CITY CLERKS: PLEASE POST

AGENDA

PALOS VERDES PENINSULA
PUBLIC SAFETY COMMITTEE

THURSDAY, NOVEMBER 18, 2021
7:30 A.M.

VIRTUAL MEETING

In accordance with Assembly Bill 361 (AB361), due to the continuing state of emergency, including masking and social distancing directives as a result of the threat of the COVID-19 virus, the Palos Verdes Peninsula Regional Emergency Preparedness Committee for Thursday, November 18, 2021, at 7:30 a.m., will be conducted via teleconference using the Zoom platform. Please see separate cover for public participation options.

I.   CALL TO ORDER

II.   ROLL CALL

III. PLEDGE OF ALLEGIANCE

IV.   PUBLIC COMMENT

> **NOTE:** *This is the appropriate time for members of the public to make comments regarding items not listed on this agenda. Pursuant to the Brown Act, no action will take place on any items not listed on the agenda.*

V.   APPROVAL OF MINUTES

A.   MINUTES OF AUGUST 12, 2021

VI.   OLD BUSINESS

A.   UPDATE ON THE PENINSULA EMERGENCY PREPAREDNESS TASKFORCE (RHE VERBAL REPORT)

VII. NEW BUSINESS

A. FINAL DRAFT OF THE PENINSULA WHITE PAPER ON UTILITY COMPANIES' RESPONSE TO A DISASTER (RPV)

B. UPDATE ON PENINSULA WIDE MASS EVACUATION PLANS (RPV AND RH)

C. UPDATE ON WILDFIRE CAMERAS (RPV)

VIII. **OTHER MATTERS FROM REGIONAL EMERGENCY PREPAREDNESS COMMITTEE MEMBERS**

NOTE: *This is the appropriate time for Committee Members to direct the placement of items for future action on upcoming agendas.*

IX. **ADJOURNMENT**

A. Next regular meeting Thursday, February 10, 2022 at 7:30 a.m.

City of Rolling Hills INCORPORATED JANUARY 24, 1957

In accordance with Assembly Bill 361 (AB 361), due to the continuing state of emergency, including masking and social distancing directives as a result of the threat of the COVID-19 virus, this meeting is being held remotely via teleconference. There will not be a physical location for this meeting.

Those members of the public wishing to participate may do so in the following ways:

1. Viewing the "live" meeting: To view the City Council meeting live, email Connie Viramontes at cityclerk@cityofrh.net with you name and contact information prior to 3pm on Wednesday prior to the meeting. Upon successful submission, you will receive an email with further instructions on how to connect to the meeting.

2. Comments on non-agenda and specific agenda item(s): If you wish to make a comment, please submit via email to Connie Viramontes at cityclerk@cityofrh.net. Comments received by 3pm on the Wednesday prior to the meeting will be forwarded to the Committees prior to the meeting for consideration. Comments received after 3pm on the Wednesday prior to the meeting will not be read during the meeting.

3. Comments on non-agenda and specific agenda item(s) during the "live" meeting: If you are watching the meeting live and wish to make a comment on an agenda item, as it is being heard, you may submit your brief comment using the following methods below. Please note that there is a maximum allowance of 3 minutes per individual comment, subject to the Chair's direction. Your comment will be read or heard during the meeting, if received in real time and prior to the commencement of that item.

   a. Email: Comments will be accepted via email at cityclerk@cityofrh.net during the meeting, prior to the close of the public comment portion on an item or during public comments for non-agenda items, and read aloud into the record with a maximum allowance of 3 minutes per individual comment, subject to the Chair's discretion.
   b. Telephone: If you wish to speak during the meeting, email Connie Viramontes at cityclerk@cityofrh.net with you name, contact information, and the item number on which you wish to comment. Upon successful submission, you will receive an email with further instructions on how to connect to the meeting.

In compliance with the American with Disability Act, if you require a disability-related modification or accommodation to participate in this meeting, please contact the City at least 48 hours prior to the meeting via cityclerk@cityofrh.net. Staff will use their best effort to provide reasonable accommodations to provide as much accessibility as possible while also maintaining public safety.

PALOS VERDES PENINSULA
PUBLIC SAFETY COMMITTEE
MINUTES TO MEETING ON THURSDAY, AUGUST 12, 2021

I.   CALL TO ORDER

A meeting of the Palos Verdes Peninsula Regional Emergency Preparedness Committee was called to order by Chair Dieringer at 7:30 a.m. via Zoom.

Mayor Dieringer presiding

II.   ROLL CALL

PRESENT: **Rancho Palos Verdes**
                  David Bradley, Mayor Pro Tem
                  Rolling Hills Estates
                  Steve Zuckerman, Mayor
                  Velveth Schmitz, Councilmember
                  Rolling Hills
                  Bea Dieringer, Mayor
                  Palos Verdes Estates
                  Dawn Murdock, Councilmember

ABSENT: Eric Alegria, Mayor, Rancho Palos Verdes
                  David McGowan, Councilmember, Palos Verdes Estates
                  Patrick Wilson, Councilmember, Rolling Hills

ALSO PRESENT: **Rancho Palos Verdes**
                  Ara Mihranian, City Manager
                  Karina Bañales, Deputy City Manager
                  Jesse Villalpando, Emergency Services Coordinator
                  Mckenzie Bright, Administrative Analyst
                  Rolling Hills Estates
                  Greg Grammer, City Manager
                  Alexa Davis, Assistant City Manager
                  Jessica Slawson, Administrative Analyst
                  Rolling Hills
                  Janely Sandoval, City Clerk
                  Ashford Ball, Senior Management Analyst
                  Palos Verdes Estates

Laura Guglielmo, City Manager
Tony Best, Acting Police Chief
Marcelle Herrera, Community Relations Officer
Los Angeles County Sheriff's Department
Captain James Powers, Lomita Sheriff's Station
Palos Verdes Peninsula Unified School District (PVPUSD)
Brenna Terrones, Assistant Superintendent of Administrative Services
Linda Reid, Board Member
Los Angeles County Fire Department
Acting Chief Bennett, Los Angeles County Fire Department

III. PLEDGE OF ALLEGIANCE

Pledge of Allegiance by Mayor Bea Dieringer.

IV. PUBLIC COMMENT

None.

V. APPROVAL OF MINUTES

A. MINUTES OF MAY 13, 2021

Mayor Dieringer presented the edits to the minutes.

Mayor Pro Tem Bradley motioned to approve the minutes as amended and Mayor Zuckerman seconded the motion.

AYES: Members: Bradley, Zuckerman, Murdock, and Chair Dieringer
NOES: Members: None
ABSTAIN: Members: Schmitz

VI. OLD BUSINESS

A. UPDATE ON JOINTLY FUNDED SCHOOL RESOURCE OFFICER. (PVPUSD VERBAL REPORT)

City Clerk Sandoval informed the committee that staff members from PVPUSD were contacted to join the meeting, but at this time, there were no members to provide verbal report.

Mayor Dieringer informed the committee that the purpose for this item was to clarify if the SRO invoice needed to be paid, since in the previous meeting the committee was informed that payment was not needed.

City Manager Grammer further clarified that this item is reported in every agenda, but agreed with Mayor Dieringer that the main concern was regarding the clarification if the SRO invoices need to be paid, and informed the committee that RHE will be withholding from paying till clarification is provided.

City Manager Mihranian informed the committee that RPV will withhold from paying till clarification is provided, followed by Mayor Dieringer representing RH.

Councilmember Schmitz suggested to clarify and thoroughly communicate with PVPUSD regarding the need for them to attend the meeting.

Due to no PVPUSD staff members attending the meeting at this time, City Manager Mihranian suggested a letter be sent by RPV, RHE, and RH to request for clarification regarding the SRO invoices.

City Manager Guglielmo informed the committee that PVE did already pay invoice as staff was not aware that there was an agreement not to pay the SRO invoice, and if indeed there was an error, PVE will seek a credit to the program for the upcoming school year.

Mayor Dieringer suggested letter should reflect that it is coming from the committee.

Councilmember Murdock also suggested that the letter clarify that PVPUSD staff are supposed to attend the Public Safety quarterly meeting.

Mayor Zuckerman made motion to send letter from the Public Safety Committee, with a clarification about PVPUSD attending the quarterly meeting, and Mayor Pro Tem Bradley seconded the motion

AYES: Members: Bradley, Zuckerman, Murdock, and Chair Dieringer
NOES: Members: None

B. LOS ANGELES COUNTY FIRE DEPARTMENT ANNUAL BRUSH CLEARANCE INSPECTIONS. (LACoFD VERBAL REPORT)

Acting Chief Bennett provided report accounting for the 4,065 total inspections up to July 22, 2021. For the City of PVE, there were a total of 605 parcels with no outstanding initial inspections, and 21 outstanding for re-inspections. For the City of RPV, there were a total of 293 parcels with no outstanding initial inspections, and 24 outstanding for re-inspections. For the City of RH, there were a total of 754 parcels with no outstanding initial inspections, and 36 outstanding for re-inspections. Lastly, for City of RHE, there

were a total of 994 parcels, and 132 outstanding for re-inspections. Goal is to do re-inspections for all four cities by August 15, 2021.

Mayor Pro Tem Bradley and Councilmember Schmitz expressed appreciation for the LACoFD, how they manage the inspections, communication with the residents, and their overall customer service.

Councilmember Murdock requested clarification on what happens if residents that undergo a re-inspection are still found noncompliant.

Acting Chief Bennett explained that residents that are noncompliant after the second re-inspection get an extended 21 days to clear their property, followed by another 14 extension if needed, and if the property is still noncompliant, then the LACoFD submits necessary paperwork to the Brush Clearance Unit, part of the Forestry Division, who can fine the property owners. If property owners are still noncompliant after receiving the fine, then the LACo Forestry Division will clear the property themselves, and send the bill to the property owners.

Mayor Zuckerman requested clarification on how the LACoFD determines which properties are inspected.

Acting Chief Bennett explained that over the years, the LACo Forestry Department has gathered data of parcels that are within a high-risk area, and send the check-list of properties to the corresponding LACoFD units that cover such areas to begin inspections. At times, the LACoFD can also add or remove properties from such list if needed.

Mayor Dieringer also expressed appreciation for the work the LACoFD has done in inspecting the RH community and the Peninsula as a whole.

Linda Reid from PVPUSD logged on at 7:57 am.

A. UPDATE ON JOINTLY FUNDED SCHOOL RESOURCE OFFICER. (PVPUSD VERBAL REPORT)

Linda Reid informed the committee that a new SRO was hired to replace the previous SRO who retired. The new SRO is Robert Watt from City of Torrance who retired from the Torrance Police Department after 26 years of service. Lastly, she informed the committee that the district is offering a COVID-19 Vaccination Clinic on August 18, in efforts to get staff and students vaccinated.

Mayor Dieringer asked Linda Reid regarding the SRO invoices the cities received, even though the cities were informed that they will not be billed for the SRO Program.

Linda Reid informed the committee that when she expressed such comment regarding the cities not needing to pay for the SROs, the kids were not back in schools, thus the program was not undergoing. However, with the schools back in service, the SROs are needed on campus. She also expressed that due to lack of understanding, the cities do not have to pay for the SROs, although they were on campus and services were provided.

Mayor Pro Tem Bradley asked if the invoices were prorated to reflect the whole school year, or solemnly when the SROs were on campus.

Mayor Dieringer asked if the specific time coverage was indicated on the invoices, and asked if the cities were informed that the SROs would be returning to the campus thus the invoices needed to be paid.

Linda Reid informed the committee that the invoices should only reflect the time the kids and SROs were on campus, and to inform her if there are any issues. Furthermore, she was not sure if cities were informed about SROs returning to the campus, but believes the staff were just following the MOU.

City Manager Grammer informed the committee that the invoice did only reflect the time the students and SROs were actually on campus.

City Manager Mihranian stated that RPV did not receive any form of notice that the SROs would return back on campus.

Councilmember Schmitz expressed that due to the multiple changes occurring at a daily, it might be beneficial for PVPUSD to communicate with the committee, so that there is understanding and clarification of upcoming expected events with the caveat that changes can occur.

Mayor Dieringer informed Linda Reid that individual cities can be contacted with suggestion provided by Councilmember Schmitz, and also asked if the individual cities can get data regarding how many students actually returned to campus.

Linda Reid expressed to the committee that such suggestions will be brought back to the districts, and also informed the committee that at this time, the district is expecting to have in-person classes at 100% capacity. She then logged off at 8:09 am.

Councilmember Schmitz explained that it does not matter how many students actually are on the campus, but that as long as the campus is opened, SROs are needed. Furthermore, she also expressed that although having an open dialogue will help the committee, the explanation provided to the committee as to why the invoices were sent is understandable and feels comfortable paying the invoices.

Mayor Pro Tem Bradley made motion to withdraw the letter, to ensure the bills were prorated, and authorize the cities to pay the invoices as prorated, and Mayor Zuckerman seconded the motion.

AYES: Members: Bradley, Zuckerman, Murdock, and Chair Dieringer
NOES: Members: None

C. UPDATE ON THE PENINSULA EMERGENCY PREPAREDNESS TASKFORCE. (RHE VERBAL REPORT)

Administrative Analyst Slawson informed the committee that the Peninsula Emergency Preparedness Taskforce met on July 06, 2021. She reported that the PVPUSD have an on-going brush clearance with the assistance of goats in specific areas, and are reviewing their PPE supplies as they are preparing for in-person classes for the upcoming school year. They have secured 1.7 million dollars through a grant from the Los Angeles County Office of Education through the CDC for COVID testing, and will continue to apply and secure more grant funding, and lastly, they have upgraded some of their security services. PV Transit is also preparing for the upcoming school year and saw an increase in ridership throughout the summer. Then, the Library District expanded their hours of operation during the summer and started opening their meeting rooms on July 10. Southern California Edison (SCE) and Cal Waters are working alongside the cities for wildfire mitigation, and the cities continue to work on clearing brush within their cities.

VII.   NEW BUSINESS

A. UPDATED DRAFT ON THE PENINSULA WHITE PAPER ON UTILITY COMPANIES' RESPONSE TO A DISASTER. (RPV)

Emergency Services Coordinator Villalpando presented the updates. He made revision to the Executive Summary adding a "What is Critical Infrastructure" section, which includes an official and generalized definition of critical infrastructure, "What are the Threats and Hazards to Critical Infrastructure" section, which includes critical information, and added an additional summary table identifying Critical Infrastructure Interdependencies. He presented that revisions were made on the Community Profile Section by adding a map with critical information, and added a Cyber Security Vulnerability Considerations and Mitigation Strategies section. Furthermore he reviewed the Peninsula's previously established Incident Communications Protocols, and made necessary amendments. Emergency Services Coordinator Villalpando stated that overall, the Peninsula Cities, will send a unified message when there is a county, state, or federal government emergency; information posted will need to be approved by the agency that has jurisdiction over the incident; if there is a power outage and/or loss of cell service the Peninsula Cities will work together to distribute information; and lastly, the Peninsula Cities will communicate and coordinate with one another and corresponding

partners when there is a need to issue a uniformed coordinated emergency alerts through the systems in place.

Mayor Zuckerman had concerns that there was no mention of septic tanks when addressing sewers, and how there is no locating the isolation valves for the water lines. He would like to know if such information could be shared with City staff, so that in an event of emergency if the water company is shorthanded, then the City staff could provide visits to certain valves and shut off if ruptured. Furthermore, he also commented that in the communications portion, there is no mention of the new high speed cable managed by the SBCCOG, and recommended it should be included in the paper. Lastly, he mentioned that he noticed there is no mention of the reservoir on PV Drive East and PV Drive North that can potentially rupture during an earthquake, may or may not be a problem, and can potentially be a resource for clean water.

Mayor Dieringer had a question regarding the last part of the changes. She stated that it was indicated that RHE will handle the emergency contact list created by each agency that will be provided to them and distribute it to other cities, but would like to know why Emergency Services Coordinator Villalpando with RPV, will not be handling the list, since he is covers Peninsula wide emergency information and research?

Emergency Services Coordinator Villalpando stated there needs to be edits to the paper to reflect that he is the person of contact and read RPV and not RHE.

City Manager Grammer clarified that if there is an incident that occurs in an individual City, the City in which the incident occurs is responsible for communicating such with the other cities.

Mayor Dieringer recommended that City Manager Grammer's clarification should be revised in the white paper, and how there should be a plan if an emergency event affects more than one city.

Emergency Services Coordinator informed Mayor Dieringer that there is a protocol in place, and provided the plan of communication.

Assistant City Manager Davis informed Mayor Dieringer that City Staff within the Peninsula and agencies that can assist during an emergency have a group text message where information is shared, plus other forms of joint communication is already occurring as well.

Mayor Pro Tem Bradley logs off from the meeting at 8:27 a.m.

City Manager Grammer informs the committee that quorum was lost, therefore, amendments could not be approve, but this item with updates can be brought back for motion and approval in the next meeting.

B. PALOS VERDES PENINSULA INGRESS AND EGRESS MAP AND STRATEGY FOR ESTABLISHING PENINSULA WIDE MASS EVACUATION PLANS. (RPV)

Emergency Services Coordinator Villalpando explained how, along with RH Staff, they created a Palos Verdes Peninsula Ingress and Egress Map highlighting the ingress and egress points of the Peninsula. The map depicts the Peninsula's major artillery roads, and it is intended to align the major roads in each Peninsula City, and it is not supposed to showcase evacuation roads specifically, and residents should follow live-time evacuation roads as presented to them. Although the ingress and egress maps are good items to prepare evacuation plans, additional research is needed to fully prepare an effective evacuation plan. Furthermore, he expressed how he has been working alongside the Rancho Palos Verdes Emergency Preparedness Committee on conducting meetings with communities who have been recently impacted by an emergency event to gather for research and information to better prepare RPV and the Peninsula. He explained that through their research, they have concluded that an effective preparedness plan is to have an evacuation "playbook" that details what should be done, where it should be done, and who should do something during an emergency evacuation event. He informed that committee that his written reports provides detailed information regarding evacuation systems that can assist, like dividing the Cities into grid-like zones that can quickly support emergency responders to properly direct residents to evacuate. If such playbook is approved, educating residents of their zones will be the next step. Emergency Services Coordinator Villalpando proceeded to explain that in additional the playbook will also indicate safe refuge areas for residents and people to have access to in case during emergency disasters, and should consider planning for mass care and sheltering services areas as part of the process for evacuation. Due to the extent of the research, information, and process to prepare such playbook, there is a need to hire a third independent party consultant that can specialize in such reports. Emergency Services Coordinator Villalpando suggested the opportunity to submit a request for professional services that can focus on all the attributes and details pertaining to this item.

Larry Maizlish from the Emergency Preparedness Committee (EPC) provided summary how the EPC has reviewed and analyzed previous emergency events, and gathering data that can be beneficial to the Peninsula. They have retained information from other areas, specific to wildfire affected areas, of what works and does not work on preparing for emergency events, and strongly support using the possibility of having a disaster playbook, as it was worked from other cities in the past. This playbook will focus on a variety of emergency events that can occur, and having a vendor with experience on preparing such playbook can be beneficial. Also, to maintain the Peninsula safe, having a vendor that focuses on all four cities will be both effective for the Peninsula as a whole, and less expensive than each individual contracting their own vendor. The RPV EPC strongly supports the Committee to hire a vendor to assist in creating the disaster playbook for the Peninsula.

Ruth Roswell from the RPV EPC agreed with the report from Emergency Services Coordinator Villalpando, and Maizlish support. She added that the playbook has flexible response plans to a variety of scenarios that can occur, and helps provide first responders on a plan on how to manage an emergency event. Additionally, having safe refuge is important for the residents, and to help maintain streets clear of those members that need to evacuate. Lastly, educating residents of their role and how they can help the city, and keep themselves safe. EPC Volunteers can be beneficial to assist residents and on other items in case of an emergency event.

Mayor Zuckerman gave kudos to Emergency Services Coordinator Villalpando and the EPC members for their presentation. Furthermore, he had questions on the inventory on the City's emergency cashes are, but is assuming that potential refuge areas might be the current locations the City has containers with emergency cash, and wanted to know if those containers contain surgical masks and diapers, as are important needs during an emergency. Additionally, he expressed housing units being required for the cities can be an issue due to the fire hazard such cities can face. Adding housing units can create additional traffic, and can make the cities more vulnerable to potential issues if there is a need to evacuate. Therefore, having a traffic engineer analyze such information must assist to present it to politicians that feel housing is more important than public safety.

Mayor Dieringer stated that if SB9 and SB10 are passed, making housing units mandatory, the density of the population will affect evacuation plans and the safety of the communities.

Councilmember Murdock is intrigued by the idea of a playbook, but is interested in knowing how other cities developed their playbook. She is interested in knowing if the Peninsula has enough resources to handle such task, or a consultant is needed.

Emergency Services Coordinator Villalpando explained that from his knowledge, other cities have hired a consultant, and although the Peninsula might be able to hand such task, due to the research, work, and experience the playbook requires, hiring a consultant can provide a more effective and thorough project.

Mayor Zuckerman recommended also considering addressing issues pertaining to water pressure in case of an emergency, and the access for the fire department to have access to adequate water pressure in case of a wildfire.

Councilmember Schmitz believes Mayor Zuckerman's comments are very astute, given the grant funding provided to by CalWater to ensure water pressure delivery. It would be good to audit and know if the cities are prepared to manage such disaster.

Mayor Dieringer requested clarification regarding the study of peninsula evacuation routes establishing communication contact to respective cities for traffic control, and if that meant having a designated monitor for each respective city to control traffic. Also,

she requested clarification regarding what "obtain utilities' recommended measures for individual contingency plans" referred too, and if "individual" referred to individual utilities or individual cities and which individual the contingency plan refers too. She requested clarification on what the "EOC to community" was addressing, and if it reflected individual cities or the Peninsula wide. She informed the committee that the map prepared provided an additional exit route for City of RH that is incorrect, and needs to be changed. She then had additional questions regarding a potential list with specific task the consultant will address, as well as expected costs.

Emergency Services Coordinator Villalpando clarified that the goal is to establish a traffic control matrix. He also explained that the individual stands for individual utility companies, and the EOC has been discussed previously as being addressed by individual cities, then it would be Peninsula wide once individual communities are addressed. Furthermore, he mentioned that the plan is to prepare the scope of work with costs estimates, and bring back to the committee for approval.

Mayor Pro Tem Bradley returned to the Zoom meeting at 9:00 a.m.

City Manager Grammer informed the committee that City Staff will research for potential grants that can cover the costs of such consultant and services.

C. PREPARED PENINSULA EXPO SAVE THE TENTATIVE DATE FOR SUNDAY, OCTOBER 24, 2021. (RPV VERBAL REPORT)

VIII. ADJOURNMENT

There being no further business before the Palos Verdes Peninsula Regional Emergency Preparedness Committee, Chair Dieringer adjourned the meeting at 9:15 a.m. The next meeting is scheduled to be held on Thursday, November 11, 2021, beginning at 7:30 a.m.

Respectfully submitted,

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Janely Sandoval
City Clerk
City of Rolling Hills

Approved,

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Bea Dieringer
Chair and Mayor,
City of Rolling Hills

ITEM VII A

FINAL DRAFT: PENINSULA WHITE PAPER

MEMORANDUM

TO: **PENINSULA PUBLIC SAFETY COMMITTEE**

FROM: **CITY MANAGERS**

DATE: **NOVEMBER 18, 2021**

SUBJECT: **FINAL DRAFT: PENINSULA WHITE PAPER**

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Peninsula White Paper on Utility Companies' Response to a Disaster

The City of Rancho Palos Verdes Emergency Services Coordinator has created a White Paper that examines the interrelationship vulnerabilities between power, water, gas and sewer utilities servicing the Palos Verdes Peninsula, as well as outlining the potential consequences that could result from cascading and escalating failures of these utilities.

The following critical infrastructure sectors servicing the Palos Verdes Peninsula are currently analyzed in the White Paper:

- ⇒ Electricity (Energy Sector)
- ⇒ Natural Gas (Energy Sector)
- ⇒ Telecommunications Systems (Communication Sector)
- ⇒ Information Systems (Communication Sector)
- ⇒ Water systems (Water Sector)
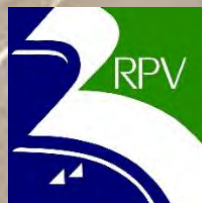- ⇒ Wastewater systems (Water and Wastewater Sector)

On August 12, 2021, the Peninsula Public Safety Committee reviewed a draft version of the White Paper and provided staff direction to incorporate items related to the Palos Verdes Reservoir and wastewater items related to septic systems.

The White Paper has been updated and submitted to the Committee for a final draft in which Peninsula cities will share with their respective City Councils. The White Paper will serve as a regional working document that may be updated or modified with the collaboration and coordination of peninsula staff.

INFRASTRUCTURE INTERDEPENDENCY VULNERABILITIES ASSESSMENT

PALOS VERDES PENINSULA
WHITEPAPER NOVEMBER 2021

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INTRODUCTION

The four Cities consisting of the Palos Verdes Peninsula share similar geography, development patterns and exposure to similar types of natural hazards. Recognizing that greater efficiencies are possible when emergency preparedness occurs in a regionally coordinated manner the Peninsula Cities formed a Regional Emergency Preparedness Committee (REPC). The Regional Emergency Preparedness Committee (REPC) (now known as the Palos Verdes Peninsula Public Safety Committee) consists of two Council Members from each of the Peninsula Cities and meets on a quarterly basis to discuss collaborative efforts on ensuring Peninsula-wide emergency preparedness. The objective of the Palos Verdes Peninsula Public Safety Committee (PPSC) is to enhance emergency preparedness on the Peninsula by addressing joint preparedness efforts and responses to widespread disasters affecting the greater Peninsula region.

Following presentations from utility companies servicing the Peninsula, the Palos Verdes Peninsula Public Safety Committee (PPSC) expressed concern regarding the risks associated with the possible loss of power to critical infrastructure utilities servicing the Peninsula Community. In response to this concern, the Committee motioned for the City of Rancho Palos Verdes' Emergency Services Coordinator to take the lead in creating a White Paper that examines the interrelationship vulnerabilities of utilities servicing the Peninsula community.

This White Paper highlights historically known interdependencies of the critical infrastructure sector and evaluates the potential effects of the failure of these utilities. Utilizing potential cascading and escalating effects established by existing research and lessons learned on best practices in responding to utility failures, this study will recommend areas of improvement in the Integration of analysis findings into emergency planning considerations for the Palos Verdes Peninsula Communities.

This paper first discusses a general overview of how utilities currently provide services, then this paper will cover background on the physical infrastructure sectors located in the community, and the interdependencies between that sector and other critical infrastructure systems; and the potential consequences that could result from cascading and escalating failures.

The goal of this project is to support long-term emergency planning for the Peninsula Cities through an infrastructure interdependency vulnerability assessment, contributing to the resiliency of the Palos Verdes Peninsula community.

PROJECT OBJECTIVES
The following five objectives were established at the outset of the Whitepaper Project:
  ⇒ Identification of critical facilities & infrastructure
  ⇒ Identification of primary critical infrastructure contacts and stakeholders
  ⇒ Assessment of utility interrelationship vulnerabilities
  ⇒ Development of a crisis communications protocol
  ⇒ Integration with Peninsula cities emergency operations plan

EXECUTIVE SUMMARY

This White Paper was developed as a result of the four Peninsula Cities of Palos Verdes Estates, Rancho Palos Verdes, Rolling Hills, and Rolling Hills Estates' efforts to ensure a constant state of readiness to provide uninterrupted services to their respective communities, before, during and after an emergency incident. The City of Rancho Palos Verdes led the development of this White Paper as a result of the Palos Verdes Peninsula Public Safety Committee's (PPSC) direction in exploring the potential effects of cascading failures of critical utility systems servicing the Palos Verdes Peninsula due to their interdependencies vulnerabilities.

What is Critical Infrastructure?

The Palos Verdes Peninsula communities' comfort and security rests upon a myriad of highly interdependent critical infrastructure sectors that currently provide essential everyday services. Critical infrastructure consists of a large number of sectors, including the electric power grid, natural gas production, water and water waste systems as well as telecommunications and information systems. These infrastructure systems depend upon extensive interconnections and are part of a "system of systems"[1] that ensures the quality of life for the entire Palos Verdes Peninsula Community.

In the United States (U.S.), the [Patriot Act of 2001](#) defines critical infrastructure as those "systems and assets, whether physical or virtual, so vital to the United States that the incapacity or destruction of such systems and assets would have a debilitating impact on security, national economic security, national public health or safety, or any combination of those matters." Generally critical infrastructure can be defined as the electricity that powers our homes, the water we drink, the transportation that gets us around, the stores where we shop, and the Internet and communications that enable us to stay in touch with friends, family, and coworkers.

There are four designated lifeline functions – transportation, water, energy, and communications, which means that their reliable operations are so critical that a disruption or loss of one of these functions will directly affect the security and resilience of critical infrastructure within and across numerous sectors.

The energy infrastructure sector is of most importance as the sector needs to be operating properly in order for all other sections of critical infrastructure, such as natural gas production, water and wastewater systems as well as telecommunications and information systems, to perform as needed. These other critical infrastructures are dependent on the energy sector to maintain functionality, and vice versa—that is, they are interdependent.

The importance of critical infrastructure protection and interconnectedness was highlighted in [1998 when the Presidential Commission on Critical Infrastructure Protection](#)[2] recognized that the security, economic prosperity, and social well-being of the nation depend on the reliable functioning of our increasingly complex and interdependent infrastructures. These include water supply and wastewater systems, energy systems (electric power, oil, and gas), communications, transportation (road, rail, air, and water), banking and finance, and emergency and government services.

What are the "Threats and Hazards" to Critical Infrastructure?

Both natural and man-made (intentional or unintentional) events have the potential to harm, damage, disable, or destroy critical infrastructure. Critical infrastructure has long been exposed to physical threats and natural disasters and is now becoming increasingly vulnerable to cyber threats. These risks arise as a result of the increasing integration of information and communications technologies with critical infrastructure, as well as adversaries intent on exploiting potential cyber vulnerabilities. As physical infrastructure becomes increasingly reliant on complex cyber systems to operate, critical infrastructure may become more vulnerable to specific cyber threats, including transnational threats.

Due to the interconnections and interdependence of infrastructure elements and sectors, damage, disruption, or destruction to one infrastructure element can have cascading effects, affecting the continued operation of another.

Identifying and comprehending the interdependence (two-way) or dependency (one-way) between infrastructure elements and sectors is critical for assessing risks and vulnerabilities and determining the best course of action for increasing security and resilience. For instance, the electric grid operates with the assistance of integrated information and communication systems from other critical infrastructure sectors.

Consequences resulting from one infrastructure sector failing can generate cascading failures across the entire infrastructure systems. The location of critical infrastructure lifelines is typically not shared among different utility operators, thus resulting in a majority of these infrastructures placements being unknown.[3] The colocation of multiple lifelines also increases the likelihood that failure in one system can damage and interrupt others. Severe disruption of one section of the critical infrastructures sector caused by natural or manmade disasters, can cause undue damage to the security and sustainable living of a community. Because of the essential role the infrastructure sector plays and the ability for its failure to cause severe disruption to a society's stability, the understanding of interdependencies among these critical infrastructure systems is essential in ensuring the resilience of a local community.

PALOS VERDES PENINSULA PROFILE

The Palos Verdes Peninsula has a unique physiography, formed over millions of years of submerging and lifting from the Pacific Ocean. Once an island, the Peninsula is nine miles wide by four miles deep, now rises above the Los Angeles Basin, with the highest elevation at 1480 feet. The terrain of much of the planning area is rolling hills, steep slopes, canyons, and coastal bluffs. Several active park sites and an extensive amount of preserved natural open space and passive parkland, particularly along the Peninsula's coastline, provide the majority of recreational resources for residents. The Palos Verdes Peninsula is made up of four cities: Rolling Hills, Rolling Hills Estates, Rancho Palos Verdes, and Palos Verdes Estates as well as the unincorporated community of Westfield/Academy Hill. The Palos Verdes Peninsula is bounded on the north by Torrance, on the south and west by the Pacific Ocean; and on the east by Lomita and San Pedro (Los Angeles).

The Palos Verdes Peninsula has one of the most ideal climates of the world. Its average maximum and minimum temperatures range approximately between 67-68°F and 50-54°F and the average annual precipitation is approximately 13 inches. The sea breeze, which is the predominant wind, is a primary factor in creating this climate and typically flows from the west-southwest in a day-night cycle with speeds generally ranging from 5 to 15 mph. The sea breeze maintains the cool temperatures and clean air circulation and generally prevents warmer inland temperatures and air pollution from permeating into the peninsula, except under certain seasonal conditions such as the offshore Santa Ana winds.[4]

The Palos Verdes Peninsula has a total population of about 67,067 (PVE 13,434, RPV 42,030, RH 1,513, RHE 8,169 and the unincorporated areas of the Peninsula 1,921) The Palos Verdes Peninsula includes an area of approximately 17.78 square miles (PVE 4.77 sq mi RPV 13.6 sq mi, RH 3.0 sq mi and RHE 4.18 sq mi).[4]

MAP OF THE FOUR PENINSULA CITIES

THREATS AND HAZARDS
The Peninsula Cities' Hazard Mitigation Plans identify the following hazards posing a significant threat against the Palos Verdes Peninsula area:
- Earthquake
- Wildfire
- Earth Movement
- Tsunami
- Hazardous Materials
- Human-Caused Events
- Utility-Related Events

As an example of risks faced by the Peninsula Cities, can be found in the City of Rancho Palos Verdes Multi-Jurisdictional Hazard Mitigation Plan's Calculated Priority Risk Index

Ranking table for the City as depicted below. This Risk Index Ranking table indicates a generalized perspective of the community's vulnerability of the various hazards according to extent (or degree), location, and probability with four (4) as the highest probability and one (1) as the lowest probability. The probability of a wildfire in Rancho Palos Verdes is the highest probability with the probability of a three (3). (Source: City of Rancho Palos Verdes Multi-Jurisdictional Hazard Mitigation Plan).

Hazard	Probability	Weighted 45% (x.45)	Magnitude Severity	Weighted 30% (x.3)	Warning Time	Weighted 15% (x.15)	Duration	Weighted 10% (x.1)	CPRI Total
Earthquake – Palos Verdes M7.3	3	1.35	4	1.2	4	0.6	1	0.1	2.98
Earthquake – San Andreas M7.8	3	1.35	3	0.9	4	0.6	1	0.1	2.95
Earthquake – Newport-Inglewood M7.2	3	1.35	3	0.9	4	0.6	1	0.1	2.95
Wildfire	3	1.35	2	0.6	4	0.6	3	0.3	2.85
Utility-Related Events	3	1.35	2	0.6	4	0.6	3	0.3	2.76
Earth Movement	3	1.35	1	0.3	4	0.6	4	0.4	2.65
Hazardous Materials	2	0.9	2	0.6	4	0.6	2	0.2	2.30
Human-Caused Events	2	0.9	2	0.6	4	0.6	2	0.2	2.30
Tsunami	1	.45	3	0.9	4	0.6	2	0.2	2.15

WILDFIRE VULNERABILITY

The Palos Verdes Peninsula has always been vulnerable to wildfire hazards due to its numerous steep canyons and open scrub brush-covered hillsides. The Palos Verdes Peninsula is surrounded by dense brush and other vegetation that, if ignited, could pose a threat to residential areas via wind-borne embers and direct ignition from uncontrolled fires. The most recent fire in igniting on the Peninsula was on August 27 and 28, 2009, when a wildfire burned through approximately 230 total acres. The fire is believed to have originated from wildlife interference and was exacerbated by wind in the Portuguese Bend Nature Reserve, located in the City where 165 acres were charred. The remaining 65 acres burned in the neighboring Peninsula City of Rolling Hills. Dozens of homes were threatened and approximately 1,200 residents were forced to evacuate. [6]

State law requires that all local jurisdictions identify very high fire hazard severity zones (VHFSZ) within their areas of responsibility. California Government
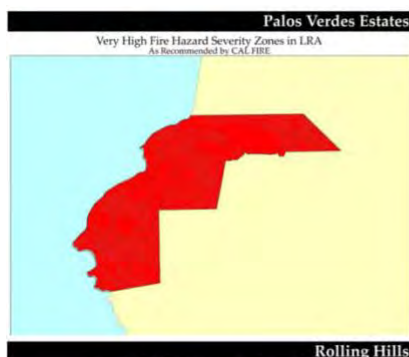
Code section 51178 requires the California Department of Forestry and Fire Protection (CAL FIRE) to identify "Very High Fire Hazard Severity Zones" using consistent statewide criteria. Fire hazard is established using a number of applicable criteria. Inclusion within these zones is based on vegetation density, slope severity and other relevant factors that contribute to fire severity. Based on the this criteria, the four Peninsula Cities, are generally classified as a Very High Fire Hazard Severity Zones, as illustrated in the maps above.

CRITICAL FACILITIES

FEMA separates critical buildings and facilities into the five categories shown below based on their loss potential. All of the following elements are considered critical facilities:[6]The most critical municipal facilities for the Palos Verdes Peninsula are those that support public administration and emergency operations, police, fire, and emergency medical and emergency communications.

- **Essential Facilities** are essential to the health and welfare of the whole population and are especially important following hazard events. Essential facilities include hospitals and other medical facilities, police and fire stations, emergency operations centers and evacuation shelters, and schools.

- **Transportation Systems** include airways – airports, heliports; highways – bridges, tunnels, roadbeds, overpasses, transfer centers; railways – trackage, tunnels, bridges, rail yards, depots; and waterways – canals, locks, seaports, ferries, harbors, drydocks, piers.

- **Lifeline Utility Systems** such as potable water, wastewater, oil, natural gas, electric power and communication systems. High Potential Loss Facilities are facilities that would have a high loss associated with them, such as nuclear power plants, dams, and military installations.

- **Hazardous Material Facilities** include facilities housing industrial/hazardous materials, such as corrosives, explosives, flammable materials, radioactive materials, and toxins.

