

NORTH BAY ENERGY STORAGE



SONOMA COUNTY, CA

NORTH BAY ENERGY STORAGE PROJECT SONOMA COUNTY, CA

Tonight's Schedule

6:15 – 7:30 PM

Presentation

7:30 PM

Q & A with experts

Ask all your questions by speaking directly with our expert team members at the various stations with subjects identified by signage on the walls.

Tonight's Speakers

Strata Clean Energy

- Collin Ramsey, Director
- Joel Vyduna, Senior VP

Fire Safety

- Greg Martin, GLM Safety
- Vern Losh, Losh & Associates

Emergency Evacuation

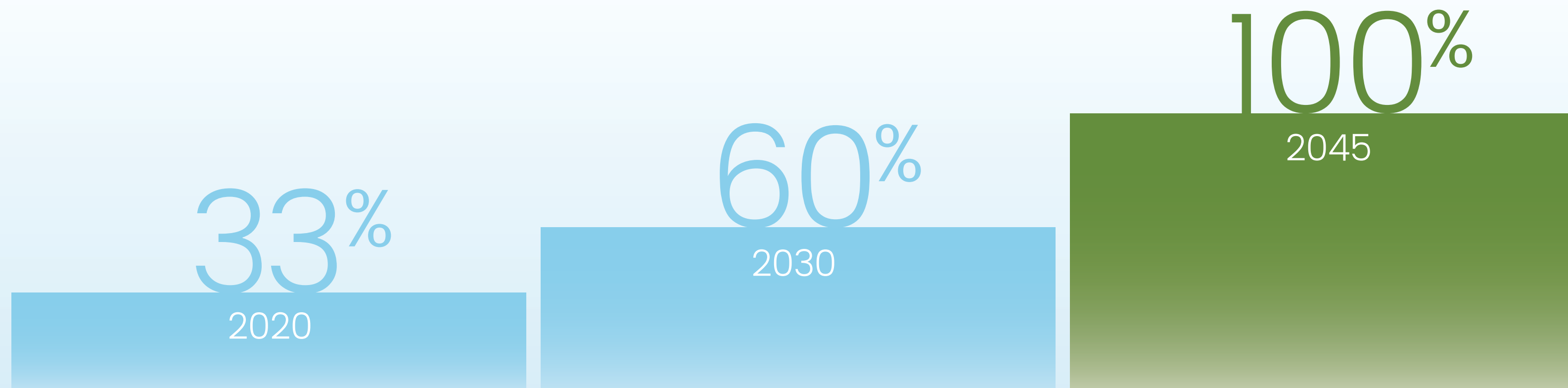
- Rob Giordano, CAS Safety Consulting
- Clint Shubel, CAS Safety Consulting

WHY SONOMA COUNTY NEEDS ENERGY RESOURCES

- California is facing increased electric demand, due to:
 - Changes in climate patterns due to global climate change
 - Electric vehicle adoption and built environment electrification
 - Retirement of fossil fuel power plants
 - De-rating and abandonment of hydroelectric plants
 - Lack of new transmission line projects
- California's ability to import electricity from other states is sharply declining
- Statewide reliability issues due to more severe seasonal climate fluctuations (hotter heatwaves, wetter storms, perpetual wildfire season)

CA CLEAN ENERGY MANDATES

California has many renewable energy mandates, including SB 1078/350 (Renewable Portfolio Standard) and SB 100 (100% Clean Energy Act) pushing statewide resources to be 60% from renewable sources in less than 7 years from today.



SB 1078/SB 350 Renewables Portfolio Standard



Eligible resources include solar, wind, geothermal, biomass and small hydroelectric.

