



P A S A D E N A  
Water & Power  
SERVING THE COMMUNITY SINCE 1906

POWER DELIVERY  
POLICIES & PROCEDURES

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**WILDFIRE  
MITIGATION  
PLAN**

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## 1. OVERVIEW

### Policy Statement

Pasadena Water and Power's ("PWP") overarching goal is to provide safe, reliable, and economic electric service to its local community. In order to meet this goal, PWP constructs, maintains, and operates its electrical lines and equipment in a manner that minimizes the risk of catastrophic wildfire posed by its electrical lines and equipment.

### Purpose of the Wildfire Mitigation Plan

This Wildfire Mitigation Plan describes the range of activities that PWP is taking to mitigate the threat of power-line ignited wildfires, including its various programs, policies, and procedures. This plan is subject to direct supervision by the Pasadena City Council and is implemented by the General Manager of PWP. This plan complies with the requirements of California Public Utilities Code ("CPUC") section 8387 for publicly owned electric utilities to prepare a wildfire mitigation plan by January 1, 2020, and annually thereafter.

PWP is a department within the City of Pasadena. PWP's efforts to mitigate catastrophic wildfires align with the City's goals to provide safe and reliable service to the citizens of Pasadena. This plan represents an update to the fire mitigation manual that Pasadena proactively drafted several years ago. This plan's goals are reflected in PWP's short and long term CIP budget planning. PWP presented this plan to the City Council on 11/18/2019 and will continue to update the plan per the provisions of PUC section 8387.

### Organization of the Wildfire Mitigation Plan

This Wildfire Mitigation Plan includes the following elements:

- Objectives of the plan;
- Roles and responsibilities for carrying out the plan;
- Identification of key wildfire risks and risk drivers;
- Description of wildfire prevention, mitigation, and response strategies and programs;
- Metrics for evaluating the performance of the plan and identifying areas for improvement;
- Review and validation of the plan; and
- Timelines.

## 2. DEFINITIONS

PWP will maintain the following definitions for this plan:

- Wildfire – As defined in Public Resources Code Sections 4103 and 4104.
  - 4103 Wildland: Uncultivated land, other than fallow, neglected or maintained for such purposes as wood or range-forage production, wildlife, recreation, protective watershed cover, or wilderness.

- 4104 Uncontrolled Fire: The term “uncontrolled fire,” as used in this division, means any fire which threatens to destroy life, property, or resources and either: (1) is unattended by any person; (2) is attended by persons unable to prevent its unrestricted spread; or (3) is burning with such velocity or intensity that it could not be readily controlled with those ordinary tools available to private persons at the fire scene.

### **3. OBJECTIVES OF THE WILDFIRE MITIGATION PLAN**

#### **Minimizing Sources of Ignition**

The primary goal of this Wildfire Mitigation Plan is to minimize the probability that PWP’s sub-transmission and distribution system may be the origin or contributing source for the ignition of a fire. PWP has evaluated the prudent and cost-effective improvements to its physical assets, operations, and training that can help to meet this objective. PWP has implemented those changes in design and construction standards consistent with this evaluation.