CITY HALL LOCATIONS FOR THE PENINSULA CITIES

PENINSULA CITY	CITY HALL LOCATIONS	PHONE NUMBER
Palos Verdes Estates City Hall	340 Palos Verdes Drive West Palos Verdes Estates, CA 90274	310-378-0383
Rancho Palos Verdes City Hall	30940 Hawthorne Blvd. Rancho Palos Verdes, CA 90275	310-544-5200
Rolling Hills City Hall	2 Portuguese Bend Rd. Rolling Hills, CA 90274	310-377-1521
Rolling Hills Estates City Hall	4045 Palos Verdes Drive North Rolling Hills Estates, CA 90274	310-377-1577

EMERGENCY SERVICES

Law Enforcement Services:

The Cities of Rolling Hills, Rolling Hills Estates, and Rancho Palos Verdes jointly contract with the Los Angeles County Sheriff's Department for law enforcement

services. The Lomita Sheriff Station provides police protection to the Peninsula Region. The City of Palos Verdes Estates has its own police department. Officers are assigned to different divisions such as traffic, patrol, and detectives. The city also has its own dispatch center and jail. Both are staffed 24 hours a day. [4]

Fire protection Services:
Currently, the four Peninsula Cities contract with Los Angeles County for Fire Department for fire suppression, enforcement of the Fire Code, and paramedic services. Concurrently, Los Angeles County Fire also provides emergency ambulance service. [4]

FIRE AND POLICE STATIONS SERVICING THE PALOS VERDES PENINSULA

Type of Asset	Name	Address	Phone Number
Police (PVE)	Palos Verdes Estates Police Department	340 Palos Verdes Drive West Palos Verdes Estates, CA 90274	310-378-4211
Police (RPV, RH, RHE)	LA County Sheriff Department - Lomita Station	26123 Narbonne Ave, Lomita, CA 90717	310-539-1661
FIRE	LA County Fire Dept. Station 2	340 Palos Verdes Drive West Palos Verdes, CA 90274	310-373-6539
FIRE	LA County Fire Dept. Station 6	25517 S. Narbonne Ave. Lomita, CA 90717	310-326-2461
FIRE	LA County Fire Dept. Station 53	6124 PV Drive South RPV CA, 90275	310-377-3333
FIRE	LA County Fire Dept. Station 56	12 Crest Rd. West Rolling Hills, CA 90274	310-377-1584
FIRE	LA County Fire Dept. Station 83	83 Miraleste Plaza, Rancho Palos Verdes, CA 90275	310-831-4624
FIRE	LA County Fire Dept. Station 106	27413 Indian Peak Rd. Rolling Hills Estates, CA 90275	310-377-9523

AREA HOSPITALS:

The Palos Verdes Peninsula has the following acute care hospitals in Torrance and San Pedro located approximately 15 minutes away. [4]

AREA HOSPITALS

| Name	Address	Phone Number
Del Amo Hospital Torrance	23700 Camino Del Sol, Torrance, CA 90505	(310) 530-1151
Harbor - UCLA Medical Center	1000 W Carson St, Torrance, CA 90502	(424) 306-4000
Providence Little Company of Mary Medical Center - Torrance	4101 Torrance Blvd, Torrance, CA 90503	(310) 540-7676
Providence Little Company of Mary Medical Center -San Pedro	1300 W 7th St, San Pedro, CA 90732	(310) 832-3311
Torrance Memorial Medical Center	3330 Lomita Blvd, Torrance, CA 90505	(310) 325-9110

METHODOLOGY

Due to the complexity and highly interdependent nature of the critical infrastructure sectors currently providing essential services to the Peninsula Community, disruption of one section by natural or manmade disasters, can severely impact the security and quality of life for the community. Understanding the interdependencies among critical infrastructure systems is critical in ensuring the resilience of a local community because of the critical role those critical infrastructures play in society and the ability for their failure to cause severe disruption to societal stability.

DEFINING KEY TERMS:

- **DEPENDENCY:** A dependency is a unidirectional relationship between two assets where the operations of one asset affects the operations of the other. [6] For example, a water treatment plant depends on communications services that support the supervisory control and data systems required to control plant operations. [6]

- **INTERDEPENDENCY**: An Interdependency can be defined as a two-way relationship between two assets where the operations of both assets affect each other.[6] For example, water treatment plants require electricity for its data processing systems and, in turn, provides water that the communications system uses to cool its equipment. [6]

Figure 2-3 illustrates the definitions of dependency and interdependency.
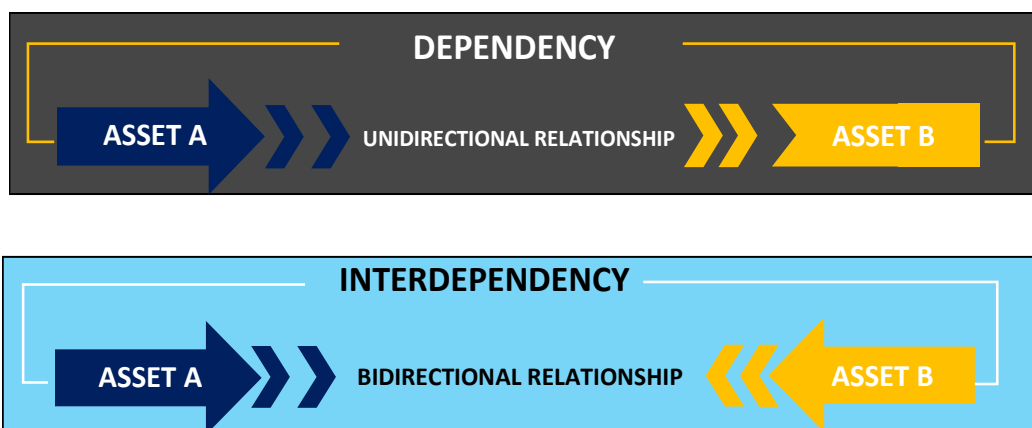
The interactions between critical infrastructure and its environment can also be characterized in four distinct classes of infrastructure dependencies and interdependencies that are helpful in scoping, executing, documenting, and communicating analysis: physical, cyber, geographic, and logical dependencies. [6]

The interactions between critical infrastructure and its environment can be characterized into three categories:

- **UPSTREAM DEPENDENCIES:** The products or services provided to one infrastructure by another external infrastructure that are necessary to support its operations and functions.

- **INTERNAL DEPENDENCIES**: The interactions among internal operations, functions, and missions of the infrastructure7. Internal dependencies are the internal links among the assets constituting a critical infrastructure (e.g., an electric generating plant that depends on cooling water from its own onsite water well).

- **DOWNSTREAM DEPENDENCIES:** The consequences to a critical infrastructure's consumers orrecipients from the degradation of the resources provided by a critical infrastructure.

APPROACHES TO CHARACTERIZING DEPENDENCIES

TOP-DOWN APPROACH:
Each dependency has its own characteristics, therefore analyzing dependencies requires different approaches to successfully consider their category, class, and dimension(s). These approaches can generally be described as either top-down or bottom-up. Top-down approaches consist of analyzing a system in its entirety and then focusing on its component parts. Bottom-up approaches consist of analyzing the component parts of a system and building on this analysis to describe the system as a whole. [6]

Infrastructure interdependencies are complex and dynamic and continue to grow in number and complexity, resulting in systems that are increasingly vulnerable to cascading and escalating effects across infrastructure sectors. There are numerous approaches to identifying interdependencies, to manage these complexities, this White Paper uses a Top-Down approach of defining how the overall critical infrastructure system functions in general; current infrastructure functions in a particular geographical region context; the interdependencies between that sector and other critical infrastructure systems; and the potential consequences that could result from a disruption of services.

TOP-DOWN APPROACH:

HOW THE OVERALL CRITICAL INFRASTRUCTURE SYSTEM FUNCTIONS IN GENERAL

HOW CURRENT INFRASTRUCTURE FUNCTIONS IN A PARTICULAR GEOGRAPHICAL AREA

INTERDEPENDENCIES BETWEEN OTHER CRITICAL INFRASTRUCTURE SYSTEMS

POTENTIAL CONSEQUENCES THAT COULD RESULT FROM A DISRUPTION OF SERVICES
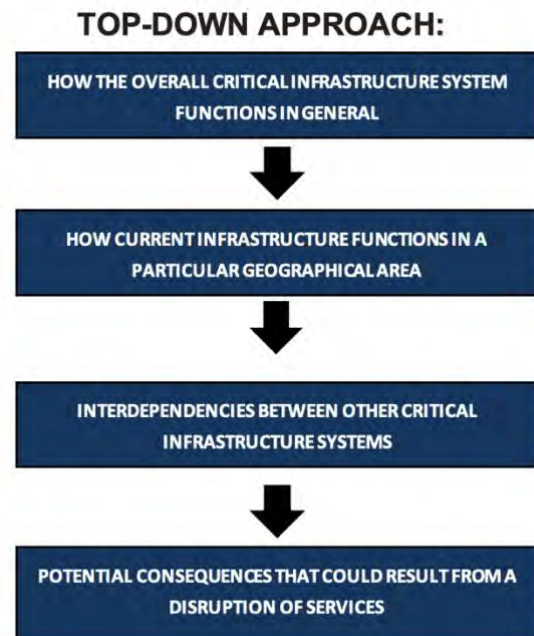
Six critical infrastructure sectors servicing the Palos Verdes Peninsula are analyzed in this White Paper:
- Energy systems (electric power, oil, and gas),
- Telecommunications Systems (Communication Sector)
- Information Systems (Communication Sector)
- Water systems (Water Sector)
- Wastewater systems (Water and Wastewater Sector)

CYBER SECURITY VULNERABILITY CONSIDERATIONS

Cyber security refers to the protection of everything related to the Internet, from networks to information stored in computer databases and other applications, to devices that control equipment operations via network connections. Without launching a physical attack, attackers can cause damage to physical infrastructure by infiltrating the digital systems that control physical processes, damaging specialized equipment, and disrupting vital services. While often dismissed as an issue only for information technology departments, cyber security is an area of increasing concern for Infrastructure resiliency.

Almost every aspect of Critical infrastructure sector is vulnerable to a cyberattack. As an example, In addition to generation capacity, the transmission and distribution system that transports power from the generator to the users is vulnerable to cyber-attack. Power misrouting, spoofed reports of power outages, and other malicious attacks could result in power outages even when the system was functioning normally. In the worst-case scenario, such an event could cause a cascading failure, in which one outage causes a power surge, which causes another outage. While their effects are not as immediate as those of direct threats, additional Cyber Security threats include data breaches, in which unauthorized users obtain personal or other confidential information, such as billing and account information or even meter data. Keeping all of these kinds of Data is critical for retaining customer trust in the power distribution system. [6]

MITIGATING CYBER SECURITY THREATS

There are a variety of protocols and techniques for mitigating cyber security threats that may be appropriate to incorporate and address in emergency planning efforts, many of which are already widely used in the information technology industry. The first step is to understand the vulnerabilities. Once threats are identified, some common methods of mitigating them include:

- **Instituting access control policies:** Restricting access to key terminals, files, and networks to individuals who have the training and the need to work with those resources.

- **Adopting security protocols:** In some cases, failure to use industry-standard antivirus software and failure to install security patches and upgrades have resulted in severe consequences.

- **Monitoring systems:** Constant monitoring of system usage and assessing abnormal usage patterns on systems can help identify vulnerabilities and attacks before major problems occur.

- **Training:** Individuals responsible for ensuring the reliability of the system need to be trained to recognize and respond to security threats, as even the most advanced security technology can be undermined by lack of awareness.

- **Testing:** Security protocols and procedures need to be tested, and it may make sense for the planning process to include regular exercises (some of which simulate cyber attacks and responses), as well as penetration tests/ security evaluations by third parties to identify potential vulnerabilities.

- **Verifying information:** In some instances, taking major corrective actions in response to news of a problem could trigger unintended consequences if the information is not valid

Overall Summary of Critical Infrastructure Interdependencies

	ELECTRICITY	NATURAL GAS	WATER	COMMUNICATIONS	WASTEWATER
ELECTRICITY	Highly connected and interdependent infrastructure	Power needed for pumping stations, storage, control systems and facilities.	Power for control system monitoring, pumps and facilities Temperature control (e.g., cooling of equipment), fire suppression, potable water.	Power needed for control facilities, communication towers, and remote monitoring capabilities.	Power needed for control systems, sewage pumping and treatment, and for facilities
NATURAL GAS	Fuel for heat, generators & facilities	Highly connected and interdependent infrastructure	Fuel for treatment, heat, pumps and lift stations, and facilities	Fuel for heat, generators & facilities	Fuel for treatment, heat, pumps and lift stations, and facilities
WATER	Temperature control (e.g., cooling of equipment), fire suppression, potable water	Water for production, cooling and emissions control	Highly connected and interdependent infrastructure	Temperature control (e.g., cooling of equipment), fire suppression, potable water	wastewater removal service, raw water supply for hydroelectric generation
WASTEWATER	Sewage wastewater services for facilities.	Sewage wastewater services for facilities.	Sewage wastewater services for facilities.	Sewage wastewater services for facilities.	Sewage wastewater services for facilities.
COMMUNICATIONS	Telecommunication for daily operations; and SCADA systems	SCADA communication, and customer service and crew repair communication	Control system SCADA communication, and customer service and crew repair communication	Highly connected and interdependent infrastructure	SCADA communication, and customer service and crew repair communication

CRITICAL INFRASTRUCTURE INTERDEPENDENCIES'

The table above depicts an overall summary of the interdependence of electric, water/wastewater, gas, and communications infrastructures. Multiple connections between infrastructures characterize these complex relationships. The connections form an intricate web that, depending on the characteristics of its linkages, can cause a cascading effect across multiple infrastructures, affecting the economy and security of a community.[7]

ELECTRICITY GENERAL OVERVIEW

The electricity Infrastructure sector includes the generation, transmission, and distribution of electricity. Electricity is universal, impacting all critical infrastructure systems. Electricity is generated at power plant stations, transmitted across high voltage lines to substations and then delivered at lower voltages to end users through the distribution system.[1]

HOW ELECTRICITY GETS TO YOUR HOME[1]

1. **Electricity Generation:** Electricity is made at a power plant station, large spinning turbines generate electricity, powered by wind, coal, natural gas, or water and deliver it to the transmission system.
2. **Transformers**: Once generated, the electrical current is then sent through transformers, which increase the voltage so the power can be pushed over long distances.
3. **Transmission Lines:** The electrical charge then goes through high-voltage transmission lines that stretch across the country.
4. **Substations**: At the other end of a transmission line, is a substation that uses transformers to lower the voltage, so the electricity can be distributed to customers at a usable voltage.
5. **Distribution Lines:** The electricity is then sent through distribution lines to neighborhoods. Smaller transformers reduce the voltage again to make the power safe to use in homes. These smaller transformers may be mounted on power poles or sitting on the ground (they're the big green boxes, called pad mount transformers).
   - The electricity then connects to consumers' homes, where it passes through a meter which measures the amount of electricity used.
   - Finally, electricity travels through wires inside the walls to the outlets and switches in consumers' homes

power plant generates electricity

transmission lines carry electricity long distances

distribution lines carry electricity to houses

transformer steps up voltage for transmission

neighborhood transformer steps down voltage

transformers on poles step down electricity before it enters houses

Source: Adapted from National Energy Education Development Project (public domain)
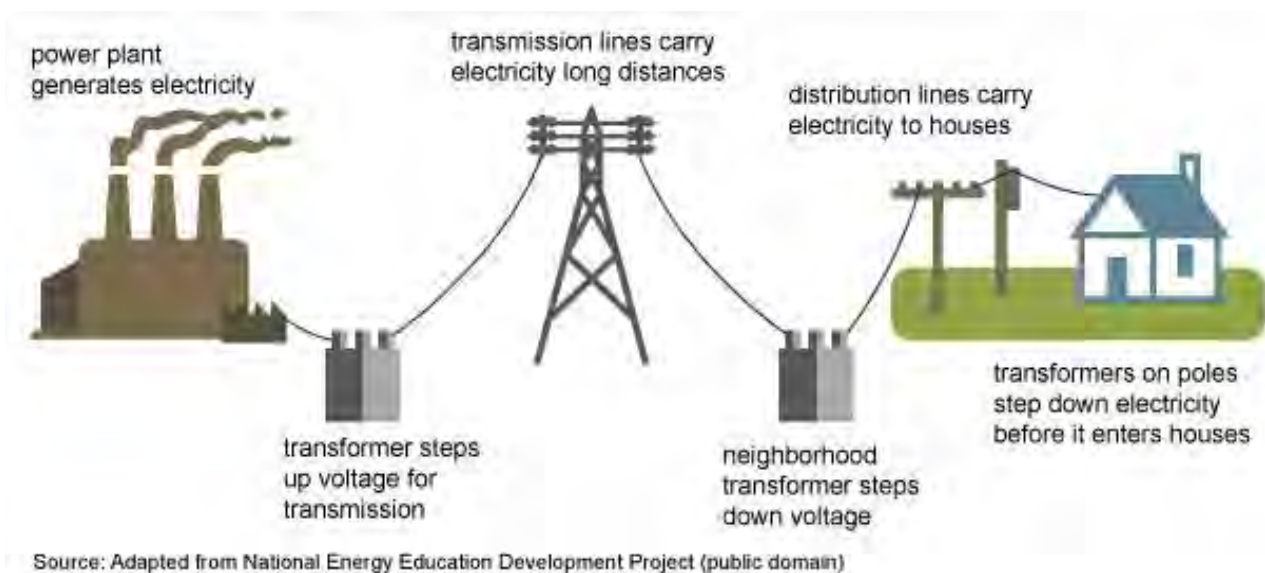
FIGURE: ELECTRICITY GENERATION, TRANSMISSION AND DISTRIBUTION

ELECTRICITY BACKGROUND: PALOS VERDES PENINSULA

Southern California Edison (SCE) provides the supply of electrical power to municipal, commercial, and residential customers on the Palos Verdes Peninsula. SCE operates the Harbor Generating Station, a 474-megawatt natural gas facility located south of Wilmington which supplies a majority of electrical power to the Palos Verdes Peninsula. The electrical power distribution infrastructure for the Peninsula is designed as an integrated grid system, principally for ease of maintenance and uniform current flow.[4]

SCE operates two different types of overhead facilities within the Peninsula, namely transmission and distribution lines. The transmission line system provides high voltage service to a larger regional area. The distribution line system receives power from the transmission system and makes electricity available at a usable voltage to smaller service are in some areas, both transmission and distribution lines are co-located on the same poles.[4]
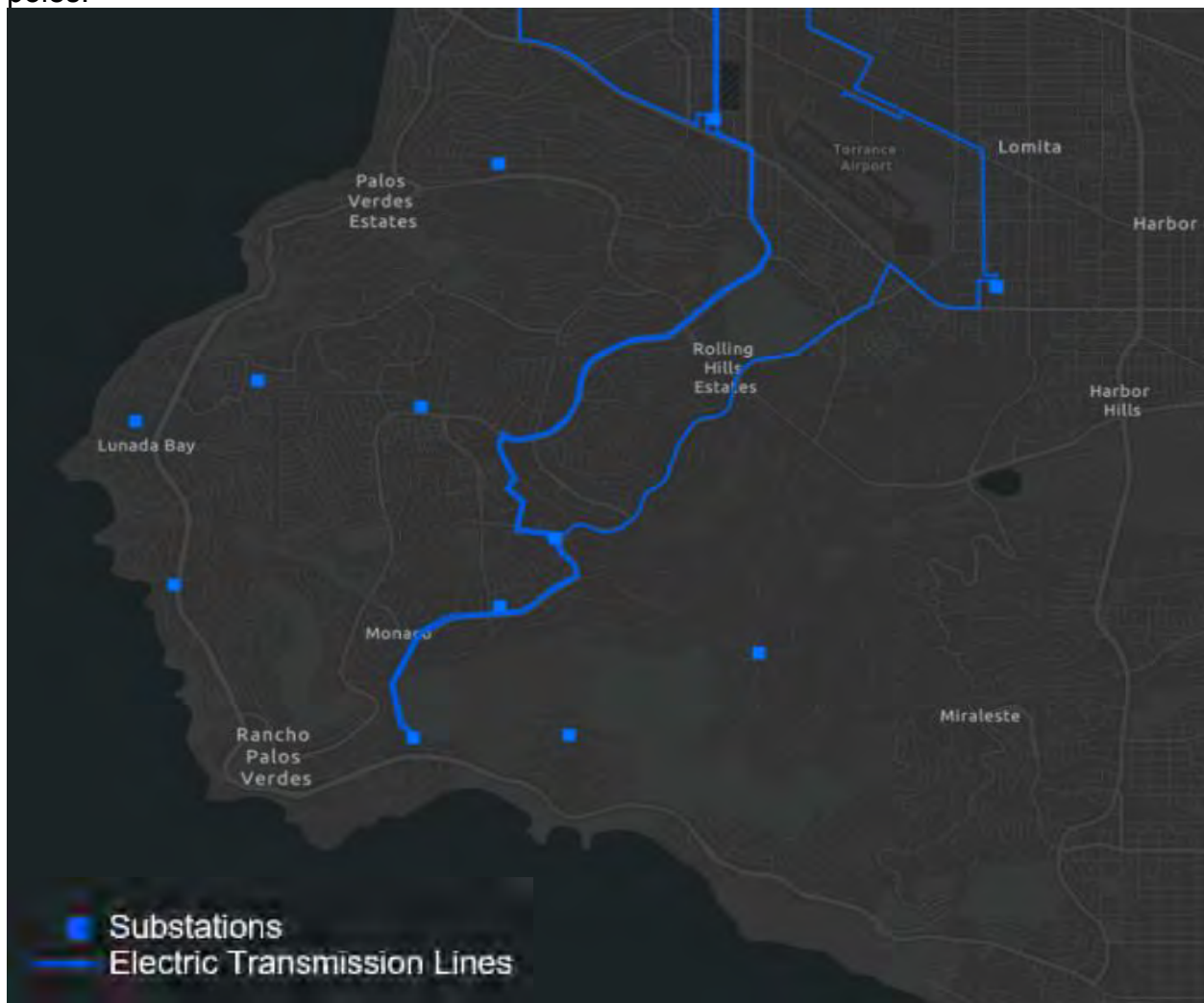
Southern California Edison (SCE) Network Of Transmission Lines Servicing The Peninsula, Information Gathered From: Southern California Edison Power Site.

ELECTRICITY SYSTEM INTERDEPENDENCIES

Electricity infrastructure is heavily interdependent with other infrastructure sectors. The diagram above depicts critical infrastructure sectors that are interdependent with the Electricity Subsector. The left side depicts which infrastructure sectors the electricity sector rely heavily on (upstream Dependencies), while the right side depicts critical infrastructure sectors that rely on electricity (down Stream Dependencies).

ELECTRICITY UPSTREAM INTERDEPENDENCIES:

The Electricity Subsector depends heavily on other energy subsectors (i.e., natural gas, coal, and petroleum) supplying fossil fuels for power generation. These upstream dependencies can vary when considered at the asset level. The following Table depicts critical infrastructure sectors that Electricity depends on to function properly. [8]

ELECTRICITY UPSTREAM DEPENDENCIES	
SERVICES/RESOURCES PROVIDED	
NATURAL GAS	Fuel for power generation.
WATER	Temperature control (e.g., cooling of equipment), fire suppression, potable water.
WASTEWATER	Telecommunication for daily operations; and SCADA systems.
COMMUNICATIONS	Wastewater removal Service, raw water supply for hydroelectric generation.

ELECTRICITY DOWNSTREAM DEPENDENCIES:

The Electricity Subsector has downstream dependencies with all critical infrastructure sectors, making it a fundamental need and community-wide requirement. Water treatment facilities, pumping stations, and communication systems rely heavily on electricity supply. Electricity is particularly important for heating, control systems, lighting, mechanical and electrical equipment, and security and safety. Additionally, electricity is required for the operation of petroleum refineries and distribution terminals[8].

ELECTRICITY DOWNSTREAM DEPENDENCIES	
SERVICES/RESOURCES PROVIDED	
NATURAL GAS	Power needed for pumping stations, storage, control systems and facilities.
WATER	Power is needed to energize control system monitoring and controls at remote sites, including IT and Communications equipment.
WASTEWATER	Power needed for control systems, sewage pumping and treatment, and for facilities

COMMUNICATIONS	Wastewater removal Service, raw water supply for hydroelectric generation.

POTENTIAL EFFECTS OF ENERGY DISRUPTIONS ON ESSENTIAL INFRASTRUCTURE:

Outside of the impacted region, the power system remains largely intact and functional. The impact of a disruption on local or regional infrastructure has a significant impact on the severity of a power outage and the restoration efforts required to return the system to normal operation. The following Table illustrates the effects of electricity disruptions on critical services [8].

ELECTRICITY POTENTIAL EFFECTS OF DISRUPTIONS	
NATURAL GAS	Failure of fuel for power generators and lubricants for facilities. Loss of heating and cooking abilities.
WATER	Lack of potable water as a result of a reduction in supply from water mains, with the risk of contamination from various sources. Water may not be able to be boiled, resulting in a scarcity of drinking water.
WASTEWATER	Challenges in hygiene: reduced pressure in the water mains, toilets not flushing, difficult to maintain the sewer system. working
COMMUNICATIONS	Failure of communication facilities and towers, Loss of electronic transactions and ability to obtain data. Customer service and repair crew communications failure.
TRANSPORTATION	Traffic lights not working: increased number of accidents, traffic jams, bottlenecks. Possible disruption of tunnels due to reduced lights and ventilation, further increasing bottlenecks.

At the present time, the Peninsulas electrical power needs are being reliably met by Southern California Edison (SCE). A potential problem of electricity reliability for the Peninsula is that facilities in the area are susceptible to damage from earth movements, such as earthquakes and landslides. Additionally, overhead transmission lines, transformers, and associated poles pose potential significant adverse safety hazards for the Peninsula. The interdependencies of the Electrical infrastructure sector servicing the Palos Verdes Peninsula combined with impacts of natural disasters can lead to a ripple effect of disruptions of Critical Infrastructures serving the Palos Verdes Residents. Further understanding of the Electricity infrastructure sector interdependencies and critical failure points is therefore vital to achieving long term resilience planning for the Palos Verdes Peninsula.

NATURAL GAS GENERAL OVERVIEW

Natural gas accounts for a significant percentage of the primary energy consumed in the United States. Natural gas consumption in the United States is highly seasonal, with the higher demand in winter for heating and lower demand in summer. The natural gas section of the critical infrastructure sectors includes the production, processing, transportation, distribution, and storage of natural gas; and gas control systems [9].

- **Natural Gas Production** – A majority of natural gas comes from natural gas production fields in New Mexico, west Texas, and Oklahoma, as well as in the Rocky Mountains and Canada. The remaining natural gas supply percentage is produced locally in Central and Southern California from onshore and offshore fields.

- **Natural Gas Processing** – Natural gas processing consists of separating all of the various hydrocarbons and fluids from the pure natural gas to produce pipeline-quality dry natural gas.

- **Natural Gas Transmission**- The interstate natural gas pipeline network transports natural gas from processing plants in producing regions to areas with high natural gas demands, particularly large urban areas. Compression stations along the pipeline transmission route keep the gas moving at the desired pressure.

- **Natural Gas Storage** – Gas is typically stored underground and under pressure as an efficient way to balance discrepancies between supply input and market demand. Three types of facilities are used for underground gas storage: depleted reservoirs in oil and/or gas fields, aquifers, and salt caverns.

- **Natural Gas Distribution** – Local distribution companies, typically transport natural gas from interstate pipeline delivery points to end-users through thousands of miles of distribution pipe. Delivery points for local distribution companies are often termed city gates, especially for large municipal areas, and are important market centers for the pricing of natural gas. [9]

Natural gas production and delivery

Source: U.S. Energy Information Administration
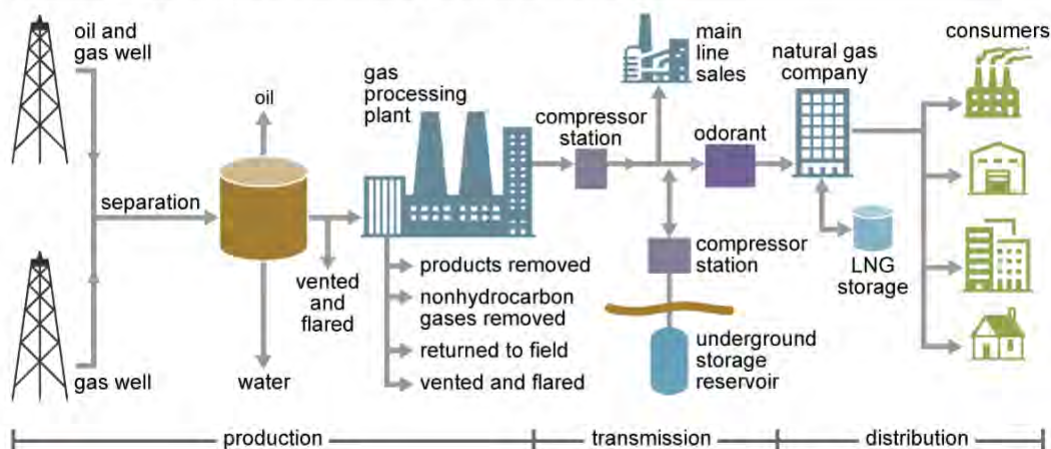
NATURAL GAS BACKGROUND: PALOS VERDES PENINSULA

Southern California Gas Company (SoCalGas) provides natural gas to the Palos Verdes Peninsula through a network of transmission lines, high-pressure distribution supply lines and medium pressure distribution pipelines. Although part of the larger SoCalGas system, the Peninsula is also included in SoCalGas distribution sections, which function principally as sub-administrative districts and are responsible for all lines and service systems that feed from transmission lines to the point of delivery [4].

The natural gas distribution system consists of resource facilities and networks. Resource facilities include natural gas processing and transmission facilities that are located outside the Peninsula area. Natural gas networks, on the other hand, consist of the physical infrastructure in place on the Peninsula that is used to deliver natural gas to residents; in many cases, the natural gas network parallels water and electric networks.[4]

NATURAL GAS TRANSMISSION AND HIGH-PRESSURE DISTRIBUTION LINES: INFORMATION GATHERED FROM SOCALGAS NATURAL GAS PIPELINE MAP

NATURAL GAS INTERDEPENDENCIES

NATURAL GAS UPSTREAM DEPENDENCIES:

Significant Interdependencies exist between Natural Gas infrastructure and the Communications, Transportation, Water, and Wastewater Systems Sectors. Natural gas is used for generating electric power, while electric power is used for core operations in each fuels subsector (e.g., for pumping stations, storage, control systems). The Table below depicts critical infrastructure sectors Natural Gas depends on to function properly.

NATURAL GAS INFRASTRUCTURE UPSTREAM DEPENDENCIES

SERVICES/RESOURCES PROVIDED	
ELECTRICITY	Power needed for pumping stations, storage, control systems and facilities.
WATER	Temperature control (e.g., cooling of equipment), fire suppression, potable water.
WASTEWATER	Wastewater removal service, raw water supply for hydroelectric generation.
COMMUNICATIONS	Telecommunication for daily operations; and SCADA systems.

NATURAL GAS DOWNSTREAM DEPENDENCIES:

Historically, natural gas was primarily used for heating. However, natural gas has been increasingly used to generate electricity since the late 1990s. Natural gas-fired generation was also increased by the advent of combined-cycle generation capacity additions. Additionally, The Natural Gas sector has downstream dependencies with all of the critical infrastructure sectors as, Natural Gas provides all sectors with heating, steam generation, and cooking abilities. Table 7 depicts critical infrastructure sectors Electricity depends on to function properly.

NATURAL GAS INFRASTRUCTURE DOWNSTREAM DEPENDENCIES

SERVICES/RESOURCES PROVIDED	
ELECTRICITY	Natural Gas in needed for fuel for power generation.
WATER	Natural Gas is needed for heating, pumps and lift stations, and facilities.
WASTEWATER	Natural gas needed for fuel for generators and facilities.
COMMUNICATIONS	Natural gas needed for fuel for generators and facilities.

POTENTIAL EFFECTS OF NATURAL GAS DISRUPTIONS ON ESSENTIAL INFRASTRUCTURE:

An interruption or pressure loss in natural gas pipeline systems may result in the loss of multiple natural gas-fired power generators, significantly reducing available power and jeopardizing the reliability of the energy sector. Although underground natural gas storage facilities can provide a backup for the natural gas supply to certain power sources, natural gas pipeline disruptions, would cause significant reductions in electric power services. The following table gives an example of Potential Effects of Natural Gas Disruptions on Essential Services.

ELECTRICITY POTENTIAL EFFECTS OF DISRUPTIONS

NATURAL GAS	Significant impact to power generation. Impact on fuel for heating, generators and for facilities
WATER	Lack of potable water as a result of a reduction in supply from water mains, with the risk of contamination from various sources. Water may not be able to be boiled, resulting in a scarcity of drinking water.
WASTEWATER	Challenges in hygiene: reduced pressure in the water mains, toilets not flushing, difficult to maintain the sewer system. working
COMMUNICATIONS	Impact to facility lighting, telecommunications; electronic data. Impact on fuel for heating, generators and for facilities.

COMMUNICATIONS SYSTEMS GENERAL OVERVIEW

The Communications Sector provides products and services that enable the efficient operation of our global information-based society. The communications industry has evolved rapidly over the last decade to include mobile broadband, cloud computing, the Internet of Things, and software-defined networks. Convergence of voice and data networks has continued, and widespread adoption of mobile devices (e.g., smartphones and tablet computers) has created a massive demand for mobile broadband communications[10].

Communication networks enable people from all over the world to communicate with one another, instantly access information, and communicate from remote locations. This entails establishing a connection between a sender (including voice signals) and one or more recipients through the use of technology (e.g., a telephone system or the Internet) in order to transfer data from one location to another. Communication networks comprise both physical infrastructure (structures, switches, towers, and antennas) and cyber infrastructure (routing and switching software, operational support systems, and user applications), posing significant interdependencies on all sectors of critical infrastructure [10].

The Communications sector includes the following five component areas that have similar functions and operations.

- **Broadcasting Systems:** Broadcasting systems are composed of free and subscription-based over-the-air radio and television (TV) stations that provide analog and digital audio, video, and data programming. Broadcasting systems operate on three different frequency bands: medium frequency (MF (AM radio)), very high frequency (VHF (FM radio and television)), and ultra-high frequency (UHF (TV)).

- **Cable:** The cable industry is made up of over 7,700 cable systems that provide analog and digital video programming, digital telephone service, and high-speed broadband. The cable systems provide bidirectional signal paths to the customer via a combination of fiber and coaxial cable. This hybrid fiber/coaxial (HFC) network effectively benefits Business and residential customers because it improves signal performance, expands available bandwidth, and increases overall network reliability.

- **Satellite:** Satellites are launched into orbit to relay voice, video, or data signals as part of a telecommunications network. Earth station antennas transmit signals to the satellite, which are amplified and sent back to Earth for reception by other earth station antennas. Antennas on stationed on Earth transmit signals to the satellite, which are amplified and received via other ground stations antennas. Satellites perform a variety of functions through the use of a combination of terrestrial and space-based components, including bidirectional transmission of voice, video, and data services; data collection; event detection and timing; and navigation.

- **Wireless**: Wireless refers to telecommunication in which electromagnetic waves rather than wire carry a signal over a portion of or the entire communication path. Wireless technologies consist of cellular phones, wireless hot spots (WiFi), personal communication services, high-frequency radio and commercial and private radio services to provide communication services.

- **Wireline:** Comprises circuit- and packet-switched networks connected via copper, fiber, and coaxial cable. It consists of private enterprise data and telephony networks, the Internet's core backbone, and the public switched telephone network (PSTN).

COMMUNICATIONS SECTOR BACKGROUND: PALOS VERDES PENINSULA

Communication systems are critical for disseminating news and information, relaying personal and business messages, providing audio and visual entertainment, and transmitting and receiving emergency messages. The communication component of the Palos Verdes Peninsula infrastructure system is a multifaceted and highly complex system of resource facilities and networks that contribute to the economic and social well-being of the peninsula4.

Telephone systems in the Peninsula consists of a network of transceivers (telephones), transmission lines, and switching centers. Residents can contract their cell phones and laptops with any company of their choice.

Cable Television, on the Peninsula, cable television is supplied by Frontier, AT&T, and Cox Communications. All three companies use fiber-optic lines to provide instant access to numerous television channels, high-speed Internet, and digital telephone for their customers. There is also satellite TV provided by companies such as DirectTV and DishNetwork, who can provide similar access to television channels. The difference is that with satellite TV, a satellite dish will need to be installed.

Broadcast Communications are systems that have no wires or transmission lines, but rather transmit signals through the airwaves. Of the three primary broadcast systems, radio and television are by far the most popular, while microwave remains a more specialized communications medium. Radio and television communication systems are operated by privately owned companies that supply free audio and audio/visual communication to people with appropriate receivers. These broadcast systems are used primarily for the dissemination of news, information, and entertainment.

The County of Los Angeles currently owns and operates a microwave station near the intersection of Highridge Road and Crestridge Road in the City of Rancho Palos Verdes. The facility is a broadcast communication system designed to relay signals to and from the Palos Verdes Peninsula area. The prime users of the facility are the County Fire and Sheriff Departments and other County agencies

COMMUNICATIONS SYSTEMS INTERDEPENDENCIES

UPSTREAM DEPENDENCIES:

The Communications Sector's primary upstream dependency is on electricity, which is generated either commercially or on-site. Water can also be a limiting factor in the operation of buildings that require heating, ventilation, and air conditioning or cooling (e.g., data centers). Additional, upstream dependencies of the Communications System sector are depicted in the Table below.

COMMUNICATIONS SYSTEMS UPSTREAM DEPENDENCIES

SERVICES/RESOURCES PROVIDED	
ELECTRICITY	Power needed for control facilities, communication towers, and remote monitoring capabilities.
WATER	Water is needed for Temperature control (e.g., cooling of equipment), fire suppression, potable water.
WASTEWATER	Wastewater removal service, raw water supply for hydroelectric generation.
NATURAL GAS	Telecommunication for daily operations; and SCADA systems.