SB 100 100% Clean Energy Act



Expands eligibility to include additional carbon-free resources

CPUC RELIABILITY & RESILIENCY PROCUREMENT DIRECTIVES

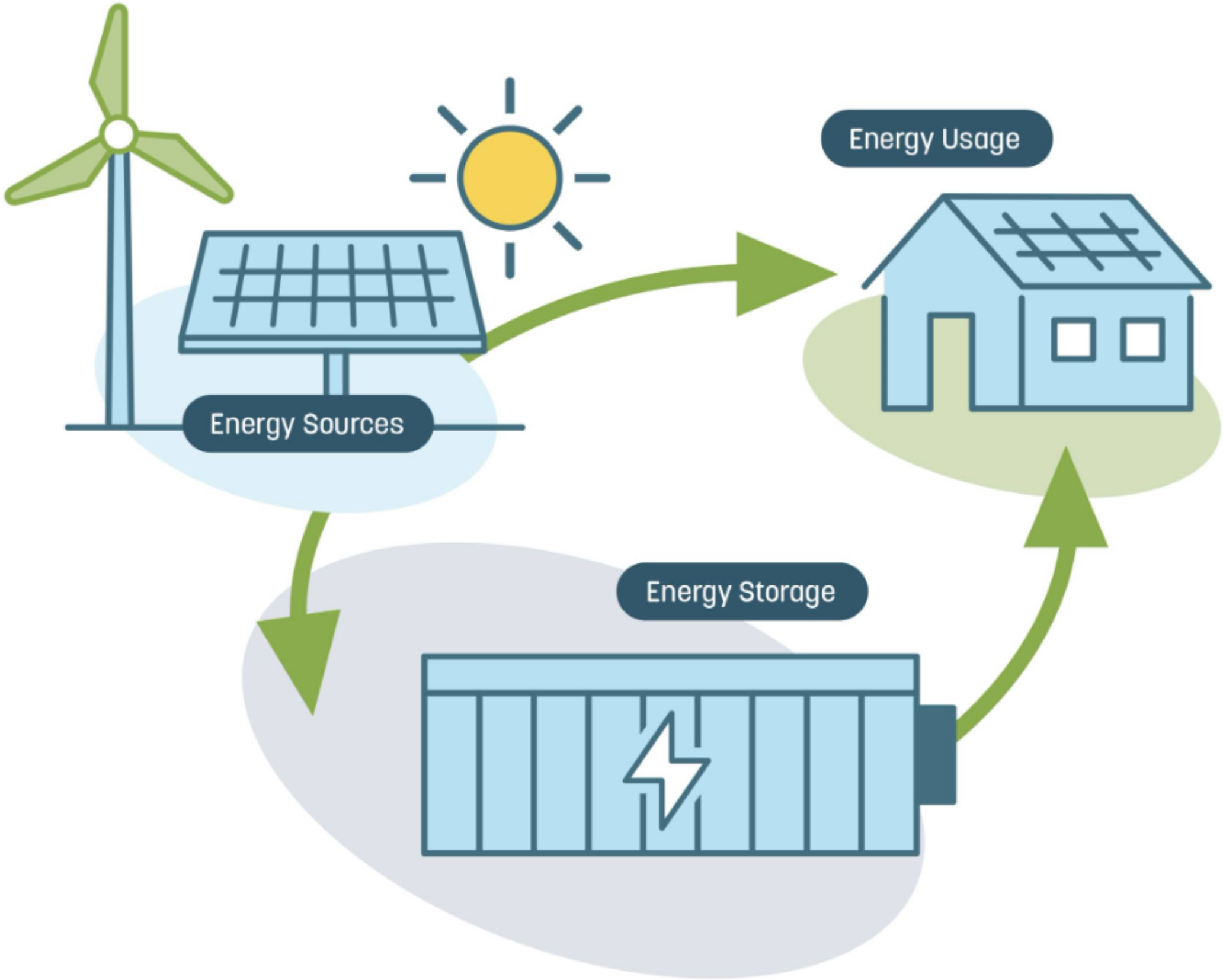
Despite existing renewable energy mandates, the state is still concerned about its ability to provide electricity to all Californians

- CPUC regulates services and utilities, protects consumers, safeguards the environment, and assures Californians' access to safe and reliable utility infrastructure and services
- June 2021: CPUC approved an 11.5 GW (11,500 MW) procurement package of clean energy resources to come online from 2023 to 2026.
- February 2023: CPUC ordered power providers to procure an additional 4 GW (4,000 MW) of renewable resources by 2027.

WHAT IS A BESS?

- A Battery Energy Storage System (BESS) is an electrical grid-connected resource that uses lithium-ion batteries to support the healthy operation of the grid while also supporting the integration of renewable energy.
- The Project will use batteries to store excess energy from the grid during times when energy generation is greater than demand, generally when solar and wind energy production are high.
- When energy demand outpaces energy supply, the Project discharges that same energy back onto the electrical grid.

BESS SYSTEMS - HOW IT WORKS



NORTH BAY ENERGY STORAGE 

BESS BENEFITS

- Direct substitute for fossil fuel “peaking” power plants
- Reduces GHG emissions
- Improves the reliable operation of the electrical grid
- Defers investments in generation, transmission, and distribution
- Can provide backup power during a rolling blackout or PSPS event

TYPICAL BESS

The typical BESS facility is comprised of lithium-ion batteries housed within standardized, purpose-built, all-weather outdoor enclosures. The enclosures are paired with cooling systems, safety systems, inverters, controls, metering/telemetry, transformers, and accessory equipment.



BESS ENCLOSURE

24/7 Monitoring
& Automatic
Shut-off

24/7

Individual
Battery
Compartments



Non
Habitable
Enclosure



Integrated
Cooling
System



HVAC,
Radiator
& Venting



Individual Fire
Rated
Cabinets



Fire Rated
Steel
Enclosure

BESS TECHNOLOGY

The Project will use lithium-ion batteries, which are less toxic than lead acid batteries, do not have spill/chemical burn risk and have a longer useful life.