#### **Resiliency of the Electric Grid**

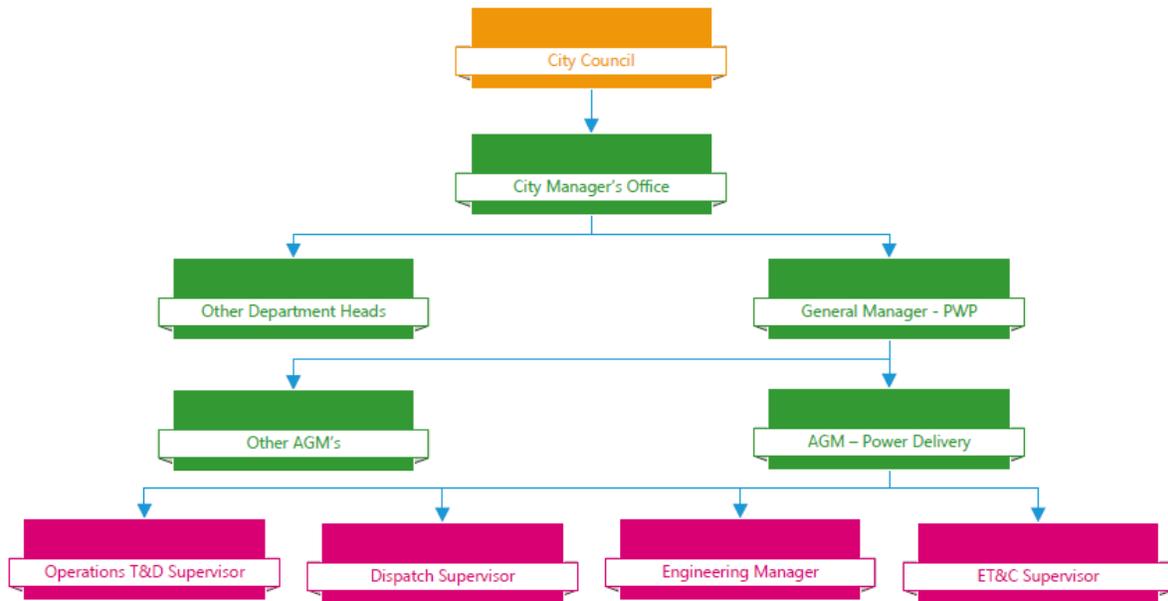
The secondary goal of this Wildfire Mitigation Plan is to improve the resiliency of the electric grid. As part of the development of this plan, PWP assesses new industry practices and technologies that will reduce the likelihood of an interruption (frequency) in service and improve the restoration (duration) of service.

#### **Identifying Unnecessary or Ineffective Actions**

The final goal for this Wildfire Mitigation Plan is to measure the effectiveness of specific wildfire mitigation strategies. Where a particular action, program component, or protocol is determined to be unnecessary or ineffective, PWP will assess whether a modification or replacement is merited. This plan will also help determine if more cost-effective measures would produce the same or improved results.

## 4. ROLES AND RESPONSIBILITIES

### Utility Governance Structure



PWP operates as a department of the City of Pasadena with oversight from City Council. Proposed projects, positions, and budgets are submitted to City Council for evaluation and authorization. This plan will be owned by PWP's Assistant General Manager ("AGM") of Power Delivery.

### Wildfire Prevention

#### All PWP Employees:

- Take all reasonable and practicable actions to minimize the risk of catastrophic wildfires that may be caused by PWP electric facilities.
- Immediately report fires to power dispatch and/or 911 operator, pursuant to existing practices and the requirements of this Wildfire Mitigation Plan

#### Assistant General Manager of Power Delivery

- Provide regular training programs for employees having obligations for implementation of the Wildfire Mitigation Plan.
- Coordinate with federal, state, and local fire management personnel as necessary or appropriate to implement PWP's Wildfire Mitigation Plan.

#### Operations Transmission and Distribution Supervisor

- Operate and construct system in a manner that will minimize potential wildfire risks.
- Conduct continuous vegetation management in order to minimize potential wildfire risks.

- Take corrective action when staff witnesses or is notified that fire protection measures have not been properly installed or maintained.
- Conduct continuous system inspection to minimize potential wildfire risk.

### **Engineering Manager**

- Collect and maintain wildfire data necessary for the implementation of this Wildfire Mitigation Plan
- Conduct electric facility design in a manner that mitigates the potential for wildfire.
- Continually update standards and practices to minimize the risk of wildfire.
- Comply with relevant federal, state, and industry standard requirements, including the industry standards established by the CPUC.