DOWNSTREAM DEPENDENCIES:

Many other sectors of critical infrastructure are highly dependent on the Communications Sector, The Communications Sector is one of the few sectors that affects all other sectors. Each sector relies on communications services to support its operations and associated daily communication requirements for corporate and organizational networks and services (e.g., Internet connectivity, voice services, and video teleconferencing capabilities). Table 10 summarizes the extent to which other sectors rely on the Communications Sector.

COMMUNICATIONS SYSTEMS UPSTREAM DEPENDENCIES

SERVICES/RESOURCES PROVIDED	
ELECTRICITY	**Telecommunication for daily operations; and SCADA systems**
WATER	**Telecommunication for daily operations; and SCADA systems**
WASTEWATER	**Telecommunication for daily operations; and SCADA systems**
NATURAL GAS	**Telecommunication for daily operations; and SCADA systems**

POTENTIAL EFFECTS OF COMMUNICATION SYSTEMS DISRUPTIONS ON ESSENTIAL INFRASTRUCTURE

The Communications sector has downstream dependencies with all critical infrastructure sectors. All sectors rely on Communications, making its reliability a fundamental need and requirement. Communications is particularly important for Telecommunication for daily operations, and Supervisory control and data acquisition (SCADA) systems monitoring. Large regional impacts across all infrastructure sectors can occur when communication systems disrupted. California has seen an increasing number of large-scale disasters over the last two decades as a result of climate change. Our communications systems, which are normally extremely reliable and dependable, failed during recent disasters. These failures jeopardize situational awareness, impact alerts and warnings, obstruct critical communications between multiple stakeholders, and can result in unnecessary deaths and other social harms.

During a community wide crisis, efficient, rapid and accurate information flow can save lives, especially during complex, evolving events like a wildfire. Given the importance of communication to the public in an emergency, it is critical to continue to examine the extent to which the Communication Sector depends on and impacts essential critical infrastructure servicing the Palos Verdes Peninsula. The following table summarizes the potential effects of disruptions of the Communications Sector.

POTENTIAL EFFECTS OF DISRUPTIONS

ELECTRICITY	Failure of communication facilities and towers, Loss of electronic transactions and ability to obtain data. Customer service and repair crew communications failure.
WATER	Loss of monitoring of pipeline status, loss of situational awareness.
WASTEWATER	Monitoring equipment affected, Restriction of sewage pumping and treatment for stationary, scale systems. Challenges in communicating with Residents and business Potential impact to facility lighting, telecommunications; electronic data.
NATURAL GAS	Loss of monitoring of pipeline status, loss of situational awareness.

WATER SYSTEMS GENERAL OVERVIEW

Water is drawn from a freshwater source, usually a lake, river, or stream, and treated before it is pumped to our homes and businesses. Water from reservoirs, streams, and rivers often contains a variety of organisms and dissolved chemicals or metals. This material must be removed from the water to ensure that it is safe for drinking or other uses. Most systems will include at least two to three filtration stages to remove harmful or dangerous particles such as bacteria, viruses and other debris. [11]

After treatment, the system works by transferring quantities of water into the established water distribution systems. Water Distribution system infrastructure is generally considered to consist of the pipes, pumps, valves, storage tanks, reservoirs, meters, fittings, and other hydraulic appurtenances that connect treatment plants or well supplies to consumers' taps. [11]

Fundamentally, a water supply system consists of three basic components: the source of supply, the processing or treatment of the water, and the distribution of water to the users.

> **Water Sources** – These include surface reservoirs, rivers, and ground water from aquifers via wells. Utilities often use a combination of multiple water sources to ensure an uninterrupted supply.
>
> **Treatment** –Drinking water in a public water system is treated to make sure it is safe to drink before it enters all those pipes. Water treatment plants filter the water to remove particles of dirt, minerals, microorganisms and other contaminants. Chlorine is a chemical commonly used to disinfect water supplies.
> **Distribution and Collection** – Public drinking water systems include a series of pipes, storage tanks, pumps, valves, and gates. Flow rates are adjusted to ensure that the required pressure is available where it is needed.
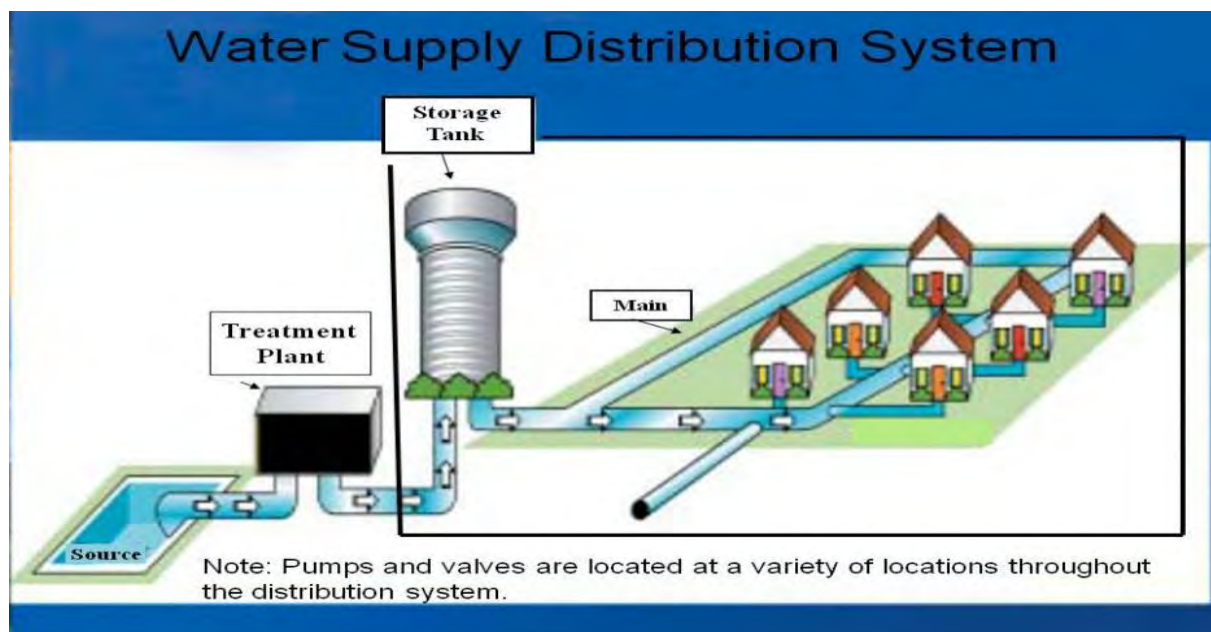

Source: Environmental Protection Agency: https://www.epa.gov/dwsixyearreview/drinking-water-distribution-systems

WATER BACKGROUND: PALOS VERDES PENINSULA

The Palos Verdes Peninsula's water needs are currently served by the California Water Service Company (Cal Water). Cal Water purchases surface water imported by the Metropolitan Water District of Southern California from the Colorado River and the State Water Project in Northern California, which is then used to serve the entire Peninsula, including the City, through the Palos Verdes water system.

Palos Verdes Reservoir is categorized as a Surface Water Reservoir. Surface storage is a critical element of Southern California's water resources strategy. Because California experiences dramatic swings in weather and hydrology, surface storage is important to regulate those swings and mitigate possible supply shortages. Surface storage provides a means of storing water during normal and wet years for later use during dry years, when imported supplies are limited. The Metropolitan Water District has a comprehensive Emergency Action Plan (EAP) for each of its dam and reservoir facilities. *(MWD 2020 Urban Water Management Plan)*
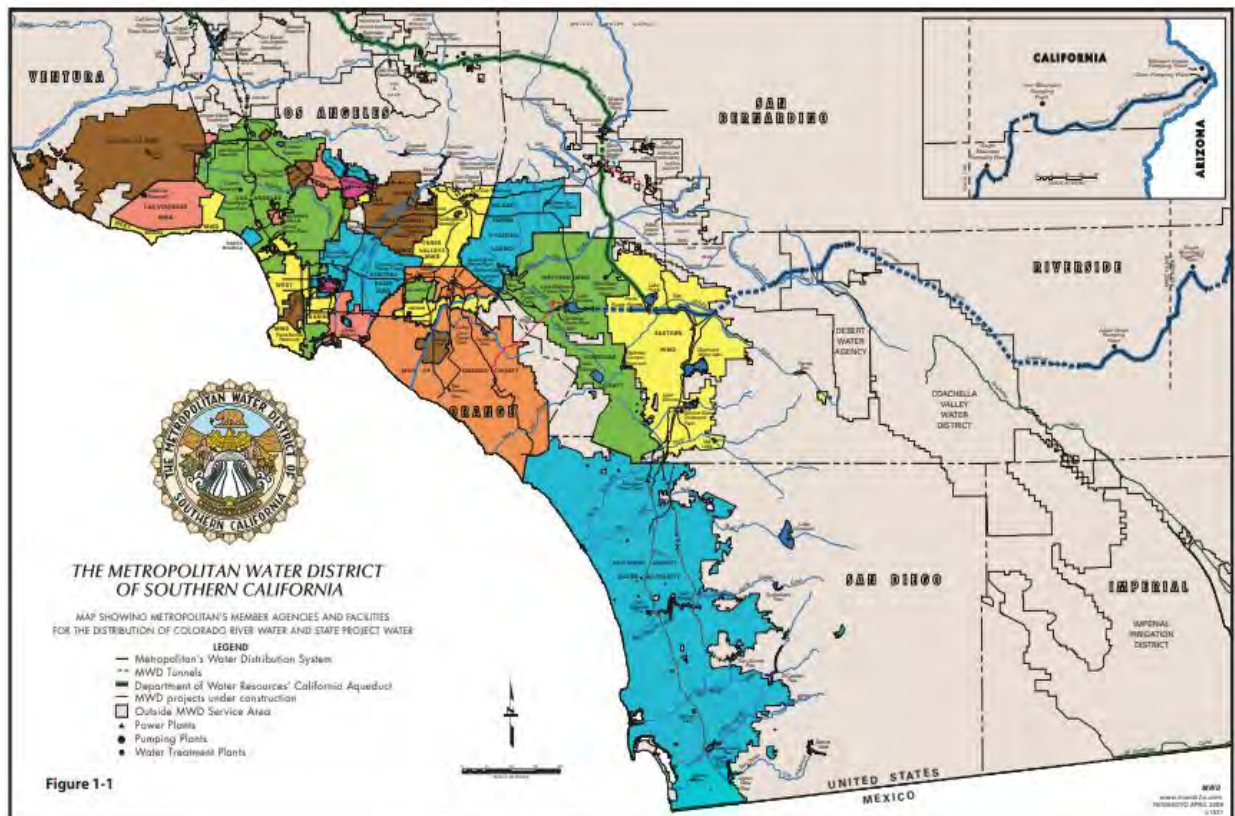
The Palos Verdes water system distributes water through two distinct water distribution systems. These systems are commonly referred to as the "D-500 System" and the "Ridge System." The D-500 System serves the lower-elevation areas of the Peninsula, about 13% of the total demand, and the Ridge System serves the upper-elevation areas, comprising the remaining 87% of demand. The average daily demand and maximum daily

demand of the Ridge and D-500 Systems combined is 12,500 gallons per minute (gpm) and 20,600 gpm, respectively.

All of the supply to the Palos Verdes system is delivered through four connections located at the northeastern edge of the Peninsula4.

Recently, Cal Water has completed the Palos Verdes Peninsula Water Reliability Project, the project enhances the reliability of the drinking water infrastructure on the Palos Verdes Peninsula and will help ensure that all Peninsula residents continue to have safe, reliable water service. Prior to the project's completion, 90% of the Palos Verdes Peninsula was served by one 60-year-old drinking water pipeline and a single pump station.

The project replaced a portion of the existing water pipeline and added a second pipeline to deliver drinking water to homes and businesses. In total, crews installed about seven miles of a new pipeline. Additionally, the project added a second pump station on a separate electrical grid that will help guard against the risk of prolonged water service outages caused by disruptions such as natural disasters.
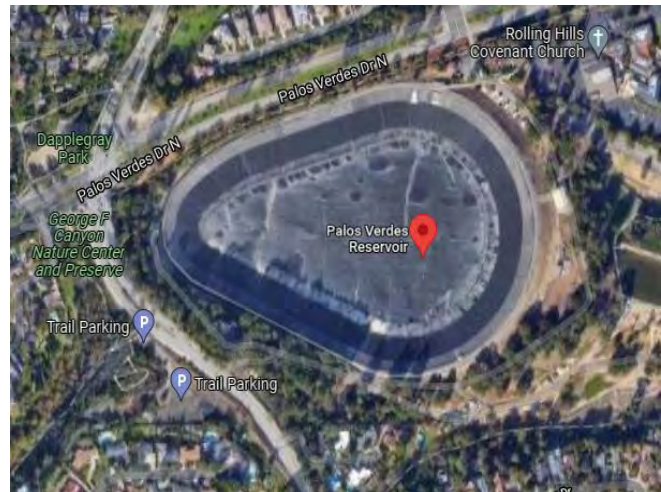
CALIFORNIA WATER SERVICE (CAL WATER) FACILITIES SERVICING THE PENINSULA
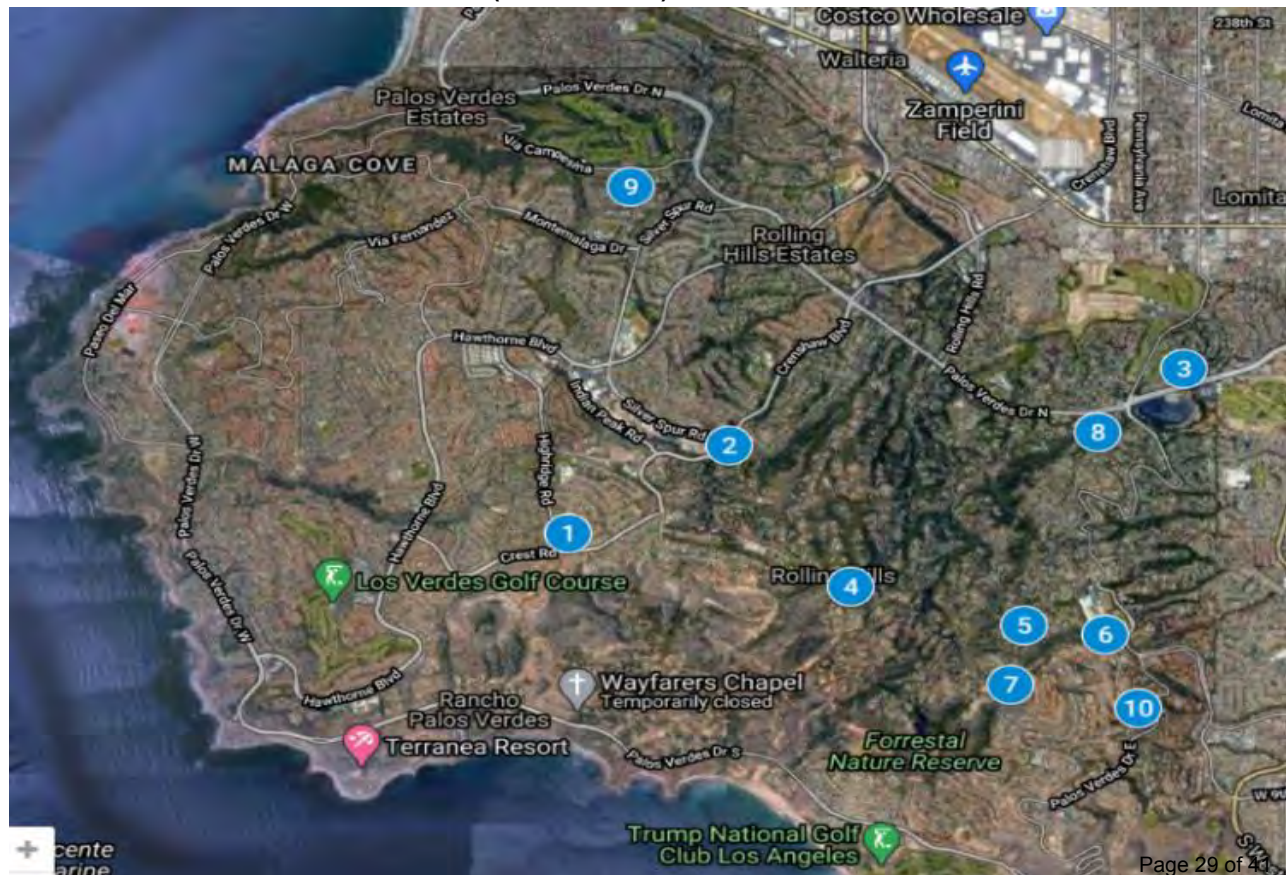
WATER SYSTEMS INTERDEPENDENCIES

UPSTREAM DEPENDENCIES:

The Water Sector is critical to all sectors, it is dependent on several key sectors. Upstream dependencies of the Water System sector are depicted in the following Tablle[11].

WATER UPSTREAM DEPENDENCIES

SERVICES/RESOURCES PROVIDED	
ELECTRICITY	Power needed for pumping stations, storage, control systems and facilities.
COMMUNICATIONS	Power for switches and communication facilities
WASTEWATER	Essential and highly dependent infrastructure for health and safety
NATURAL GAS	Natural Gas is needed for heating, pumps and lift stations, and facilities.

WATER DOWNSTREAM DEPENDENCIES:

The Water Sector is considered one of the most critical lifeline sectors because its functions are essential to core operations in nearly every other critical sector. When water services are lost for relatively short periods (less than eight hours), the functioning of multiple sectors is significantly degraded.

WATER DOWNSTREAM DEPENDENCIES

SERVICES/RESOURCES PROVIDED	
ELECTRICITY	Temperature control (e.g., cooling of equipment), fire suppression, potable water
COMMUNICATIONS	Water needed for cooling and facilities.
WASTEWATER	wastewater removalservice, raw water supply for hydroelectric generation
NATURAL GAS	Water needed for production, cooling, emission reduction and facilities.

POTENTIAL EFFECTS OF WATER DISRUPTIONS ON ESSENTIAL INFRASTRUCTURE:

When water services are lost, even for short periods, the consequences can be widespread and dramatic. When these services are lost for an extended period of time, the results can be catastrophic. potential impacts that a disruption in water service could cause include the following: Loss of water for cooling, resulting in impacts to electrical and telecommunications equipment; Lack of water for consumption, cooking, bathing, flushing, fire suppression, etc.; Loss of water for commercial irrigation, food supply, and production to meet consumer needs and a secreased public confidence in water supply13.

POTENTIAL EFFECTS OF DISRUPTIONS

ELECTRICITY	**Loss of water for cooling (disabling electrical and telecommunications equipment)** **Lack of water for consumption, flushing, fire suppression**
COMMUNICATIONS	**Loss of water for cooling (disabling electrical and telecommunications equipment) Lack of water for consumption, flushing, fire suppression**
WASTEWATER	**Significant Impact on wastewater treatment plants negatively affecting public health and the environment.**
NATURAL GAS	**Impact on Cooling and Emissions Reduction Lack of water for consumption, flushing, fire suppression, etc.**

WASTEWATER SYSTEMS GENERAL OVERVIEW

The collection and treatment of wastewater is vital to public health and clean water. Sewers collect sewage and wastewater from homes, businesses, and industries and deliver it to wastewater treatment facilities. Wastewater systems move raw wastewater from the producer to wastewater treatment plants via a collection system The treatment plants remove hazardous materials from the wastewater via Physical, chemical, and biological processes prior to discharging the treated water safely into approved locations, typically reservoirs, streams, rivers, the ocean, etc. [11]

Fundamentally, the basic function of wastewater treatment is to speed up the natural processes by which water is purified. The treatment of wastewater consists of two basic stages. The **primary and secondary**, which are outlined here. In the **primary** stage, solids are allowed to settle and removed from **wastewater**. The **secondary** stage uses biological processes to further purify **wastewater**. Sometimes, these stages are combined into one operation.

There are two basic stages in the treatment of wastewater. In the primary stage, solids are allowed to settle and removed from wastewater. The secondary stage uses biological processes to further purify wastewater. In the first stage primary stage, solids are allowed to settle and be removed from wastewater. The secondary stage uses biological processes to purify wastewater further.

WASTEWATER BACKGROUND PALOS VERDES PENINSULA

The four Peninsula Cities are located in District #5; the South Bay Cities Sanitation District is serviced by the Los Angeles County Sanitation District, which owns and operates the wastewater collection system within the Peninsula Cities. [11]

Onsite Wastewater Treatment Systems (OWTS), also known as septic systems, are used to treat wastewater that is contaminated by human use, from a home or business, and then released into the environment. OWTS are underground structures that treat and dispose wastewater, typically from homes and businesses in suburban and rural locations. Instead of the wastewater being transported to a wastewater treatment plant, the wastewater is treated on-site. Los Angeles County Department of Public Health (LACDPH) reviews and approves OWTS under the provisions of the Local Area Management Program (LAMP) to residents of unincorporated county areas and contracted cities. *(Los Angeles Regional Water Quality Control Board & CA State Water Resources Control Board)*

The Los Angeles County Sanitation District operates ten water reclamation plants, which treat an estimated 510 million gallons per day. The Joint Water Pollution Control Plant is located in Carson, California. The Joint Water Pollution Control Plant is one of the largest wastewater treatment plants in the world and is the largest of the Districts' wastewater treatment plans.

This facility provides both primary and secondary treatment for approximately 300 mgd of wastewater. This plant serves a population of approximately 3.5 million people throughout the County, including the Palos Verdes Peninsula. Prior to discharge, the treated wastewater is disinfected with hypochlorite and sent to the Pacific Ocean through a network of outfalls. These outfalls extend 2 miles off the Peninsula to a depth of 200 feet.

WASTEWATER INTERDEPENDENCIES

WASTEWATER UPSTREAM DEPENDENCIES:

Wastewater systems for the Palos Verdes Peninsula depend on a variety of external infrastructures to maintain normal operations. Electric power is one of the most important services necessary for maintaining pumping and treatment operations. Table presents some Upstream dependencies of the wastewater System sector are depicted in the Table below.

WASTEWATER UPSTREAM DEPENDENCIES

SERVICES/RESOURCES PROVIDED	
ELECTRICITY	Power needed for pumping stations, storage, control systems and facilities.
COMMUNICATIONS	Water for cooling (disabling electrical and telecommunications equipment) Lack of water for consumption, flushing, fire suppression
WATER	Essential and highly dependent infrastructure for health and safety
NATURAL GAS	Natural Gas is needed for heating, pumps and lift stations, and facilities.

WASTEWATER DOWNSTREAM DEPENDENCIES:

A wide range of physical infrastructure in industries and other critical infrastructure relies heavily on the proper functioning of wastewater systems. The following Table demonstrates the interdependencies between wastewater infrastructure and other critical infrastructure.

TABLE 16: WATER DOWNSTREAM DEPENDENCIES

SERVICES/RESOURCES PROVIDED	
ELECTRICITY	Power needed for pumping stations, storage, control systems and facilities.
COMMUNICATIONS	Water for cooling (disabling electrical and telecommunications equipment) Lack of water for consumption, flushing, fire suppression
WATER	Essential and highly dependent infrastructure for health and safety
NATURAL GAS	Sewage wastewater services for facilities.

POTENTIAL EFFECTS OF WASTEWATER DISRUPTIONS ON ESSENTIAL INFRASTRUCTURE

The deterioration and subsequent failure of the Wastewater sector impacts the health of community, the environment, and has significant consequences for the additional utility sectors. the Table below demonstrates the interdependencies between wastewater infrastructure and other critical infrastructure.

Water system infrastructure is critical to a community's economic and social viability. Although these systems ensure the basic health and safety of residents, businesses, and industry, they are frequently taken for granted due to the high level of service and reliability provided by water and wastewater utilities. The critical nature of these

systems is not appreciated until a water main breaks or another type of service interruption occurs.

POTENTIAL EFFECTS OF DISRUPTIONS

ELECTRICITY	Lack of wastewater services, posing public health and sanitation issues.
COMMUNICATIONS	Lack of wastewater services, posing public health and sanitation issues.
WATER	Lack of wastewater services, posing public health and sanitation issues.
NATURAL GAS	Lack of wastewater services, posing public health and sanitation issues.

The interdependence of the water sector serving the Palos Verdes Peninsula, combined with the impact of natural disasters, can result in a ripple effect of critical infrastructure disruptions serving Palos Verdes residents. Understanding the interdependence and critical failure points of the water infrastructure sector is therefore critical for achieving long-term resilience planning for the Palos Verdes Peninsula

.

CONCLUSION

It is important to recognize that infrastructure sectors interoperate together in myriad ways in a "systems of systems" that supports the quality of life, wellbeing, and overall security for residents of the Palos Verdes Peninsula. Understanding these independencies is crucial to ensure that the Peninsula Cites are prepared to continue critical services to residents in times of emergencies. [12]

As critical infrastructures become more complex, the probability increases that infrastructure failures will cascade and escalate in multipart ways. Additional research is needed to understand better the infrastructure sectors processes and interoperability with other infrastructures. The infrastructure sector analysis in this White Paper provides a high-level summary of inter-operations that affect infrastructure servicing the Palos Verdes Peninsula. This White Paper serves as an initial framework for recognizing interdependencies in the analysis of critical infrastructures and is intended to provide emergency planners with a foundational understanding of infrastructure interdependencies and how they could inform future emergency operation protocols.

Critical infrastructure sectors can lead to the proliferation of cascading and escalating failures across all infrastructure sectors. It is essential to integrate the characterization of interdependencies into emergency planning methodologies. This White Paper on Infrastructure Interdependencies is intended to convey this central concept. Future emergency planning efforts will address the specific interdependencies threats to the Palos Verdes Peninsula.

The Palos Verdes Cities of Palos Verdes Estates, Rancho Palos Verdes, Rolling Hills and Rolling Hills Estates comprehend the importance of the analysis of infrastructure interdependencies vulnerabilities in the belief that this analysis is a key in addressing the catastrophic challenges of infrastructure failures during an emergency response.

APPENDIX A: PENINSULA-WIDE INCIDENT COMMUNICATION PROTOCOLS

The existing protocol for communication from LASD to RPV, RH and RHE typically involves an email and or text message from the Captain or Watch Commander to the City Managers. Depending on the particulars of the incident, a phone call may be made as well. Similarly, PVEPD advises the PVE City Manager in the most immediate and appropriate manner available. The City Managers then disseminate the information to their respective City Councils via email or phone depending on the situation. Appropriate information is then disseminated to the public via applicable electronic platforms.

LASD and PVEPD typically advise each other of incidents that may result in involvement by the other agency. This also occurs with other neighboring jurisdictions such as Torrance PD and LAPD. LASD and PVE also advise adjacent schools when warranted on a case by case basis.

ADDITIONAL STRATEGIES: IMPROVED FLOW OF COMMUNICATION

1) It would be appropriate to include the Superintendent of PVPUSD in any communication going to the City Managers;

2) All communication with City Council Members or School Board Members should come through their respective City Managers or Superintendent so as to relieve first responders from excessive communication burdens;

3) The City in which an incident occurs will act as lead agency in dealing with the media as well as posting and updating information as it becomes available;

4) Inasmuch as it is possible, the lead agency will communicate electronically with the other cities and PVPUSD immediately prior to posting or updating information;

5) Each City and PVPUSD will determine the information it wishes to post and where to post it;

6) During a regional emergency declared by the county, state, or federal government, the Peninsula Cities will coordinate with the County Office of Emergency Management to ensure unified messaging about incident.

7) To ensure unified messaging, the Peninsula Cities will only post-incident emergency information that has been approved by the agency that has jurisdiction over the incident. Individual Peninsula Cities may still post-emergency and incident information that is directly under the City's purview.

8) In the event of a power outage and/or a loss of cell service impacting the entire Palos Verdes Peninsula the Peninsula Cities will work cooperatively (to the best extent possible) to implement the following strategies for information distribution:
- Regional Emergency Phone hotline
- Deployment of Information Stations (large wooden sandwich boards) to post information when other means of communication are impaired at key locations (dependent on the situation and where it is needed.)

- Printed materials to distribute to Emergency Information Stations
- Flyers for in-person distribution
- Loudspeakers in vehicles

9) During an emergency of any level, the Peninsula Cities will communicate and coordinate with one another, as well as with any other partner agency responding to or involved in the incident, to issue uniform coordinated emergency alerts via all appropriate and available notification platforms, including the individual Cities' disaster and emergency alert systems, Wireless Emergency Alerts (WEA), and social media.

10) Each City and PVPUSD will provide the other agencies with priority contact lists for purposes of communicating during incidents of joint concern.

It is universally recognized that many times judgment is required in determining when and whom to notify in any given circumstance. There is concern about inundating each other and the public with non-critical information. Generally speaking, though, the consensus would be to err on the side of over-communicating.

An emergency contact list has been developed and will be distributed to key staff in each agency to facilitate inter-agency communication. It is not meant to be publicly available. This list will be dynamic, and each agency will provide updated contact information as changes occur. RHE will act as the central point for receiving updates and then disseminating the updated information to all.

COMMUNICATION PROTOCOL: PENINSULA-WIDE INCIDENT

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APPENDIX B - REFERENCES

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ITEM VII B

UPDATE ON PENINSULA WIDE MASS EVACUATION PLANS

AGENDA TITLE:

Update on Strategy for Establishing Peninsula Wide Mass Evacuation Plans

RECOMMENDED COMMITTEE ACTION:

Receive and file report.

STAFF COORDINATOR: Elaine Jeng, City Manager
Jesse Villalpando, Emergency Services Coordinator

BACKGROUND:

At the August 12, 2021 Peninsula Public Safety Committee meeting, the Committee supported staff's recommendation to prepare a Request for Proposal (RFP) to solicit consultant services to prepare a Peninsula Wide Mass Evacuation Plan. The Committee and participants of the meeting discussed components of the plan and provided suggestions for additional components to be a part of the plan. Staff anticipates reporting on the RFP process at the February 2022 Committee meeting.

DISCUSSION:

In July 2019, the City of Laguna Beach solicited qualified consultants to coordinate, facilitate, and prepare an Evacuation Time Estimate (ETE) study. Laguna Beach is a well-known beach community that has a very unique topography that consists of canyons, hills and eight miles of coastline. Due to its topography, the City stated that it has limited ingress/egress routes and over 88 percent of the city is within the Very High Fire Severity Zone designated by Cal Fire. The City of Laguna Beach said that a completed study will help provide clarify for potential bottlenecks in traffic and if a staged evacuation is called.

The City of Laguna Beach recently completed an Evacuation Time Study through the services of KLD Engineering. KLD Engineering used a special evacuation software capable of estimating and testing evacuation time estimates for the City of Laguna Beach's 22 Evacuation Management Zones (EMZ). The software included the ability to create a Disability Access & Functional Needs registry/database. Per the City of Laguna Beach's staff report, the cost for KLD Engineering to prepare an Evacuation Time Estimate Study, develop an evacuation website, and a Disability Access & Functional Needs registry was $192,020.

CONCLUSION

An Evacuation Time Study could be valuable to the communities of the Peninsula. Staff recommends including an evacuation time study as a part of the Peninsula Wide Mass

Evacuation Plan. The RFP would request proposers to provide details and a cost to prepare an evacuation time study.

ITEM VII C

UPDATE ON INSTALLING WILDFIRE MONITORING CAMERAS

PENINSULA PUBLIC SAFETY COMMITTEE
AGENDA REPORT

MEETING DATE: 11/18/2021
AGENDA HEADING: New Business

AGENDA TITLE:

Update on installing Wildfire Monitoring Cameras

RECOMMENDED COMMITTEE ACTION:

(1)   Receive updated information regarding the viability of implementing a Peninsula-wide wildfire monitoring camera system, and provide further direction to Staff.

STAFF COORDINATOR: Jesse Villalpando, Emergency Services Coordinator J. v.

ATTACHED SUPPORTING DOCUMENTS:

    A.   [August 17, City Council Meeting Staff Report](#) (page A-1)
    B.   November 2, RPV City Council Meeting Staff Report (page B-1)
    C.   Pano AI Proposal (page C-1)

BACKGROUND:

Climate change and human-caused factors have had a significant impact on the environment in recent years. These events include heat waves, droughts, dust storms, floods, hurricanes, and wildfires. Wildfires have severe consequences for local and global ecosystems and serious infrastructure damage, injuries, and loss of life. With the wildland fire season of 2020 in the State of California in mind and as we enter the 2021 fire season, it is imperative that the Palos Verdes Peninsula Community improves situational awareness and efficiencies in mitigation, response and recovery in the greater Palos Verdes Peninsula area, as described below.

In response to this direct threat to the Palos Verdes Peninsula community, the City of Rancho Palos Verdes has taken significant steps to mitigate such consequences, including the investigation of a fire detection camera network for the city.

This staff report is intended to provide an overview of the City of Rancho Palos Verdes' current research and potential actions, as well as the issues and considerations associated with the installation of a wildfire camera system, and serves as a request for cooperation from the Palos Verdes Peninsula cities in mitigating the devastating losses associated with wildfires through participation in the procurement and use of a Peninsula-wide system.

DISCUSSION

<u>Existing Efforts:</u>

The City of Rancho Palos Verdes is investigating the development of a wildfire camera detection system. This system would involve the deployment of high-definition cameras, as well as associated artificial intelligence software and tools, in strategic locations identified as having a favorable vantage point for monitoring and providing constant surveillance of areas most vulnerable to wildfire within the City's open spaces and canyons.

This is a highly complex topic; the following section highlights ongoing efforts by the City of Rancho Palos Verdes in relation to this project to improve clarity on the proposed course of action and the current status of this project.

August 11, 2021 - Meeting with the ALERTWildfire Network

Numerous organizations have begun deploying network-connected optical cameras in strategic locations, in or near California's wildland areas, The largest of which is the ALERTWildfire Network, which currently monitors for wildfires with over 700 state-of-the art cameras, with additional cameras planned for installation in the coming years. It is a collaboration of several West Coast universities (the University of Nevada, Reno, the University of California, San Diego, and the University of Oregon) that uses high-definition video cameras to continuously monitor areas within their field of view for fire activity.

The video signals are transmitted from the cameras to servers at the University of Nevada, Reno via resilient, hardened microwave/fiber networks, where they are made available on the ALERTWildfire.org website. Along with cameras, each ALERTwildfire Network installation site includes a variety of other pieces of equipment such as hard power, solar power, and battery backup.

While the ALERTWildfire Network cameras provide situational awareness for first responders, detecting and alerting wildfire ignition is typically done manually by examining video streams. Currently, the system is used primarily to confirm fire reports made by 911 dispatchers. (Attachment B contains additional information about the AlertWILDFIRE Network.)

On August 11, 2021, the City of Rancho Palos Verdes Staff met with representatives from the ALERTWildfire Network to discuss the use of closed-circuit cameras for wildfire monitoring and learn more about the network and its partnership specifications. During this meeting, representatives from the ALERTWildfire Network informed Staff that due to the City's urban landscape and population, they do not currently recommend the installation of fire cameras.

ALERTWildfire representatives stated that their network of cameras is typically located on mountain tops in rural areas, where fires can quickly spread before being noticed or reported to authorities. In contrast to remote Wildland Urban Interface (WUI) fires, fires igniting in urban and suburban areas are frequently detected quickly via a mobile phone

call to 9-1-1. Additionally, representatives noted that no cameras are currently located near urban areas due to the possibility that an individual may report a fire before the ALERTWildfire Network cameras detect it. According to ALERTWildfire, at the time of writing this staff report, no near-term plan exists to cover the Palos Verdes Peninsula with cameras.

RPV City Council Meeting – August 17, 2021:

On August 17, 2021, the City of Rancho Palos Verdes (RPV) Staff provided the RPV City Council with a report on the potential use of wildfire monitoring cameras throughout the City. Specifically, during this meeting staff recommended that the council consider procuring and installing five [AXIS Q60 Network Cameras](#) (similar to those used by the ALERTWildfire Network) in strategic locations identified as having a favorable vantage point to monitor and provide constant surveillance of areas most at risk for wildfires throughout the City. (For additional background on this item, see Attachment A).

At this meeting, the RPV City Council directed Staff to research the viability of implementing a Peninsula-wide wildfire monitoring camera system; to work with the other Peninsula cities and the County of Los Angeles (representing unincorporated areas); and to report back with additional information, including potential camera locations and whether cameras could be collocated on existing Southern California Edison (SCE) poles.

RPV Emergency Preparedness Committee (EPC) Input and Recommendations:

At the regular meeting of the City of Rancho Palos Verdes Emergency Preparedness Committee (EPC), On September 16, 2021, the RPV Emergency Services Coordinator provided an update on the status of the investigation into the feasibility of implementing a wildfire network camera system, as directed by the RPV Council.

Following this presentation, the Emergency Preparedness Committee provided city staff with potential camera locations and feedback for consideration and implementation prior to the Council presentation. In summary, the committee's input focused on the importance of obtaining additional information on these cameras, the importance of exploring their installation on existing communication tower infrastructure, potential site view issues for residents, potential concerns about residents' privacy, the possibility of solar power powering the majority of these cameras, and the importance of obtaining revised cost estimates that include solar power, internet, and any other ad hoc costs. Additional information about the Committee's feedback is included in the Committee's September 16th meeting minutes, which are included in this report in Attachment B.

EPC Pros & Cons for The Proposed Installation of Wildfire Monitoring Cameras:

At the September 16th meeting, the EPC further provided staff with the following list of specific benefits and drawbacks (Pros & Cons) regarding the Committee's recommendation to install wildfire monitoring cameras throughout the City of Rancho Palos Verdes.