- Unlike traditional household alkaline batteries that are non-rechargeable and may leak, rechargeable lithium-ion batteries use a completely different chemistry and form factor that doesn't leak.
- If a battery were mechanically damaged, the small amount of electrolyte in each battery that may be exposed evaporates quickly due to low vapor pressure.
- The Project will not produce any emissions during operation.

PREVIOUS INDUSTRY INCIDENTS

BESS now comprise at least 2% of the capacity on the U.S. power grid and have a failure rate equal to/less than traditional fossil fuel generation facilities

There have been a limited number of publicized fire incidents, including the PG&E's 182.5MW/730MWh Elkhorn Energy Storage in Moss Landing, CA (2022)

- Fire contained to single BESS enclosure (as is common in modern systems)
- Emergency response consistent with manufacturer guidance
- Considered a 'safe failure' (fire didn't propagate, no injuries)

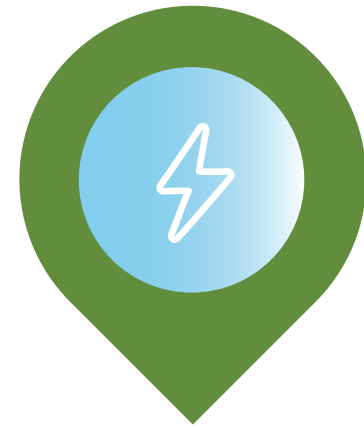
PREVIOUS INDUSTRY INCIDENTS — LESSONS LEARNED

Some things observed from incidents to date:

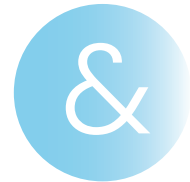
- Hasty buildouts by inexperienced parties chasing lucrative incentives with no roadmap (South Korea)
- One-off designs, engineered and built from scratch (straight from theory to deployment; Serial #1)
- Occupiable buildings & shipping containers (lots of potential energy and free-space for gas buildup)
- Pre-McMicken buildouts (didn't know what we were doing yet; McMicken changed everything)
- Little/no code compliance (if there were even codes to comply with)
- Some labs, facilities, & test sites (R&D, manufacturing)
- Cell defects (pre-mass-EV adoption which has revolutionized cell quality)
- High C-rate / low duration (thermal buildup = gas venting + thermal runaway)
- High states of charge (dendrite formation piercing separator, mechanical stress on anode)
- Multiple cycles per day (thermal buildup; mechanical fatigue of anode)
- Fire never propagated from one enclosure to another across an access aisle (that I'm aware of)
- Inappropriate first responder response (we didn't know any better or education wasn't provided)

The North Bay Energy Storage project addresses all of these past issues.

WHO IS STRATA CLEAN ENERGY?



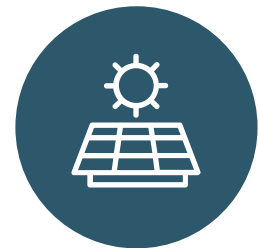
Strata has the experience



resources to safely and effectively develop this Project

Strata has
250+

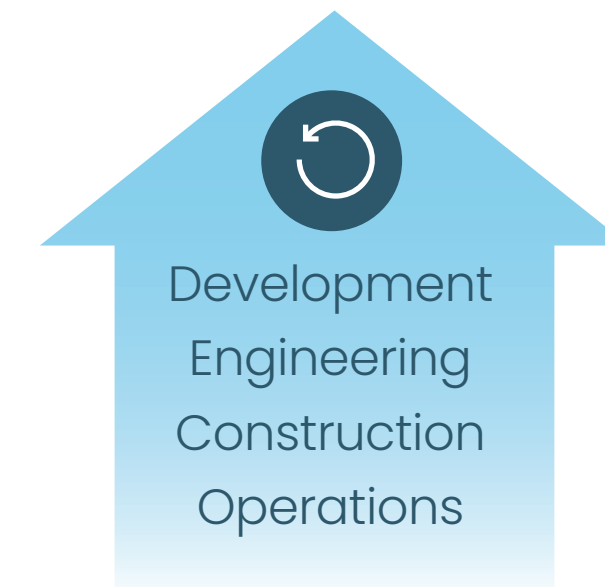
solar and energy storage projects constructed and in operation



Started 15 years ago and is a U.S.-based business, creating good paying jobs

Over **4** billion dollars invested in renewable energy projects

Fully integrated renewable energy company under one roof



Development
Engineering
Construction
Operations

STRATA BESS – VENTURA SIMILAR SIZED FACILITY

VENTURA ENERGY STORAGE



- 100MW/400MWh BESS facility developed by Strata
- Located in Ventura County, CA
- Facility operating since June 2021
- Energized and operating for 2+ years without incident or downtime