### **Dispatch Supervisor**

- Manage active utility response to wildfire events, and coordinate with the appropriate local or State fire authority.
- Monitor weather conditions and circuits within high fire threat areas during wind advisories and red flag warnings
- Coordinate with Field staff to ensure that circuits are safely reenergized
- Deenergize circuits that pose an immediate risk to public safety

### **Electrical Test and Construction (“ET&C”) Supervisor**

- Operate and construct system in a manner that will minimize potential wildfire risks.
- Take corrective action when the staff witnesses or is notified that fire protection measures have not been properly installed or maintained.
- Conduct continuous system inspection to minimize potential wildfire risk.

## **Wildfire Response and Recovery**

During a wildfire event, PWP staff will follow the policies and procedures outlines in the *Emergency Response Plan*. PWP utility staff have the following obligations regarding fire prevention, response, and investigation:

- Initiate Emergency Response in accordance with the Emergency Response Plan.
- Take all reasonable and practicable actions to prevent and suppress fires resulting from PWP electric facilities
- Follow PWP protocols during Red Flag Warnings.

## **Coordination with Water Department**

It will be the responsibility of PWP Power Delivery to ensure that all pumping stations that require power for the purposes of water line pressurization are a priority consideration for energization or back-up generator dispatch.

## 5. WILDFIRE RISKS AND DRIVERS ASSOCIATED WITH DESIGN, CONSTRUCTION, OPERATION, AND MAINTENANCE

### Particular Risks and Risk Drivers Associated With Topographic and Climatological Risk Factors

Within PWP's service territory and the surrounding areas, the primary risk drivers for wildfire are the following:

- Extended drought
- Vegetation
- Vegetation Density
- Weather
- High winds
- Terrain
- Changing Weather Patterns (Climate Change)
- Communities at Risk
- Fire History
- Electrical Ignition Sources

### Enterprise Safety Risks

Power outages can disable water booster stations during an emergency, which could result in fire fighter's loss of their ability to combat fires. Extended loss of power at public and private communication facilities could limit our ability to communicate during an emergency. Extended loss of power at traffic signals could cause traffic congestion, which would limit our ability to respond to outages. Loss of power for street lighting could cause public safety impacts. Hospitals and other health services and Public Safety Facilities are also a consideration.

### Changes to CPUC Fire Threat Map

PWP will consider the area west of the flood channel and south of the 134 as part of our tier 2 fire threat area in addition to the state approved CPUC fire treat map tier 2 areas (see Exhibit "A").

## 6. WILDFIRE PREVENTATIVE STRATEGIES

### High Fire Threat District

PWP directly participated in the development of the CPUC's Fire-Threat Map,<sup>1</sup> which designates a High-Fire Threat District. In the map development process, PWP served as a territory lead, and worked with utility staff and local fire & government officials to identify the areas of PWP's service territory that are at an elevated or extreme risk of power line ignited wildfire. PWP has incorporated the High Fire Threat District into its construction, inspection, maintenance, repair, and clearance practices, where applicable.

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<sup>1</sup> Adopted by CPUC Decision 17-12-024.

## Weather Monitoring

PWP monitors current and forecasted weather data from the United States National Weather Service.

PWP assigns one of two operating conditions based on the relevant weather data and knowledge of local conditions:

- (1) **Normal:** During normal conditions, no changes are made to operations or work policy.
- (2) **Red Flag:** If the National Weather Service declares a Red Flag Warning for any portion of PWP's service territory, then PWP Dispatch Staff will disable automatic reclosing on field deployed reclosers in the high fire threat areas.

## Design and Construction Standards

PWP's electric facilities are designed and constructed to meet or exceed the relevant federal, state, or industry standard. PWP treats CPUC General Order ("GO") 95 as a key industry standard for design and construction for overhead electrical facilities. PWP meets or exceeds all standards in GO 95.

Additionally, PWP monitors and follows as appropriate the National Electric Safety Code.

