

SOUTHERN CALIFORNIA EDISON

Wildfire Mitigation, Safety & Grid Resiliency



Energy for What's Ahead®

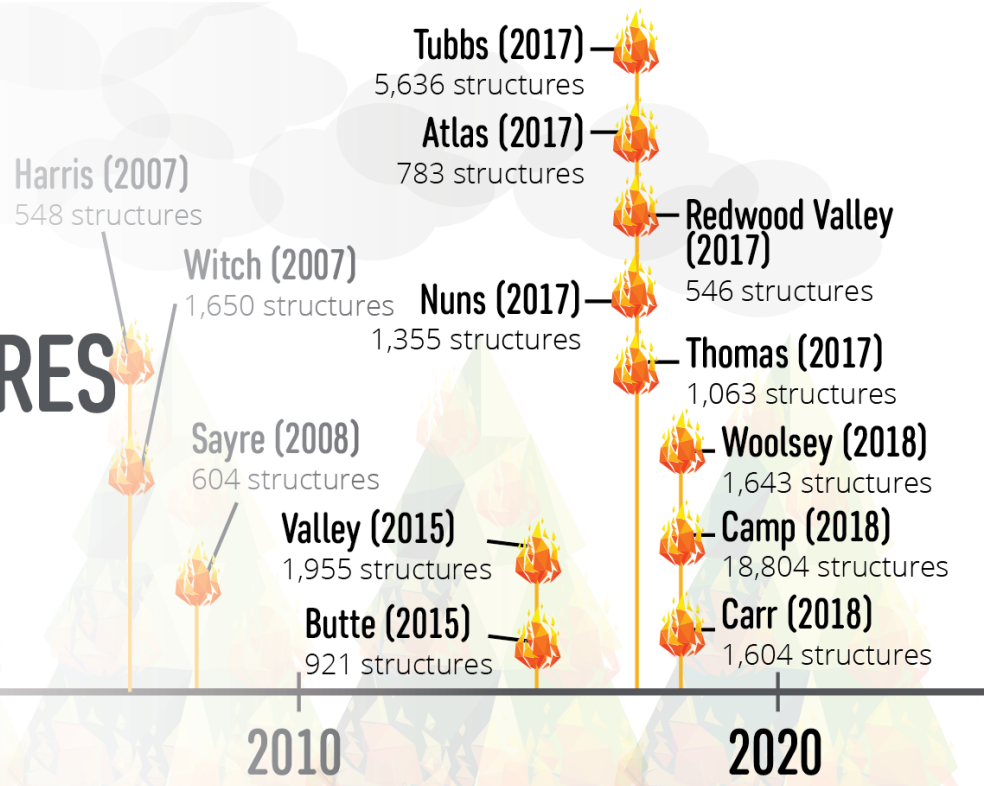


California's Wildfire Risk

Year-Round Fire Season: Changes to California's climate means that the traditional notion of a fire "season" no longer exists

Hazardous fuel is building up: 9M acres of land contain ready-to-burn kindling from nearly 129M trees that have been killed or weakened by drought and bark beetle infestation

10 OF THE 20
MOST DESTRUCTIVE
CALIFORNIA WILDFIRES
HAVE HAPPENED
SINCE 2015^v



SCE's Wildfire Mitigation Strategy

SCE has long taken substantial steps to reduce the risk of wildfires and continues to proactively enhance its operational practices and infrastructure through its comprehensive wildfire mitigation strategy

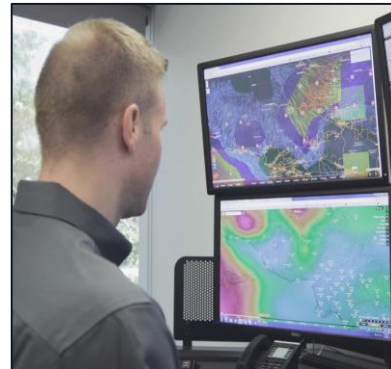
**Long-Standing
Operational
Practices**



**Investing in
System
Hardening
of Electric Grid**

**Bolstering
Situational
Awareness
Capabilities**

**Enhancing
Operational
Practices**



SCE's Wildfire Mitigation Strategy

Focuses on ignition avoidance, targeting highest fire risk areas first

- **Strategy**

- Focus on **Prevention** (*avoiding ignitions*)
- Make advancements in **Resiliency** (*withstand events*)