DIABLO – PROXIMITY TO RESIDENTIAL 320 FEET

DIABLO ENERGY STORAGE

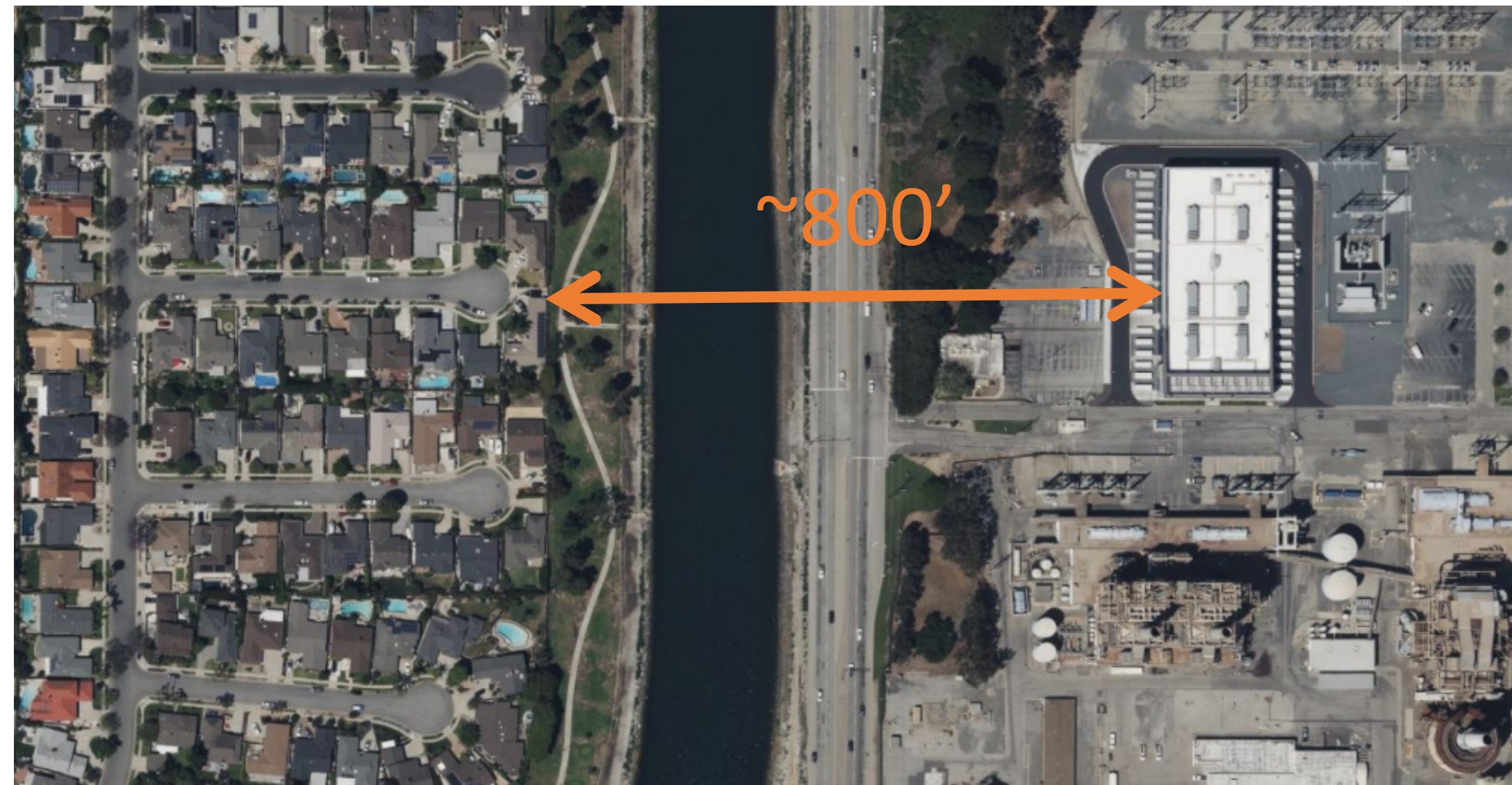
- Location: 753 Willow Pass Rd, Pittsburg, CA
- Size: 200MW / 800MWh (same as the North Bay Energy Storage Project)
- Distance from closest BESS enclosure to nearest residences: ~320'



ALAMITOS – PROXIMITY TO RESIDENTIAL 800 FEET

ALAMITOS ENERGY STORAGE

- Location: 690 N Studebaker Rd, Long Beach, CA
- Size: 100MW / 400MWh
- Distance from closest BESS enclosure to nearest residences: ~800'



NORTH BAY ENERGY STORAGE BESS LOCATED MORE THAN ¼ MILE FROM RESIDENCES



- 200MW/800MWh BESS
- 15.6-acre site on the former Adobe Creek Golf Course just outside of Petaluma
- Abuts PG&E's Lakeville substation
- 1,400+ feet (1/4+ mile, ~3.9 football fields) from the residences to the west
- Landscaped berms will shield views from street or nearby houses.