## Vegetation Management

PWP meets or exceeds the minimum industry standard vegetation management practices. For transmission-level facilities that PWP solely owns, PWP complies with NERC FAC-003, where applicable. For both transmission and distribution level facilities where PWP is the base owner, PWP meets: (1) Public Resources Code section 4292; (2) Public Resources Code section 4293; (3) GO 95 Rule 35; and (4) the GO 95 Appendix E Guidelines to Rule 35. These standards require significantly increased clearances in the High Fire Threat District. The recommended time-of-trim guidelines do not establish a mandatory standard, but instead provide useful guidance to utilities. PWP will use specific knowledge of growing conditions and tree species to determine the appropriate time of trim clearance in each circumstance.

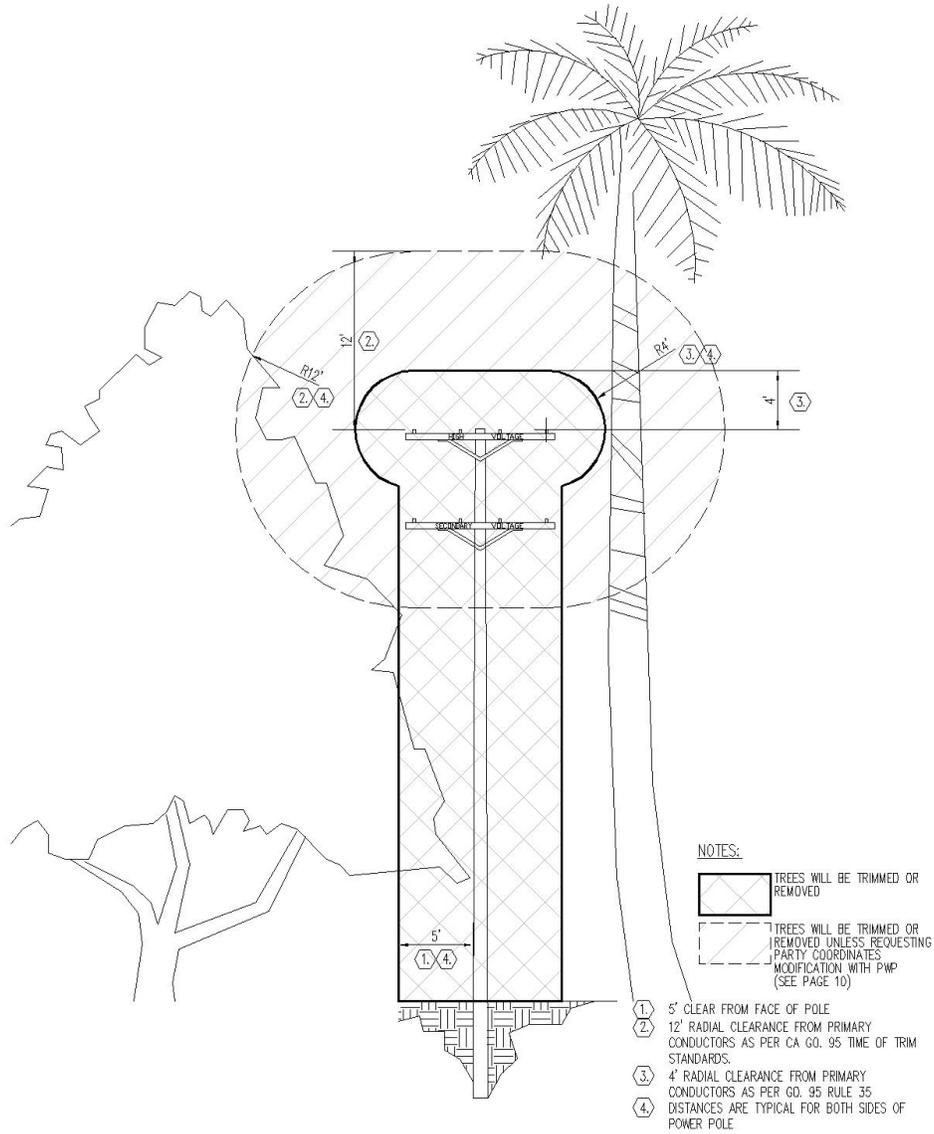
| GO 95, Rule 35, Table 1 |                                                                                      |                                               |                                                         |                                                    |                                                        |
|-------------------------|--------------------------------------------------------------------------------------|-----------------------------------------------|---------------------------------------------------------|----------------------------------------------------|--------------------------------------------------------|
| Case                    | Type of Clearance                                                                    | Trolley Contact, Feeder and Span Wires, 0-5kv | Supply Conductors and Supply Cables, 750 - 22,500 Volts | Supply Conductors and Supply Cables, 22.5 - 300 kV | Supply Conductors and Supply Cables, 300 - 550 kV (mm) |
| 13                      | Radial clearance of bare line conductors from tree branches or foliage               | 18 inches                                     | 18 inches                                               | ¼ Pin Spacing                                      | ½ Pin Spacing                                          |
| 14                      | Radial clearance of bare line conductors from vegetation in the Fire-Threat District | 18 inches                                     | 48 inches                                               | 48 inches                                          | 120 inches                                             |