PROS	CONS
- **Potential for the use of cameras to detect the ignition of a wildfire on the prior to residents reporting it.** It should be noted that the EPC recognized the magnitude of devastation caused by wildfires and the potential for early detection by these cameras to aid in public warning, evacuation, and first responder mobilization in order to mitigate the potential devastation caused by a wildfire.	- **Wildfire Monitoring Cameras are not primarily designed for use in small areas.**
- **Increased situational awareness in the event of a wildfire.** Once a fire is detected or reported, these cameras can provide first responders with enhanced situational awareness, allowing them to assist in evacuation efforts, scale up or down firefighting resources quickly, monitor fire behavior during containment, and observe contained fires for flare-ups.	- **Possibility for a large number of false alerts, resulting in alert fatigue and a delay in alerting appropriate authorities by camera monitors.** - **Possibility of having a detrimental effect on residents' site views as a result of poles needed to mount these cameras.** - **Possibility of privacy concerns for residents.** - **Vulnerability to vandalism due to the cameras' remote location.** - **Possibility that the city will incur significant ongoing costs associated with the establishment of cellular data internet connectivity.** - **Possibility of unintended consequences, such as residents becoming aware of a fire monitoring system and believing that it will detect fires quickly and consistently prior to human reporting and concluding that they do not need to call 911 if they see smoke.**

On October 21, 2021, the City of Rancho Palos Verdes Emergency Services Coordinator provided the EPC with an update on progress made since the directives issued at the September 16 meeting. In support of the RPV Council's direction, the EPC identified the following three critical decisions that must be made prior to proceeding with the purchase/installation/monitoring of wildfire cameras during this meeting (Attachment)

They are as follows:
    (1) Location of Cameras (and coverage)
    (2) Type of Camera system (detection vs surveillance)
    (3) How best to proceed forward

RPV Council Meeting - November 2, 2021:

During the City of Rancho Palos Verdes Council meeting on November 2, 2021, city staff and members of the RPV Emergency Preparedness Committee updated the Council on the status of the investigation into the viability of implementing a wildfire monitoring camera system for the City, as well as solicited direction from the Council on potential monitoring camera placement locations and the type of camera system to pursue (surveillance with the use of volunteers or AI technology-based detection).

The presentation specifically covered a variety of topics, including an overview of the ALERTWildfire Network camera system, recommendations from the Emergency Preparedness Committee (EPC) regarding proposed wildfire fire camera locations and coverage, and an examination of the differences between camera systems (surveillance vs. detection) (Attachment B)

As a result of this meeting, the RPV City Council expressed interest in pursuing a wildfire detection system that utilizes Artificial Intelligence (AI) technology to actively monitor for signs of smoke indicative of a wildfire ignition and additionally, the Council directed staff to coordinate with the RPV Emergency Preparedness Committee and the Los Angeles County Fire Department to identify and finalize camera installation locations for consideration by the council, as well as to move forward with issuing a Request for Proposals for the procurement and installation of a wildfire detection system for the City, and to report back to the City Council with additional information.

Potential Location of Cameras

There has been expressed interest in installing wildfire cameras to monitor for fires in the City's canyons and open space areas, assisting firefighters and the general public in detecting fire ignitions before they develop into full-fledged conflagrations. Due to the cameras' remote locations must be rugged enough to withstand the elements, including seismic activity. Additionally, they must provide crystal-clear images in a variety of lighting and weather conditions and be capable of zooming in on fires that are miles or even kilometers away.

As the Committee is well aware, the physiography of the Palos Verdes Peninsula features rolling hills, steep slopes, canyons, and coastal bluffs. The requirement for power and internet connection for fire monitoring cameras and potential sight line concerns associated with erecting poles that obstruct residential views, among myriad issues, significantly complicates the installation of cameras to monitor wildfires. While cameras do offer the benefit of constant coverage, it is critical to note that even if multiple additional

camera sites were added, the topography (valleys, etc.) and dense forestation would make full coverage of the area impractical.

⇒ **RPV EPC Criteria for Fire Monitoring Camera Locations:**
  o On October 21, theRPV EPC developed a list of criteria for prioritizing the location of wildfire monitoring camera installations and further refined a list of proposed camera locations. The following EPC-identified criteria were used to guide the selection of proposed camera locations (identified in the next section of this report):
    ▪ A wide, relatively open view of the RPV Canyons and open space
    ▪ View of open space areas not easily visible from homes
    ▪ View of canyons where fires can grow and spread quickly
    ▪ View of areas where fires have previously occurred
    ▪ Existing infrastructure to mount camera on poles or similar
    ▪ Wifi access/Power access (or use solar)

⇒ **Proposed Wildfire Fire Camera Locations and Coverage:** The Emergency Preparedness Committee proposed multiple locations for the cameras during this meeting, including overlooking the Portuguese Bend Reserve, Forrestal Reserve, and San Ramon Reserve, as described below:
  o [U.S. Coast Guard Monopole at Upper Point Vicente Park](#)
  o [Overlooking the Portuguese Bend Reserve and Forrestal Reserve areas in the City of Rancho Palos Verdes.](#)
  o [Overlooking the San Ramon Reserve/Switchback areas of the City of Rancho Palos Verdes.](#)
  o [Overlooking the San Ramon Reserve's East Side](#)
  o [Rattle Snake Trail and Adjacent Canyon](#)
  o [Open Space Areas visible from Vistapoint Scenic Outlook](#)

Legend:
- USGC Monopole at Upper Point Vicente
- Overlooking the Portuguese Bend Reserve and Forrestal Reserve areas.
- Overlooking the San Ramon Reserve
- Overlooking the San Ramon Reserve's East Side
- Rattle Snake Trail and Adjacent Canyon
- Open Space Areas visible from Vistapoint Scenic Outlook
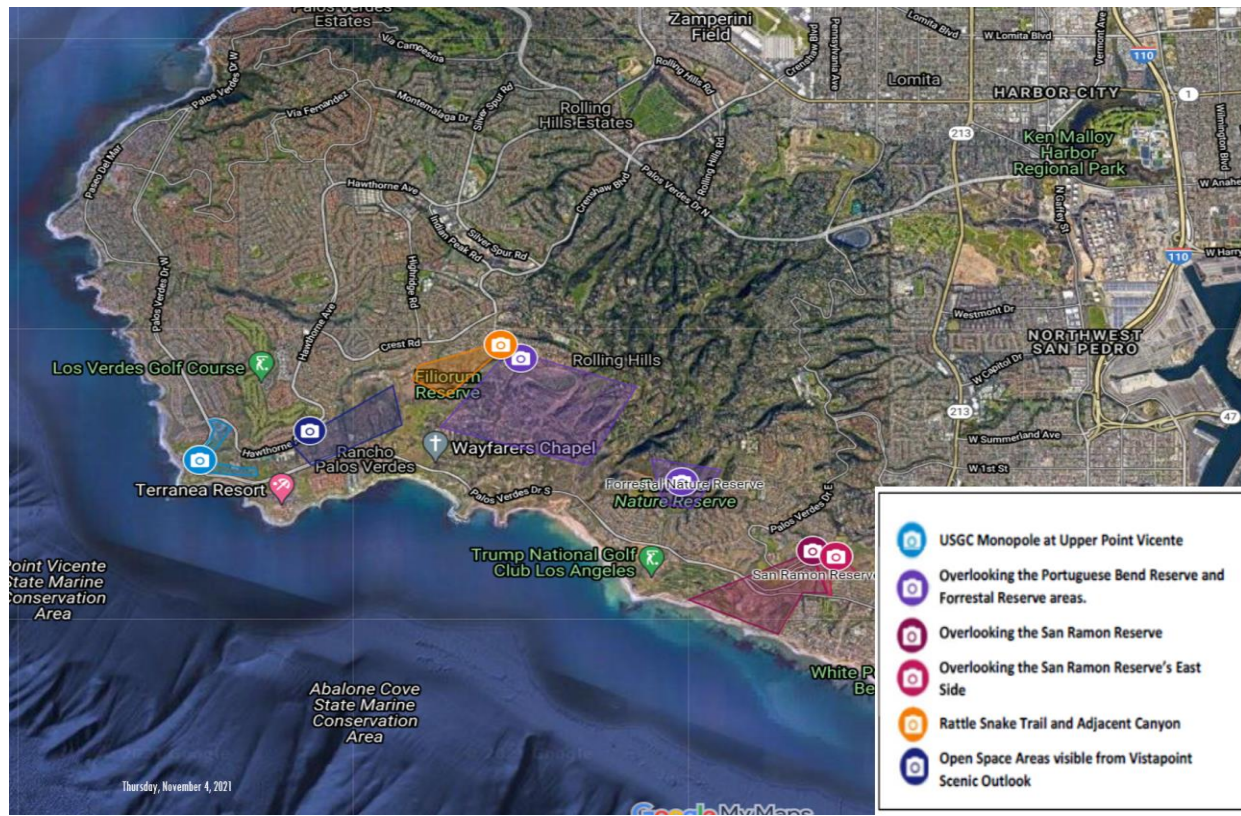
⇒ **Next steps in identifying preferred locations of cameras:** Due to the complexity of this issue, staff is currently recommending that the Next Steps in this process be to coordinate with the Los Angeles County Fire Department to ensure that the final location and coverage of these cameras are determined in accordance with historical fires, future risk, and exposures (life and property).

   o Staff has had preliminary discussions regarding this project with representatives of the Los Angeles Fire Department, during which they expressed their support and willingness to provide staff with historical fire data and identified areas of concern for wildfire ignition to ensure that these cameras are covered.

Type of Camera Systems:

There are generally two types of camera systems that can be used to monitor for fires, depending on the overarching objective of these cameras: surveillance and detection. There is a significant difference between surveillance and detection monitoring. Surveillance requires a human looking at a video stream which could be a potential detection source, though unreliable since 24/7/365 monitoring is in most cases impractical due to human fatigue and lack of volunteers or staff. This task is better suited for computerized automation, which can process an unlimited number of images continuously with a consistent level of accuracy while maintaining sensitivity for detection and a low false alarm rate. -On the other hand, detection requires the integration of innovative AI technology that will notify emergency crews when fires are spotted through fire cameras regardless of whether anybody is watching.

It is critical to keep in mind that in order to maintain privacy near cameras located within the viewshed, nearby buildings and other structures are typically excluded from the field of view, making artificial intelligence detection increasingly challenging in these areas.

The following summarizes the current camera system being proposed by the City of Rancho Palos Verdes, as well as the project objective.

PROPOSED PROJECT:

⇒ **Establishment of a Wildfire Camera Detection System:**

⇒ **Proposed Objective:** The primary objective of this project is to install a network of cameras in strategic locations identified as providing an advantageous vantage point for monitoring and providing constant surveillance of areas most vulnerable to fire within the City of Rancho Palos Verdes Open Spaces and canyons.

⇒ **Project Concept:** The proposed concept is for network cameras to be installed on the Peninsula, coupled with artificial intelligence and intuitive software technology to detect, locate and communicate wildfire threats almost instantly, according to a news release.

⇒ **Desired End State:** This Wildfire Camera Detection System is envisioned to provide public safety agencies, allied organizations, the Peninsula Cities, and the general public with timely and accurate situational awareness regarding fires and other critical incidents in the greater Palos Verdes Peninsula.

⇒ **Some of the key anticipated outcomes include:**

o **Fire Detection and Mitigation:** Wildfire DETECTION Cameras will allow public safety agencies to be aware of emergent conditions. Cameras installed in strategic locations identified as having a favorable vantage point for monitoring and providing constant surveillance of areas most susceptible to wildfire within the City' of Rancho Palos Verdes open spaces and canyons will continuously rotate to capture 360-degree views of the area; Artificial Intelligence software will process that imagery in real time to detect smoke and provide an alert to appropriate agencies.

o **Improved Situational Awareness:** Fixed cameras will enable firefighters and first responders to manage firefighting operations more effectively. High-definition video streaming from the wildfire incident site to the City's Emergency Operations Center (EOC) and/or an established Incident Command Post will provide City Staff and first responders with a live, real-time video feed of a wildfire incident, assisting with response operations. This will streamline firefighting capabilities and enable command center personnel to make quick decisions based on real-time data, rather than relying on information relayed through multiple parties or waiting for first responders to arrive.
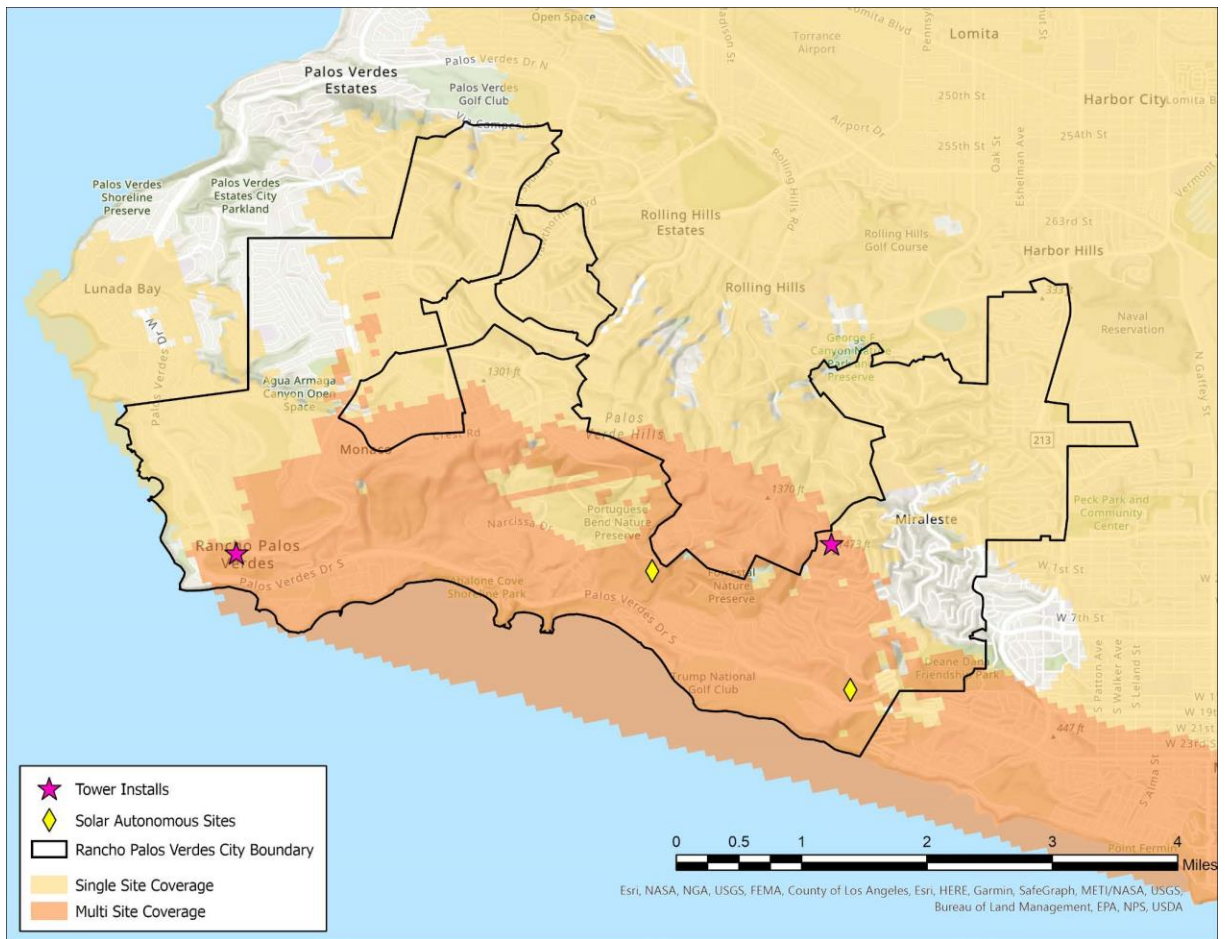
Pano AI Proposal For Rancho Palos Verdes

While conducting research for the establishment of a wildfire camera detection/monitoring network, staff learned about Pano AI, a wildfire technology company that uses mountaintop cameras and artificial and intuitive software to detect the first wisps of smoke and deliver real-time fire images to first responders and emergency personnel, all with the goal of detecting flare-ups earlier and enabling a faster response before they grow in size. Pano Rapid Detect systems utilize proprietary artificial intelligence (AI) algorithms to detect smoke in camera imagery from Pano Stations. The Pano Station's cameras rotate 360 degrees every minute and capture images from eight to ten different positions.

City of Rancho Palos Verdes Staff and the City's' Emergency Preparedness Committee Chair met with Pano AI representatives on October 14, 2021, to discuss the Peninsula's unique needs. Pano representatives presented the City of Rancho Palos Verdes with a proposal for early wildfire detection services as a result of this meeting. (See Attachment C)

Pano's proposal included an all-inclusive Pano deployment, entirely managed by Pano, in which Pano would deploy four of its state-of-the-art Pano Stations to provide 24-hour detection capability. Panos' proposal calls for a network of four Pano Stations (two autonomous solar stations and two powered stations) to be deployed on telecommunications towers or other high vantage points throughout Rancho Palos. This will cover 89.5 percent of the City's land area with one or more Pano Stations and 99.7 percent of its high-risk fire areas, even taking into account topography. On the map below, the Pano team identified optimal, preliminary site locations based on information provided by the City of Rancho Palos Verdes.

Legend:
- ★ Tower Installs
- ◇ Solar Autonomous Sites
- ▭ Rancho Palos Verdes City Boundary
- Single Site Coverage
- Multi Site Coverage

If the City of Rancho Palos Verdes chooses to proceed with Pano's proposal, Pano's Site Selection team will begin a rigorous qualification process to ensure that Pano Stations are capable of being installed at these locations. Pano has also identified suitable alternative locations that will provide comparable levels of coverage in the event that one or more locations become unavailable.

Additional Early Fire Detection Systems

Traditionally, forest fires have been detected primarily through human observation from fire lookout towers; however, this approach is inefficient because it is prone to human error and fatigue. Recent advances in computer vision, machine learning, and remote sensing technologies offer new tools for detecting and monitoring forest fires, while the development of new materials and technologies have allowed sensors to be more efficient in detecting a wildfire ignition.

There are a number of detection and monitoring systems used by authorities. These range include observers in the form of patrols or monitoring towers, aerial and satellite monitoring and increasingly promoted detection and monitoring systems based on optical camera sensors, and different types of detection sensors or their combination.

Of particular interest at this time is the exploration of the use of unmanned aerial vehicles (UAVs) or more commonly referred to as drones, which have been proposed as a more convenient technology for this task. As a result of the difficulties mentioned previously associated with the physiography of the Palos Verdes Peninsula, their maneuverability, autonomy, ease of deployment, and relatively low cost all contribute to the use of drones being strong candidate for resolving the challenges inherent in installing a network of fire monitoring/detection cameras due to the Palos Verdes Peninsula's terrain.

It is staff's current understanding that that similar to cameras, drones will require pairing with either artificial intelligence software that actively scans for signs of smoke ignition; or with ground temperature sensors that allow drones to read the sensor's temperature data while flying over it and alert the appropriate authorities to an elevated temperature indicating a fire ignition.

Additionally, due to their constant movement along their flight paths, drones have a limited flight time (depending on the model and battery source) and would be unable to cover an entire area in the same way that stationary cameras can. Staff is currently conducting additional research on this subject in order to determine the best method for implementing this system for the RPV council's consideration as the project moves forward.

This is a highly complex topic, and additional research needs to be conducted by staff to grasp the variety of detection systems options and best fit for incorporation on the Palos Verdes Peninsula.

Request for Coordination with the Neighboring Peninsula Cities

Wildfires are not territorial in their behavior. Neither should wildfire preparedness, response, or recovery. Given that wildfires do not recognize city boundaries, the City of Rancho Palos Verdes' is requesting cooperation from the Palos Verdes Peninsula's cities in mitigating the devastating losses associated with wildfires by participating in the procurement and use of a Peninsula-wide fire detection system during this morning's Regional Public Safety Committee (RPSC) Committee meeting.

No formal agreement or commitment to this program is sought at this time; rather, this report is intended to gauge interest in a cooperative regional wildfire monitoring and detection camera system among the Peninsula's four cities.

While installing and utilizing wildfire detection cameras or other associated detection technologies determined to be more appropriate for this project is beneficial, it is critical to note their implementation and use may incur significant costs. Staff will coordinate with Peninsula City Managers to issue a Request For Proposal (RFP) to vendors, outlining the scope of work, cost estimates, and a cost-sharing agreement with interested partnering agencies, based on the Committee's input during this morning's meeting. Each city would then present this information to their respective city council for their review and approval. It should also be noted that City staff has identified potential grant funding sources for the project's implementation.

CONCLUSION:

Staff recommends that the Committee review the information contained in this report and provide input on whether to proceed with the procurement and installation of regional wildfire detection system cameras; and, if desired, direct Staff to coordinate with Peninsula City Managers to issue a Request for Proposal (RFP) to vendors outlining the scope of work, estimated costs, and a cost-sharing agreement with interested partnering agencies. Each city would then present this information to their respective city council for their review and approval

AGENDA TITLE:

Consideration and possible action to receive updated information on the installation of a potential Peninsula-wide wildfire monitoring camera system.

RECOMMENDED COUNCIL ACTION:

(1) Receive updated information regarding the viability of implementing a Peninsula-wide wildfire monitoring camera system; and
(2) Provide direction to Staff on:
      a. Which wildfire network, ALERTWildfire or Pano AI, to pursue;
      b. Potential locations for the wildfire monitoring camera system; and,
      c. What type of camera system, surveillance or detection, is preferred.

FISCAL IMPACT: N/A

     Amount Budgeted: N/A
     Additional Appropriation: N/A
     Account Number(s):   N/A

ORIGINATED BY: Jesse Villalpando, Senior Administrative Analyst J. V.
REVIEWED BY: Karina Bañales, Deputy City Manager
APPROVED BY: Ara Mihranian, AICP, City Manager

ATTACHED SUPPORTING DOCUMENTS:

     A.   August 17, 2021, Staff Report
     B.   Ventura County Fire Department Maria Fire Press Release (page B-1)
     C.   Sonoma County's Fire Camera Program Press Release (page C-1)
     D.   SCE Email Correspondence (page D-1)
     E.   EPC September 2021 Meeting Minutes (page E-1)
     F.   EPC October 21, 2021 staff report (page F-1)
     G.   Pano AI Presentation (page G-1)

BACKGROUND:

On August 17, 2021, Staff provided the City Council with a report on the potential use of wildfire monitoring cameras throughout the City (for background on this item, see Attachment A). The Council directed Staff to research the viability of implementing a Peninsula-wide wildfire monitoring camera system; to work with the other Peninsula cities

and the County of Los Angeles (representing unincorporated areas); and to report back with additional information, including potential camera locations and whether cameras could be collocated on existing Southern California Edison (SCE) poles.

This staff report provides an update on Staff's progress, including recommendations from the Emergency Preparedness Committee (EPC) and additional information. Considering the information presented this evening, Staff seeks direction from the City Council regarding, among other things, the type of camera network (surveillance versus detection) that the City would invite the other Peninsula cities and Los Angeles County to join in pursuing.

DISCUSSION:

As the Council is well aware, the physiography of the Palos Verdes Peninsula features rolling hills, steep slopes, canyons, and coastal bluffs. The requirement for power and internet connection for fire monitoring cameras, as well as potential sight line concerns associated with erecting poles that obstruct residential views, among myriad issues, significantly complicates the installation of cameras to monitor wildfires. The discussion provided in this staff report takes these complications into account for City Council direction in implementing a wildfire monitoring camera system.

Wildfire Camera Network Options

At this time, there are two companies that can provide wildfire camera networks, as discussed below

1. ALERTWildfire Network:

At the August 17 City Council meeting, Staff provided information about ALERTWildfire, a consortium of several West Coast universities (the University of Nevada, Reno, the University of California, San Diego, and the University of Oregon) that utilizes high-definition video cameras to continuously monitor areas within their field of view for fire activity.

Resilient, hardened microwave/fiber networks carry the video signals from the cameras to servers at the University of Nevada, Reno, making them available on the ALERTWildfire.org website. In addition to cameras, each ALERTwildfire Network installation site includes a variety of equipment such as hard power or solar power and battery backup related items.

The images below show are from an ALERTWildfire camera that captured the moment that the 2019 Maria Fire ignited and the minutes that followed as the fire spread at an extraordinary pace in the mountains above Santa Paula, California. According to a press release from the Ventura County Fire Department (Attachment B), the Maria fire began in the evening hours of Thursday, October 31, 2019, and was determined to be caused by a power line equipment failure. Despite an aggressive initial attack by first responders, the fire quickly spread due to the presence of a strong Santa Ana wind event in the area

at the time of its ignition, consuming 9,999 acres of native vegetation and damaging four structures.

The ALERTWildfire.org website states that the motivation for installation of these cameras is to provide access to state-of-the-art Pan-Tilt-Zoom (PTZ) fire cameras and associated tools to help firefighters and first responders: (1) Discover/locate/confirm fire ignition; (2) Quickly scale fire resources up or down appropriately; (3) Monitor fire behavior through containment; (4) During firestorms, help evacuations through enhanced situational awareness; and (5) Ensure contained fires are monitored appropriately through their demise.

While the ALERTWildfire Network cameras are effective at achieving these objectives, detecting and alerting to a wildfire ignition typically requires human examination of video streams. Currently, the system is largely used by 911 dispatchers to confirm reports of fires. Once a fire has started and been reported, these cameras are helpful in terms of increasing situational awareness for first responders to tackle the fire as noted above.

It should be noted that ALERTWildfire is currently working to fully integrate Artificial Intelligence (AI) software into its camera network, which will be used to monitor video feeds for signs of smoke and provide early warning of a fire. A recent example of this implementation is in Sonoma County, California, where the county is expanding its early

wildfire detection capabilities through innovative AI technology that will notify emergency crews when fires are spotted via fire cameras.

Sonoma County was recently awarded a $2.7 million through the Federal Emergency Management Agency Hazard Mitigation Grant Program for early detection system additions and improvements. The grant will be used to fund AI monitoring systems that will improve detection capabilities by utilizing existing ALERTWildfire Network camera infrastructure. With the addition of AI technology to Sonoma County cameras, optical detection programming will be integrated through 24/7 monitoring, real-time data streams, and automated email and text alerts for critical incidents. Once the system is in place, a detection like this would alert personnel of a potential fire scenario via email or text message, and the responding officer would confirm or deny the detection of smoke (Attachment C).

On August 11, 2021, Staff met with representatives from the ALERTWildfire Network to discuss the use of closed-circuit cameras for wildfire monitoring and to learn more about the network and its partnership specifications. During this meeting, representatives from the ALERTWildfire Network informed Staff that due to the City's urban landscape and population, they do not currently recommend the installation of fire cameras. ALERTWildfire representatives stated that their network of cameras is typically located on mountain tops in rural areas, where fires can spread quickly before being noticed or reported to authorities.

Additionally, they encouraged Staff to review the network's current camera locations in the Los Angeles area (shown below), noting that no cameras are currently located near urban areas given the possibility of an individual reporting a fire before the ALERTWildfire Network cameras discover it. According to ALERTWildfire, as of the writing of this staff report, camera coverage for Palos Verdes Peninsula is not in any near-term plan.

Despite the ALERTWildfire network's recommendation against installing cameras on the Peninsula, given the frequency with which fires are detected via 911 calls in urban and suburban areas, one must consider the possibility that an "unwitnessed" fire that begins in the middle of the night or early morning in a densely populated residential area may go undetected for several minutes, if not hours, resulting in a major conflagration. Early notification of a fire's ignition is critical to facilitating public warning, evacuation, and mobilization of first responders. Fundamentally, if firefighting resources are not brought to bear quickly enough, many wildland fires quickly progress beyond the point of realistic intervention, leaving first responders with no choice but to adopt a "defensive" posture.

2. Pano AI

Pano AI, is a wildfire technology company that uses mountaintop cameras and artificial and intuitive software to automatically detect the first wisps of smoke and deliver real-time fire images to first responders and emergency personnel, all with the goal of detecting flare-ups earlier and enabling a faster response before they grow in size.

Multiple users can concurrently view 360-degree live panoramic imagery, respond to AI-generated ignition alerts, and triangulate the precise location of a fire using easy-to-use digital pan and zoom functionality. Once the AI camera picks up smoke, it sends an alert back to a 24/7 Pano AI intelligence center, where real people analyze the data, determine if it's a fire incident, and notify the fire department and/or appropriate agencies.

Pano can also integrate data from third-party sources such as satellites, 911 calls, weather sensors, and existing cameras to provide emergency personnel with a centralized platform for wildfire detection and response. A machine-learning component allows the system to become increasingly accurate at detecting minor differences in movement between smoke, haze and fog (Attachment G).

On October 14, 2021, Staff and the Committee Chair met with Pano AI representatives to discuss the Peninsula's unique needs. Staff is currently gathering additional information about a potential partnership with Pano AI and will present a summary of the meeting's key takeaways and how to apply this technology solution to the proposed wildfire monitoring cameras during tonight's meeting.

Staff seeks City Council direction on whether to continue to pursue joining the ALERTWildfire network or to pursue the Pano AI network.

Potential Wildfire Camera Locations

On September 16, 2021, the City's Emergency Services Coordinator provided the EPC with an update on the progress made in investigating the feasibility of implementing a wildfire network camera system. At this meeting, the EPC provided Staff with recommendations and additional feedback for review and implementation prior to reporting back to the Council.

In summary, the EPC emphasized the importance of Staff investigating how cameras can be integrated into the existing communication tower infrastructure locations on the Peninsula, gathering additional information about the cameras' installation, use, and capabilities, taking into account how camera installation may affect residents' sight lines, addressing residents' privacy concerns, and taking into consideration power and data connection requirements for each location. Additional information about the EPC's feedback is included in the September 16 meeting minutes (Attachment E).

During the September 16 meeting, the EPC requested that Staff compile a list of specific advantages and disadvantages regarding the proposed installation of wildfire monitoring cameras throughout the City. Staff has prepared the following list of pros and cons for the City Council's consideration.

⇒ **Pros**
- **Potential for the use of cameras to detect the ignition of a wildfire on the Palos Verdes Peninsula prior to residents reporting it.** It should be noted that the EPC recognized the magnitude of devastation caused by wildfires and the potential for early detection by these cameras to aid in public warning, evacuation, and first responder mobilization in order to mitigate the potential devastation caused by a wildfire.

- **Increased situational awareness in the event of a wildfire.** Once a fire is detected or reported, these cameras can provide first responders with enhanced situational awareness, allowing them to assist in evacuation efforts, scale up or down firefighting resources quickly, monitor fire behavior during containment, and observe contained fires for flare-ups.

⇒ **Cons**
- Wildfire monitoring cameras are not typically designed for use in small areas and are traditionally intended to be used at a considerable distance.

- Possibility for a large number of false alerts, resulting in alert fatigue and a delay in alerting appropriate authorities by camera monitors.
- Possibility of having a detrimental effect on residents' site views as a result of poles needed to mount these cameras.
- Possibility of privacy concerns for residents.
- Vulnerability to vandalism due to the cameras' remote location.
- Possibility that the City will incur significant ongoing costs associated with the establishment of cellular data internet connectivity.
- Possibility of unintended consequences, such as residents becoming aware of a fire monitoring system and believing that it will detect fires quickly and consistently prior to human reporting and concluding that they do not need to call 911 if they see smoke.

On October 21, 2021, the City's Emergency Services Coordinator provided the EPC with an update on progress made since the directives issued at the September 16 meeting. In support of the Council's direction, the EPC identified the following three critical decisions that must be made prior to proceeding with the purchase/installation/monitoring of wildfire cameras during this meeting (Attachment F):

1. Location of cameras
2. Type of camera system
3. How best to proceed

1. Location of Cameras

During the September 16 meeting, the EPC initially proposed the following Peninsula-wide locations for Staff to consider for potential placement of fire monitoring cameras:

- Los Angeles County Antenna Farm at 5741 W. Crest Ridge Rd in the City of Rancho Palos Verdes.
- Federal Aviation Administration (FAA) Radar Station on top of the San Pedro Hill in the City of Rancho Palos Verdes.
- Overlooking the San Ramon Reserve/Switchback areas of the City of Rancho Palos Verdes.
- South Bay Regional Public Communications Tower at Via Visalia and Punta Place in the City of Palos Verdes Estates.
- Marymount California University, located at 30800 Palos Verdes Dr. East in the City of Rancho Palos Verdes.
- Overlooking the Portuguese Bend Reserve and Forrestal Reserve in the City of Rancho Palos Verdes.

Criteria for Fire Monitoring Camera Locations:

On October 21, the EPC developed a list of criteria for prioritizing the location of wildfire monitoring camera installations and further refined a list of proposed camera locations (location changed from their initial proposal on September 16). It is important to note that

the City Council has the option of adding additional cameras at a later time, if desired. The selection of the proposed camera locations was guided by the following criteria as identified by the EPC:

- A wide, relatively open view of RPV canyons and open space
- View of open space areas not easily visible from homes
- View of canyons where fires can grow and spread quickly
- View of areas where fires have previously occurred
- Existing infrastructure to mount cameras on poles or similar
- Wi-Fi/power access (or use solar)

<u>Proposed Wildfire Fire Camera Locations and Coverage</u>

Location 1 - U.S. Coast Guard Monopole at Upper Point Vicente Park

EPC Criteria:

Wide, relatively open view of RPV canyons and open space	X
View of open space areas not easily visible from homes	X
View of canyons where fires can grow and spread quickly	X
View of areas where fires have previously occurred	
Existing infrastructure to mount camera on poles or similar	X
Wi-Fi access/Power access (or use solar)	

Location 2 - Overlooking the Portuguese Bend Reserve and Forrestal Reserve areas.

EPC Criteria:

Wide, relatively open view of RPV canyons and open space	X
View of open space areas not easily visible from homes	X
View of canyons where fires can grow and spread quickly	X
View of areas where fires have previously occurred	X
Existing infrastructure to mount camera on poles or similar	
Wi-Fi access/Power access (or use solar)	

Location 3 - Overlooking the San Ramon Reserve

EPC Criteria:

Wide, relatively open view of RPV canyons and open space	X
View of open space areas not easily visible from homes	X
View of canyons where fires can grow and spread quickly	X
View of areas where fires have previously occurred	X
Existing infrastructure to mount camera on poles or similar	
Wi-Fi access/Power access (or use solar)	

Location 4 - Overlooking the San Ramon Reserve's East Side

EPC Criteria:

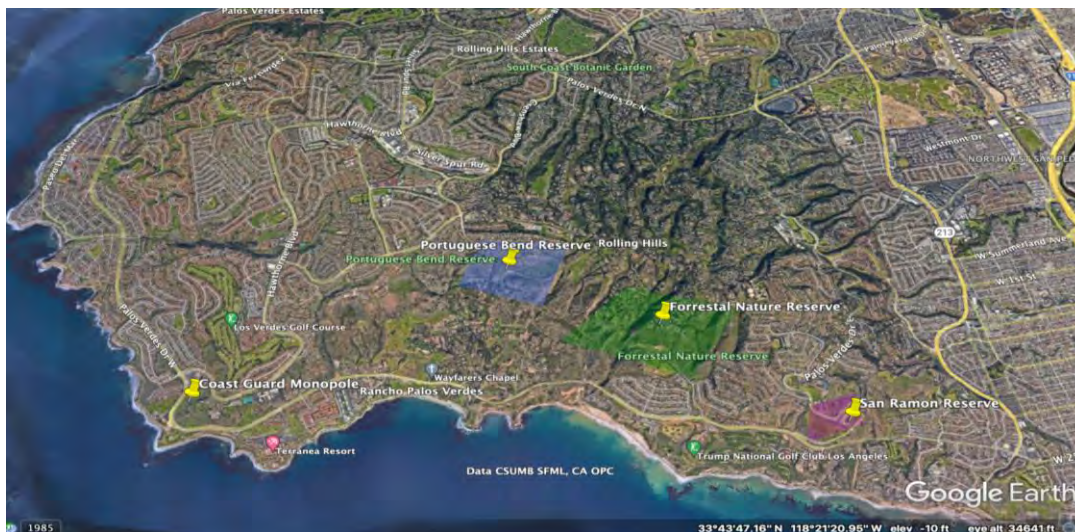|	
Wide, relatively open view of RPV canyons and open space	X
View of open space areas not easily visible from homes	X
View of canyons where fires can grow and spread quickly	X
View of areas where fires have previously occurred	X
Existing infrastructure to mount camera on poles or similar	
Wi-Fi access/Power access (or use solar)	

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Location 5 - Rattle Snake Trail and Adjacent Canyon

EPC Criteria:

Wide, relatively open view of RPV canyons and open space	X
View of open space areas not easily visible from homes	X
View of canyons where fires can grow and spread quickly	X
View of areas where fires have previously occurred	X
Existing infrastructure to mount camera on poles or similar	
Wi-Fi access/Power access (or use solar)	

Location 6 – Open Space Areas visible from Vistapoint Scenic Outlook

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EPC Criteria:

Wide, relatively open view of RPV canyons and open space	X
View of open space areas not easily visible from homes	X
View of canyons where fires can grow and spread quickly	X
View of areas where fires have previously occurred	X
Existing infrastructure to mount camera on poles or similar	
Wi-Fi access/Power access (or use solar)	

Collocation of Wildfire Cameras on Southern California Edison (SCE) Poles:

At the August 17 meeting, the City Council requested staff explore collacting the wildfire cameras on existing SCE poles. On October 18, 2021, SCE representatives informed the City that SCE was not in agreement with the use of SCE facilities to collocate wildfire monitoring cameras on power poles with the potential for advantageous views of the Peninsula, citing safety violations for the public, SCE personnel, SCE equipment, and California Public Utilities Commission (CPUC) Tariff violations, as well as a concern about liability and SCE structures (Attachment D). This correspondence was sent by SCE representatives in response to an October 21, 2021, Emergency Preparedness Committee (EPC) staff report on an update on the installation of wildfire monitoring cameras (Attachment F). Pages 6-8 of this report outline potential locations for the installation of monitoring cameras, three of which were proposed to be collocated on SCE power poles as identified by a field visit by city Staff and EPC members, as discussed later in this report.

Staff seeks Council's directions on camera locations based on the EPC's proposed location of wildfire monitoring camera installations including identifying locations in neighboring cities provided there is an interest in partnering with Rancho Palos Verdes.