NORTH BAY ENERGY STORAGE BESS WHAT IS NOT PART OF THE PROJECT

The Project does not include any of the following:

- Housing
- Subdivision/parcel map
- Commercial Uses
- Any use or activity not directly associated with construction and operation of the proposed 200MW BESS facility
- Any other BESS facility in Sonoma County

NORTH BAY ENERGY STORAGE BESS — PERMITS & APPROVALS

- The Project, including an application for a Conditional Use Permit, is currently under review by the County
- The Project currently includes the following requested entitlements:
 - Design Review
 - A Use permit for:
 - for an up to 200MW/800MWh BESS project
 - fence taller than six (6) feet on all sides of the BESS Facility
 - to exceed the maximum lot coverage limitation for the K zoning district

NORTH BAY ENERGY STORAGE BESS - APPLICATION STATUS

Sonoma County Permitting Process

- Use permit application submitted early 2022
- Preliminary Design Review: October 2022
- Project modified in response to Preliminary Design Review and public comments
- CEQA review, including public comments, is expected to occur later this year
- Board of Supervisors (BOS) will hold a public hearing, receive public comments, and decide on the North Bay Energy Storage BESS applications
- Final Design Review will take place after a BOS decision if approved.

NORTH BAY ENERGY STORAGE BESS ENVIRONMENTAL CONSIDERATIONS

1. Aesthetics, Lighting & Visual
2. Noise
3. Geotech
4. Fire Safety
5. Emergency Evacuation

AESTHETICS AND VISUAL BERM BLOCKS VIEWS FROM STREET & HOUSES

BESS Enclosures

- Standardized, purpose-built, all-weather outdoor enclosures
- Roughly 10' tall by 8' wide, placed side-by-side
- Per Preliminary Design Review, will be painted a neutral color
- Berm around the facility visually blocks the view from street and houses

Onsite Project Substation and Gen-Tie Transmission Line

- Located along eastern edge of the Project Site, furthest from residences
- Taller than BESS enclosures but complies with the height limit in the K Zoning District
- Heights consistent with heights of existing adjacent utility poles/lines
- Strata continues to work with PG&E on undergrounding the gen-tie line

AESTHETICS AND VISUAL LIGHTING & WATER TANKS

Lighting

- Limited number of new light fixtures will be installed onsite
- Lighting at the entrance automatically-controlled, dusk-to-dawn fixtures
- Onsite Project substation includes limited, manually-controlled lighting
- Nighttime lighting only needed for non-routine, unplanned nighttime work

Fire Suppression Water Tanks

- If required, up to two water tanks, painted a neutral color, may be installed onsite
- Like the BESS enclosures, would be screened by the perimeter berm

AESTHETICS AND VISUAL POST PRELIMINARY DESIGN REVIEW CHANGES

Preliminary Design Review Committee Meeting (October 2022)

- Committee and public comments provided, resulting in the following:
 - Height of permitter earthen berm increased
 - The landscape plan further fortified
 - Site plan refined to push Project equipment away from Frates Rd.
 - BESS enclosures to be painted a darker forest green color
 - Neutral-colored vinyl slats to be used on internal chain-link fence

AESTHETICS AND VISUAL



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AESTHETICS AND VISUAL



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NOISE

Construction

- Consecutive days of monitoring found ambient sound between 53–55 dBA.
- Noise generated by construction activities will range between 47–53 dBA, within the current ambient sound levels.

Operations

- Once operational, primary sources of noise on the Project site will be generated by:
 - air conditioning units
 - inverters and
 - onsite substation
- Operational noise modeling indicates that noise levels at residences west of Clubhouse Drive will be <44 dBA, consistent with rural/semi-rural sound levels and lower than existing ambient sound levels

GEOTECHNICAL AND SEISMIC

- The equipment used by the Project is designed to withstand ground accelerations roughly equivalent to a magnitude 8.0 earthquake.
- BESS enclosures are designed for use in seismically active areas and are seismically anchored to concrete foundations, all of which are designed per the latest applicable CA Building Code requirements for seismic loads.
- A licensed structural engineer reviewed the Project's BESS enclosures and anchoring and determined that the Project can be designed to withstand a significant seismic event and still operate.

GEOTECHNICAL AND SEISMIC

- Applicable building, electrical and fire codes and standards, including but not limited to UL 9540, UL 9540A, UL 1973, and UN 38.3, require that battery components be subjected to extensive physical and electrical abuse testing prior to real-world implementation.
- Safeguards such as circuit breakers and a battery management system are in-place to disconnect the system from the electrical grid if the BESS system recognizes less than optimal conditions, including but limited to irregular movement.
- While Battery enclosures and their contents may be jostled during an earthquake to the point that the system is brought offline, seismic activity would not increase the risk of upset, malfunction, or failure of the batteries.