**Appendix E  
Guidelines to Rule 35**

The radial clearances shown below are recommended minimum clearances that should be established, at time of trimming, between the vegetation and the energized conductors and associated live parts where practicable. Reasonable vegetation management practices may make it advantageous for the purposes of public safety or service reliability to obtain greater clearances than those listed below to ensure compliance until the next scheduled maintenance. Each utility may determine and apply additional appropriate clearances beyond clearances listed below, which take into consideration various factors, including: line operating voltage, length of span, line sag, planned maintenance cycles, location of vegetation within the span, species type, experience with particular species, vegetation growth rate and characteristics, vegetation management standards and best practices, local climate, elevation, fire risk, and vegetation trimming requirements that are applicable to State Responsibility Area lands pursuant to Public Resource Code Sections 4102 and 4293.

| <b>Voltage of Lines</b>                                                                                       | <b>Case 13</b> | <b>Case 14</b> |
|---------------------------------------------------------------------------------------------------------------|----------------|----------------|
| Radial clearances for any conductor of a line operating at 2,400 or more volts, but less than 72,000 volts    | 4 feet         | 12 feet*       |
| Radial clearances for any conductor of a line operating at 72,000 or more volts, but less than 110,000 volts  | 6 feet         | 20 feet*       |
| Radial clearances for any conductor of a line operating at 110,000 or more volts, but less than 300,000 volts | 10 feet        | 30 feet*       |
| Radial clearances for any conductor of a line operating at 300,000 or more volts                              | 15 feet        | 30 feet*       |

\* PWP's Standard tree trimming practice will follow the State's guidelines on time-of-trim clearance. PWP can coordinate with customers to reduce the trimming clearance, however costs associated with modifications, additional patrols or enhanced trimming practices will be funded by the requesting customer



**FIGURE 1**

## Inspections

PWP meets or exceeds the minimum inspection requirements provided in CPUC GO 165 and CPUC GO 95, Rule 18. Additionally, PWP staff use their knowledge of the specific environmental and geographical conditions to determine when areas require more frequent inspections.

If PWP staff discovers a facility in need of repair that is owned by an entity other than PWP, PWP will issue a notice of repair to the facility owner and work to ensure that necessary repairs are completed promptly.

## Workforce Training

PWP has implemented work rules and complementary training programs for its workforce to help reduce the likelihood of the ignition of wildfires. During Pasadena's apprenticeship programs, apprentices are taught how to install and maintain overhead covered wire, inspect overhead assets for potential failures and how to ensure the system has properly installed protection. In the office the engineering department uses its standards to train staff of the enhanced design requirements in high fire threat areas, such as reduced overload criteria for transformers and lower age threshold for pole replacements during routine work.