- **Near-Term Mitigations**

- Operational practices that can be **deployed quickly**
- **Apply broadly** across all high fire risk areas

- **Long-Term Mitigations**

- Multi-year effort to **harden infrastructure**
- Prioritize using **risk-based approach** factoring in both likelihood and impact of ignitions

Mitigation Strategy based on Fire Science

Eliminating any side of the fire triangle can prevent ignitions

Weather
Conditions
(Wind, Humidity)

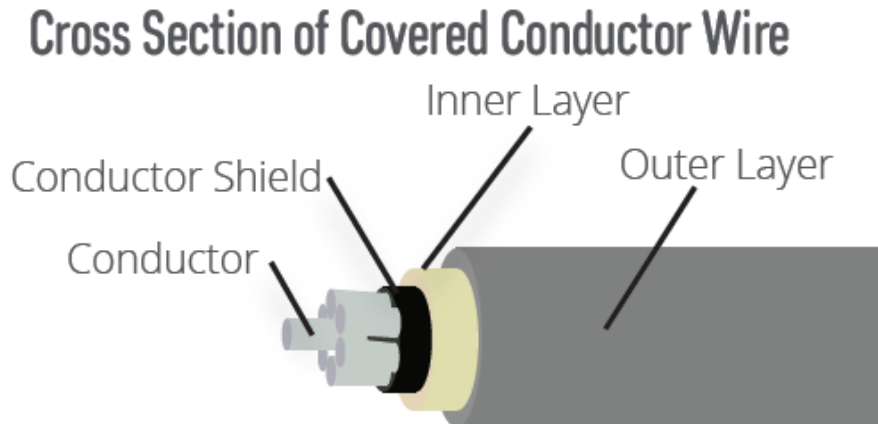


Energy from
Electrical
Infrastructure

Vegetation &
Structures

System Hardening Elements

Covered Conductor



Insulation on wire prevents faults (tree limbs, windborne debris, metallic balloons, etc.) that can lead to ignitions