FIRE CODE COMPLIANCE BESS SYSTEMS

- UL 1642 – Standard for Lithium Batteries. UL 1642 physical tests demonstrate that the battery cells do not explode when subjected to a nail puncture and projectile. Module level tests consist of internal fire exposure.
- UL 1973 – Standard for Batteries for Use in Light Electric Rail (LER) and Stationary Applications (module level certification). (UL 1973) and propagation test (IEC 62619) found that fire is isolated to one cabinet. Tests demonstrated this by heating one centrally located cell until a thermal runaway (fire) occurs. No explosion or propagation/spread of fire occurred. The neighboring cells and rest of the system did not catch fire or explode.
- UL 9540 – Standard for Energy Storage Systems and Equipment (system level certification).
- UL 9540A – Standard for Inverters, Controllers, Converters, and Interconnection Equipment.
- IEC 62619 – Standard for Battery Safety in Stationary Application
- NFPA 855 (2019/2023) and IFC (2018/2021)
- IFC/CFC Chapt. 12 (2022 updates)

FIRE CODE COMPLIANCE BESS SYSTEMS

UL 9540 Compliance

- UL 9540A requires burn testing at the rack level to ensure proper fire behavior
- Strata pushes vendors to also do large-scale burn tests of entire BESS enclosures

NFPA 855

- Hazard mitigation analysis by a certified fire protection engineer
- Emergency Site Safety Plan
- First Responder Training
- Appropriate signage installed
- Deflagration management (proper venting)
- Minimum spacing and setbacks

REDUNDANT FIRE SAFETY SYSTEMS

The Project will employ several redundant safety systems, including:

- Cell venting
- Fuses and circuit breakers
- Automated management system monitoring hundreds of times per second
- Smoke, heat and gas detection
- Fire protection/suppression system
- 24/7/365 remote monitoring of hundreds of data points each second
- Layers of physical fire containment/separation and appropriate spacing between equipment to avoid fire propagation
- 1,400+ feet (1/4+ mile, ~3.9 football fields) from nearest residences
- Earthen berm and abundant fire safe landscaping to be installed to screen BESS enclosures
- Excellent Defensible Space and Distances

BESS ENCLOSURES - SAFETY FEATURES



FIRE DETECTION & SUPPRESSION

Fire Detection

- Gas, smoke and heat detection

Fire Suppression

- Project won't deploy chemical clean agents or aerosols
- We will have a means to apply water to the batteries (Integrated Standpipe System) and a defined source of water (fire hydrants, water storage tanks, etc.)
- In the unlikely event of a fire, the recommended approach for water application is total flooding via a stand-pipe system, and protect exposures.

FIRE DETECTION & SUPPRESSION

- BESS will be designed to prevent and effectively manage all risks of fire.
- In addition, each BESS contains an onboard battery management system that monitors the appropriate state of individual battery cells. In the event of an anomaly, the system is designed to remove power from the effected cells.
- BESS includes multiple fire detection systems onsite and within the individual BESS enclosures.
- The site will utilize infrared cameras for security and thermal deviation detection.
- In the rare situation that a fire does occur, the systems are designed to burn in a controlled manner that does not put surrounding batteries, neighboring exposures, or fire response personnel at risk.
- Project includes upgrading the water infrastructure for fire protection to comply with all NFPA standards and Sonoma County Fire Code.

FIRST RESPONDER TRAINING

- Strata understands the importance of first responder training and ongoing communication with local fire departments.
- First Responder Coordination and Training
 - Strata has already coordinated with these fire professionals:
 - Sonoma County, Petaluma City, Rancho Adobe
 - The Project is currently being reviewed by Sonoma County PRMD
 - Strata will provide First Responder training at Strata's expense
 - Training during construction, commissioning, and operations
 - Goal of training is that first responders are familiar with the North Bay Energy Storage Bess and know what to do and what not to do to preserve and protect life, property, and the environment

INCIDENT AIR QUALITY

- Air Emissions (Smoke) from a Fire Incident
 - Batteries are sealed, so no liquids or gasses released during normal operation.
 - As a safety feature, batteries include a vent that prevents pressure from building up inside a cell.
 - In the unlikely event of a fire, the composition of the smoke is like smoke created by a structure fire, vehicle or refuse fire.
 - Strata commissioned a Health Risk Assessment to analyze emissions generated during a theoretical fire event;
 - Determined the public health and flammability impacts of smoke plumes to be 'less than significant' compared with adopted and accepted thresholds.