## Deenergization

PWP has the authority to preemptively shut off power due to fire-threat conditions or when power lines are compromised; however, this option will only be used in extraordinary circumstances. PWP will make a case-by-case decision to shut off power based on the following considerations:

- Red Flag Warnings issued by the National Weather Service for fire weather zones that contain PWP circuits;
- PWP staff assessments of local conditions, including wind speed (sustained and gust), humidity and temperature, fuel moisture, fuel loading and data from weather stations;
- Real-time information from staff located in areas identified as at risk of being subject to extreme weather conditions;
- Input from fire experts and vegetation experts;
- Input from local and state fire authorities regarding the potential consequences of wildfires in select locations;
- Alternative ways to reroute power to affected areas;
- Awareness of mandatory or voluntary evacuation orders in place;
- Expected impact of de-energizing circuits on essential services;
- Other operational considerations to minimize potential wildfire ignitions, including the blocking of reclosers on the identified circuit(s);
- On-going fire activity throughout PWP territory and California;
- Ability to notify customers;
- Notifications to local governments and public officials; and
- Potential impacts to communities and customers

## Impacts to Public Safety

Loss of power could result in:

- De-energization of life support systems
- loss of operational traffic signals
- loss of power to water well sites / pumping stations
- loss of power to sewer systems
- loss of elevator operation

## Customer Notification Protocols

- **Planned Outages**

PWP's current Outage Notification Procedure (Exhibit "A") is to provide advance notification to customers that will be impacted by planned power outages utilizing its "Everbridge" software notification system. This notification protocol will typically provide two advanced notices (3 or 7 days, and 24 hours) to customers that are known to fall within the outage area. Please refer to Exhibit "A" for more information.

- **Unplanned Outages**

If an unplanned event causes a power outage, PWP customers can receive updates by calling power outage hotline at (626) 744-4673 or visiting the outage map available of PWP's website:

<https://ww5.cityofpasadena.net/water-and-power/outage-map/>

- **Power Safety Preemptive Shutoff**

Although it is not currently the intent of PWP to preemptively deenergize portions of the city during periods of elevated fire risk, PWP retains the right to do so provided it has considered all of the factors outlined under "Deenergization" section above. In an event when PWP decides to deenergize power lines, due to fire-threat conditions or when power lines are compromised, PWP will make every effort to provide notification to impacted customers if feasible.

## 7. RESTORATION OF SERVICE

When weather and environmental factors stabilize to safe conditions, PWP Power Delivery Staff will patrol the overhead section of the de-energized line to ensure that the circuit is ready for energization. After the circuit is determined to be safe, PWP patrol staff will inform PWP Dispatch that the line appears safe for energization and PWP Dispatch will follow standard communications protocol to Re-energize the circuit.

## 8. EVALUATING THE PLAN

### Metrics and Assumptions for Measuring Plan Performance

PWP will track two metrics within the high fire threat districts of its service territory to measure the performance of this Wildfire Mitigation Plan: (1) number of PWP caused fire ignitions; and (2) electrical wires down

- **PWP Caused Fire Ignitions**

For purposes of this metric, a PWP Caused fire ignition is defined as follows:

- The fire was self-propagating and of a material other than electrical and/or communication facilities;
- The resulting fire traveled greater than 3.2 feet from the ignition point; and
- PWP has knowledge that the fire occurred.

In future Wildfire Mitigation Plans, PWP will provide the number of fires PWP caused that were greater than 10 acres in size.

- **Electrical Wires Down**

The second metric is the number of distribution and transmission wires downed. For purposes of this metric, a wires down event includes any instance where an electric transmission or primary distribution conductor falls to the ground or on to a foreign object.

### Impact of Metrics on Plan

In the initial years, PWP anticipates that there will be relatively limited data gathered through these metrics. However, as the data collection history becomes more robust, PWP will be able to identify areas of its operations and service territory that are disproportionately impacted. PWP will then evaluate potential improvements to the plan.

### Annual Updates

The annual review of the plan will be preceded by presenting the plan to PWP engineers and operations staff for comments and suggestions. Recommended changes to operating and design procedures will be documented and evaluated against the Metrics collected to measure this plan's performance. If the PWP AGM of Power Delivery agrees that a modification will result in additional fire mitigation, the change will be presented as part of the annual update to the Municipal Services Committee.