2. <u>Type of Camera System</u>

There are generally two types of camera systems that can be used to monitor for fires, depending on the overarching objective of these cameras: surveillance and detection. There is a significant difference between surveillance and detection monitoring. <u>Surveillance</u> requires a human looking at a video stream which could be a potential detection source, though unreliable since 24/7/365 monitoring is in most cases impractical due to human fatigue and lack of volunteers or staff. This task is better suited for computerized automation, which can process an unlimited number of images continuously with a consistent level of accuracy, all the while maintaining sensitivity for detection and a low false alarm rate. <u>Detection</u>, on the other hand, requires the integration of innovative AI technology that will notify emergency crews when fires are spotted through fire cameras regardless of whether anybody is watching.

Staff seeks City Council direction on the preferred camera system prior to seeking buy-in from our neighboring cities and issuing a request for proposals (RFP). The following summarizes the type of camera system based on proposed objectives and the corresponding projects.

PROPOSED OBJECTIVE NO. 1 - <u>Establishment of a wildfire camera SURVEILLANCE system in areas of the City most susceptible to fire.</u>

Objective: The objective is to install a network of cameras throughout the City in strategic locations identified as having a favorable vantage point for monitoring and providing constant surveillance of areas most susceptible to wildfire within the City's open spaces and canyons.

Project Concept: The proposed concept is for the installed network cameras to function similarly to traditional fire lookout towers (buildings located on high vantage points from which people can monitor for wildfires in the wilderness). This project can be accomplished by acquiring and installing <u>AXIS Q6078-E PTZ Network Cameras</u> (similar to those used by the ALERTWildfire Network) throughout the City and in strategic locations identified as having a favorable vantage point to monitor and provide constant surveillance of areas most at risk for wildfires throughout the City.

Fire Detection/Monitoring: While these cameras are extremely effective at providing situational awareness, it is critical to note that they must be monitored constantly and diligently in order to detect fires manually, as the cameras themselves require the addition of AI technology to provide 24/7 monitoring, real-time and automated email and text alerts for critical incidents.

The next phase of the project would be establishing a volunteer fire watch program for residents comparable to the <u>Orange County Firewatch Program</u>, in which volunteers from across the Orange County Parks system are activated and deployed to high-visibility locations near likely ignition sources in response to National Weather Service Red Flag warnings indicating an increased fire risk.

The Orange County Fire Watch Program combines on-site and remote monitoring by enlisting several volunteers to monitor a variety of camera feeds for early indications of wildfire ignitions via the publicly-accessible ALERTWildfire camera network.

The proposed program will enlist volunteers to monitor installed camera feeds for early indications of wildfire ignitions in response to National Weather Service Red Flag warnings indicating an increased risk of fire. Red Flag Warnings are issued by the National Weather Service during periods of high temperature, low humidity, and high winds indicating an increased chance of a fire.

PROPOSED OBJECTIVE NO. 2 - <u>Establishment of a Wildfire Camera DETECTION System</u>

Objective: The objective is to combine high-performance cameras and advanced AI technology to detect smoke within the cameras' field of view and alert the appropriate parties.

Project Concept: The proposed concept is for network cameras to be installed on existing elevated communication tower locations on the Peninsula, coupled with AI and intuitive software technology from wildfire tech company, Pano AI, to detect, locate and communicate wildfire threats almost instantly, according to a news release.

Feasibility: Cameras stationed on existing communications towers with commanding views of the Palos Verdes Peninsula will continuously rotate to capture 360-degree views of the area; Pano AI software will process that imagery in real time to detect smoke and provide an alert to appropriate agencies. When multiple cameras capture the same smoke wisps, the software can use triangulation to pinpoint the location. Additional camera location installation considerations need to be taken into account as described later in this report.

Staff seeks direction from the City Council this evening on what kind of camera system to pursue (surveillance with use of volunteers or AI technology-based detection).

3. <u>How best to proceed</u>

Based on Council direction on which camera system to pursue, the next step in implementing this proposed camera installation requires Staff to schedule a meeting with relevant agencies to review and implement the installation process.

There has been expressed interest in installing wildfire cameras to monitor for fires in the City's canyons and open space areas, assisting firefighters and the general public in detecting fire ignitions before they develop into full-fledged conflagrations. Due to the cameras' remote locations, they must be rugged enough to withstand the elements, including seismic activity. Additionally, they must provide crystal-clear images in a variety of lighting and weather conditions and be capable of zooming in on fires that are miles or even kilometers away. While network cameras can be installed virtually anywhere, they cannot function properly unless they are powered and connected to the internet.

While cameras do offer the benefit of constant coverage, it is critical to note that even if multiple additional camera sites were added, the topography (valleys, etc.) and dense forestation would make full coverage of the area impractical. Firefighters and first responders can manage firefighting operations more effectively with the aid of cameras. High-definition video streaming from the wildfire incident site to the City's Emergency Operations Center (EOC) and/or a previously established Incident Command Post will provide Staff and first responders with a live, real-time video feed of a wildfire incident, assisting with response operations. This will streamline firefighting capabilities and enable command center personnel to make quick decisions based on real-time data, rather than relying on information relayed through multiple parties or on the arrival of first responders. Personnel at the command center will be able to see the direction in which a fire is spreading, allowing them to direct resources to the most effective positions.

ADDITIONAL INFORMATION:

Wildfires do not recognize City boundaries and to be most effective with the use of a wildfire camera system, the other Peninsula cities (Palos Verdes Estates, Rolling Hills, and Rolling Hills Estates) and the County of Los Angeles (representing unincorporated areas) should be invited to join in procuring a Peninsula-wide system.

Based on Council direction, Staff will share this information with the other Peninsula cities at the upcoming November 18, 2021 Peninsula Public Safety Committee (PPSC) meeting. Staff will also reach out to the appropriate County office about the possibility if including cameras to cover unincorporated areas of the Peninsula. Based on their input, Staff will come back at a later date with an update report on the expressed interest of other jurisdictions

Staff would then issue an RFP to vendors and return to the City Council at a future meeting with a report outlining the scope of work, cost estimates, and potential locations for consideration, as well as a cost-sharing agreement with interested partnering agencies.

CONCLUSION:

Staff recommends the City Council review the information in this report to determine whether to proceed with the procurement and installation of wildfire monitoring cameras (surveillance versus detection), which type of network is preferred, and potential locations.

ALTERNATIVES:

In addition to the Staff recommendation, the following alternative actions are available for the City Council's consideration:

1. Identify specific areas of research and continue the consideration of installing wildfire monitoring cameras to a future meeting date.
2. Take no action at this time.

Website: VCFD.org
Facebook: @VenturaCountyFire
Twitter: @VCFD

CONTACT: Public Information Office
OFFICE PHONE: (805) 389-9746
DUTY PHONE: (805) 377-4860
EMAIL: PIOFire@ventura.org

NEWS RELEASE
FOR IMMEDIATE RELEASE

October 22, 2020

Investigation Finds Power Line Equipment Failure Caused 2019 Maria Fire

CAMARILLO, California – Equipment failure on electrical distribution lines owned and operated by California Resources Corp. (CRC), caused the 2019 Maria Fire, which burned nearly 10,000 acres and damaged four structures, an investigation by the Ventura Fire Department and CAL FIRE determined.

Fire investigators found that an electrical conductor separated and contacted a metal pipe on the ground, igniting the fire.

The fire started along the ridgetop of South Mountain in Santa Paula on October 31, 2019, amid extreme fire weather conditions. It quickly spread to the southwest, consuming 9,999 acres of native vegetation and damaging four structures. It took a week for firefighters to fully contain the fire.

Ventura County Fire Department investigators were dispatched to the scene and worked with investigators from CAL FIRE to determine the cause of the fire.

For public records inquiries, visit www.vcfd.org

For more information on how to be prepared for wildfires, visit www.VCReadySetGo.org

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COUNTY OF
SONOMA

FOR IMMEDIATE RELEASE

Sonoma County invests in artificial intelligent technology to detect possible fire starts through wildfire camera system

Santa Rosa, CA – March 17, 2021 – The County of Sonoma is expanding its early wildfire detection capabilities through innovative artificial intelligence technology that will notify emergency crews when fires are spotted through fire cameras - regardless of whether anybody is watching. Through the Federal Emergency Management Agency Hazard Mitigation Grant Program, the County was awarded $2.7 million for early detection system additions and improvements. The grant allocates $225,000 for artificial intelligence monitoring systems that will broaden detection capabilities through existing wildfire camera infrastructure. Remaining funds will be used to install additional cameras to the existing system and reinforce critical communication towers with fire-resilient measures.

In recent years, wildfires have had a devastating effect on human life, property and the environment throughout the state and especially in Sonoma County. Since the October 2017 Tubbs Fire, the County has partnered with other agencies in installing cameras on existing radio communication towers to provide wildfire surveillance throughout California. The ALERTWildfire system was developed and installed by a consortium of public and private entities and currently consists of 746 cameras in California alone. During recent wildfires, ALERTWildfire was a critical tool for command and control elements of regional fire and emergency services to respond quickly to wildfire locations and enable early evacuation warnings.

The addition of AI technology on Sonoma County cameras will deliver integration of optical detection programming through 24/7 monitoring, real-time data streams and automated email and text alerts for critical incidents.

"This early detection technology will provide emergency managers and first responders with round-the-clock monitoring, a sophisticated addition we are excited to add to our

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alert and warning toolkit," said Lynda Hopkins, Chair of the Sonoma County Board of Supervisors.

As part of the program, the County this month awarded a $300,000 contract to South Korea-based Alchera Inc. who specializes in visual AI algorithm development and deployment. Alchera has been formulating smoke and fire detection sensors since 2018, working through the ALERTWildfire camera system. More than 10 million images have been collected from wildfire events between 2013 and 2020 to develop, test and train this technology. An example result of the AI algorithm provided by Alchera can be seen below. The upper and lower images are examples of when the detection result is non-smoke and smoke, respectively. The blue box is the detection result and, in this case, registers a detection result of 97 percent confidence in the probability of smoke.

Once the system is implemented, a detection such as this would notify personnel of a possible fire scenario, either via email or text message and the responding officer would confirm or deny the detection of smoke.

Implementation and real-time monitoring of the AI technology will begin May 1, 2021. Training and modifications will take place through the summer months until November when the system will be able to direct alerts without human intervention. Alchera will continue to manage adjustments including false positive and false negative alerts through February 2023 at which point the County along with other planning partners, including CalFire and REDCOM, will participate in an evaluation of the program and decide on its future use.

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Contact Information

Paul Gullixson
Communications Manager
County Administrator's Office
County of Sonoma

Accessibility Assistance

Sonoma County COVID-19 Vaccine Information

Address

575 Administration Drive

Suite 104A
Santa Rosa, CA 95403

Page Links

1. Accessibility Assistance - https://sonomacounty.ca.gov/CAO/Press-Releases/Sonoma-County-invests-in-artificial-intelligent-technology//CAO/Accessibility-Assistance/

2. Sonoma County COVID-19 Vaccine Information - http://socoemergency.org/vaccine

3. Sign Up for Press Release Updates - https://public.govdelivery.com/accounts/CASONOMA/subscriber/new?topic_id=CASONOMA_197

4. Facebook - https://www.facebook.com/CountyofSonoma/

5. Twitter - http://twitter.com/countyofsonoma

6. YouTube [Video] - http://www.youtube.com/officialsonomacounty

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Subject:	FW: Rancho Palos Verdes Anticipated City's Request to install wildfire cameras on SCE Distribution Poles or Transmission Towers
Date:	Tuesday, October 26, 2021 at 8:57:30 AM Pacific Daylight Time
From:	Jesse Villalpando <jvillalpando@rpvca.gov>
To:	Jesse Villalpando <jvillalpando@rpvca.gov>
Attachments:	image001.jpg, image002.jpg

From: Constance Turner <Constance.Turner@sce.com>
Sent: Monday, October 18, 2021 10:58 AM
To: Ara Mihranian <AraM@rpvca.gov>
Cc: Michael X Glenn <Michael.X.Glenn@sce.com>
Subject: Rancho Palos Verdes Anticipated City's Request to install wildfire cameras on SCE Distribution Poles or Transmission Towers

CAUTION: **This email originated from outside of the City of Rancho Palos Verdes.**

Ara,

I was reading Jesse's Villalpando's draft on installation of surveillance cameras and none of this would be agreeable to SCE. What is being suggested here would be major safety violations (the public, SCE personnel, SCE equipment and CPUC Tariff violations). In addition, there is also a large concern of liability and SCE structures. In this era of heightened security and safety, Edison would not agree to any of this. I just want to make sure SCE is on record as not in agreement with use of SCE facilities due to the above concerns, just to mention a few.

AlertWildfire/UC San Diego did not support RPV installation of wildfire cameras citing RPV as an urban environment and that wildfire cameras had to be installed at higher elevation (30 to 100 feet) to be effective. It appears, in reading Jesse's report, the City does not want to install "new" poles citing residents would not support that and the city would also incur costs. Jesse suggested SCE power poles for 3 of

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the 4 cameras, and consider requesting access to towers for the last camera from radio towers owned by either Federal Aviation Administration, US Coast Guard or the LA County OEM. It also appears that SCE is also being requested to provide free electrical power or allow 12 feet solar panels to be installed on top of power poles to power these wildfire cameras.

The 3 SCE power poles are within the boundaries of the Portuguese Bend Nature Reserve. 2 are actually on Portuguese Bend Road and 1 on San Ramon Road.

If I am mistaken about this information, please advise.

Thanks.
Connie Turner
Southern California Edison
Government Relations Manager

The file for the Oct 21 file is too large to transmit this is the link below, but attached are screenshots of the 3 SCE power poles identified, request for power and WildfireAlert saying RPV not a good candidate for wildfire cameras.
https://rpv.granicus.com/DocumentViewer.php?file=rpv_d43f745c6ab78e1b5619d0dca4568632.pdf&view=1

located at 30870 Palos Verdes Dr E, Rancho Palos Verdes, due to these locations' internet capabilities and the potential for these cameras to cover the Palos Verdes Peninsula's east side.

Member Colville inquired about the solar powered options for these cameras, and noted the potential necessity of having the majority of installed cameras be Solar powered. Member Colville further emphasized the importance of including solar options in the final cost estimate.

- Member Colville further inquired whether staff has contacted the AlertWildfire Network regarding this project. Emergency Coordinator Villalpando responded that he has contacted the AlertWildfire organization and stated that while meeting with them they indicated that they do not recommend the installation of Wildfire Monitoring Cameras at this time, noting that due to the city's urban landscape that a 911 call has the high possibility of being made prior to these cameras detecting a fire.

Chair Maizlish stated his agreement with Committee Members' previous comments about the need for revised cost estimates that include solar power, internet connectivity/data, and any additional hardware costs needed to present a realistic cost for the entire project implementation to the City Council.

- Chair Maizlish further stated that the cameras need to be mounted high, noting that these cameras are typically mounted on communication towers that are 70 to 100 feet tall. Chair Maizlish also stated that these cameras are best suited to be embedded in the target area rather than at the edge of an area to be monitored. Chair Maizlish further noted that having a camera pole installed in the middle of open space areas creates concerns about residential site views and emphasized the potential for privacy concerns from residents.

- Chair Maizlish also mentioned that the proposed wildfire monitoring cameras' lenses are designed for long-distance viewing and that he is unsure if the cameras' lenses are wide enough for close-range viewing. He also mentioned the need to identify the salt air ratings for these cameras due to the Peninsula's ocean salt air breeze.

- Chair Maizlish stated that in his discussions with the AlertWildfire Network, that the network recommended against installing cameras in the City due to the small size of the Peninsula and the high likelihood of a resident noticing and reporting a fire before the cameras detect it. Chair Maizlish also stated that once the cameras detect an anomaly, an individual must log into the system and confirm the presence of a fire before it is reported to the appropriate authorities. Chair Maizlish further stated that he had learned that the AlertWildfire network has an annual cost of $6,500 per camera, and he expressed a desire for more information on the purpose of this cost and what the AlertWildfire Network is offering for this cost.

- Chair Maizlish further emphasized the importance of ensuring that the City Council and the Peninsula Cities are not led to believe that installing these cameras will result in quick, faster fire detection prior to being reported by a person, and emphasized the high possibility of false positives being issued by these cameras. Chair Maizlish further stated that the cameras are not intended to protect residential structures from fire, as this is beyond their scope of design.

- Chair Maizlish proposed installing cameras in the City's Nature Preserve areas to ensure adequate coverage of Del Cerro Park, Three Sisters Reserve, Forrestal Nature Preserve, and the San Ramone Nature Preserve/switchback area of the City. Chair Maizlish further suggested that cameras be installed on the existing monopole at Rancho Palos Verdes Hall, as well as the LA County Antenna Farm Tower, which the committee had previously recommended.

→ Due to the Portuguese Bend Reserve's topography, the second and third locations proposed are for two cameras to be mounted on existing Southern California Edison (SCE) power poles in the Portuguese Bend Reserve area of the City's

Nature Preserves to ensure adequate coverage of Del Cerro Park and Three

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Sisters Reserve.

- The first camera proposed location would offer an excellent view of the reserve's left side.

- The second proposed camera location would ensure that the preserve's right side is adequately covered.

- The fourth location would be atop the SCE power pole, with a view of the City's switchback the San Ramone Nature Preserve/switchback area.

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MINUTES
EMERGENCY PREPAREDNESS COMMITTEE
REGULAR MEETING
SEPTEMBER 16, 2021

CALL TO ORDER:

A Regular meeting of the Rancho Palos Verdes Emergency Preparedness Committee was called to order by Chair Maizlish at 7:05 P.M. This meeting took place remotely in accordance with Government Code Section 54953(e) et seq. (AB 361). Members of the public could observe and participate using the zoom participation feature, and with options called out in the public participation form provided under separate cover with the agenda. Notice having been given with affidavit thereto on file.

The Committee roll call was answered as follows:

PRESENT: Member Boudreau, Member Braswell, Member Campbell, Member Colville
Member Robinson, Member Warner, Chair Maizlish
ABSENT: None

Also, present were Deputy City Manager Karina Bañales and Emergency Services Coordinator Jesse Villalpando.

PLEDGE OF ALLEGIANCE:

The Pledge of Allegiance was led by Emergency Services Coordinator Villalpando.

CHAIR'S ANNOUNCEMENTS:

Chair Maizlish reminded Committee Members to use the raise hand button located within the zoom window to indicate their desire to comment on an agenda item. Chair Maizlish informed the Committee that they may use the "raise hand" function in the following ways: virtually: By clicking the "raise hand" button at the bottom of the Zoom meeting screen; OR Telephonically: By pressing *9 on your keypad.

APPROVAL OF THE AGENDA:

Member Braswell moved, seconded by Member Boudreau, to approve the agenda.

The motion passed on the following roll call vote:

AYES: Member Boudreau, Member Braswell, Member Campbell, Member Colville
Member Robinson, Member Warner, Chair Maizlish
NOES: None

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ABSENT: None

PUBLIC COMMENTS FOR NON-AGENDA ITEMS:

None

STAFF LIAISON REPORT

Emergency Services Coordinator Villalpando, presented updates on the following items, 2021 National Preparedness Month and the 7th Annual Prepared Peninsula Expo.

REGULAR BUSINESS:

SELECTION OF A VICE-CHAIR (VILLALPANDO)

Chair Maizlish requested nominations for Vice-Chairs from the Committee. Member Boudreau called for Member Campbell be appointed Vice-Chair.

The nomination of Member Campbell for Vice-chair passed on the following roll call vote:

AYES: Member Boudreau, Member Braswell, Member Campbell, Member Colville
                 Member Robinson, Member Warner, Chair Maizlish
NOES: None
ABSENT: None

APPROVAL OF MINUTES OF AUGUST 19, 2021 (VILLALPANDO)

Member Boudreau noted an error on the final page of the August 19, 2021, meeting minutes under the adjournment section, stating that the second to the motion to adjourn was made by herself despite the fact that she was absent for the August 19th meeting.

Member Braswell moved, and Chair Maizlish seconded to approve the August 19, 2021, meeting minutes as amended.

The motion passed on the following roll call vote:

AYES: Member Boudreau, Member Braswell, Member Campbell, Member Colville
                 Member Robinson, Member Warner, Chair Maizlish
NOES: None
ABSENT: None

UPDATE ON THE IMPLEMENTATION OF EPC WOOLSEY FIRE AFTER ACTION REPORT RECOMMENDATIONS (VILLALPANDO)

Emergency Services Coordinator Villalpando, presented the Committee with a staff report outlining the progress made in implementing the identified EPC Woolsey Fire After Action Report recommendations.

The presentation made by Coordinator Villalpando included the following updates.

For the recommendation of "Engaging an experienced vendor to develop a playbook of flexible response plans with likely or possible scenarios and possible response actions."

- Coordinator Villalpando informed the Committee that he is currently collaborating with the EPC Subcommittee on incorporating recommendations from the EPC Woolsey Fire After Action Report into the drafting of a request for proposal for the hiring of a third party consultant to develop an Emergency Evacuation "Playbook" for the Peninsula, per the direction issued by the Peninsula Public Safety Committee (PPSC) during their August 12, 2021, meeting.

For the recommendation of "Collating currently established wildfire mitigation efforts and information for the Peninsula."

- Coordinator Villalpando provided the following update for the recommendation's direction of obtaining a copy of the Integrated Emergency Response Manual for the County of Los Angeles Department of Public Works. Coordinator Villalpando stated that he has contacted the Emergency Management Division of the Los Angeles County Department of Public Works' and obtained a copy of the Department's Integrated Emergency Response Manual, which he attached to tonight's agenda report.

Discussion ensued between the Emergency Preparedness Committee and staff regarding the implementation of EPC Woolsey Fire After Action Report recommendations.

Among the discussion's key takeaways was the need for city staff to outreach to the County of Los Angeles Department of Public Works to update outdated contact information in the County's Integrated Emergency Response Manual for City of Rancho Palos Verdes staff.

The Committee's discussion further highlighted the need for staff to contact the Palos Verdes Peninsula Land Conservancy to ascertain their interest in establishing a volunteer program for residents to help monitor the city's open spaces, which are especially vulnerable to fire during Red Flag conditions comparable to the Orange County Fire Watch Program.

The Committee further discussed the importance of collaborating with the Los Angeles County Sheriff's Department – Lomita station in the drafting of an evacuation playbook, as well as continuing to coordinate efforts with the Los Angeles Fire Department to obtain

a copy of their Wildfire Response Book which contains specific information for a wildfire response for the Palos Verdes Peninsula Community.

Chair Maizlish moved, and Member Warner seconded, to: 1) Receive and file the update on the implementation of EPC Woolsey Fire After Action Report recommendations; and 2) Direct staff to contact the Palos Verdes Peninsula Land Conservancy prior to the next month's meeting to gauge their interest in establishing a volunteer fire watch program comparable to that found in Orange County.

The motion passed on the following roll call vote:

AYES: Member Boudreau, Member Braswell, Member Campbell, Member Colville
              Member Robinson, Member Warner, Chair Maizlish
NOES: None
ABSENT: None

UPDATE ON FY 2021-22 EPC WORK PLAN SUBCOMMITTEES (VILLALPANDO)

Emergency Services Coordinator Jesse Villalpando presented the following Updates for the Committee's FY 2021-22 Work Plan Subcommittees.

For the workplan goal of "Incorporate key lessons learned from Woolsey AAR regarding emergency communications, emergency playbook, resources, and drills/training into all four surrounding Peninsula cities emergency planning"
- Coordinator Villalpando stated that the subcommittee met on August 23rd and on August 30th to discuss the drafting of a request for proposal for the hiring of a third party consultant to establish a Peninsula wide Emergency Evacuation Play Book as mentioned above.

Further updates included informing the committee that on September 21st, the city council will be reviewing a preliminary spending plan for funds received by the city as part of the American Rescue Plan Act of 2021.
- Coordinator Villalpando stated that City staff has compiled a list of proposed projects for consideration by the Council in the development of a spending plan for this funding, and that he has provided the following three recommendations aimed at emergency preparedness initiatives to be included:
  - $100,000 in ARPA funding for the Replenishment of the City's Emergency Supplies
  - $100,000 in ARPA funding for the Development of a Peninsula-wide Evacuation Plan
  - $125,000 in ARPA funding for the installation of Wildfire Monitoring Cameras.

Discussion ensued between the Emergency Preparedness Committee (EPC) and staff regarding the progression of implementation for each of the Committee's Work Plan goals. One of the key takeaways from this discussion was the importance and necessity of creating an emergency status webpage in the near future.

This discussion also included a request for City staff to investigate the feasibility of erecting a "Smokey the Bear" sign for the Peninsula. Additionally, committee members noted that a high-risk road sign near the hill's entrance point needs to be repaired due to damage, and they requested that staff look into the matter further.

Furthermore, Committee members stated that it is imperative that staff inquire whether the City's grant consultants have been identifying grants and tax breaks for residents interested in hardening their homes/neighborhoods against fire (roofs, screens, trees, defensible space).

Additional discussion included the need to begin work on developing a uniformed, up-to-date, easily maintained list of residents who may require additional assistance during an emergency.

Member Braswell moved, and Member Robinson seconded, to receive and file the staff report, with the provision that staff follow up on the action items raised by committee members during tonight's discussion.

The motion passed on the following roll call vote:

AYES: Member Boudreau, Member Braswell, Member Campbell, Member Colville Member Robinson, Member Warner, Chair Maizlish
NOES: None
ABSENT: None

REPORT ON INSTALLING WILDFIRE CAMERAS (VILLALPANDO)

Emergency Services Coordinator Villalpando presented a staff report outlining his progress in researching the feasibility of instituting a wildfire monitoring camera system throughout the city.

Coordinator Villalpando stated that on August 17th, he presented a report to the City Council regarding the installation of wildfire monitoring cameras throughout the City's open space areas. Coordinator Villalpando further reported that during the August 17th meeting, the Council expressed an interest in establishing a permanent City program to monitor for wildfires in the City's canyons and open space areas and directed Staff to investigate the feasibility of establishing a joint wildfire monitoring camera system with the three neighboring peninsula cities and report back to the City Council with a scope of work and cost estimates at a subsequent meeting.

The Council further provided the direction to staff to coordinate with neighboring Peninsula Cities, the Emergency Preparedness Committee, and the Los Angeles County Fire Department in order to identify potential camera installation locations for consideration and adoption by the City Council.

Discussion ensued between the Emergency Preparedness Committee and staff regarding the installation of wildfire monitoring cameras.

The following are key takeaways from this discussion:

Vice-Chair Campbell recommended that wildfire monitoring cameras be placed on existing Antenna Communication Structures on the Palos Verdes Peninsula to take advantage of their elevated locations that provide commanding views of the Peninsula.

- Vice-Chair Campbell suggested the South Bay Regional Public Communications Tower at Via Visalia & Punta Place in the City of Palos Verdes Estates, the Los Angeles County Antenna Farm at 5741 W Crest Ridge Rd in the City of Rancho Palos Verdes, and the Federally owned Radar Station on top of the San Pedro Hill in the City of Rancho Palos Verdes as possible locations for staff's consideration.

- Vice-chair Campbell further emphasized the importance of reviewing historical fire maps for the Peninsula, which show a high likelihood of fire, to ensure adequate camera coverages of these areas.

Member Braswell proposed installing cameras overlooking the Sam Ramon/switchback areas of the city. Member Braswell further stated she is in agreement with Vice-chair Campbell suggestions.

- Member Braswell also noted the potential need for poles to house these cameras and the potential for site view issues for residents, as well as potential concerns about residents' privacy and the need for solar-powered cameras.

- Member Braswell also emphasized the importance of taking into consideration internet connectivity/data signal availability and strength for proposed installation areas.

- Member Braswell further noted that the vendor's current quote excludes the cost of erecting camera towers, costs associated with solar power, and potential cellular data charges. Member Braswell stated that she is unsure whether the existing available funds will be sufficient to implement this project and emphasized the need to resolve these issues prior to presenting to council to ensure that the City Council is presented with a realistic cost for the entire project implementation.

Member Robinson proposed installing a camera at Miraleste Library, located at 29089 Palos Verdes Dr E, Rancho Palos Verdes, as well as at Marymount California University, located at 30800 Palos Verdes Dr E, Rancho Palos Verdes, due to these locations' internet capabilities and the potential for these cameras to cover the Palos Verdes Peninsula's east side.

Member Colville inquired about the solar capabilities and options for these cameras, and noted the potential necessity of having the majority of installed cameras be Solar powered. Member Colville further emphasized the importance of including solar costs in the final cost estimate.

- Member Colville further inquired whether staff has contacted the AlertWildfire Network regarding this project. Emergency Coordinator Villalpando responded that he has contacted the AlertWildfire organization and stated that while meeting with them they indicated that they do not recommend the installation of Wildfire Monitoring Cameras at this time, noting that due to the city's urban landscape that a 911 call has the high possibility of being made prior to these cameras detecting a fire.

Chair Maizlish stated his agreement with Committee Members' previous comments about the need for revised cost estimates that include solar power, internet connectivity/data, and any additional hardware costs needed to present a realistic cost for the entire project implementation to the City Council.

- Chair Maizlish further stated that the cameras need to be mounted high, noting that these cameras are typically mounted on communication towers that are 70 to 100 feet tall. Chair Maizlish also stated that these cameras are best suited to be embedded in the target area rather than at the edge of an area to be monitored. Chair Maizlish further noted that having a camera pole installed in the middle of open space areas creates concerns about residential site views and emphasized the potential for privacy concerns from residents.

- Chair Maizlish also mentioned that the proposed wildfire monitoring cameras' lenses are designed for long-distance viewing and that he is unsure if the cameras' lenses are wide enough for close-range viewing. He also mentioned the need to identify the salt air ratings for these cameras due to the Peninsula's ocean salt air breeze.

- Chair Maizlish stated that in his discussions with the AlertWildfire Network, that the network recommended against installing cameras in the City due to the small size of the Peninsula and the high likelihood of a resident noticing and reporting a fire before the cameras detect it. Chair Maizlish also stated that once the cameras detect an anomaly, an individual must log into the system and confirm the presence of a fire before it is reported to the appropriate authorities. Chair Maizlish

further stated that he had learned that the Alertwildfire network has an annual cost of $8,500 per camera, and he expressed a desire for more information on the purpose of this cost and what the AlertWildfire Network is offering for this cost.

- Chair Maizlish further emphasized the importance of ensuring that the City Council and the Peninsula Cities are not led to believe that installing these cameras will result in quick, failsafe fire detection prior to being reported by a person, and emphasized the high possibility of false positives being issued by these cameras. Chair Maizlish further stated that the cameras are not intended to protect residential structures from fire, as this is beyond their scope of design.

- Chair Maizlish proposed installing cameras in the City's Nature Preserve areas to ensure adequate coverage of Del Cerro Park, Three Sisters Reserve, Forrestal Nature Preserve, and the San Ramone Nature Preserve/switchback area of the City. Chair Maizlish further suggested that cameras be installed on the existing monopole at Rancho Palos Verdes Hall, as well as the LA County Antenna Farm Tower, which the committee had previously recommended.

- Chair Maizlish also stated that due to the topography of the Peninsula, multiple cameras may be required to ensure proper coverage of all high-risk areas. Chair Maizlish also stated that the staff recommendation for a camera installation at Grand View Park was not a suitable location.

- Chair Maizlish identified several drawbacks to implementing these cameras, including that these cameras are not truly designed for small-application use, the possibility of a large number of false alerts leading to potential alerting fatigue, vulnerability to vandalism due to the cameras' remote location, and the possibility of a negative impact on residents' site views in regard to needed pole for the mounting of these cameras.

- In summary, Chair Maizlish recommended that cameras be installed in the City's Nature Preserve areas, that vandalism mitigation efforts need to be considered during the installation process, and that the council be presented with an accurate installation and ongoing cost estimate for the project. Chair Maizlish also noted the potential need for additional funds being allocated to ensure the project's success.

Member Boudreau, noted the need to outreach to the Lake Tahoe Area and directed staff to reach out to them for their lessons learned and best practices in using these cameras.

- Member Boudreau inquired on the potential to ask Southern California Edison to install cameras at one or two locations within the City. Coordinator Villalpando responded that SCE has installed numerous camera in accordance to their 2020-2022 Wildfire Mitigation Plan, and further noted that SCE representatives have

stated that they will not fund additional cameras beyond the approved 2020-2022 Wildfire Mitigation Plans scope.

- Member Boudreau proposed installing cameras at the federally owned Radar Station on top of San Pedro Hill, the Los Angeles County Antenna Farm, the City of Rancho Palos Verdes City Hall, and Grandview Park.

Member Braswell moved, and Member Boudreau seconded, to direct staff to:
1) Compile a list of advantages and disadvantages (pros & cons) based on tonight's committee discussion.
2) Ensure that existing camera installation cost estimates are updated to include all necessary systems for the program's implementation
3) Verify the salt Air rating for these cameras;
4) Identify considerations for vandalism mitigation;
5) Outreach to Lake Tahoe for lessons learned regarding their use of wildfire monitoring cameras; and
6) Ensure that the aforementioned requirements are presented to the City Council at the subsequent city staff report on wildfire monitoring cameras.

The motion passed on the following roll call vote:

AYES: Member Boudreau, Member Braswell, Member Campbell, Member Colville
              Member Robinson, Member Warner, Chair Maizlish
NOES: None
ABSENT: None

UPDATE OF THE 'CITY'S CORONAVIRUS RESPONSE AND PREPARATION (VILLALPANDO)

Emergency Services Coordinator Villalpando briefed the Committee on the City's Coronavirus Response and Preparedness activities.

Discussion ensued between the Emergency Preparedness Committee and Staff.

Among the key takeaways from this discussion was an overview of the new COVID-19 variants, which Emergency Services Coordinator Villalpando reported that the Los Angeles County Department of Public Health has stated is not a cause for concern at the moment and that the Delta variant accounts for the majority of existing positive cases.

Member Braswell motioned, and Member Robinson seconded to receive and file the update on the City's Coronavirus Response and Preparation by Coordinator Villalpando.

The motion passed on the following roll call vote:

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AYES: Member Boudreau, Member Braswell, Member Campbell, Member Colville Member Robinson, Member Warner, Chair Maizlish
NOES: None
ABSENT: None

UPDATE ON THE CALIFORNIA PUBLIC UTILITIES COMMISSION'S (CPUC) DECISION ADOPTING WIRELESS PROVIDER RESILIENCY STRATEGIES (VILLALPANDO)

Emergency Services Coordinator Villalpando, presented a staff report outlining the progress made in obtaining additional information from wireless and wireline communication providers, as mandated by the Public Utilities Commission's (CPUC) Decision Adopting Wireless Provider Resiliency Strategies.

Discussion ensued between the Emergency Preparedness Committee and Staff regarding the compiled list of questions for the committee's consideration on information the committee would like to glean from major wireless providers to discuss their plans to implement the CPUC-mandated resiliency requirements.

Among the key takeaways from this discussion was the Committee's interest in convening a meeting with a major wireless provider in the near future to address the Committee's concerns about the provider's implementation of the CPUC's mandate.

Member Braswell motioned, and Member Boudreau seconded to direct staff to proceed in scheduling a presentation from wireless communication providers servicing the Palos Verdes Peninsula,

The motion passed on the following roll call vote:

AYES: Member Boudreau, Member Braswell, Member Campbell, Member Colville Member Robinson, Member Warner, Chair Maizlish
NOES: None
ABSENT: None

FUTURE AGENDA ITEMS:

- None

COMMUNICATIONS:

COMMITTEE MEMBERS ORAL REPORTS:

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Member Warner provided an update on the mayor's breakfast that he recently attended which included a discussion on Cox Communications resiliency efforts, collaborative Mass evacuation planning efforts, community planning and new home developments involving Senate Bill 9 and 10 and a presentation on crime rates by Los Angeles County Sheriff Department's- Lomita Station Captain Powers.

Chair Maizlish stated that on Wednesday, September 15, 2021, the West Basin Municipal Water District will host a free online fire escape workshop to educate residents on how to use landscaping and irrigation techniques to protect their homes from wildfires. Chair Maizlish stated that the presentation can be used as a template for future EPC community presentations to educate residents about wildfire home hardening measures they can take.

Member Braswell stated her congratulations to Vice-Chair Campbell for this election of a Vice-Chair for the Committee.

STAFF COMMUNICATIONS:

Emergency Services Coordinator Villalpando expressed his appreciation and gratitude to Committee Member Warner for his remarks during the September 7th City Council meeting's remembrance presentation commemorating the 20th anniversary of the September 11, 2001, attacks.

ADJOURNMENT:

Member Braswell motioned, and Member Boudreau seconded to adjourn the meeting at 8:30 pm.

The motion passed on the following roll call vote:

AYES: Member Boudreau, Member Braswell, Member Campbell, Member Colville
                Member Robinson, Member Warner, Chair Maizlish
NOES: None
ABSENT: None

AGENDA TITLE:

Report on installing Wildfire Monitoring Cameras

RECOMMENDED COMMITTEE ACTION:

    (1)   Receive and file a report on installing Wildfire Monitoring Cameras throughout the City's open space areas;
    (2)   Review and approve the drafted list of advantages and disadvantages (pros & cons) based on the committee's discussion; and
    (3)   Make recommendations on potential wildfire camera monitoring projects and locations to present to the City of Rancho Palos Verdes City Council.

STAFF COORDINATOR: Jesse Villalpando, Emergency Services Coordinator   J. V.

ATTACHED SUPPORTING DOCUMENTS:

    A. August 17, 2021, Staff Report
    B. Pano AI Presentation

 BACKGROUND

In recognition of the overt threat of wildfires to the Palos Verdes Peninsula Community's livelihoods during the May 4, 2021, City Council meeting, Councilmember Cruikshank requested Staff prepare a report on the City's options for installing high-definition cameras throughout the City to monitor for wildfires to be presented to the council at a future meeting. In support of this request, City staff presented to the City Council on August 17, 2021, a report on the installation of wildfire monitoring cameras throughout the city's open space areas. The staff presentation discussed the use of high-definition cameras for wildfire monitoring and mitigation, as well as implementation considerations, an estimated cost range, and funding sources (Attachment A).