EVACUATIONS

- Analysis and Plan
 - Provided evacuation recommendations for the BESS
 - Including Alert and Warning procedures
 - Alert and Warning is a critical component of emergency planning safety
 - Applicant adopted all our recommendations

Let's talk about the specifics

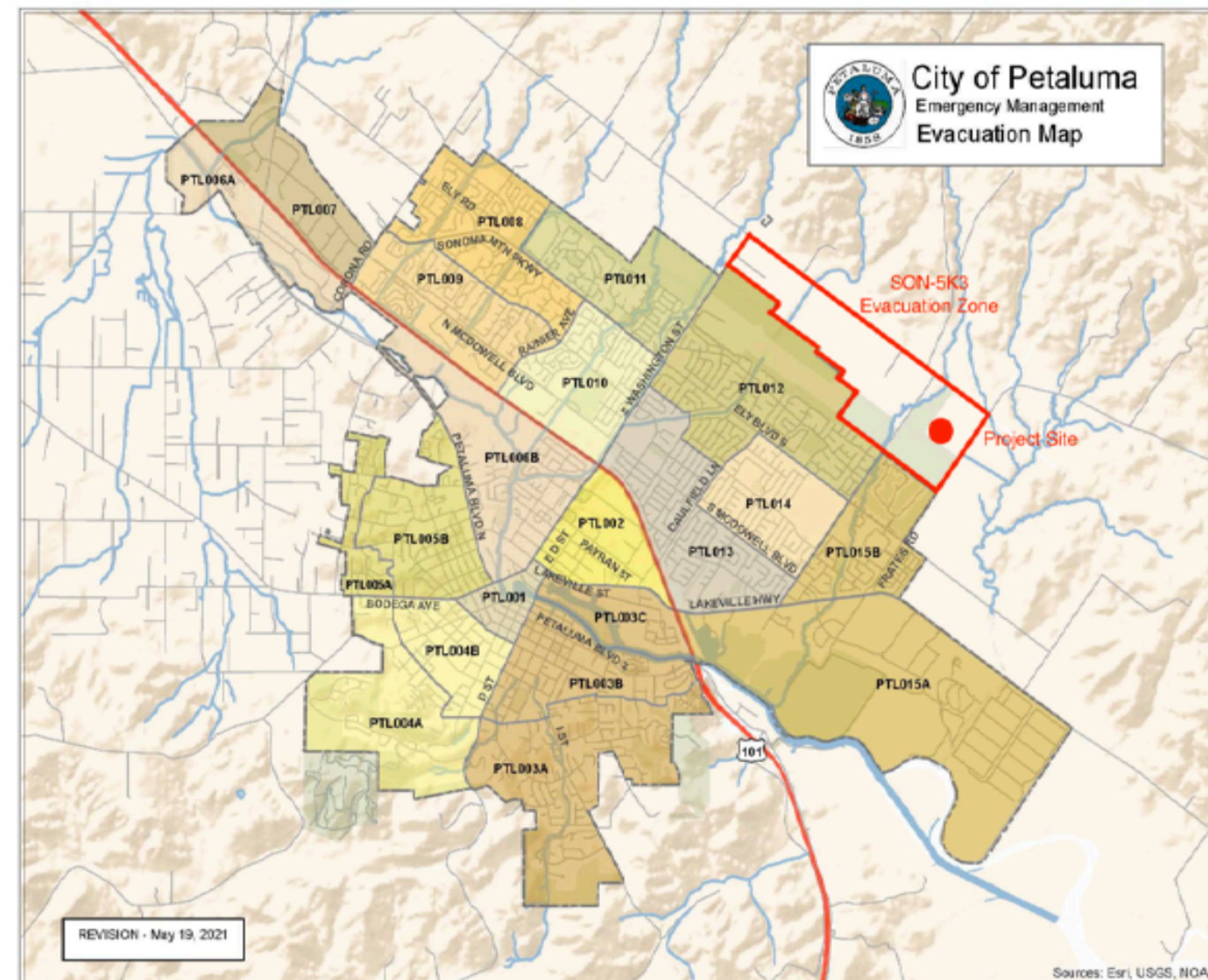
COUNTY WILDFIRE & EVACUATION ZONES

Site

- Sonoma County Evacuation Zone SON-5K3
- Additional Ingress/Egress for emergency response
- Additional egress routes within facility

Two Types of Site Evacuations

- Construction
- Operations



PROJECT CONSTRUCTION & SAFETY REQUIREMENTS

Construction Timeline & Staffing

- Construction is estimated to last for 10 months
- 25-35 average daily construction staff on the site
- 45 maximum number of construction staff on the site

General Contractor Safety Requirements & Evacuation Protocols

- Fire Protection Plan – approved by County Fire Marshal
- LEAVE AT EVACUATION WARNING STAGE
 - Generally, leaving prior to official orders reduces peak evacuation traffic and increases safety