### Plan Approval

This Wildfire Mitigation Plan will be presented to the Pasadena City Council for approval. On an annual basis the updated plan and Independent Auditor's report will be provided to the Municipal Services Committee.

## 9. INDEPENDENT AUDITOR

PWP will comply with Public Utilities Code section 8387(c) with any audit requirements.

## 10. PLAN REVISIONS

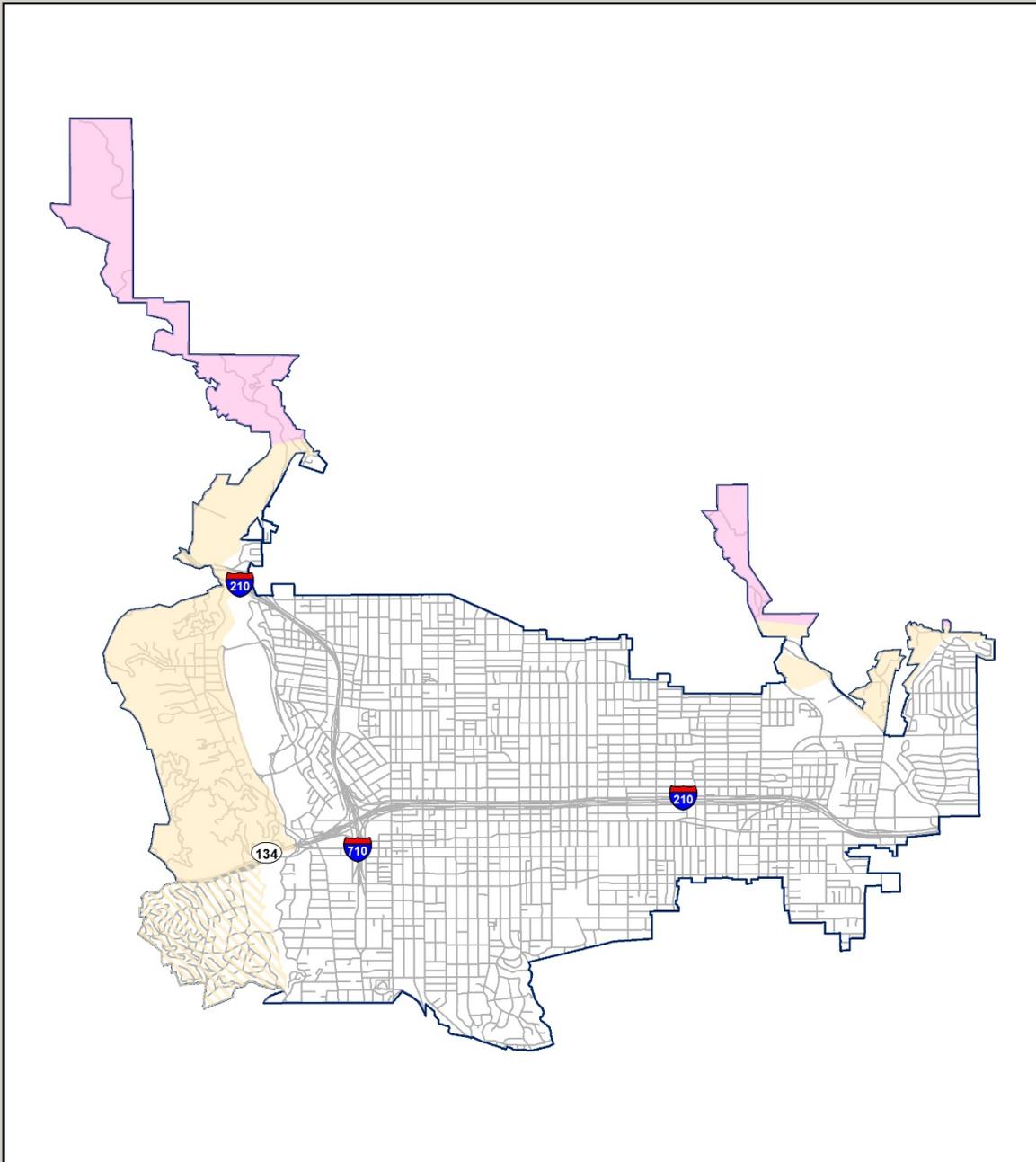
REVISION NO:

0

CHECKED BY: JASON NICCOLI

| APPROVED BY: | TITLE                                            | SIGNATURE                                                                          | DATE       |
|--------------|--------------------------------------------------|------------------------------------------------------------------------------------|------------|
| Marvin Moon  | Assistant General<br>Manager – Power<br>Delivery |  | 11/12/2019 |

# EXHIBIT "A"



## CITY OF PASADENA DEPARTMENT OF WATER & POWER



- |                                                                                                                        |                                                                                                                                     |
|------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
|  TIER 1: HIGH HAZARD FIRE RISK AREA |  TIER 3: EXTREME FIRE RISK AREA                  |
|  TIER 2: ELEVATED FIRE RISK         |  VOLUNTARY TIER 2 EQUIVALENT HIGH FIRE RISK AREA |

## **EXHIBIT “B”**

### **Outage Notification Procedure (Planned Outages)**

#### **Purpose:**

To establish guidelines for scheduling Everbridge Outage Management System (“OMS”) notifications for requested Planned Notifications of Outages. Dispatch/Yard Office Assistants, Principal Power Dispatcher, Crew Supervisors, and OMS Administrator are responsible for following this protocol.

#### **Procedure:**

The Dispatch Office Assistant is the primary person who schedules the Everbridge OMS notifications. If the primary person is unavailable the below persons shall schedule the notifications.

By order:

1. Principal Power Dispatcher
2. Yard Office Assistants
3. OMS Administrator

#### **Steps:**

1. Crew Supervisors shall submit Everbridge OMS notifications request in accordance with table 1 below.

**NOTE for Crew Supervisors: If 1<sup>st</sup> Notification is not received please notify Dispatch Office Assistant.**

| PLANNED OUTAGES<br>(Days in Advance) | 1 <sup>st</sup> NOTIFICATION<br>(Days in Advance) | 2nd NOTIFICATION<br>(Days in Advance) |
|--------------------------------------|---------------------------------------------------|---------------------------------------|
| 10                                   | 7                                                 | 1 (24 hours)                          |
| 4                                    | 3                                                 | 1 (24 hours)                          |
| Emergency <24hrs                     | As soon as possible before<br>outage              | None                                  |
| Services Turn Off/On                 | None                                              | None                                  |
| Meter Testing                        | None                                              | None                                  |
| Customer Requested<br>Shutdown       | None                                              | None                                  |

**Table 1**

2. Upon receipt of Notification of Planned Power Outage email, navigate to Everbridge-BLS website location. Currently: (<http://svrwp-sam:3138/Home>)
3. Click on Everbridge to launch application.

## Business Logic Server - Outbound Call Campaigns

This application allows the tracking and searching of the daily results from the BLS Outbound Calling Campaigns. Results are loaded at the end of each day and does not include campaigns in process.

[Start »](#)

### Getting started

The best way to learn this application is to start using it. Account numbers must be inputted in full without the check digit for search. We hope to expand the search in the future to include more details and flexibility.

[Search »](#)

### View Campaigns

Here you will find the daily results to the campaigns. We process nightly around midnight.

[Campaigns »](#)

### Questions

Having problems? Suggestions? No worries, just ask your friendly PWP IT Staff. We will get back to you shortly.

[Contact »](#)

© 2019 - PWP Application

Once inside the Everbridge application, you will notice all currently scheduled campaigns. This list will only show scheduled campaigns. If a campaign is currently running