During the August 17th meeting, the Council expressed an interest in establishing a permanent City program to monitor for wildfires in the City's canyons and open space areas and directed Staff to investigate the feasibility of establishing a joint wildfire monitoring camera system with the three neighboring peninsula cities and report back to the City Council with a scope of work and cost estimates at a subsequent meeting. The Council further provided the direction to staff to coordinate with neighboring Peninsula Cities, the Emergency Preparedness Committee, and the Los Angeles County Fire

Department in order to identify potential camera installation locations for consideration and adoption by the City Council.

On September 16, 2021, during the regular meeting of the City of Rancho Palos Verdes Emergency Preparedness Committee, Emergency Services Coordinator Villalpando provided the Committee with a report on the implementation of a wildfire monitoring camera system for the city, as directed by the City Council. During this presentation to the Committee, Coordinator Villalpando provided an update on the progress made in researching the feasibility of obtaining and implementing a wildfire camera system for the Palos Verdes Peninsula and sought the committee's input on potential locations for wildfire monitoring cameras, as well as additional direction from the Committee on planning, prioritizing, and implementing these systems.

Following this presentation, the Emergency Preparedness Committee provided city staff with potential camera locations and feedback for consideration and implementation prior to the Council presentation. In summary, the committee's input focused on the importance of obtaining additional information on these cameras, the importance of exploring their installation on existing communication tower infrastructure, potential site view issues for residents, potential concerns about residents' privacy, the possibility of solar power powering the majority of these cameras, and the importance of obtaining revised cost estimates that include solar power, internet, and any other ad hoc costs. (Additional information on the Committees feedback is documented in the September 16, meeting minutes, which are included in tonight's agenda packet.)

<u>Pros & Cons for The Proposed Installation of Wildfire Monitoring Cameras</u>

During the Emergency Preparedness Committee's regular meeting on September 16, 2021, the committee requested that staff compile a list of specific advantages and disadvantages (Pros & Cons) regarding the proposed installation of wildfire monitoring cameras throughout the city identified by the Committee.

City staff has drafted the following list of Pros and Cons for the committee's consideration and adoption at tonight's meeting.

⇒ **Identified Advantages (PROS)**
- **Potential for Cameras to detect the ignition of a wildfire on the Palos Verdes Peninsula prior to residents reporting it.** It should be noted that the Committee recognized the magnitude of devastation caused by wildfires and the potential for early detection by these cameras to aid in public warning, evacuation, and first responder mobilization in order to mitigate the potential devastation caused by a wildfire.

- **Increased situational awareness in the event of a wildfire.** Once a fire is detected or reported, these cameras can provide first responders with enhanced situational awareness, allowing them to assist in evacuation efforts, scale up or down firefighting resources quickly, monitor fire behavior during containment, observe contained fires for flare-ups.

⇒ **Identified disadvantages (CONS)**
  - Wildfire Monitoring Cameras are not primarily designed for use in small areas and are traditionally intended to be used at a considerable distance.
  - Possibility of cameras producing a large number of false alerts, resulting in alert fatigue and a delay in alerting appropriate authorities by camera monitors.
  - Possibility of having a detrimental effect on residents' site views as a result of poles needed to mount these cameras.
  - Possibility of privacy concerns for residents.
  - Vulnerability to vandalism due to the cameras' remote location.
  - Possibility that the city will incur significant ongoing costs associated with the establishment of cellular data internet connectivity.
  - Possibility of unintended consequences, such as residents becoming aware of a fire detection system and believing that it will detect fires quickly and consistently prior to human reporting and concluding that they do not need to call 911 if they see smoke.

Proposed Suggestions for Potential Camera Locations

The following section summarizes potential cameral installation locations identified by Committee Members at their meeting on September 16, 2021.

COMMUNICATIONS TOWER VIA VISALIA AND PUNTA PL. (PVE)

Structure Owner:	South Bay Regional Public Communications Authority
Structure Type:	Pole
Latitude/Longitude:	(33.789194, -118.401750)
Street:	1700 Punta Pl
City, State:	Palos Verdes Estates, CA
Overall Height:	50 feet

LOS ANGELES COUNTY ANTENNA FARM

Structure Owner:	Los Angeles County
Structure Type:	Communications Antenna
Latitude/Longitude:	(33.768333 / -118.376667)
Street:	5741 Crest Ridge Rd.
City, State:	Rancho Palos Verdes, CA
Overall Height:	177 Feet

SAN PEDRO HILL RADAR STATION

Structure Owner:	Federal Aviation Administration
Structure Type:	Radar Domes
Latitude/Longitude:	(33.7464, -118.3363)
Street:	867 Crest Road
City, State:	Rancho Palos Verdes, CA
Overall Height:	TBD

US COASTGUARD MONOPOLE AT UPPER POINT VICENTE

Structure Owner:	United States Coast Guard
Structure Type:	Pole
Latitude/Longitude:	(33.74410, -118.40676)
Street:	Hawthorne Blvd,
City, State:	Rancho Palos Verdes, CA
Overall Height:	TBD

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Portuguese Bend Reserve	San Ramone/ Switchback Areas	MARYMOUNT UNIVERSITY

Structure Owner:	United States Coast Guard
Structure Type:	Pole
Latitude/Longitude:	(33.74410, -118.40676)
Street:	Hawthorne Blvd,
City, State:	Rancho Palos Verdes, CA
Overall Height:	TBD

Structure Owner:	United States Coast Guard
Structure Type:	Pole
Latitude/Longitude:	(33.74410, -118.40676)
Street:	Hawthorne Blvd,
City, State:	Rancho Palos Verdes, CA
Overall Height:	TBD

Structure Owner:	Marymount University
Structure Type:	Building
Latitude/Longitude:	33.7351° N, 118.3339° W
Street:	30800 Palos Verdes Dr E
City, State:	Rancho Palos Verdes, CA
Overall Height:	TBD

DISCUSSION:

There is an expressed interest in installing wildfire cameras to monitor for fires in the City's canyons and open space areas, which have the potential to assist firefighters and the general public in spotting fire ignitions before they become full-fledged conflagrations. general, fire agencies prefer to be notified of a wildfire as soon as possible. In a mass evacuation scenario each minute of advance notice can save lives and result in a safer and more coordinated evacuation. In terms of suppression, it is evident that smaller fires are much easier to extinguish or redirect. It is unquestionably more cost effective for fire suppression agencies to devote an excessive amount of resources to containing a small fire than it is to fight a week-long battle against a 100,000-acre fire.

Numerous organizations have begun deploying network-connected optical cameras in strategic locations, in or near California's wildland areas, The largest of which is the ALERTWildfire Network, which currently monitors for wildfires with over 700 state-of-the-art cameras, with additional cameras planned for installation in the coming years. The motivation for installing these cameras has been for individuals to be actively monitoring them with three main goals: (1) Discover/locate/confirm fire ignition by continuous manual observation of the images, (2) Quickly scale fire resources up or down appropriately, and (3) Closely monitor a known fire by panning and zooming around the incident.

While the cameras are extremely effective for the latter two objectives, manually detecting fires with them requires individuals to stare at continuously changing live image streams. Once a fire has been started and reported, these cameras would aid first responders in tackling the blaze and developing evacuation plans via enhanced situational awareness. However, it is critical to understand the distinction between monitoring and detection. Monitoring necessitates the examination of video streams by a human. They could be a potential source of detection, but this is highly improbable given the impracticality of 24/7/365 monitoring in most cases. This task is better suited to automated processing, which can process an infinite number of images continuously with a consistent level of accuracy while maintaining detection sensitivity and a low false alarm rate. As discussed later in this report's staff report, any automated system will generate some false positives and negatives.

Contrary to Wildland Urban Interface (WUI) fires, which typically ignite in remote areas and have the potential to grow to significant size before being spotted or reported to authorities, fires in urban and suburban areas are frequently detected quickly via a 9-1-1 call. However, one must consider the possibility that an "unwitnessed" fire starting in the middle of the night or early morning in a densely populated residential area could go undetected for several minutes if not hours, eventually resulting in a major conflagration. Early detection is of paramount importance to facilitate public warning, evacuation, and first responder mobilization. It is also important to consider the indirect effects of wildland fires, such as air quality, traffic disruption, loss of utilities and other infrastructure (including Public Safety Power Shutoffs or unplanned failures that could result in widespread power outages). Most fundamentally: If firefighting resources are not brought to bear quickly enough, many wildland fires quickly move past the point of realistic intervention, meaning a "defensive" posture is the only option left for the first responders.

Proposed Wildfire Monitoring Camera Projects:

City staff has been tasked with determining the viability of implementing a wildfire suppression system throughout the Palos Verdes Peninsula. The following section provides an overview of proposed projects that staff intends to present to the City of Rancho Palos Verdes City Council for consideration during their November 2, 2021 meeting, as well as for review and discussion by the Emergency Preparedness Committee during tonight's meeting.

PROPOSED PROJECT NO. 1: Establishment of a Wildfire Camera Monitoring surveillance system and a volunteer Fire Watch Program

Project Objective: The main goal of this project is to provide Palos Verdes Peninsula community, with timely and accurate situational awareness regarding fires and other critical incidents occurring throughout the greater community. This would be accomplished by acquiring and installing AXIS Q6078-E PTZ Network Cameras (similar to those used by the AlertWildfire Program) throughout the city and in strategic locations identified as having a favorable vantage point or having previously burned.

While these cameras are extremely effective at providing situational awareness, it is critical to note that they must be monitored constantly and diligently in order to detect fires manually, as the cameras themselves require the addition of Artificial Intelligence technology to provide 24/7 monitoring, real-time and automated email and text alerts for critical incidents.

The proposed concept is for these network cameras to function similarly to traditional fire lookout towers (buildings located on high vantage points from which people can monitor for wildfires in the wilderness). The next phase of the project will be the establishment of a volunteer fire watch program for residents. This would require the recruitment of dedicated volunteers willing to donate their time to monitor camera feeds, search for signs of smoke or potential fire danger, and call 911 to report fires in their early stages, effectively crowdsourcing a fire-warning version of Neighborhood Watch.

Comparable to the Orange County Firewatch Program, a volunteer-based organization in which volunteers from across the Orange County Parks system are activated and deployed to high-visibility locations near likely ignition sources in response to National Weather Service Red Flag warnings indicating an increased fire risk. The proposed program will establish a similar program that combines on-site and remote monitoring by enlisting volunteers to monitor installed camera feeds for early indications of wildfire ignitions via the installed camera network. Additionally, the proposed program will incorporate in-person fire watch volunteers to assist in monitoring the city's open spaces, serving as visual deterrents, reporting suspicious or dangerous behaviors or activities, and assisting in the early detection and reporting of ignitions.

Camera installation Considerations

On Monday, October 11, 2021, city staff from the Public Works Department, the City Manager's Office, and the Chair of the City's Emergency Preparedness Committee conducted a site survey with the proposed vendor for the AXIS Q6078-E PTZ Network Cameras to identify potential ideal installation locations for these cameras on city-owned facilities and to determine the power and data requirements for each proposed location.

City staff identified four potential locations for the installation of camera monitoring cameras as a result of this site survey.

⇒ The first location would be the Coast Guard Monopole, which is located on Coast Guard property in Upper Point Vicente Park and features an 80-foot-tall pole with a panoramic view of the city's north and south coastlines. This pole is owned by the Coast Guard, and the city will need to contact the coast guard's point of contact to ascertain their interest in granting us access to it.

⇒ Due to the Portuguese Bend Reserve's topography, the second and third locations proposed are for two cameras to be mounted on existing Southern California Edison (SCE) power poles in the Portuguese Bend Reserve area of the City's
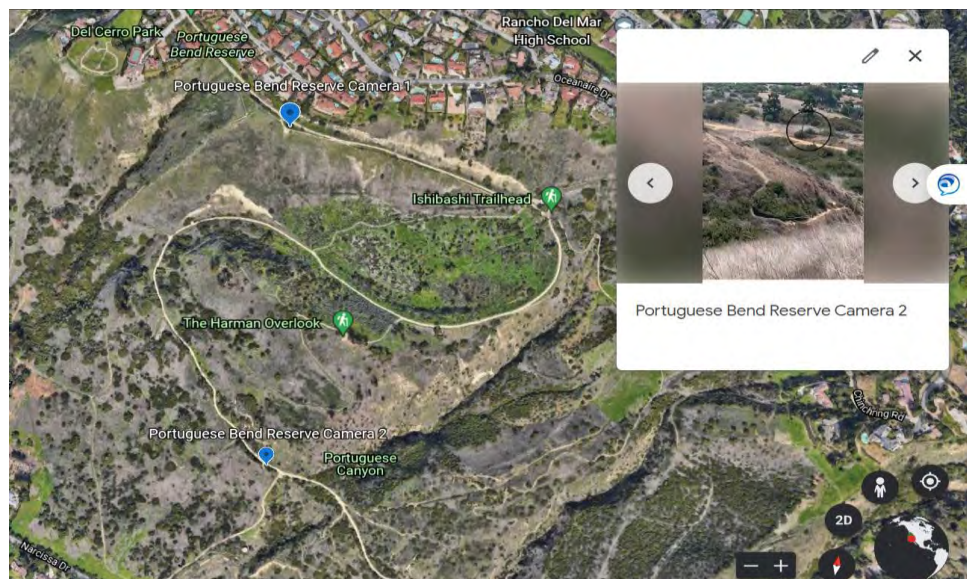
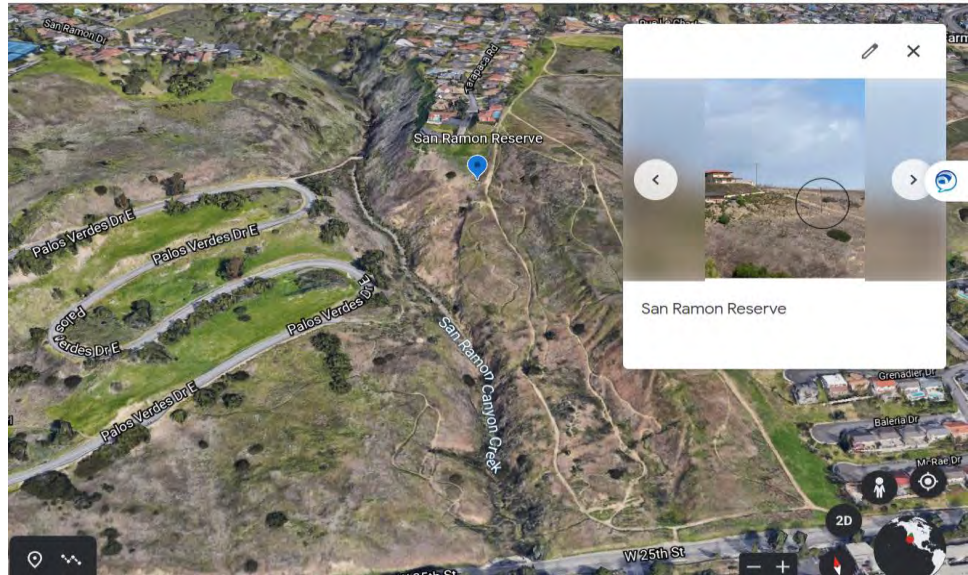Nature Preserves to ensure adequate coverage of Del Cerro Park and Three Sisters Reserve.

o The first camera proposed location would offer an excellent view of the reserve's left side.
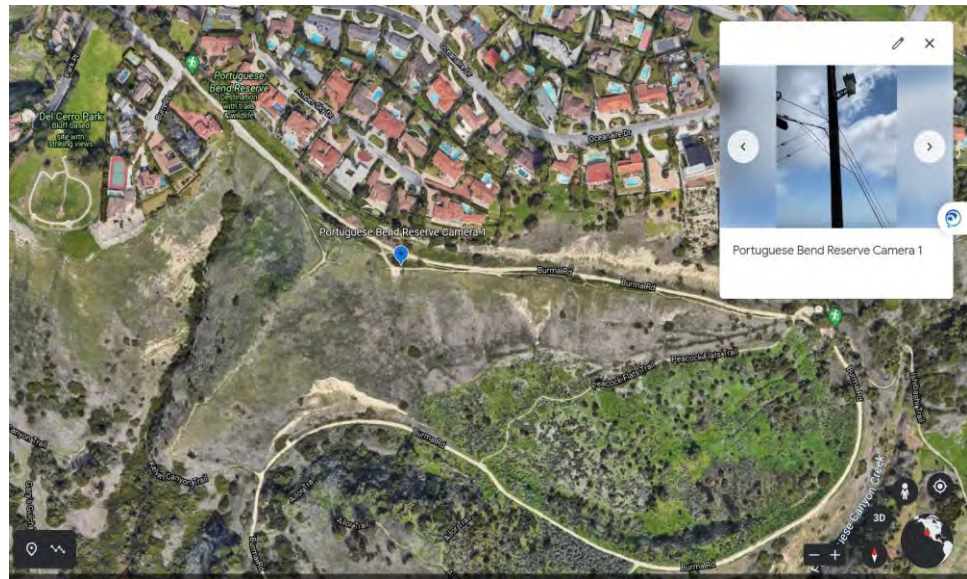
o The second proposed camera location would ensure that the preserve's right side is adequately covered.

⇒ The fourth location would be atop the SCE power pole, with a view of the City's switchback the San Ramone Nature Preserve/switchback area.

The next step in implementing this proposed camera installation is to contact the organizations involved to ascertain their interest in providing us with an easement and access, as well as a power connection. Following this initial coordination, staff will schedule a meeting with the vendor and relevant agencies to finalize the installation process. It should be noted that the proposed vendor indicated that they will be able to provide a revised cost estimate prior to the council's November 2 consideration of the project, which will include an accurate installation and ongoing cost estimate for the project

PROPOSED PROJECT NO. 2: Partnership with Pano AI in an early wildfire detection program

As part of the research process for establishing a wildfire camera/monitoring network for, staff discovered a company called Pano AI, whose platform utilizes mountaintop cameras and artificial intelligence software to detect and alert first responders to the first signs of smoke and provide real-time imaging.

Pano's Rapid Detect platform leverages mountaintop cameras, artificial intelligence, and intuitive software to detect the first wisps of smoke and deliver real-time fire images to first responders, private firefighters, and emergency personnel, with the goal of detecting flare-ups earlier and enabling a faster response before they become large infernos.

Multiple users can concurrently view 360-degree live panoramic imagery, respond to AI-generated ignition alerts, and triangulate the precise location of a fire using easy-to-use

digital pan and zoom functionality. Once the AI camera picks up smoke, it sends an alert back to a 24/7 Pano AI intelligence center, where real people analyze the data , determine if it's a fire incident, and notify the fire department. Pano can also integrate data from third-party sources such as satellites, 911 calls, weather sensors, and existing cameras to provide emergency personnel with a centralized platform for wildfire detection and response. (ATTACHMENT B).

On October 14, 2021, staff and the Committee Chair met with Pano AI representatives to discuss the peninsula's unique needs. City staff is currently gathering additional information about the potential partnership with Pano Ai and will present a summary of the meeting's key takeaways and how to apply this technology solution to the proposed Wildfire Monitoring Camera Projects during tonight's Committee meeting.

CONCLUSION:

Staff recommends that the Committee review the information contained in this report and provide input on proposed projects that staff intends to present to the City of Rancho Palos Verdes City Council for consideration during their November 2, 2021 meeting, as well as provide any additional direction they wish to provide regarding the planning, prioritization, and implementation of these systems.

CITY COUNCIL	**MEETING DATE:** 08/17/2021
AGENDA REPORT	**AGENDA HEADING:** Regular Business

AGENDA TITLE:

Consideration and possible action to receive a report on installing Wildfire Monitoring Cameras.

RECOMMENDED COUNCIL ACTION:

(1)   Receive and file a report on installing Wildfire Monitoring Cameras throughout the City's open space areas; and

(2)   If the desire of the City Council is to proceed with the procurement and installation, direct Staff to issue a request for proposals to vendors and present a report to the Council outlining the scope of work, cost estimates, and potential locations for consideration at a future meeting.

FISCAL IMPACT: None at this time

Amount Budgeted:	N/A
Additional Appropriation:	N/A
Account Number(s):	N/A

ORIGINATED BY: Jesse Villalpando, Emergency Services Coordinator J. V.
REVIEWED BY: Karina Bañales, Deputy City Manager
APPROVED BY: Ara Mihranian, AICP, City Manager

ATTACHED SUPPORTING DOCUMENTS:

A. AXIS Communications Q60-E PTZ Dome Network Cameras Informational Sheet (page A-1)
B. Preliminary Cost Estimate (page B-1)

BACKROUND:

At the May 4, 2021 City Council meeting, Councilmember Cruikshank requested Staff prepare a report to be agendized for a future City Council meeting on the City's options for the installation of high-definition cameras throughout the City to monitor for wildfires. This report provides an overview of the use of high-definition cameras for wildfire detection and mitigation, considerations for implementation, an estimated cost range, and suggestions for potential funding sources.

California's worsening wildfires have claimed lives, destroyed property and overextended firefighting resources. Wildfire events have long been a concern for the residents of Rancho Palos Verdes and the Palos Verdes Peninsula. In April 2019, a series of news stories on wildfire preparedness in California highlighted Rancho Palos Verdes as the most populated city in the state with 90% or more of residents living in a Very High Fire Hazard Severity Zone (VHFHSZ). The City of Rancho Palos Verdes has experienced significant wildfires, most recently in August 2009, when a wildfire burned through approximately 230 acres. The fire is believed to have originated in the Portuguese Bend Reserve, where 165 acres were charred. The remaining 65 acres were burned in the City of Rolling Hills. Dozens of homes were threatened and approximately 1,200 residents were forced to evacuate.

Use of Cameras for Fire Detection and Mitigation

Wildfires have extreme consequences on local communities and cause serious damage to infrastructure, injuries, and losses of human lives; therefore, fire detection and monitoring of wildfires, their size, and impact over large areas is becoming increasingly important. To this end, strong efforts have been made to avoid or mitigate such consequences by early fire detection. Historically, forest fires were mainly detected by human observation from fire lookout towers; however, this approach is inefficient, as it is prone to human error and fatigue. Recent advances in technologies, such as high definition cameras offer new tools for detecting and monitoring forest fires.

The installation of high-definition cameras to monitor for wildfires within a local community is critical for combating fires. When a fire is spotted or reported, fixed wildfire cameras can quickly identify and locate hot spots in the area, assist in determining the potential for the fire to spread, and provide first responders with specific intelligence for appropriately scaling fire resources up or down. In addition, strategically placed fixed cameras assist first responders in determining the best evacuation routes through enhanced situational awareness. By utilizing wildfire cameras, first responders can increase their situational awareness and response time, allowing them to react appropriately and effectively before, during, and after a wildfire.

Fixed cameras enable firefighters and first responders to manage firefighting operations more effectively. High-definition video streaming from the wildfire incident site to the City's Emergency Operations Center (EOC) and/or an established Incident Command Post will provide City Staff and first responders with a live, real-time video feed of a wildfire incident, assisting with response operations. This will streamline firefighting capabilities and enable command center personnel to make quick decisions based on real-time data, rather than relying on information relayed through multiple parties or waiting for first responders to arrive. Personnel at the command center will be able to see the direction in which a fire is spreading, allowing them to direct resources to the most effective positions.

ALERTWildfire Camera Network

ALERTWildfire is a consortium of three universities – the University of Nevada, Reno, University of California San Diego, and the University of Oregon – providing access to state-of-the-art, pan-tilt-zoom (PTZ) fire cameras and associated tools to help firefighters and first responders: 1) discover/locate/confirm fire ignition; 2) quickly scale fire resources up or down appropriately; 3) monitor fire behavior through containment; 4) during firestorms, help evacuation through enhanced situational awareness; and 5) ensure contained fires are monitored appropriately through their demise.

Over the last five fire seasons (2016-2020), ALERTWildfire has provided critical information for over 1,500 fires, including the Maria, Saddleridge, and Woolsey fires. ALERTWildfire is an extension of the ALERTTahoe network, which began as a pilot program deploying PTZ cameras and microwave networks in the Lake Tahoe region.

The ALERTWildfire project was designed through a collaborative process with the goal to provide livestreaming views of the areas within the camera view shed to the following website: alertwildfire.org

ALERTwildfire uses AXIS Q60 Network Cameras, which are high-definition PTZ cameras manufactured by Axis Communications, the ALERTWildfire network's exclusive provider of wildfire monitoring cameras. ALERTWildfire has installed over 800 AXIS Q60 Network Cameras on fire towers, cell towers, and private communications infrastructures throughout six states to assist firefighters and the general public in monitoring wildfires.
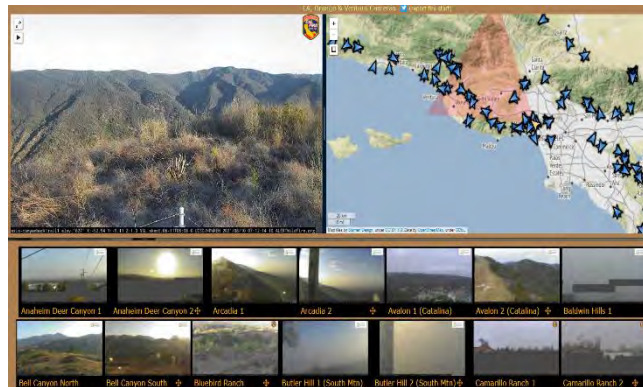
SCE Wildfire Cameras

As a part of Southern California Edison's (SCE) Wildfire Mitigation Plan (WMP), SCE aimed to install up to 160 PTZ HD cameras within high fire risk areas between 2018 and 2020. These cameras are a key component of SCE's wildfire mitigation strategy and help both fire agencies and SCE emergency management staff in assessing and responding to wildfires. SCE partnered with the ALERTWildfire network (through the University of California San Diego) and coordinated with state, county, and local fire agencies to identify optimal placement of these cameras.

SCE has installed 166 cameras to date and the deployment of SCE funded high-definition cameras is considered complete, as detailed in SCE's 2020-2022 Wildfire Mitigation Plan, which was approved by the California Public Utilities Company (CPUC) on June 11, 2020. SCE has stated that it will not fund additional cameras beyond the approved plan's

scope, and none of the installed cameras are in Rancho Palos Verdes or the Palos Verdes Peninsula. Thus, the City would have to install such cameras on its own.

DISCUSSION:

To utilize cameras as a wildfire detetction and mitigation tool, a complete surveillance camera system would be required for wildfire monitoring throughout the City of Rancho Palos Verdes. This would entail purchasing an adequate number of cameras, monitors, software, and hardware to monitor and record activity within the City, as well as staffing. In addition, ongoing maintenance and equipment replacement would also have to be taken into account. The following is information to consider in determining whether to proceed with the installation of said cameras throughout the City's open space areas.

Camera Capabilities

ALERTWildfire is currently utilizing Axis Q6055-E outdoor-ready PTZ network cameras. These high-definition network cameras are able to pan, tilt, zoom and perform 360-degree sweeps approximately every two minutes with 12 high-definition frames per sweep. The cameras are equipped with near-infrared capabilities, which enables them to operate in low-to-no-light conditions. They include a time-lapse function that can be used to verify wildfire reports and monitor the progression of wildfires and environmental conditions.

These cameras support 1080p HDTV signals, have a 32x zoom, and compress video at a low bitrate. On a clear day, each camera has a view of up to 60 miles and up to 120 miles at night. According to Axis Communications' informational sheet (Attachment A) on the Q60-E PTZ Dome Network Cameras, the aluminum casing of the cameras can withstand temperatures of up to 140 degrees Fahrenheit, although the cameras are typically mounted on the tops of towers, where temperatures caused by wildfires are irrelevant.

Recommendations for Installation

There is an expressed interest in installing wildfire cameras to monitor for fires in the City's canyons and open space areas, assisting firefighters and the general public in spotting fire ignitions before they become full-fledged conflagrations. Due to the remote locations where the cameras would be installed, they need to be rugged enough to withstand the elements, including seismic activity. Additionally, they must deliver crystal-clear images in a variety of lighting conditions and have the ability to zoom in on fires that may be miles or miles away. While network cameras can be installed virtually anywhere, they must be powered and connected to the internet in order to function properly. Fully solar-powered energy options are available at an additional cost.

Due to the ALERTwildfire cameras' history of dependability and compliance with the aforementioned requirements, if desired by the City Council, at this time, Staff recommends that the City seek assistance from a vendor to install five (5) AXIS Q60 Network Cameras throughout the City as a pilot program. This will ensure rapid implementation and compatibility with AlertWildfire's camera network.

Potential Camera Locations

Locations for the recommended five wildfire monitoring cameras on City-owned properties (including the Palos Verdes Nature Preserve) would be identified and recommended by Staff and the Los Angeles County Fire Department for consideration by the City Council at a future date. Only City Staff and Fire Department peronnel would have access to the cameras, and their purpose would be strictly limited to the detection and monitoring of wildfires. The City Council could decide whether to make the live feeds available to the public, as are other cameras in the ALERTWildfire network, or make them viewable only to City Staff and the Fire Department. To provide privacy near cameras located within the Wildland Urban Interface (WUI), buildings and other structures are blocked out from the field of view.

Potential Cost

Staff contacted Axis Communications (the exclusive provider of ALERTwildfire cameras) to obtain preliminary estimates for the recommended five wildfire monitoring cameras within the City. Since Axis Communications is the manufacturor of wildfire cameras, Axis Communications coordinated with its local installation partner DataGear to provide Staff with a preliminary cost estimate of $71,525.71 (Attachment B). The estimated cost of $71,525.71 includes the purchase, installation and mounting of five wildfire cameras located throughout the City's most vulnerable areas to wildfires (final locations to be determined). If directed by the City Council, Staff will issue a request for proposals (RPF) to vendors and present the City Council with a report outlining the scope of work, cost estimates, and potential locations for consideration at a future meeting.

Potential Funding Source - American Rescue Plan Act (ARPA)

The ARPA was approved by Congress and subsequently signed into law by President Biden on March 11, 2021. The relief package provides funding in several areas such as state and local aid, education, rental assistance, and transit. Based on the preliminary information that the City received from the Government Finance Officers Association and the League of California Cities, the City's allocation under the state and local fiscal aid of $350 billion is estimated to be $9.9 million. Based on the most current information, eligible uses may include:

- Revenue replacement for the provision of government services to the extent of the reduction in revenue due to the COVID-19 public health emergency relative to revenues collected in the most recent fiscal year prior to the emergency;
- Premium pay for essential workers;
- Assistance to small businesses, households, and hard-hit industries, and economic recovery
- Investments in water, sewer, and broadband infrastructure.

At this time, Staff recommends using allocation from the ARPA to potentially fund this project based on the following reasons:

The project is eligible under ARPA's Replacement of Revenue Loss:
- Directly provide services or aid to citizens
- Protection of critical infrastructure

CONCLUSION:

Staff recommends the City Council review the information in this report to determine whether to proceed with the procurement and installation of wildfire monitoring cameras; and if the Council desires, direct Staff to issue an RFP to vendors and return to the City Council at a future meeting with a report outlining the scope of work, cost estimates, and potential locations for consideration.

ALTERNATIVES:

In addition to the Staff recommendation, the following alternative actions are available for the City Council's consideration:

1. Identify specific areas of research and continue the consideration of installing wildfire monitoring cameras to a future meeting date.
2. Take no action at this time.

AXIS Q60-E PTZ Dome Network Cameras
Outdoor, high-speed PTZ domes

> Up to HDTV 1080p

> Up to 36x optical zoom

> Outdoor-ready and Arctic Temperature Control

> Vandal-resistant and shock detection

> Automatic defog (AXIS Q6044-E, AXIS Q6045-E Mk II)

> High PoE

AXIS Q60-E cameras are top-of-the-line, outdoor-ready pan/tilt/zoom (PTZ) domes that provide exceptional coverage of wide areas and great detail when zooming in. Designed for easy installation and reliable operation outdoors, they are ideal for city surveillance and airports, train stations, harbors and stadiums.

AXIS Q6045-E Mk II offers a rich viewing experience with HDTV 1080p and 32x optical zoom. AXIS Q6044-E provides HDTV 720p and 30x optical zoom. AXIS Q6042-E supports Extended D1 resolution and 36x optical zoom.

AXIS Q60-E cameras are vandal-resistant (IK10) and have shock detection, surge protection (railway standards), and protection against dust, rain and snow (IP66 and NEMA 4X). They can operate in temperatures ranging from -50 °C to 50 °C (-58 °F to 122 °F). The cameras' Arctic Temperature Control ensures safe start-up in extreme cold. AXIS Q6042-E and AXIS Q6044-E support electronic image stabilization-useful for get-ting smoother video in windy conditions. In fog, AXIS Q6044-E and AXIS Q6045-E Mk II can provide clearer video with its automatic defog functionality.

The PTZ domes support autotracking and Active Gatekeeper, and have substantial capacity for third-party intelligent video applications. AXIS Q6045-E Mk II offers additional built-in analytics such as highlight compensation, object removed and enter/exit detection.

AXIS Q60-E cameras have a built-in memory card slot for local storage of recordings. The cameras are powered by High Power over Ethernet using the supplied High PoE midspan.

Note: Mounting brackets are sold separately.

HDTV NETWORK VIDEO

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B 50

High-performance outdoor-ready PTZ domes

The robust AXIS Q60-E PTZ domes are designed for round-the-clock pan/tilt/zoom operation in outdoor environments. The cameras can be automatically directed to 256 preset positions using guard tour. With endless 360° pan, they enable surveillance of an extremely wide area. High zoom, in combination with high resolution, enables detailed surveillance at great distances. AXIS Q60-E cameras have fast and precise pan/tilt performance. They can also tilt 20° above the horizon, which makes it possible for the cameras to see higher than their mounting position. This can be useful, for example, at a stadium where there is a need to look up at the stands.

The images above show the field of view and level of detail provided by the three AXIS Q60-E PTZ domes.
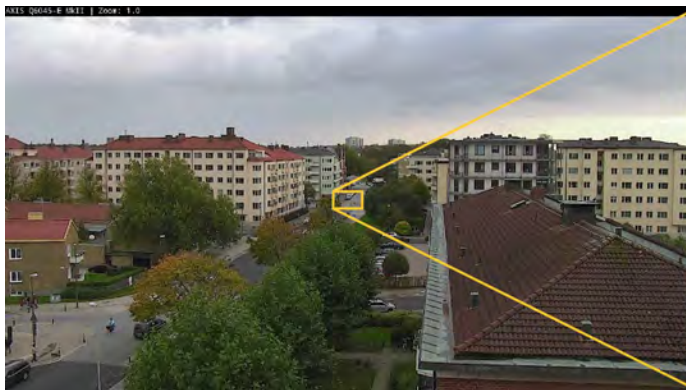
Snapshots of HDTV 1080p views from AXIS Q6045-E Mk II: at left, wide view; at right, 32x zoomed-in view where the license plate of a car 300 m (984 ft) away can be read.

Great detail with HDTV

Among the three cameras, AXIS Q6045-E Mk II provides the widest field of view-with a 62.8° horizontal angle of view. In addition, AXIS Q6045-E Mk II offers the highest level of detail as it delivers HDTV 1080p performance in compliance with the SMPTE 274M standard regarding a 1920x1080 pixel resolution, full frame rate at 25/30 frames per second, HDTV color fidelity and a 16:9 format.

AXIS Q6045-E Mk II has 32x optical zoom, the combination of the zoom factor and HDTV 1080p allows the license plate of a vehicle to be read some 300 m (984 ft) away- at a further distance than with AXIS Q6042-E, which has 36x optical zoom and standard resolution.

AXIS Q6044-E also offers a wide horizontal viewing angle at 62.9°. The camera's 30x optical zoom, in combination with HDTV 720p, provides superb zoomed-in views, enabling, for instance, the license plate of a vehicle to be read up to 245 m (800 ft) away. AXIS Q6042-E offers Extended D1 resolution (736x576 in 50 Hz, 752x480 in 60 Hz) and can enable a vehicle's license plate to be read some 190 m (620 ft) away.

All three PTZ domes support H.264 Main Profile for efficient compression of video that maintains image quality while at the same time minimizing bandwidth use and storage space. The cameras offer day/night functionality, enabling excellent color video during day time, and clear black and white video in low light.

Electronic image stabilization in AXIS Q6042-E and AXIS Q6044-E

Cameras with high zoom are sensitive to vibrations from wind and traffic. AXIS Q6042-E and AXIS Q6044-E support electronic image stabilization (EIS), which reduces the effects of camera vibration. In windy conditions, EIS provides clearer, more useful video and helps reduce the size of video files, which leads to lower bandwidth and storage use.
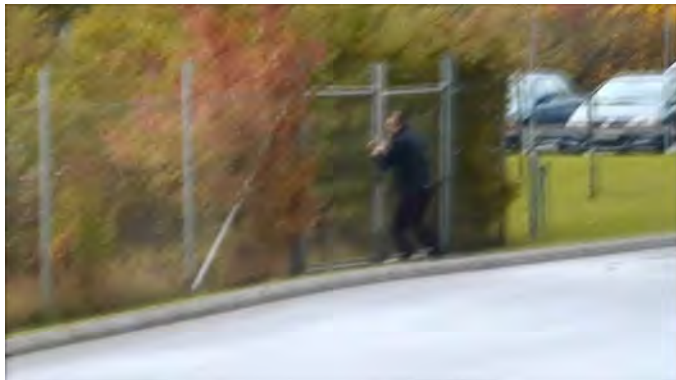
Under vibrating conditions: at left, image without EIS; at right, a snapshot from a vibrating AXIS Q6044-E with EIS activated.

Automatic defog

AXIS Q6044-E and AXIS Q6045-E Mk II support automatic defog, which when activated, automatically detects fog in the scene and digitally filters it out of view to provide clearer video.

Images from AXIS Q6044-E: at left, without automatic defog; at right, with automatic defog activated.