OPERATIONS

Daily Operations

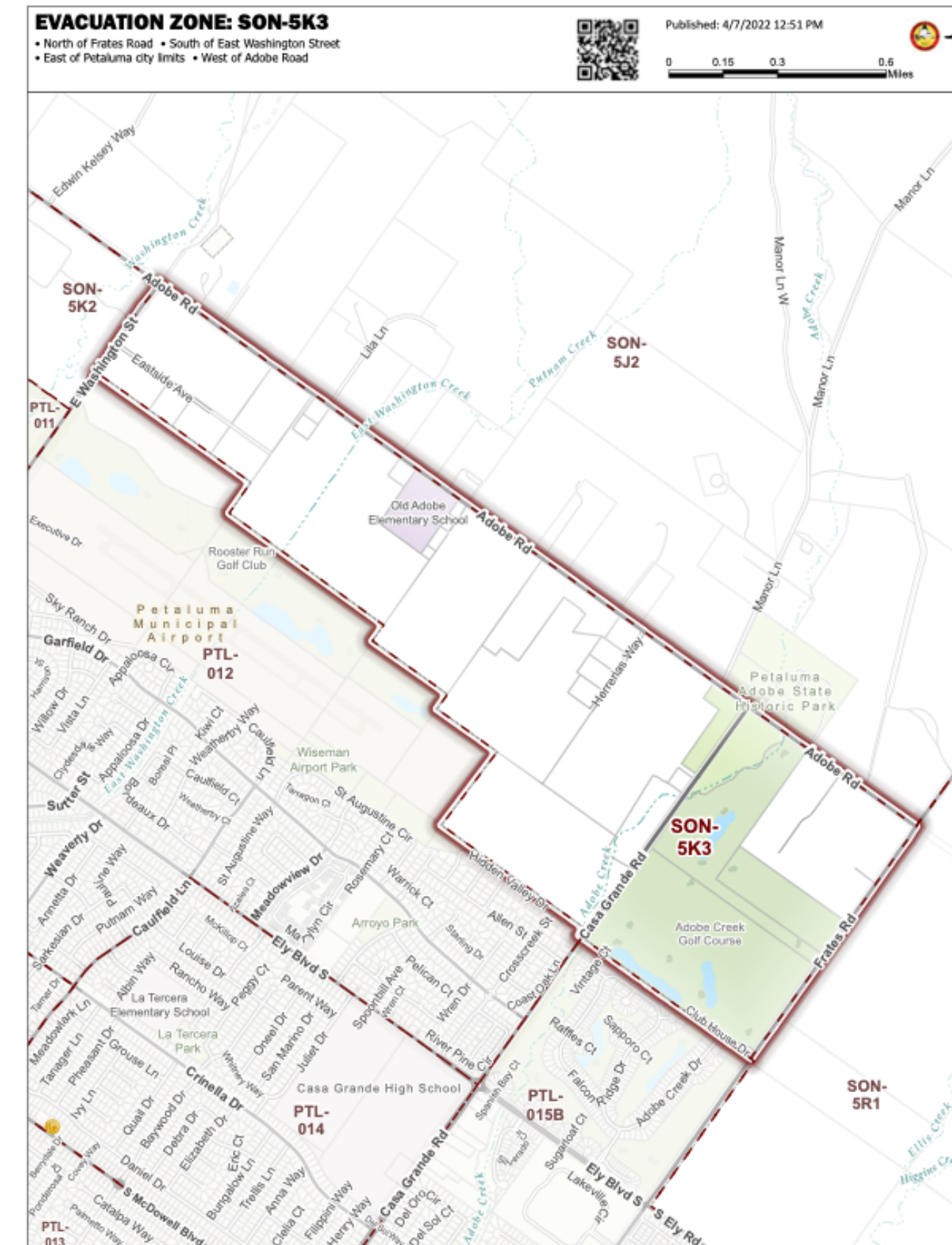
- Unoccupied facility
- 2 - 4 O&M technicians on site 1 - 2 times a week

O&M Technicians

- In addition to remote monitoring, technicians will be staged nearby and on-call 24/7
- Authority to take safety precautions during an emergency

OPERATIONS – DISASTER PREPAREDNESS TRAINING OF PERSONNEL

- O & M Disaster Preparedness
 - Subscribe and monitor local Alert and Warning Systems
 - Know pre-determined Evacuation Zones
 - NOAA and AM/FM radios
 - Sheriff evacuation tags (if possible)
 - Sonoma County Hi-Lo sirens



OPERATIONS – DISASTER PREPAREDNESS TRAINING

Examples:

- Wildfire moving toward Petaluma from Sonoma Mountain
 - O & M alerted – respond – take necessary safety precautions at facility
- Anomaly – battery fire
 - 24/7 Control Center – will make notifications to:
 - Local Police and Fire
 - Airport
 - O&M Techs
 - Work as a liaison with emergency responders for any needed information

QUESTIONS

Please feel free to speak directly with our expert team members to ask your questions.

Experts are located by the area of their specialty indicated by the signs on the wall.