System Hardening Elements

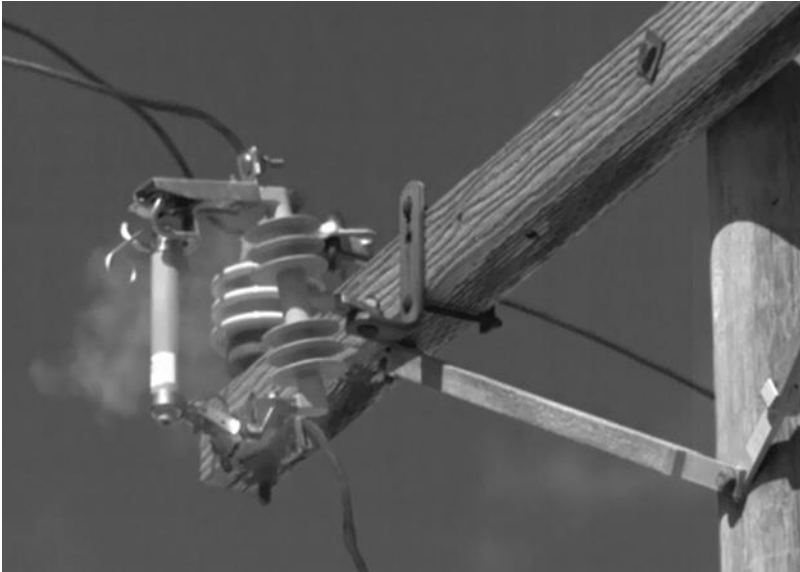
Fire-Resistant Poles



Hardened to survive fires
Speeds restoration following fires

System Hardening Elements

Fast-Acting Fuses



Fault Tamer

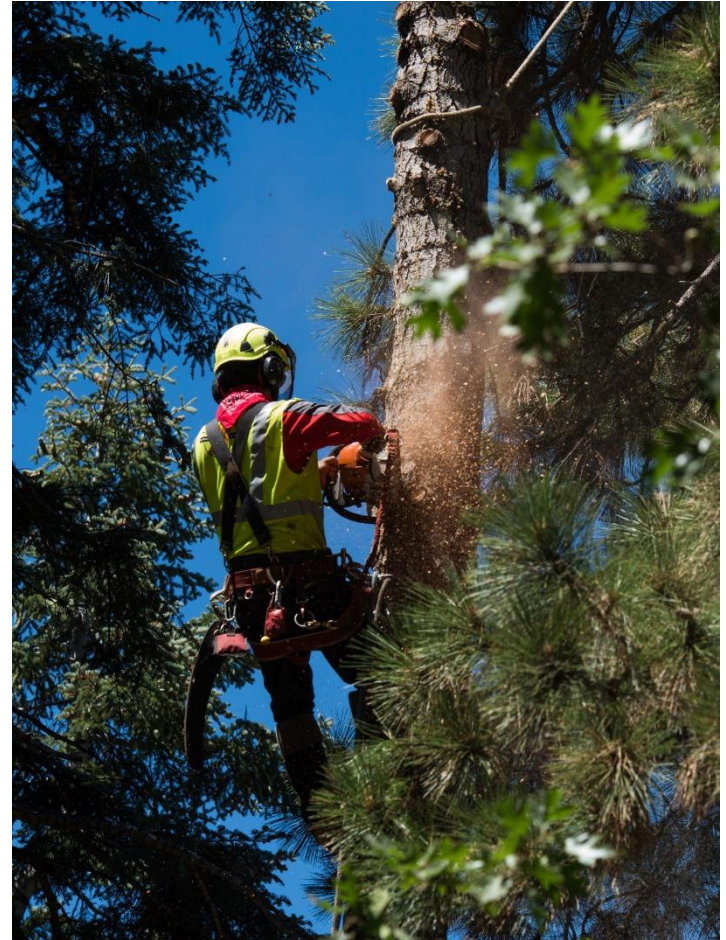


X-Limiter CLF

Reduces fault energy to prevent ignitions
Faster speed of operation

Vegetation Management

- **20+** in-house certified arborists
- **800+** pruning contractors with **60** more crews added June/July 2018
- **≈ 900,000** trees inspected annually
- **≈ 700,000** pruned per year; **400,000** trees in high fire risk areas
- Dead, dying, diseased tree removal; total drought and bark beetle trees removed in 2018 was **24,500**
- Expanding use of Light Detection and Ranging (LiDAR) technology, an advanced laser surveying method, to enhance vegetation management in remote areas of our service territory
- Joint patrols with fire agencies



Dead, dying, diseased trees present a hazard and are removed to protect electrical facilities and eliminate risk of fire.

Fire and Severe Weather Monitoring

Weather Stations



- Hi-Res Data
- Local Weather



Advanced Weather Modeling



- Better Forecasting
- Advanced Warning



Fire Monitoring Cameras



- High-Definition
- Remote-controlled



Situational Awareness Center

SCE meteorologists

24/7 monitoring



AlertWildfire HD Camera

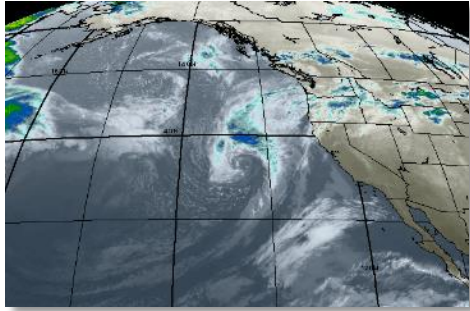


Public Safety Power Shutoff (PSPS)

- De-energization to **prevent wildfire ignitions**
- Used during **extreme weather conditions**
- Limited to **impacted circuits** in high fire risk areas
- Red Flag Warning **does not** mean a PSPS will be called
- Actual frequency of PSPS events will depend on various weather and environmental factors
 - Decision will be made with most accurate assessment of real-time information and situational awareness data

PSPS Decision Points

Decision points include but are not limited to:



SCE Meteorologists forecast **strong wind** conditions in service territory



Real-time observations from qualified electrical workers monitoring for **hazardous conditions** in the field



SCE Fire Scientist assessment **of fire potential** to include consideration of **weather** and **fuels**



Impact of de-energizing circuits on **first responders** and **essential services**