Dimensions

280 mm (11.0")
248 mm (9.8")
Ø 232 mm (9.1")
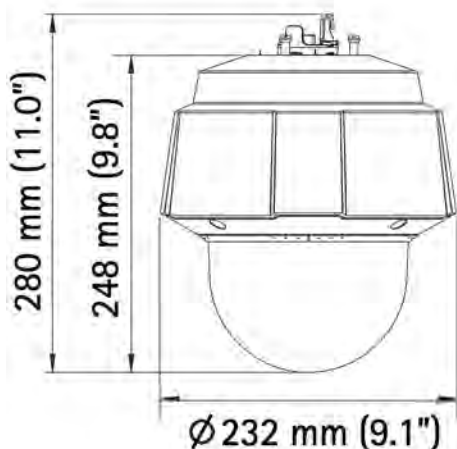
Optional accessories

1. AXIS T91A
2. Smoked Dome D
3. Axis High PoE midspans
4. AXIS T8129 PoE Extender
5. AXIS P8221 Network I/O Audio Module
6. AXIS T8310 Video Surveillance Control Board
7. RJ45 IP66-rated cables with premounted connector (CAT6)

Technical Specifications - AXIS Q60-E PTZ Dome Network Cameras

Models	AXIS Q6042–E 50 Hz, **AXIS Q6042–E** 60 Hz AXIS Q6044–E 50 Hz, **AXIS Q6044–E** 60 Hz AXIS Q6045–E Mk II 50 Hz, **AXIS Q6045–E Mk II** 60 Hz

Camera

Image sensor	**AXIS Q6042–E:** 1/4" ExView HAD Progressive scan CCD **AXIS Q6044–E:** 1/3" Progressive scan CCD **AXIS Q6045–E Mk II:** 1/2.8" Progressive scan CMOS
Lens	**AXIS Q6042–E:** f=3.3-119 mm, F1.4–4.2, Autofocus, 57.2° – 1.7° view[a] **AXIS Q6044–E:** f=4.4-132 mm, F1.4–4.6, Autofocus, 62.9° – 2.2° view[a] **AXIS Q6045–E Mk II:** f=4.44-142.6 mm, F1.6–4.41, Autofocus, 62.8° – 2.23° view[a]
Day and night	Automatically removable infrared-cut filter
Minimum illumination	**AXIS Q6042–E:** Color: 0.5 lux at 30 IRE F1.4; B/W: 0.008 lux at 30 IRE F1.4 **AXIS Q6044–E:** Color: 0.2 lux at 30 IRE F1.4; B/W: 0.04 lux at 30 IRE F1.4 **AXIS Q6045–E Mk II:** Color: 0.3 lux at 30 IRE F1.6; B/W: 0.03 lux at 30 IRE F1.6
Shutter time	**AXIS Q6042–E:** 1/30000 s to 1.5 s (50 Hz), 1/30000 s to 0.5 s (60 Hz) **AXIS Q6044–E:** 1/10000 s to 1/4 s **AXIS Q6045–E Mk II:** 1/33000 s to 1/3 s (50 Hz), 1/33000 s to 1/4 s (60 Hz)
Pan/Tilt/Zoom	E-flip, 256 preset positions, Tour recording, Guard tour, Control queue, On-screen directional indicator, Set new pan 0° Pan: 360° endless, 0.05°–450°/s; Tilt: 220°, 0.05°–450°/s **AXIS Q6042–E:** 36x optical zoom and 12x digital zoom, total 432x zoom **AXIS Q6044–E:** 30x optical zoom and 12x digital zoom, total 360x zoom **AXIS Q6045–E Mk II:** 32x optical zoom and 12x digital zoom, total 384x zoom

Video

Video compression	H.264 Main and Baseline Profiles (MPEG-4 Part 10/AVC) Motion JPEG
Resolutions	**AXIS Q6042–E:** Extended D1 736x576 to 176x144 (50 Hz), Extended D1 752x480 to 176x120 (60 Hz) **AXIS Q6044–E:** 1280x720 (HDTV 720p) to 320x180 **AXIS Q6045–E Mk II:** 1920x1080 (HDTV 1080p) to 320x180
Frame rate	**H.264:** Up to 25/30 fps (50/60 Hz) in all resolutions **Motion JPEG:** Up to 25/30 fps (50/60 Hz) in all resolutions **AXIS Q6045–E Mk II:** Up to 50/60 fps (50/60 Hz) in HDTV 720p
Video streaming	Multiple, individually configurable streams in H.264 and Motion JPEG Controllable frame rate and bandwidth VBR/CBR H.264
Image settings	Wide dynamic range (WDR), Manual shutter time, Compression, Color, Brightness, Sharpness, White balance, Exposure control, Exposure zones, Backlight compensation, Fine tuning of behavior at low light, Rotation, Text and image overlay, 32 individual 3D privacy masks, Image freeze on PTZ **AXIS Q6042–E:** Electronic image stabilization **AXIS Q6044–E:** Electronic image stabilization, Automatic defog **AXIS Q6045–E Mk II:** Highlight compensation, Automatic defog

Network

Security	Password protection, IP address filtering, HTTPS[b] encryption, IEEE 802.1X[b] network access control, Digest authentication, User access log, Centralized certificate management
Supported protocols	IPv4/v6, HTTP, HTTPS[b], SSL/TLS[b], QoS Layer 3 DiffServ, FTP, CIFS/SMB, SMTP, Bonjour, UPnP™, SNMPv1/v2c/v3 (MIB-II), DNS, DynDNS, NTP, RTSP, RTP, TCP, UDP, IGMP, RTCP, ICMP, DHCP, ARP, SOCKS, SSH, NTCIP

System integration

Application Programming Interface	Open API for software integration, including VAPIX® and AXIS Camera Application Platform; specifications at *www.axis.com* AXIS Video Hosting System (AVHS) with One-Click Camera Connection. ONVIF Profile S, specification at *www.onvif.org*
Intelligent video	Video motion detection, Autotracking, Active Gatekeeper, AXIS Camera Application Platform enabling installation of additional applications **AXIS Q6045–E Mk II:** Basic analytics (not to be compared with third-party analytics): Object removed, Enter/exit detector, Fence detector, Object counter, Highlight compensation
Event triggers	Video motion detection, Shock detection, Fan, Heater, Temperature, Manual trigger, Autotracking, Moving, PTZ preset, Edge storage events, AXIS Camera Application Platform **AXIS Q6045–E Mk II:** Enter/exit, Fence detector, Object removed
Event actions	File upload: FTP, HTTP, network share and email Notification: email, HTTP and TCP PTZ preset, Guard tour, Autotracking, Day/night mode, Video recording to edge storage, Pre- and post-alarm video buffering
Built–in installation aids	Pixel counter

General

Casing	IP66-, NEMA 4X- and IK10-rated metal casing (aluminum), polycarbonate (PC) clear dome, sunshield (PC/ASA)
Memory	512 MB RAM, 128 MB Flash
Power	High Power over Ethernet (High PoE), max. 60 W Axis High PoE 60 W Midspan 1-port: 100–240 V AC, max. 74 W
Connectors	RJ45 for 10BASE-T/100BASE-TX PoE RJ45 Push-pull Connector (IP66) included
Edge storage	SD/SDHC/SDXC slot supporting memory card up to 64 GB (card not included); support for recording to network share (network-attached storage or file server)
Operating conditions	With 30 W: -20 °C to 50 °C (-4 °F to 122 °F) With 60 W*: -50 °C to 50 °C (-58 °F to 122 °F) Humidity 10-100% RH (condensing) *Arctic Temperature Control enables camera start-up at temperatures as low as -50 ºC (-58 ºF)*
Storage conditions	-50 °C to 60 °C (-58 °F to 140 °F)
Approvals	EN 55022 Class A, EN 61000-3-2, EN 61000-3-3, EN 61000-6-1, EN 61000-6-2, EN 55024, EN 50121-4, IEC 62236-4, FCC Part 15 Subpart B Class A, ICES-003 Class A, VCCI Class A, C-tick AS/NZS CISPR 22 Class A, KCC KN22 Class A, KN24, IEC/EN/UL 60950-1, IEC/EN/UL 60950-22, IEC/EN 60529 IP66, NEMA 250 Type 4X, NEMA TS-2-2003 v 02.06, subsection 2.2.7, 2.2.8, 2.2.9; IEC 62262 IK10, IEC 60068-2-1, IEC 60068-2-2, IEC 60068-2-78, IEC 60068-2-14, IEC 60068-2-30, IEC 60068-2-6, IEC 60068-2-27, IEC 60068-2-60, ISO 4892-2 Midspan: EN 60950-1, GS, UL, cUL, CE, FCC, VCCI, CB, KCC, UL-AR
Weight	3.7 kg (8.2 lb.)
Included accessories	Axis High PoE 60 W Midspan 1-port, RJ45 Push-pull Connector (IP66), Sunshield, Installation Guide, Installation and Management Software CD, Windows decoder 1-user license
Video management software	AXIS Camera Companion (included), AXIS Camera Station and video management software from Axis' Application Development Partners (not included). For more information, see *www.axis.com/products/video/software*
Warranty	Axis 3-year warranty and AXIS Extended Warranty option, see *www.axis.com/warranty*

a. *Horizontal angle of view*
b. *This product includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit. (www.openssl.org), and cryptographic software written by Eric Young (eay@cryptsoft.com).*

More information is available at www.axis.com

DataGear®
INDUSTRIAL DATA SOLUTIONS

City Of Rancho Palos Verdes
Jesse Villalpando
309040 Hawthorne Blvd.
Rancho Palos Verdes, Ca. 90275

Ship To

City Of Rancho Palos Verdes
Jesse Villalpando
309040 Hawthorne Blvd.
Rancho Palos Verdes, CA 90275

Rep	Terms

Qty	Item #	Description	Price	Total
5	02148-001	AAXIS Q6078-E PTZ CameraThis outdoor, vandal-resistant camera is IP66, NEMA 4X, and IK10-rated to protect against dust, rain, snow, and impacts. Arctic temperature control ensures startup from a deeply frozen state and operation in temperatures ranging from -40 °C to 50 °C (-40 °F to 122 °F). Autotracking 2 with click and track functionality and an orientation aid	2,980.00	14,900.00T
5	T91B67	Pole Mount 65 - 165MM	175.00	875.00T
5	5504-821	Axis T91D61 Wall Mount Aluminum Wall Mount 1.5 Inch Pipe Compatible with Axis Fixed Domes	92.00	460.00T
10	EH-1200FX-ODU-H-EXT	Siklu EtherHaul 1200FX ODU with Adpter:Tx High;Ports:2x Copper;Power POE with 100Mbs	2,254.00	22,540.00T
20	EH-60W-AC-PoE-US	Siklu PoE Enjector 60W (100--240 AC Source, US Cable)	89.00	1,780.00T
10	EH-ANT-1ft	Siklu EtherHaul 1ft antenna (FCC/ETSI)	225.00	2,250.00T
10	FAA-Licensing	FCC Universal Licensing System (ULS): ULS Home. Fee for registering each site with FCC	269.00	2,690.00T
5	MISC	Cable Cat6e / Mounts / Unistrut / Pole	698.00	3,490.00T
40	Labor A	Wireless Network Engineer / Per Hour Charge	192.50	7,700.00
40	Labor E	Installer / Per Hour Charge	138.00	5,520.00
5	RENTAL	Equipment Rental 45 foot Bucket Truck	780.00	3,900.00T

Subtotal	
Sales Tax (10.25%)	
Total	

22 YEARS

B 54

Quote

Date	Quote #
8/9/2021	5688

City Of Rancho Palos Verdes
Jesse Villalpando
309040 Hawthorne Blvd.
Rancho Palos Verdes, Ca. 90275

Ship To

City Of Rancho Palos Verdes
Jesse Villalpando
309040 Hawthorne Blvd.
Rancho Palos Verdes, CA 90275

Rep	Terms

Qty	Item #	Description	Price	Total
		Time to Install 5 cameras and associated links 5 days (40 Hours)		

Subtotal	$66,105.00
Sales Tax (10.25%)	$5,420.71
Total	$71,525.71

22 YEARS

B 55

Introducing Pano

Recent Indecent Detections

September 2021

B 56

Pano Rapid Detect is an integrated, end-to-end solution for "early fire" response

Detection

Confirmation

Dissemination

Response

Multiple data feeds
(i.e. cameras, satellites,
911 calls, etc.)

Pano 360
web platform with
360-degree visibility and
AI smoke detection

Pano 360
Mobile Site and
SMS Alerts
with live video and
timely fire information

**Pano
enables an
informed rapid
response to
wildfires**

B 57

Todd Fire

Pano Incident Spotlight: The Todd Fire

Pano supported both PG&E and local fire authorities with real time visibility into the incident, accurate location information and timely situational updates

Viewable Pano Incident Link:
https://360.pano.ai/i/iweaomna
Active through October 11th, 2021

Smoke from the Todd Fire was first visible at 5:10pm
and detected by Pano AI at 5:15pm

1

New Pano Incident - Sweetwater Springs [Add label] ☆

P **Pano Incidents** 2 days ago
to Sonoma ⌄

Pano has detected smoke from Sweetwater Springs station.

Please view the Incident here:
https://360.pano.ai/incident/287?access_token= 451d51e9e32244bb98de89eb83e0093d

Please email support@pano...

P **Pano Incidents** 2 d
to PG&E ⌄

Pano has detected smoke fror station. It is a vegetation fire a RD, BELLVUE, CA.

2

Incident update: "Todd Incident", Sonoma County, CA [Add label] ☆

P **Pano Incidents** 2 days ago
to me, bcc: Sonoma, PG&E ⌄

Sweetwater incident (now named "Todd Incident") is ongoing, captured in Sweetwater and St. Helena Pano Stations.   According to local reports, aerial resources are now on the scene and the rate of spread has been slowed.

t here:
dent/287?access_token= e89eb83e0093d

pano.ai for assistance.

3

Incident Update: Todd Fire / Llano Rd - 100% contained, 50 acres [Add label] ☆

P **Pano Incidents** 2 days ago
to me, bcc: Sonoma, PG&E ⌄

Todd Fire / Llano Rd is now 100% contained at 50 acres, according to Santa Rosa Fire Department. http://nixle.us/alert/8896024/

Please view the Incident here: https://360.pano.ai/ incident/287?access_token= 451d51e9e32244bb98de89eb83e0093d

Please email support@pano.ai for assistance.

B 59

Pano Incident Spotlight: The Todd Fire Triangulation

Leveraging a network of connected devices to disseminate accurate information during the first minutes of an incident is critical to mitigating the total impact

LIVE SKY7

Pano 360
Triangulation

GOES Satellite

911 Call Location

Viewable Pano Incident Link:
https://360.pano.ai/i/weaomna
Active through October 11th, 2021

- This incident was caught by multiple Pano Stations allowing accurate and timely triangulation of its location

- The Todd fire was caught:
  - 12 miles away from the Sweetwater Springs Station
  - 21 miles away from the St. Helena Station

- Even at these distances, Pano's triangulation was <u>within 0.13 mile of the incident</u> and within .58 miles of the 911 call

B 60

Round Fire

B 61

Pano Incident Spotlight: The Round Fire

Just over Labor Day, Pano AI detected, provided real time visibility, accurate location information and timely situational updates for the Round Fire

Viewable Pano Incident Link:
https://360.pano.ai/i/zu7chqq
Active through October 11th, 2021

The Round Fire, a RV fire that eventually spread to vegetation, was called in at 1:15pm and detected by Pano AI at **1:14pm**

(1) New Pano Incident - Clearlake Oaks ▸ Inbox

P **Pano Incidents** Yesterday
to Pano, bcc: pge_notifica... ⌄

Pano has detected smoke from Clearlake Oaks station.

Please view the Incident here:
https://360.pano.ai/i/mwhvv3y

Please email support@pano.ai for assistance.

(2) Incident Update - Round Fire - Clearlake Oaks, Lake, CA ▸ Inbox

P **Pano Incidents** Yesterday
to Pano, PG&E ⌄

The recently alerted incident was for a vehicle fire at Round Mtn Rd and Red Rock Rd. It is currently at 3 acres with a moderate rate of spread, moving Northwest.

Pano will continue to monitor the incident and close it when the fire is fully contained.

...t here:

(3) Incident Update - Closed - Round Fire - Clearlake Oaks, Lake, CA ▸ Inbox

P **Pano Incidents** Yesterday
to Pano, PG&E ⌄

Final incident acreage is 10.7 acres. Resources committed to mop up through tomorrow.

Please view the Incident here: https://360.pano.ai/i/mwhvv3y

Please email support@pano.ai for assistance.

B 62

Pano Incident Spotlight : The Round Fire Incident Timeline

Below is a sampling of metrics Pano is tracking for each incidents captured during our 2021 pilots:

First wisps of smoke are visible from Pano's Clearlake Oaks Station

Second, confirmation AI smoke detection occurs

IRWIN Alert Issued

ALERT Wildfire camera repositioned to view smoke

1:10pm   1:11pm   1:12pm   1:14pm   1:15pm   1:16pm   1:18pm   1:19pm   1:20pm

First Pano AI smoke detection occurs

Pano AI smoke alert is triggered at the Pano Intelligence Center

Smoke detected by second Pano Station, Prather
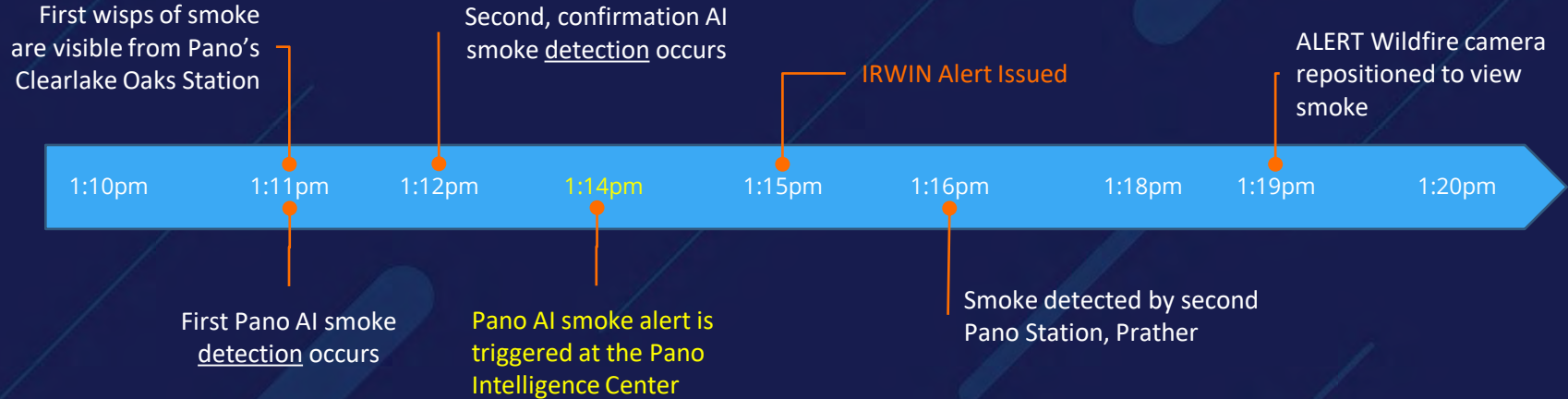
Viewable Pano Incident Link:
https://360.pano.ai/i/zu7chqq
Active through October 11th, 2021

B 63

Illegal Burning

B 64

Pano Incident Spotlight: Illegal Burning

Pano AI recently identified smoke from illegal cooking fires in Huddard Park – the timely notification and actionable intelligence provided to the fire department allowed for significantly improved response time and enabled the incident to be addressed before it became uncontrollable

Redwood City Tank

220°   225°   230°   235°

Viewable Pano Incident Link:
https://360.pano.ai/i/hsfrjly
Active through September 27th, 2021

"

On the first day after installation the camera detected a fire in Redwood City over 10 miles away. The **detection was captured 40 seconds before the first fire engine was dispatched.**

The second detection was also a significant distance away and within a Cal Fire designated very high fire severity zone, in a very densely vegetated area in the remote hills of Woodside known as Huddard Park. **The PANO smoke detection happened at 4:36 pm and fire engines were dispatched at 4:36 pm.**

Before the pilot PANO camera installation at the Redwood City location, firefighters scrambled to the highest points of the district to better locate smoke in the expansive remote southeastern slopes of the Santa Cruz mountain range and vast watershed. **This old fashioned method of wildfire location is extremely time consuming and takes personnel away from the actual initial fire attack and is only based on visual mountainous landmarks and has no precise measurement or lat/long for locating the fire.**

- Denise Enea; Executive Director - FIRE SAFE San Mateo

"

B 65

For more information, contact:

Stephen Murdock
Director, Utility Business Development
Tel. +1 (315) 272 7685
Pano AI
smurdock@pano.ai

B 66

Introducing Pano

Recent Indecent Detections

September 2021

PANO

B 67

Pano Rapid Detect is an integrated, end-to-end solution for "early fire" response

Detection → **Confirmation** → **Dissemination** → **Response**

Multiple data feeds
(i.e. cameras, satellites,
911 calls, etc.)

Pano 360
web platform with
360-degree visibility and
AI smoke detection

Pano 360
Mobile Site and
SMS Alerts
with live video and
timely fire information

**Pano
enables an
informed rapid
response to
wildfires**

B 68

Todd Fire

PANO

B 69

Pano Incident Spotlight: The Todd Fire

Pano supported both PG&E and local fire authorities with real time visibility into the incident, accurate location information and timely situational updates

Viewable Pano Incident Link:
https://360.pano.ai/i/iweaomna
Active through October 11th, 2021

Smoke from the Todd Fire was first visible at 5:10pm
and detected by Pano AI at 5:15pm

1 New Pano Incident - Sweetwater Springs [Add label]

P Pano Incidents 2 days ago
to Sonoma

Pano has detected smoke from Sweetwater Springs station.

Please view the Incident here:
https://360.pano.ai/incident/287?access_token=451d51e9e32244bb98de89eb83e0093d

Please email support@pano...

P Pano Incidents 2 d
to PG&E

Pano has detected smoke fro
station. It is a vegetation fire a
RD, BELLVUE, CA.

2 Incident update: "Todd Incident", Sonoma County, CA [Add label]

P Pano Incidents 2 days ago
to me, bcc: Sonoma, PG&E

Sweetwater incident (now named "Todd Incident") is ongoing, captured in Sweetwater and St. Helena Pano Stations. According to local reports, aerial resources are now on the scene and the rate of spread has been slowed.

t here:
dent/287?access_token=
e89eb83e0093d

pano.ai for assistance.

3 Incident Update: Todd Fire / Llano Rd - 100% contained, 50 acres [Add label]

P Pano Incidents 2 days ago
to me, bcc: Sonoma, PG&E

Todd Fire / Llano Rd is now 100% contained at 50 acres, according to Santa Rosa Fire Department.
http://nixle.us/alert/8896024/

Please view the Incident here: https://360.pano.ai/incident/287?access_token=451d51e9e32244bb98de89eb83e0093d

Please email support@pano.ai for assistance.

B 70

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LIVE SKY7

GOES Satellite

Pano 360 Triangulation

911 Call Location

Viewable Pano Incident Link:
https://360.pano.ai/i/weaomna
Active through October 11th, 2021

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  - 21 miles away from the St. Helena Station

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B 71

Round Fire

B 72

PANO

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Just over Labor Day, Pano AI detected, provided real time visibility, accurate location information and timely situational updates for the Round Fire

Viewable Pano Incident Link:
https://360.pano.ai/i/zu7chqq
Active through October 11th, 2021

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P Pano Incidents Yesterday
to Pano, bcc: pge_notifica... ⌄

Pano has detected smoke from Clearlake Oaks station.

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https://360.pano.ai/i/mwhvv3y

Please email support@pano.ai for assistance.

2 Incident Update - Round Fire - Clearlake Oaks, Lake, CA ⟩ ☆
Inbox

P Pano Incidents Yesterday
to Pano, PG&E ⌄

The recently alerted incident was for a vehicle fire at Round Mtn Rd and Red Rock Rd. It is currently at 3 acres with a moderate rate of spread, moving Northwest.

Pano will continue to monitor the incident and close it when the fire is fully contained.

...t here:

3 Incident Update - Closed - Round Fire - Clearlake Oaks, Lake, CA ⟩ Inbox ☆

P Pano Incidents Yesterday
to Pano, PG&E ⌄

Final incident acreage is 10.7 acres. Resources committed to mop up through tomorrow.

Please view the Incident here: https://360.pano.ai/i/mwhvv3y

Please email support@pano.ai for assistance.

B 73

Pano Incident Spotlight : The Round Fire Incident Timeline

Below is a sampling of metrics Pano is tracking for each incidents captured during our 2021 pilots:

First wisps of smoke are visible from Pano's Clearlake Oaks Station

Second, confirmation AI smoke detection occurs

IRWIN Alert Issued

ALERT Wildfire camera repositioned to view smoke

| 1:10pm | 1:11pm | 1:12pm | 1:14pm | 1:15pm | 1:16pm | 1:18pm | 1:19pm | 1:20pm |

First Pano AI smoke detection occurs

Pano AI smoke alert is triggered at the Pano Intelligence Center

Smoke detected by second Pano Station, Prather
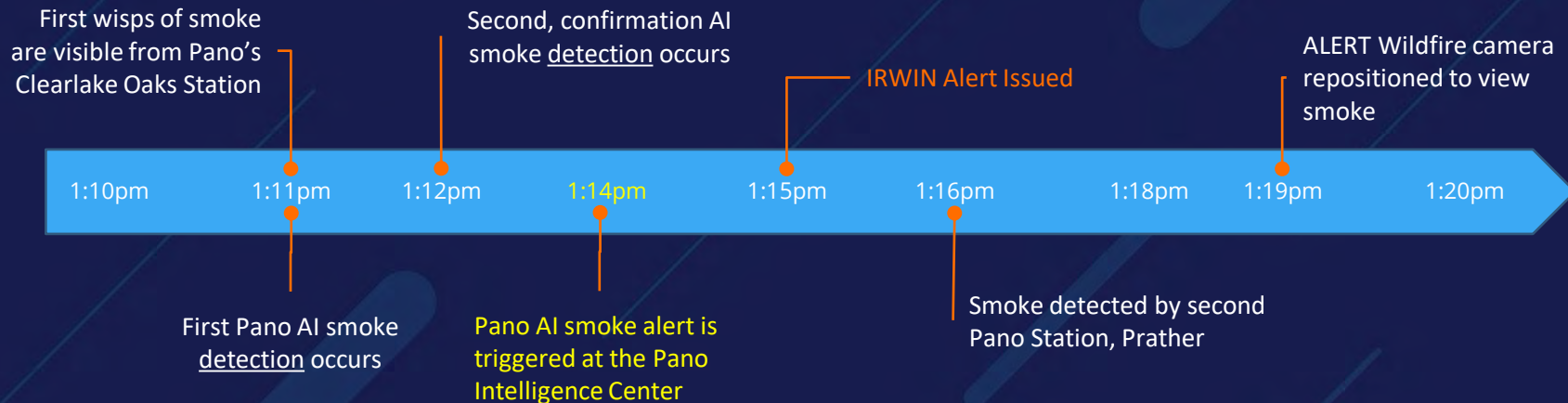
Viewable Pano Incident Link:
https://360.pano.ai/i/zu7chqq
Active through October 11th, 2021

B 74

Illegal Burning

Pano Incident Spotlight: Illegal Burning

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Redwood City Tank

220°   225°   230°   235°

Viewable Pano Incident Link:
https://360.pano.ai/i/hsfrjly
Active through September 27th, 2021

"

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The second detection was also a significant distance away and within a Cal Fire designated very high fire severity zone, in a very densely vegetated area in the remote hills of Woodside known as Huddard Park. **The PANO smoke detection happened at 4:36 pm and fire engines were dispatched at 4:36 pm.**

Before the pilot PANO camera installation at the Redwood City location, firefighters scrambled to the highest points of the district to better locate smoke in the expansive remote southeastern slopes of the Santa Cruz mountain range and vast watershed. **This old fashioned method of wildfire location is extremely time consuming and takes personnel away from the actual initial fire attack and is only based on visual mountainous landmarks and has no precise measurement or lat/long for locating the fire.**

"

- Denise Enea; Executive Director - FIRE SAFE San Mateo

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For more information, contact:

Stephen Murdock
Director, Utility Business Development
Tel. +1 (315) 272 7685
Pano AI
smurdock@pano.ai

B 77

Pano AI, Inc.

Proposal for The City of Rancho Palos Verdes

CONFIDENTIAL

October 27, 2021

October 27th, 2021

Jesse Villalpando
Senior Administrative Analyst, Emergency Preparedness
City of Rancho Palos Verdes
30940 Hawthorne Blvd.
Rancho Palos Verdes, CA 90275

Thank you for the opportunity to provide a proposal for early wildfire detection services to the City of Rancho Palos Verdes. As a California-based company, we have personally experienced the devastating impacts of wildfires. Pano's mission is to build world-class technology solutions for first responders and emergency managers, empowering them to protect their communities, while also making fire fighting safer and more efficient. At Pano, we believe that the hardware, software, and AI technologies that we take for granted in our smart-home devices and self-driving cars can and should be applied to build better tools for wildfire mitigation.

Pano understands that the City of Rancho Palos Verdes is interested in a 24/7 wildfire detection and notification system to improve fire protection for residents, businesses, and the environment. These requirements align with Pano's commercial solution, 'Pano Rapid Detect'. Our solution has been successfully deployed in parts of Napa, Sonoma, Santa Cruz, and Malibu, as well as in Colorado, Montana, and Oregon and is currently providing actionable intelligence for 24/7 early wildfire detection, confirmation and response in these communities.

Pano believes that the City of Rancho Palos Verdes would benefit from a solution that provides early detection and actionable intelligence from the first wisps of smoke to the location of fires. The shift to actionable intelligence will enable the City to be proactive (e.g. 24/7 monitoring with 360-degree view of the surrounding area) rather than reactive (e.g. re-positioning cameras only after a wildfire has been reported).

The Pano Rapid Detect solution includes ultra high-definition mountaintop cameras (Pano Stations), intuitive software (Pano 360), artificial intelligence (PanoAI), ingestion of 3rd party data feeds such as GOES satellites feeds (Pano Connect), and a fully-staffed 24/7 monitoring center (Pano Intelligence Center).

Our solution surpasses the ALERTWildfire Axis camera system in a number of ways, such as our ability to capture and display a full 360-degree panoramic camera image every minute, which allows multiple users to simultaneously utilize our "digital pan, tilt, zoom" and timelapse features. Additionally, our system ensures that the early moments of a fire are always captured, enabling continuous analysis via our AI detection engine. Our Pano 360 software platform also enables near-instant triangulation of a new incident's GPS coordinates with just a couple clicks of a mouse, easy-to-use incident-sharing/notification tools, and sophisticated map search tools.
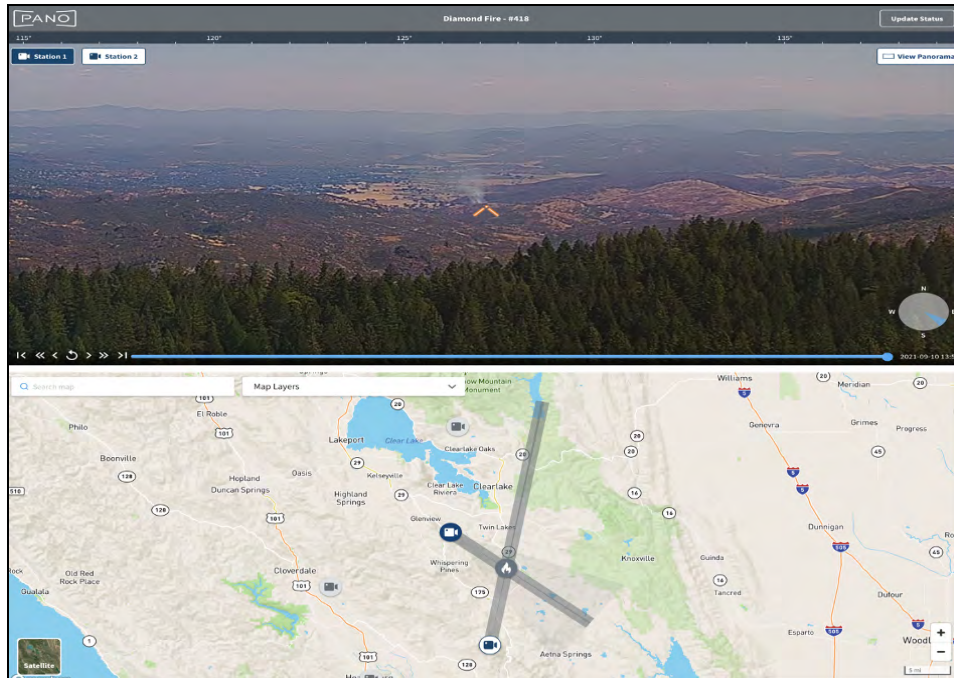
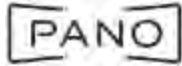*Example Pano 360 incident, Diamond Fire, Lake County, September 10, 2021*

Our proposal will provide the City of Rancho Palos Verdes with state-of-the-are Pano Stations, 24/7 detection capability, coverage of all high fire risk areas as well as significant coverage throughout the remainder of the City.

By expressing interest for a proposal, it is evident that the City of Rancho Palos Verdes is recognizing the role that new technology can play in managing the growing wildfire threat to local communities. We applaud the City in joining with legislators, regulators, academics and foundations in proactively seeking solutions to mitigate wildfire damage. We are honored to have Pano Rapid Detect considered as one of those critical tools, and look forward to further engagement.

Sincerely,

Arvind Satyan
Chief Commercial Officer, Pano AI, Inc.
arvind@pano.ai

Table of Contents

About Pano

Pano, a Bay Area-based, woman-owned business, deploys hardware, software, and artificial intelligence to provide actionable intelligence for early wildfire detection, confirmation and dissemination. Our headquarters, which is also our manufacturing and warehouse facility, is located in San Francisco's Mission District.

Pano has a track record of success delivering our Pano Rapid Detect Solution, enabled by our team of US-based business leaders, product designers, technologists and operations experts. We are able to offer a full-stack solution to our customers, due to our in-house capabilities across a range of functions: hardware design, software, data engineering, AI, Intelligence Center, manufacturing, and installation project management. Pano's team collectively brings hundreds of years of experience designing sophisticated enterprise and consumer technology products and scaling complex supply chains, with previous employers including Google Nest, Cisco's Internet of Things business, Tesla's self-driving AI team, the Apple iPhone and Mac teams, Bose, Bic, Jabil. We come from organizations of all sizes—from start-ups to global enterprises, from regional organizations to government agencies. We have managed global organizations of more than 100 people and have had direct responsibility for delivering billions of dollars in annual revenue. We bring this knowledge to bear on the challenge of consistently designing and delivering cutting edge, high quality products on time to our customers.

Pano's Approach to Early Wildfire Detection

Pano Rapid Detect helps cities, counties, utilities, and emergency responders *detect, confirm and disseminate* actionable intelligence about fire starts 24/7 to shorten response times.

Incident Detection

When detecting wildfires, every minute matters, and thus the more sources of detection the better.

To start, Pano Rapid Detect applies our proprietary smoke detection AI algorithm on camera imagery from the Pano Stations. The cameras in the Pano Station rotate 360 degrees every minute and capture images at 8-10 different positions per station. Our AI algorithm checks for smoke in each position each minute, which allows for 1 minute temporal resolution throughout the City of Rancho Palos Verdes', based on our proposed deployment.

We also supplement our automated smoke detection AI by ingesting 3rd party detection feeds, such as a thermal detection algorithm running on the GOES-16 and GOES-17 satellite data.

Each AI detection as well as each alert by a 3rd party feed is cross-referenced with our camera time-lapses by human analysts in our Pano Intelligence Center in order to screen out false positives before surfacing that alert to our customers, enabling >90% accuracy in Pano alerts.

In addition, we recognize that our customers', such as cities and counties, also receive 911 calls to their dispatch centers from bystanders who report new ignitions. These 911 calls have been and will continue to be an essential and rapid source of detection under the Pano Rapid Detect solution, but with powerful new tools provided to dispatch centers for confirming, pinpointing, and disseminating such detection.

Pano Stations

Pano Stations, the hardware component of the Pano Rapid Detect platform, are comprised of two ultra high-definition 6MP cameras that are deployed at high vantage points such as mountaintop government-owned towers, cell phone towers, private land, empty hilltops, and more. Vantage points are chosen for their ability to provide visibility for 15+ miles and have significant advantages over existing hardware technologies.

Pano Stations exceed existing hardware camera technologies in several ways:
- Pano Stations provide full 360° imagery in a panoramic view unlike existing camera installations, which may not rotate and will include obstruction from mounting hardware.
- Each camera has a resolution of 6MP, unlike existing cameras that are typically 2MP.
- Each camera is capable of 30x optical zoom.
- Each camera is equipped with self-cleaning wipers to avoid the need for manual cleaning.

Pano Stations come in many configurations, in order to address the needs of the specific site. Pano Stations are equipped to run on 110V AC power in areas where power is available and on solar power where there is no power connectivity. If a site does not contain a back-up power source, the Pano Station will include a 24 hour battery-based uninterruptible power supply, ensuring that Pano Stations remain active in the event of an electrical outage or PSPS event. Additionally, Pano Stations can be configured for different modes of data backhaul, such as leveraging existing microwave or fiber communications at a tower site or cellular communication via all major carriers, with built in 2-sim redundancy.

Example Pano Station Solar Deployment - Loch Lomond, CA

Pano AI: Artificial Intelligence Smoke Detection

Pano Rapid Detect features Pano AI, which is an artificial intelligence smoke-detection algorithm, which runs on all incoming images from the Pano Stations in real-time. The resulting smoke alerts are verified by the Pano Intelligence Center before dissemination to Cities and Fire Authorities. During the 2021 fire season, the AI model ran live detection inference on over twenty Pano Stations in four states.

