignitions and wires down) that may be used to evaluate the mitigation plan and the assumptions that underlie the use of the metrics.	Yes
(E) A discussion of how the application of previously identified metrics to previous wildfire mitigation plan performances has informed the wildfire mitigation plan.	Section 8-A, p. 22	REU was not been previously required to have a WFMP. Therefore, information related to previous metrics is not available in the context of a WFMP. However, REU has tracked outages and historic fire records to assess its wildfire risk.	Yes

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<p>(F) Protocols for disabling reclosers and deenergizing portions of the electrical distribution system that consider the associated impacts on public safety, as well as protocols related to mitigating the public safety impacts of those protocols, including impacts on critical first responders and on health and communication infrastructure.</p>	<p>Section 5-G, p. 17</p>	<p>REU disables its automatic reclosers during Red Flag Warnings. This protocol is described in <i>SOP-35 Operating During High Fire Threat Conditions</i> (Appendix F of the Plan), in which REU details its recloser protocol. The Plan should refer to this procedure and its recloser policy in more detail.</p> <p>REU will not employ pre-emptive power shut offs during high fire threat periods due to community risks and because it plans to use real-time information and other mitigation strategies (e.g., vegetation management, system hardening, and situational awareness) to avoid shutting off power. However, REU will shut off power if directed to by Redding Fire, Police, Cal Fire, and other emergency responding agencies.</p>	<p>Yes</p>
<p>(G) Appropriate and feasible procedures for notifying a customer who may be impacted by the deenergizing of electrical lines. The procedures shall consider the need to notify, as a priority, critical first responders, health care facilities, and operators of telecommunications infrastructure.</p>	<p>Section 5-F: pp. 16-17 Section 6: p. 19</p>	<p>REU has established notification and communication plans as part of its Emergency Operations Program to coordinate with emergency response personnel and maintain open lines of communication with customers. If directed to during emergencies, REU will coordinate with RFD and RPD in conjunction with the joint dispatch agency, Shasta Area Communication Agency (SHASCOM) for notifications to communities that require public safety power shutoffs. REU will also use social media and a web-based map to provide the public with more information on outages and estimated restoration times.</p> <p>Section 5-F states that it is developing a communications protocol with Shasta County Health and Human Services for notifications to vulnerable groups and coordinating with RFD and RPD through its Emergency Operating Procedures and 24/7 Operations Center.</p>	<p>Yes</p>

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<p>(H) Plans for vegetation management.</p>	<p>Section 5-A, pp. 13-14</p>	<p>Plan contains a summary description of vegetation management practices consist with NERC Standard FAC-003-4 (for transmission-level facilities), Public Resources Code 4292-4293, California General Order 95 Rule 35.</p> <p>REU has seven arborists and a contract for tree trimming services to complete its vegetation management work.</p> <p>REU is also enhancing its vegetation management program to include 30-feet of vegetation control around its Power Plant and substations, increased easement clearings per CPUC guidance, coordination with customers for wider vegetation clearances, and funding from CARB to increase fire fuels mitigation.</p>	<p>Yes</p>
<p>(I) Plans for inspections of the local publicly owned electric utility's or electrical cooperative's electrical infrastructure.</p>	<p>Section 5-B, pp. 14-15</p>	<p>REU conducts annual infrared (IR) patrol of overhead lines and substations, intrusive inspection of wood poles, annual helicopter inspections of 115 kV lines, and GIS data collection and sharing to inform inspections.</p> <p>It is also considering using unmanned aerial vehicles with IR or LIDAR and plans to increase inspections in high fire threat areas and after other disasters such as storms and snow events.</p> <p>REU may want to consider referencing GO 165 in this section of the Plan either as a comparative practice, or if it uses this standard as guidance for system inspections.</p>	<p>Yes</p>
<p>(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:</p>	<p>Section 4 A - D, pp. 11-12</p>	<p>REU has identified both system & operational risk and geographical & climate risk in its service territory.</p> <p>REU may want to consider more clearly delineating between risks and risk drivers in future iterations of the Plan.</p>	<p>Yes</p>

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<p>(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.</p>	<p>Section 4 A - D, pp. 11-12</p>	<p>The primary risk driver for its system & operational risk is that 50% of its service territory is in Tier 2 and Tier 3 high fire threat areas as defined by the CPUC.</p>	<p>Yes</p>
<p>(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.</p>	<p>Section 4 A - D, pp. 11-12</p>	<p>REU has listed 10 geographical & climate risk drivers including extended drought, vegetation type and density, weather, high winds, terrain, low humidity, changing weather patterns, communities at risk, and fire history.</p>	<p>Yes</p>
<p>(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.</p>	<p>Section 4-E, p. 12</p>	<p>In collaboration with RFD and CalFire, REU reviews the CPUC fire threat map annually to identify and communicate any adjustments based on changes in urban development and vegetation conditions in its service territory.</p> <p>The REU plan has not identified any portion of its system which should be included in a higher risk zone than is currently established and is not making any recommendations to the expand the area of a high fire threat district.</p> <p>Appendix A of REU's WFMP provides a map with REU's Tier 2 and Tier 3 portions of its service territory.</p>	<p>Yes</p>
<p>(L) A methodology for identifying and presenting enterprise wide safety risk and wildfire-related risk.</p>	<p>Section 4-A, pp. 11-12</p>	<p>REU's methodology for identifying and presenting enterprise-wide safety risk and wildfire-related risk is based on the use of historical data. Specifically, REU analyses historic outages and wildfires to assess its risk levels.</p>	<p>Yes</p>

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<p>(M) A statement of how the local publicly owned electric utility or electrical cooperative will restore service after a wildfire.</p>	<p>Section 7: pp. 20-21 Section 5-H: p. 17</p>	<p>REU has a standard operating procedure (SOP-28) that it follows for prioritizing activities for recovery and re-energization after a wildfire. REU uses a five-step approach (Assessment, Planning, Mobilize, Rebuild, and Restore) to restore service. It also has a prioritized list of facilities for restoration.</p> <p>REU is also a member of the California Utility Emergency Association and the Western Energy Institute's Western Region Mutual Assistance Agreement. It would leverage mutual assistance as needed in the restore phase.</p>	<p>Yes</p>
<p>(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:</p>			
<p>(i) Monitor and audit the implementation of the wildfire mitigation plan.</p>	<p>Section 8 C-E: pp. 22-23</p>	<p>The plan states that it will be reviewed annually and presented to Redding City Council.</p>	<p>Yes</p>
<p>(ii) Identify any deficiencies in the wildfire mitigation plan or its implementation, and correct those deficiencies.</p>	<p>Section 8 C-E: pp. 22-23</p>	<p>REU encourages all staff and external parties to identify plan deficiencies and report them to the Assistant Director of Utility Operations who will log them, assign staff to correct them, and present them at leadership meetings.</p>	<p>Yes</p>
<p>(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.</p>	<p>Section 8 C-E: pp. 22-23</p>	<p>Regarding inspections, REU will perform them based on GO 95 cycles or fire mitigation recommendations. The Assistant Director of Utility Operations also plans to engage internal staff or a third party to review and audit its equipment and line inspection programs after the completion of the first six months of the plan. Any corrective actions identified through this audit will be assigned and tracked.</p>	<p>Yes</p>

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<p>(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.</p>	<p>Section 8</p>	<p>REU will present its WMP to the City Council at a public meeting in December 2019.</p>	<p>Yes</p>
<p>(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.</p>	<p>Section 9</p>	<p>REU contracted with Navigant Consulting, Inc. to perform an independent evaluation of its WMP. Qualifications are described in Section 1.</p>	<p>Yes</p>