Ideal Timeline*

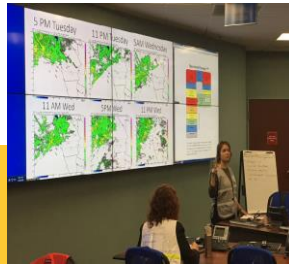
4-7 DAYS
AHEAD



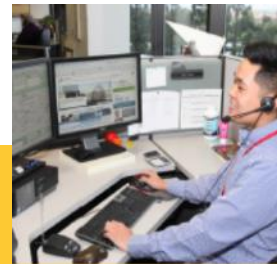
3 DAYS
AHEAD



2 DAYS
AHEAD



1 DAY
AHEAD



POWER
SHUTOFF



POWER
RESTORATION



Forecast
Weather &
Fire
Conditions

Incident
Responders
on Alert

1st
Notification
PSPS
Possible

2nd
Notification
PSPS
Possible

3rd
Notification
Power
Shutoff

4th
Notification
Power
Restored

PLANNING AND MONITORING

OUTAGE

*Erratic or sudden onset of conditions may impact our ability to provide advanced notice to customers.

Coordination with Critical Business and Government Customers

PLANNING

Collaboration
with Critical
Infrastructure



Emergency
Management
Partnerships



Account
Management
for Critical
Customers



Community
Meetings



Cities and counties



Response

California
Utilities
Emergency
Association



Integration
with CalOES



Community Resilience and Preparedness

- **Power Outages Can Occur for Many Reasons**

- Maintenance
- Emergency Repairs
- Requests from Fire Agencies
- Natural Disasters

- **Have a Plan and Be Prepared**

- Be Informed
- Plan Ahead
- Take Action

www.Ready.gov

Thank You

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SCE's Wildfire Mitigation Strategy

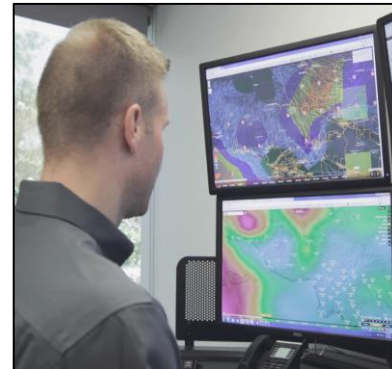
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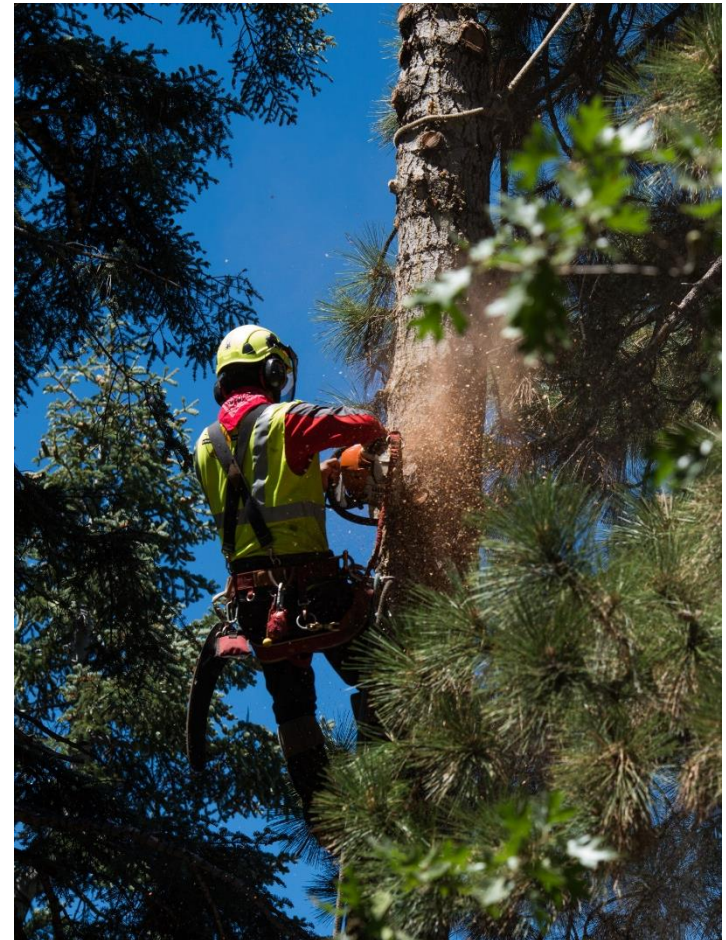
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Ellwood Mesa Emergency Work