In this example of the Todd Fire, the incident began on a clear day and had a high rate of spread. Pano AI predicted smoke in multiple stations in the early minutes of the fire.

Todd Fire from Sweetwater Springs Station   *Todd Fire from Cloverdale Station*

Pano AI quickly detected the Diamond Fire in Lake County on September 10th, 2021.
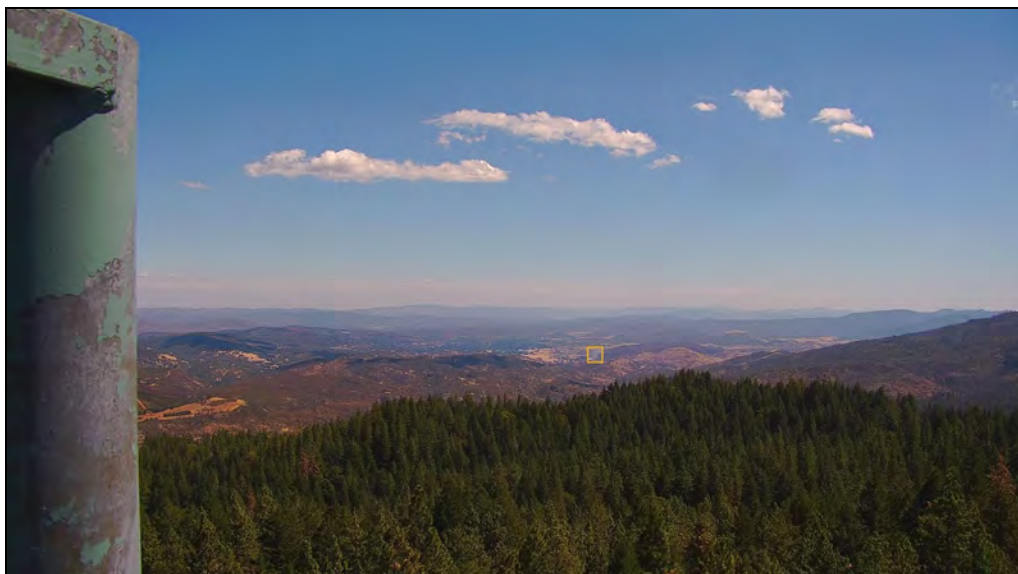
Diamond Fire from Prather Station

Pano Intelligence Center False Positive Screening

There is an important additional step that is taken after Pano AI makes a smoke detection, before a Smoke Investigation incident is registered in Pano 360 and disseminated to Fire Authorities - the Pano Intelligence Center reviews the detections and eliminates clear false positives. When a smoke detection is registered, it is reviewed, and if the PIC Representatives observe smoke, an incident is registered in Pano 360, ready for confirmation by Fire Authorities.

Below is an example of the alert that the PIC Representatives received for the Todd Fire.

Todd Fire detection from Cloverdale Station

This review step by the PIC Representatives is important, as the smoke detection model also makes false positive predictions, which include dust clouds, geyser steam, industrial smoke, prescribed burns, etc. Based on expert interviews by Pano, we understand that past efforts to implement automated wildfire smoke detection in California have been plagued with a high rate of false positives, and thus our solution was designed from day one to include a "human in the loop".

Other Fire Detection Sources (Pano Connect)

While Pano Rapid Detect utilizes Pano AI to facilitate the monitoring of many cameras for new smoke detections, Pano Rapid Detect also ingests data from sources like GOES satellites, and California Highway Patrol (CHP), in order to provide a single, integrated platform for wildfire detection.

Confirmation & Incident Intelligence

Rapid confirmation of potential fires matters just as much as initial detection to reduce costs associated with manual intelligence gathering, rule out false positive alerts, and ensure resources are properly marshaled. Once a potential wildfire has been detected by any source (Pano AI, satellite detection, 911 caller, etc.), Pano's intuitive software platform, Pano 360, allows users, such as city officials and emergency responders, to investigate smoke incidents and review the threat.

360° Panoramas

Images from Pano Stations are uploaded to the cloud where they are continuously stitched together into a 360-degree panorama, providing detailed, unobstructed 360° panoramic visibility across the entire viewshed of Pano Stations and ensuring that no fire start is missed in areas where these cameras are deployed. This is especially useful during red flag days, when multiple fires or spot fires are more likely to occur within view of the same station.
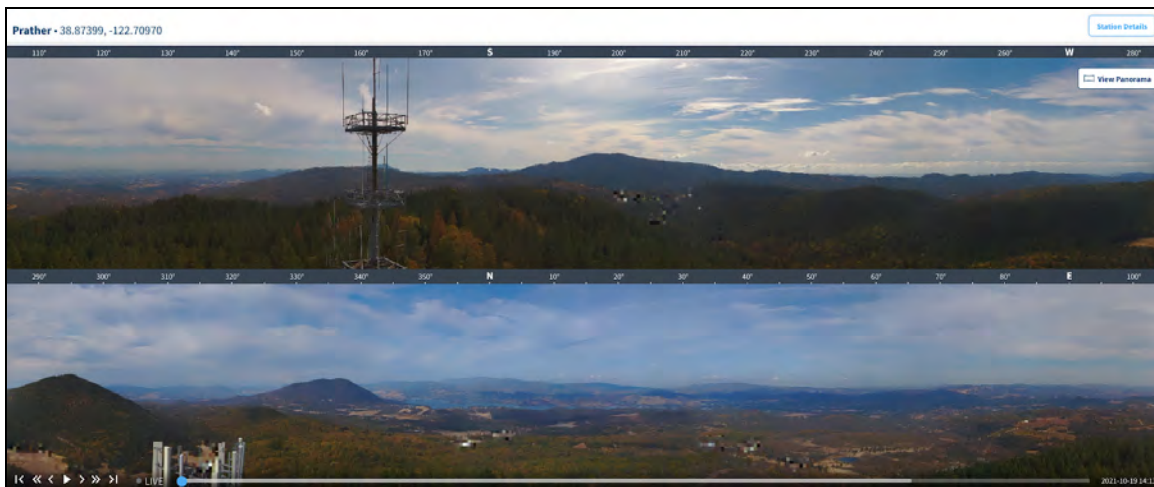
360° imagery is captured for each Pano Station every minute
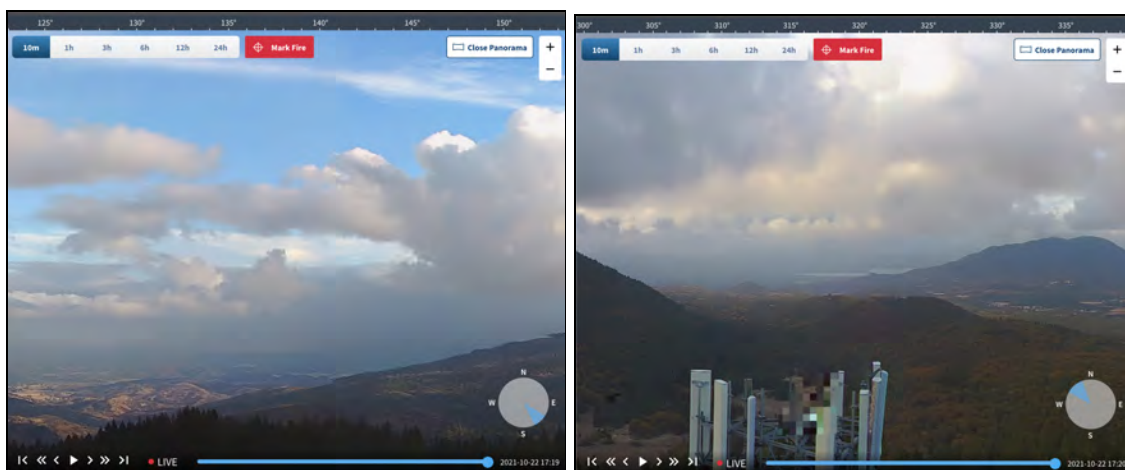
With Pano's full screen 360° viewers, users can look in different directions in the camera's viewshed at the same time.

Mobile-Optimized / Low-Data Optimized, Incident View

In talking with Fire Chiefs and emergency personnel, Pano learned that the people who must confirm a fire, and respond to it quickly, are often not near a computer. To support remote emergency response services, Pano has made it easy to view a new incident and confirm a fire, even from a mobile phone and even with limited cellular bandwidth. The entire Pano application is optimized for mobile, including the viewing of the panoramas in timelapse form. Bandwidth considerations are taken into account, to decrease the amount of data required to view the Pano 360 interface via mobile.
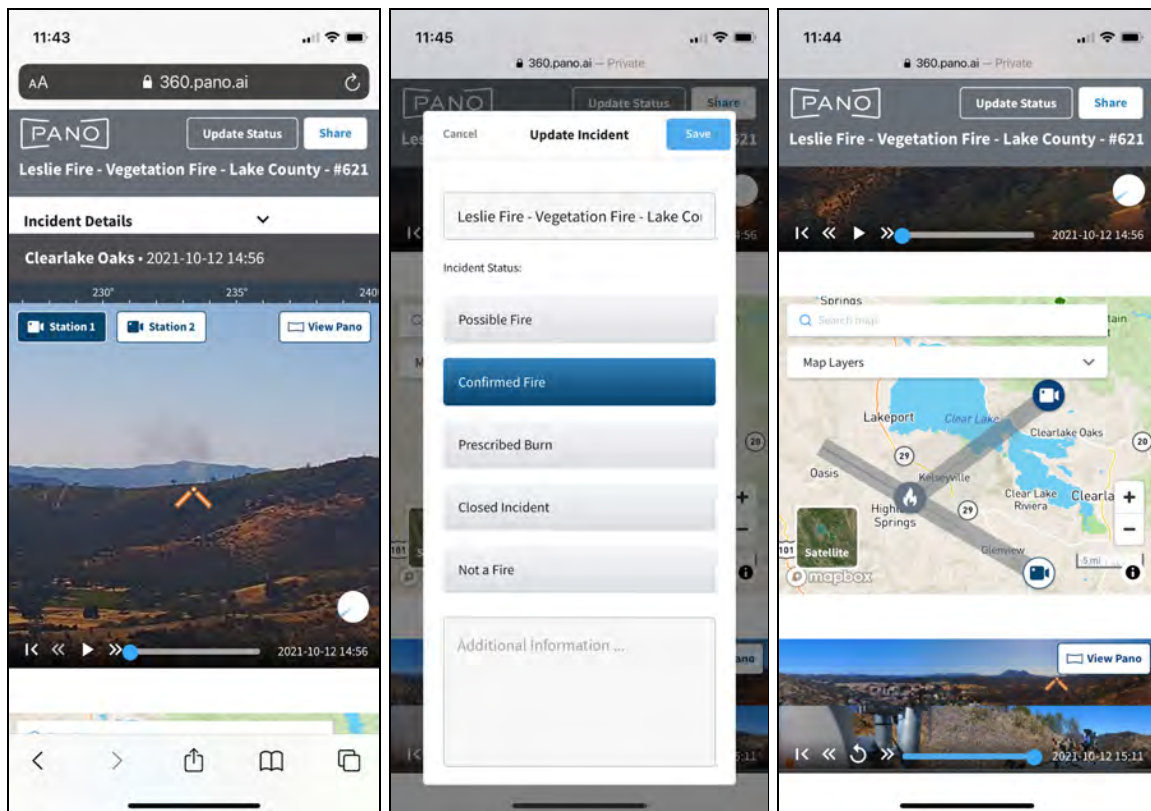
Incidents can be viewed and confirmed on mobile

Map Search for Faster Confirmation of 911-Reported Fires

Pano has developed map features that make it easy to associate cameras with the addresses of known fires. Using a map search, users can enter in an address or latitude/longitude coordinates in order to verify a scene from a Pano Station.
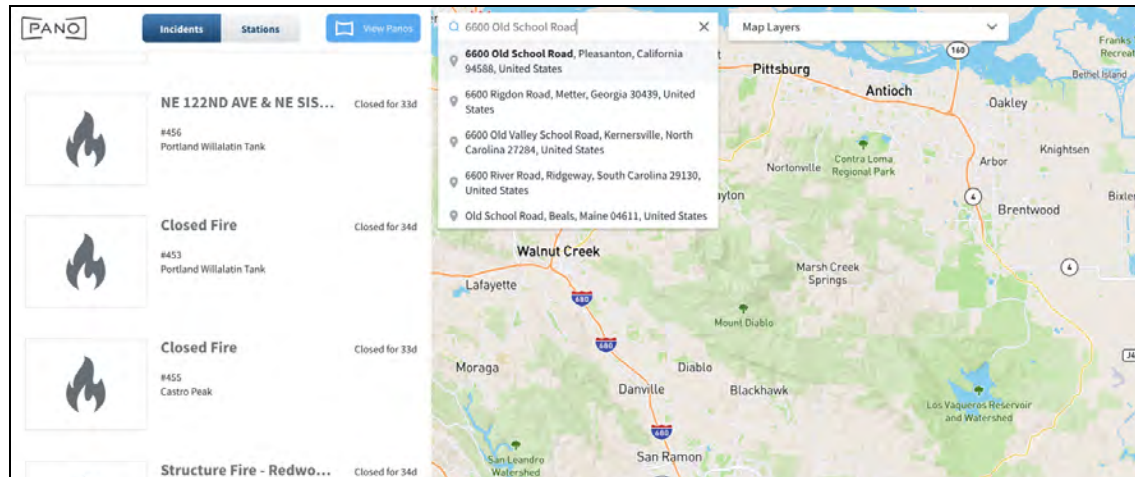
*Addresses and Latitude/Longitude coordinates can be searched on the Pano 360 maps*
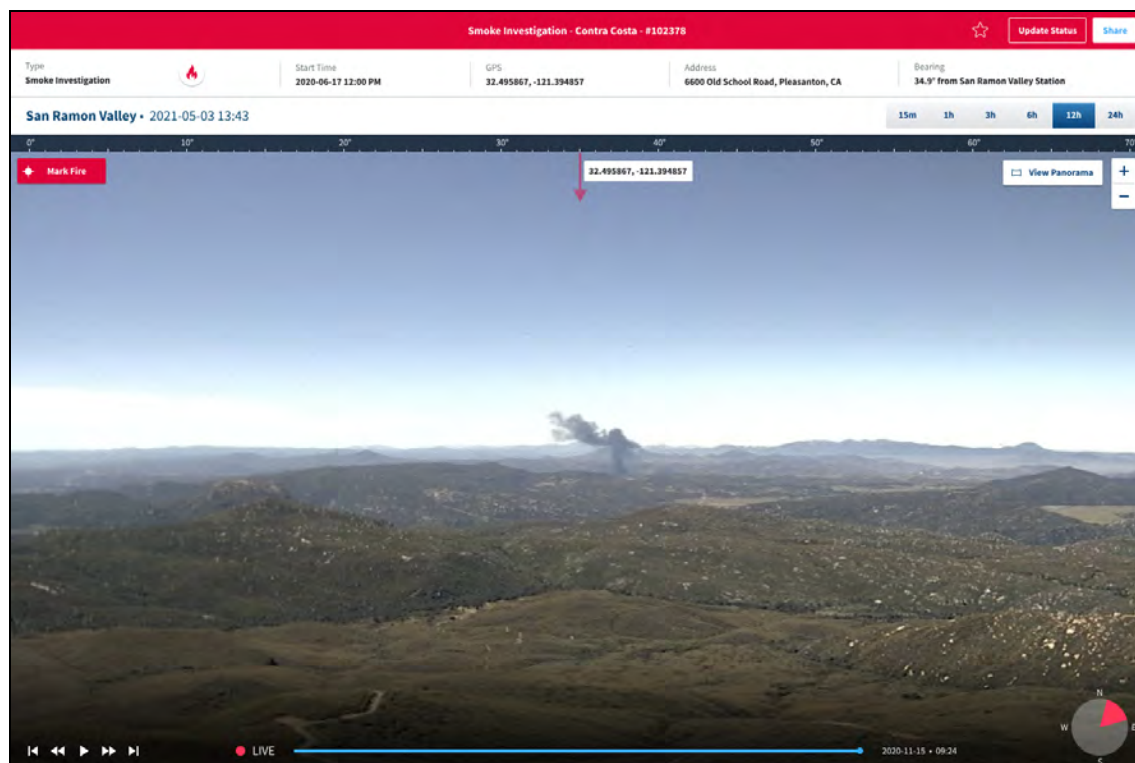
When there is a Smoke Investigation created, an incident with a known location can be immediately investigated.

Similar to confirming incidents, Fire Authorities are also able to dismiss false alarms that are clouds, fog, geysers, and dust. For anomalies like geysers, Pano will provide geyser locations on a map, allowing for a quick association between a Smoke Investigation and a known false alarm location.

Incident Triangulation

One of the key features of the Pano 360 application is the ability to triangulate the location of an incident. When an incident is initially marked from a first Pano Station, the bearing from the Pano Station is calculated, and the incident direction is plotted on the Incident Details Map.

When the Pano Station density allows for two or more stations to view an incident, it is possible to mark a second station to an incident and to get a GPS coordinate for the location of the incident.
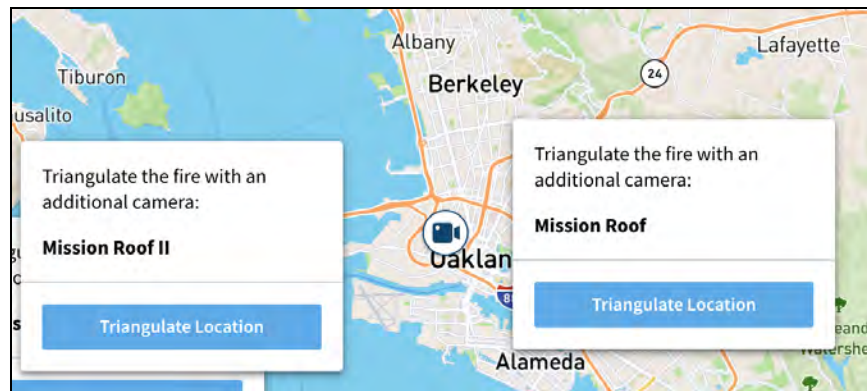
Pano Stations that are available to triangulate an incident in the Pano 360 platform

In the following example, after the first Pano Station was marked on an incident, a second station was found in view of the same plume of smoke. While the Pano Intelligence Center will send out an Incident Notification as soon as the first Pano Station is marked, the incident can still be updated with a second Pano Station, and an incident location can be calculated.
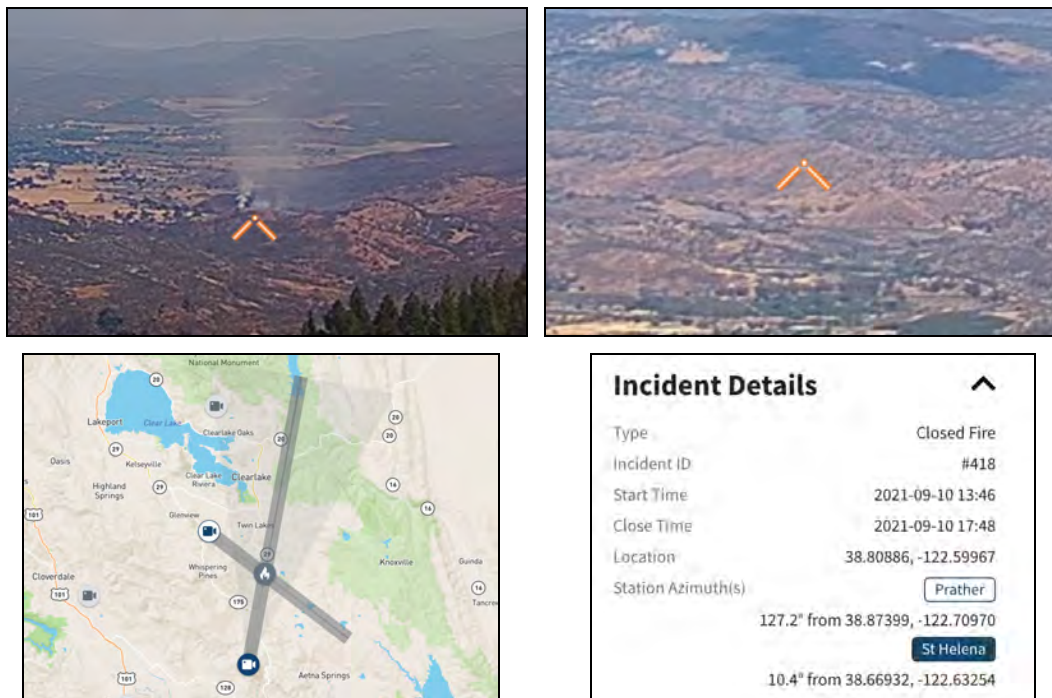
*When two Pano Stations are marked on an incident, the GPS location can be calculated*

In the case of the Todd Fire, detections from Pano AI, 911, and GOES satellites were registered for the same fire. An image from a news agency highlights the proximity of all three detection sources to the actual incident location.

The Todd Fire had detections from Pano AI, a 911 call, and the GOES Satellites

Historical Fire View

One of the many benefits of the Pano 360 Incident Timelapse is that Fire Authorities can use the time lapse to review all phases of a fire. Pano Incidents are searchable and viewable within Pano 360, even after an incident is over.
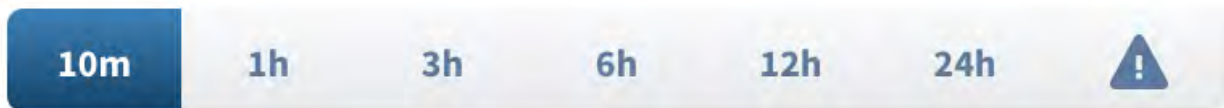
There are multiple time lapse options for Pano 360 live incidents, including an option that spans the entire duration of the incident, no matter how many hours or days it lasts


Closed incidents also have multiple timelapse viewing options, including an option that displays the incident location starting three hours before the incident start time and extending through the end of the incident.

Incident Dissemination

The last step in the Pano system is the dissemination of incidents. Once users confirm a fire through the Pano Rapid Detection solution and an incident is created in Pano 360, notifications via text and email are sent to a pre-identified set of recipients, such as fire authorities and other emergency responders. The incident is shared via a public link, which directs the user to the Incident Details View for that incident.
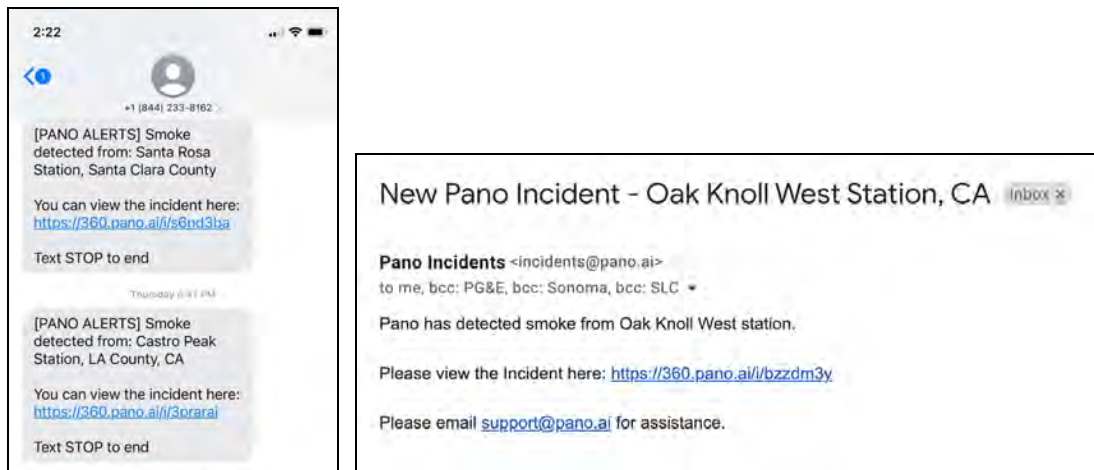
*Screenshots of the Pano Intelligence Center's Smoke Investigation alerts shared via text and email*

The automatic notification triggered by the Pano Rapid Detect platform includes a web link directing the recipient to the incident page on Pano 360, which includes a time lapse of the incident and, where available, the triangulated incident location. These incident notifications, optimized for fast mobile loading, provide critical information at users' fingertips and can be easily shared with other parties, without the recipient needing to have a login to the Pano platform.
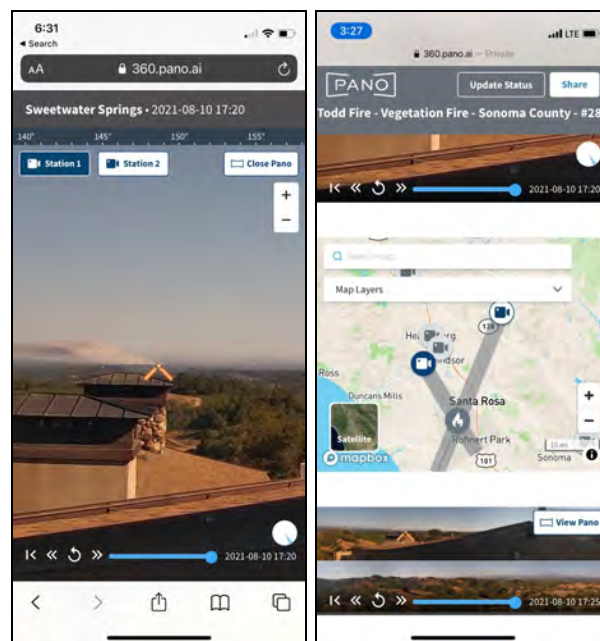
Incident Details are easily viewed via mobile, including the full screen panoramic incident player

Proposed Project Timeline & Tasks

Pano is fully capable of meeting any timelines desired by the City of Rancho Palos Verdes. Below we have provided a sample timeline for one Pano Station installation. A typical project timeline for Pano technology is deployment within 4-16 weeks, and includes the following key tasks:
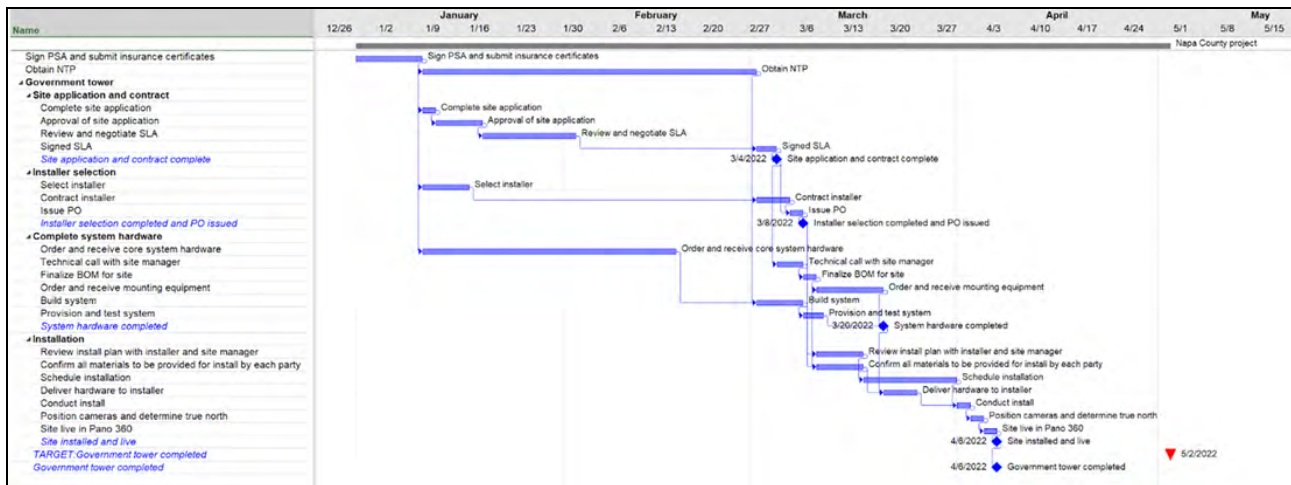
Sample timeline for installation of one Pano Station

Site Identification

Site identification occurs on average within two weeks. The Pano team collaborates with local officials to identify key areas that have the optimal combination of altitude, visibility, and the ability to support an installation. When considering the ability to support an installation, we look at the structure for the equipment, backhaul for the data transmission, and whether a power source is available or not.

Site Analysis and Selection

Once the shortlist of sites has been determined, Pano will use drones to audit the proposed locations. Pano will also conduct mounting assessments for the tower, connectivity and power checks to ensure the cameras will be able to provide 24/7 access, and permitting and access analysis prior to tower construction. This process will take on average three weeks to complete.

Installation and Commissioning

Concurrent with the site analysis and selection, the Pano team will procure and assemble any necessary custom items. Once the site has been verified, the equipment installation will commence. This process includes leveling, internet connectivity, and other processes. After installation has been completed, the entire system will undergo testing and configurations. In all, this process will take three weeks on average.

User Onboarding

Pano will work with the client to identify users that will access the Pano system. These users will create website logins and undergo user training to properly use the Pano tools.

Ongoing Support

After implementation, ongoing support will be provided to the City in a variety of ways including:

- *Dedicated Account Executive*: Each customer will be assigned a dedicated Account Executive that acts as a "one stop shop" for City of Rancho Palos Verdes users by providing daily customer service by fielding customer inquiries for all Pano solutions.
- *Helpdesk Services:* Pano provides help desk service via both phone and email to assist with any user questions throughout the length of our relationship.
- *On-going Product Training:* Pano provides all necessary training during each initial implementation and on an as-requested basis afterward. Pano training is conducted in a workshop format where users are hands-on with the application – first using Pano-provided scenarios and then quickly managing the application on their own.
- *Engagement with Pano Product Management:* Pano is committed to bringing to market enhancements to our solutions that will enable the City of Rancho Palos Verdes to further improve their situational awareness capabilities. Pano utilizes a customer-driven development methodology to quickly build those new features that our users value most. Each of our customers is given the opportunity to play an active role in our product roadmap.

Privacy & Security

Pano, as a technology company, understands that data privacy and security is paramount to any solution. We expand on several key privacy policies below:

Privacy for Pano 360 Users:
- Pano has a published Privacy Policy (https://360.pano.ai/privacy), which outlines what personal data is collected by Pano and how that data is used.
- Pano limits access to our internal data stores to only technical employees that need to access the data stores to perform their jobs.

Privacy for Camera Operations:
- Pano conducts an internal review of the viewshed for every camera that is deployed. The areas that are identified where citizens would have a reasonable expectation of privacy are pixelated. The pixelation is done by the camera, so all images that are saved in Pano's system are pixelated.
- After Pano's internal review, Pano customers are consulted about cameras in their jurisdictions to confirm that pixelation is correctly applied. If a customer identifies an area where additional pixelation is required, it is applied.

Pano additionally implements the following security procedures and industry best practices:
- Data is stored on Google Cloud Platform, which is ISO/IEC 27001 compliant.
- Best practices for web development are used (OWASP), and HTTPS is used for all URLs.
- Best practices for data transfer are used including leveraging certificates, encryption ciphers, and TLS protocols.
- Edge computers connected to cameras are secured with public key authentication and cryptographically-signed firmware images.

Proposed Commercials & Coverage

Our proposal will provide the City of Rancho Palos Verdes with state-of-the-are Pano Stations, 24/7 detection capability, coverage of all high fire risk areas as well as significant coverage throughout the remainder of the City. Our proposal includes an all-inclusive Pano deployment, fully managed by Pano, where Pano would install four of its state-of-the-art Pano Stations (two autonomous solar Stations and two powered Stations) covering 89.5% of the land area of Rancho Palos Verdes, including 99.7% coverage of high fire risk areas. This option would provide the highest levels of Pano 360 and Pano AI functionality.

The map on the below contains the optimal, preliminary site locations we've identified based on the information provided by the City of Rancho Palos Verdes. If the City decides to move forward with Pano's proposal, our Site Selection team will begin a rigorous qualification process to confirm the ability to install Pano Stations at these locations. In the event that one or more locations are unavailable, Pano has identified suitable alternative locations that will provide similar levels of coverage.

Full Pano Station Deployment

A full deployment of Pano Stations across the City of Rancho Palos, will leverage a network of **four Pano Stations** (two autonomous solar Stations and two powered Stations) deployed on comms towers or other high vantage points. This will cover 89.5% of land area with one or more Pano Station, and 99.7% of high fire risk areas of the City even when accounting for topography.
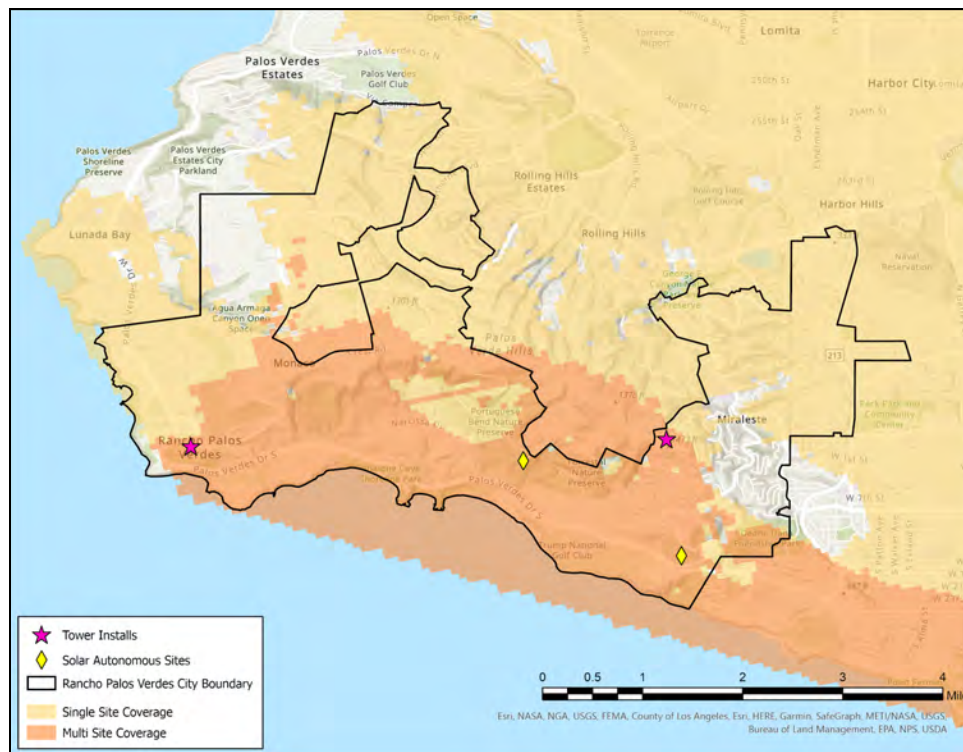
Coverage Map: Full Pano Station Deployment

The expenditure required by the City of Rancho Palos Verdes will be **$138,000 USD per year** for a minimum three year agreement. <u>Pano's proposal is a true 'all-in' cost</u> - there are no upfront capital (one-time) payments and Pano will handle all aspects of permitting, installation, monitoring, operations, and repairs. For longer term agreements, Pano's proposal also includes a hardware refresh in Year 5 and 10 at no additional cost to ensure the City of Rancho Palos Verdes continues to have the latest camera technology included in their Pano Stations.

Included Software, Support, & Services

Pano's proposal also includes industry-leading software, support and services to facilitate the ongoing success of our early wildfire detection system for the City of Rancho Palos Verdes.

In addition to the information mentioned above, specifically included in our proposal is:
- Unlimited users licenses for City of Rancho Palos Verdes personnel to the Pano 360 web interface
- 24/7 coverage by the Pano Intelligence Center's monitoring services
- Automated Incident Alerts to the City of Rancho Palos Verdes personnel
- Automated Incident Alerts for up to ten (10) individuals from either the Los Angeles County Fire Department or the Los Angeles County Sheriff's Department
- 24/7 Pano software and hardware customer support for the City of Rancho Palos Verdes
- Access to a designated Pano Client Executive
- Initial training and user onboarding for all City of Rancho Palos Verdes personnel
- Quarterly new user training for City of Rancho Palos Verdes personnel
- Quarterly Business Reviews with City of Rancho Palos Verdes leadership

Additional Information

Letter of Support

To whom it may concern,

The CPUC approved their statewide fire threat map in 2018 with the purpose of highlighting the highest risk wildfire areas, *"where there is an elevated risk and an extreme risk including likelihood and potential impacts on people and property from utility associated wildfires."* The Fire-Threat Map helps prioritize fire hazard areas to allow for implementation of new fire-safety regulations adopted by PG&E. Cal Fire has repeatedly expressed that quick initial attack and keeping wildfires small and under 10 acres is their suppression methodology for avoiding catastrophic and uncontrolled wildfires.

The PANO cameras greatly assist in this operational methodology and can detect day or night the presence of smoke within seconds of it being visible. Currently without PANO detection, fire agencies wait for the public to report the presence of smoke. These 911 calls from the public more often have no specific locations of where the smoke is originating from and is often just general visual sightings from persons traveling on Highway 280, tens of miles away.

Before the pilot PANO camera installation at the Redwood City location, local firefighters scrambled to the highest points of the district to better triangulate the location of smoke in the expansive remote southeastern slopes of the Woodside Fire Protection District. This old-fashioned method of fire location is extremely time consuming and takes personnel away from the fire initial attack and is only based on visual mountainous landmarks and has no precise measurement or lat/long for locating the fire.

In the nighttime hours or in the rural areas of San Mateo County wildfires and even structure fires can become quite large and enter the wildland before human detection is possible. The CPUC Fire Threat Map highlights a significant amount of extreme and elevated risk within San Mateo County. The entire western portion of San Mateo County has been designated by the CPUC map as Tier 2 or Tier 3.

If one considers the amount of WUI, the billions of dollars of property values, the vast critical infrastructure, and the large number of residents within these zones it sets an ominous stage for a potential wildfire incident.

We encourage the CPUC to partner with PANO to assist in funding the critical camera sites to create an early detection and location system to coincide with the Tier 2 and Tier 3 CPUC map within San Mateo County.

I am happy to answer questions or appear at any CPUC hearings to reiterate the importance of this technology.

Sincerely,

Denise Enea
Fire Safe San Mateo County
Executive Director
denea@woodsidefire.org

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