- High Fuel Area
- Overgrown Trees Near High Voltage Conductors
- Dead Trees & Over Hangs
- Failed Trees within Eucalyptus Forest
- Signs acknowledging Hazardous Trees
- High Humidity
- Sundowner Winds
- Fires within Area (Holiday Fire)



Pre-Emergency Work Conditions





ADDITIONAL WORK EXPOSED

SCE pre-inspection contractors initially identified hazardous trees at the interface of the SCE ROW. Upon completion of remediation work on the interface trees, dead, dying, or leaning trees behind were now exposed as a hazard to SCE's overhead high voltage electrical facilities.

ELLWOOD MESA POST UTILITY VEGETATION MANAGEMENT ACTIVITY

- Dead Trees Heavy Topped so they can't fall into high voltage facilities
- Crown Reduction on Overgrown Trees
- Removal of Overhangs
- Reduction of dry fuel from trees and ROW raked to mineral earth



Utility Vegetation Management Program

Utility Vegetation Management (UVM) - Program establishes effective controls and processes which are designed to comply with Federal and State regulations under the Energy Regulation Compliance Program's (ERCP's) jurisdiction which relate to utility vegetation management.

Mission: Further prevent risks to public safety and system reliability by managing vegetation in proximity to our electric facilities

Objectives: maintain a safe and reliable electric transmission and distribution system by using a defense-in-depth strategy to manage vegetation and minimize encroachments from vegetation, thus effectively managing the risk to public safety, vegetation-related wildfires, and vegetation-related outages that could lead to Cascading.

- Program elements:
 - Transmission Vegetation Management Plan (TVMP)
 - **Distribution Vegetation Management Plan (DVMP)**
 - Hazard Tree Management Plan (HTMP)
 - Integrated Vegetation Management Plan (IVMP)

Distribution Vegetation Management Plan (DVMP)

Maintenance strategies for distribution circuits designed to comply with regulatory Compliance Requirements, such as CPUC GO95 Rule 35, Public Resource Codes 4292 and 4293, and applicable California Department of Forestry and Fire Protection (CALFIRE) Codes for management of vegetation to ensure safety and reliability

DVMP Tree Pruning and Removals

- **Pruning:** CPUC requirement specifies maintain a minimum 4 ft. clearance distances at all times
 - 2017 CPUC decision increased General Order 95, Rule 35, Appendix E “recommended time-of-trim clearance” in HFA: 12 ft. (from 6.5 ft.)
 - To ensure compliance, SCE adopted the following distances:
 - Minimum clearance distance, accounting for sag & sway : 6’
 - Pruning distance: 12’
- **Removal:** Trees that represent a risk to SCE facilities and public safety
 - Fast growing trees that cannot maintain compliance for 12 months
 - Dead, dying or diseased trees
 - Palm trees whose trunks are within 12’ of facilities
 - Trees that cannot be pruned in accordance with ANSI A300 Tree Pruning Standards

DVMP – Notification Process

“Light” Pruning

- Door hanger left for resident; customer permission not obtained

- When pruning need is identified, approximately 30 days prior to maintenance

- Second door hanger is left 24-48 hours prior to maintenance

- SCE Contractor contact information provided. Work will commence without further notification. Customer can make contact if there are questions or conflicts.

“Heavy” Pruning or Removal

- SCE representative makes contact with customer to discuss a plan

- Attempts start when pruning need is identified, approximately 30 days prior to maintenance; may take time to reach customer via phone or in person

- The tree pruning/removal plan requires customer signature prior to heavy maintenance being performed

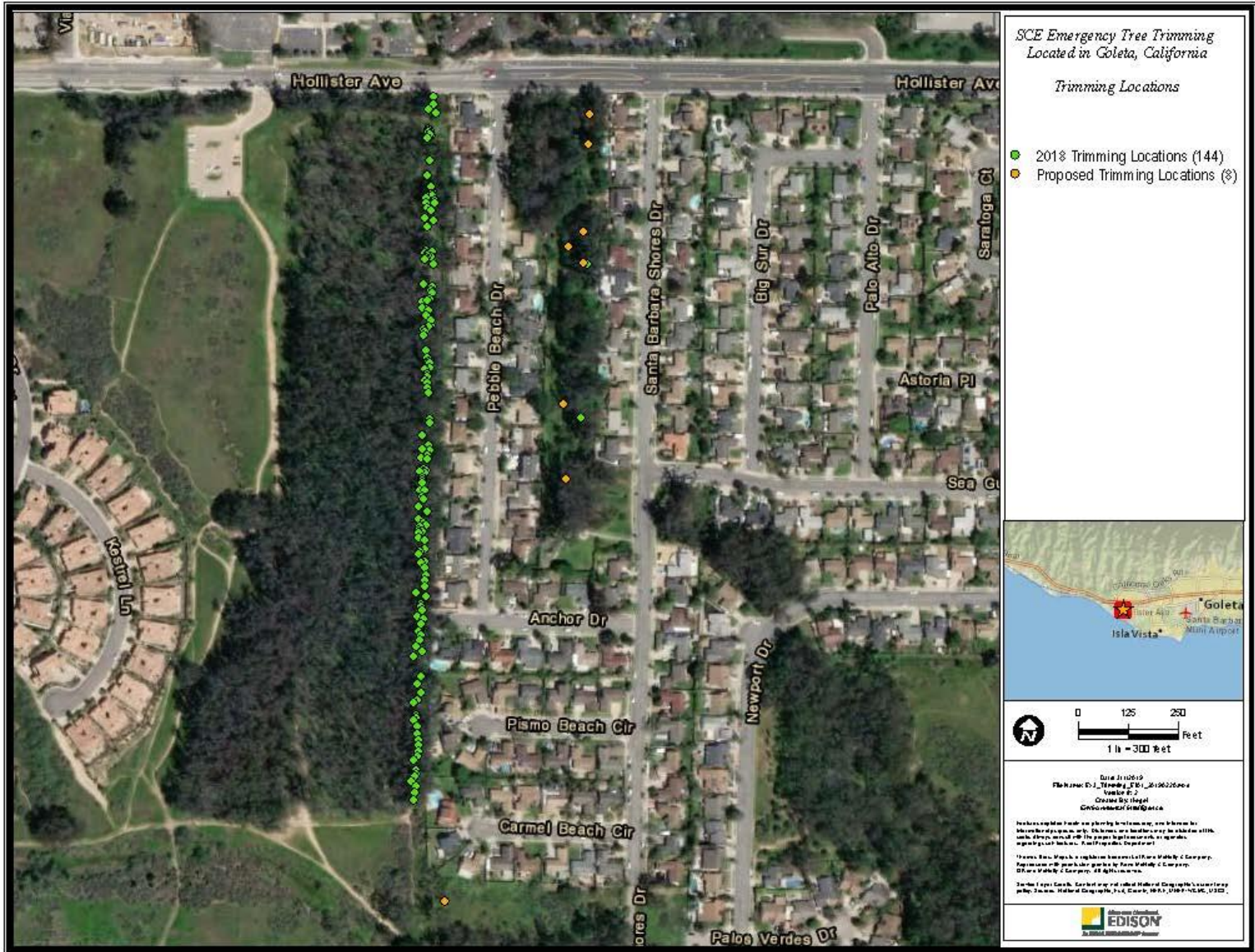
Customer Refusals

- Will be escalated for further evaluation of the risk and consideration of performing the work without customer permission supported by Cal Fire Public Resource Code 4295.5.



Emergencies Identified

- SCE received Emergency Authorization from CCC to trim 30 trees threatening lines
- During subsequent assessment 109 additional trees were identified that required immediate trimming – CCC gave verbal approval for the emergency trimming
- Trees were trimmed in August 2018, an additional 5 trees were identified and trimmed during work; 144 trees total were trimmed.
- Biological monitors were present during the trimming and conducted a preconstruction surveys and monitored the activities
- An additional 8 trees have been identified for trimming in 2019



Questions?