CITY OF PISMO BEACH

SAFETY ELEMENT UPDATE

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Safety

1. Introduction and Purpose

Providing a safe place to live is one of the fundamental priorities for the City of Pismo Beach (City). Like many coastal communities in California, Pismo Beach is most susceptible to hazards involving earthquakes, landslides, wildfires, flooding, and bluff erosion. Pismo Beach is also susceptible to, but unlikely to experience, radiation, tsunamis, and hazardous material incidents. The Safety Element describes each of the hazards to which Pismo Beach is vulnerable, and presents goals, policies, and actions to increase the City's resilience to hazards through educating citizens, maintaining an effective emergency response, and protecting life, property, and natural landforms in potential hazard areas.

Some of Pismo Beach's existing and historic hazards will worsen with climate change. Climate change occurs as the Earth warms in response to solar energy becoming trapped in the atmosphere by greenhouse gases. Sea level rise is one outcome of a changing climate, as are extreme heat, increased air pollution, and increased wildfire occurrences. The goals, policies, and actions of this element address the potential impacts of climate change on each of Pismo Beach's hazards.

1.1 Relationship to State Law

As mandated by the State of California, the Safety Element (element) is a required element in the City's General Plan. Consistent with Government Code Section 65302(g), the element must address and provide for the protection of the community from any unreasonable risks associated with the effects of seismic hazards, slopes and bluff instability, subsidence, flooding, urban and wildfires, and climate change, along with other specific topics that are dependent on individual community characteristics.

Another key component of the General Plan/Local Coastal Program (GP/LCP), is managing development in conformance with California Coastal Act policies in order to respond to coastal hazards, reduce risks to life and property, avoid substantial changes to natural landforms, and avoid the need for shoreline protective devices to the fullest legal extent, and thereby maximizing the protection of coastal resources. In addition, this element will also consider environmental justice pursuant to the California Coastal Commission's (CCC) 2019 Environmental Justice Policy (CCC 2019).

In addition to state requirements, federal law requires local governments to develop and submit hazard mitigation plans in order to qualify for grant program funds (Disaster Mitigation Act of 2000). This element incorporates information and hazard mitigation measures from the updated 2019 County of San Luis Obispo Multi-Jurisdictional Hazard Mitigation Plan (HMP; County of San Luis Obispo 2019). Prior to this 2019 HMP, the City developed and implemented its own Local HMP (2014); however, the City, along with the other incorporated cities in the County of San Luis Obispo (County), will now be covered by the County's Multi-Jurisdictional HMP.

1.2 Relationship to Other General Plan Elements

Several Safety Element policies are interrelated with other mandated topics in the General Plan. The Safety Element is most closely related to the Land Use Element and Conservation and Open Space Element. The hazard monitoring and site-specific hazard analyses required by the Safety Element will influence land use by concentrating development away from hazardous areas. The Land Use Element also includes policies and actions to create a more sustainable community and reduce the impacts of hazards with climate change, such as encouraging transit-oriented development, minimizing urban heat through green space, and updating building code requirements to reduce energy and water demand, which will ultimately lead to a safer community. Similarly, the Conservation and Open Space Element protects and, where feasible, restores the City's natural resource areas, which allows the City to increase its resilience to climate change and hazards through natural infrastructure. Additionally, open space is often a suitable use for hazard areas, such as flood zones, as they can more quickly recover from hazard events and provide additional benefit to the community.

The Circulation and Housing Elements are also closely related to the Safety Element. The guidelines provided in the Safety Element that minimize the impacts of potential hazards to citizens and property are interrelated with Housing Element guidelines and standards. The relationship between the Circulation and Safety Element is important to ensure continued access to hazard areas when accommodating housing and maintaining evacuation routes. Air quality and environmental justice are not required elements of Pismo Beach's General Plan; however, they are important topics and related to the Safety Element as they affect the overall health of the community.

1.3 Relationship to Community Vision

Consistent with the Community Vision described in the introductory chapter, the City has developed guiding principles to set the framework for this Safety Element. The Safety Element strives to implement the community vision through its goals, policies, and actions, and is built around the following guiding principles:

Be a Well-Prepared Community

The community is susceptible to a variety of hazards, including more frequent and intense hazardous events due to climate change. Although difficult to predict, being prepared to respond and recover quickly from a hazardous event is critical to ensure the safety and resilience of the community. This element shall identify the risks and provide a roadmap for educating the community, and preparing every needful thing to ensure that communication protocols, evacuation procedures, essential facilities and services, mutual aid agreements, and other priorities are all in proper condition and operating smoothly to successfully endure and quickly bounce back from a hazardous event.

Minimize Future Risk

As the community grows and as existing development is maintained and redeveloped over time, it is important to protect life and property and site structures and infrastructure to minimize risk. This element shall put in place policies and programs to ensure that City codes, protocols and studies are kept up to date to ensure that appropriate safeguards and preventative measures are in place at appropriate times for all hazards for which the community is susceptible.

Protect the Shoreline from Erosion

The City's rocky and sandy shoreline and coastal bluffs provide a unique and pristine resource that draw residents and visitors alike. Protecting the shoreline from erosion shall be done through natural means, with protective devices placed only when necessary to mitigate adverse impacts on the local shoreline or protect principal structures, coastal dependent uses, and public beaches in danger of erosion. This element shall provide policies that guide the community and decision makers to effectively manage and protect the City's valuable shoreline.

2. Climate Change

Although climate change is not a hazard in and of itself, variations in climate conditions are anticipated to make existing hazards more severe or cause them to occur more frequently.

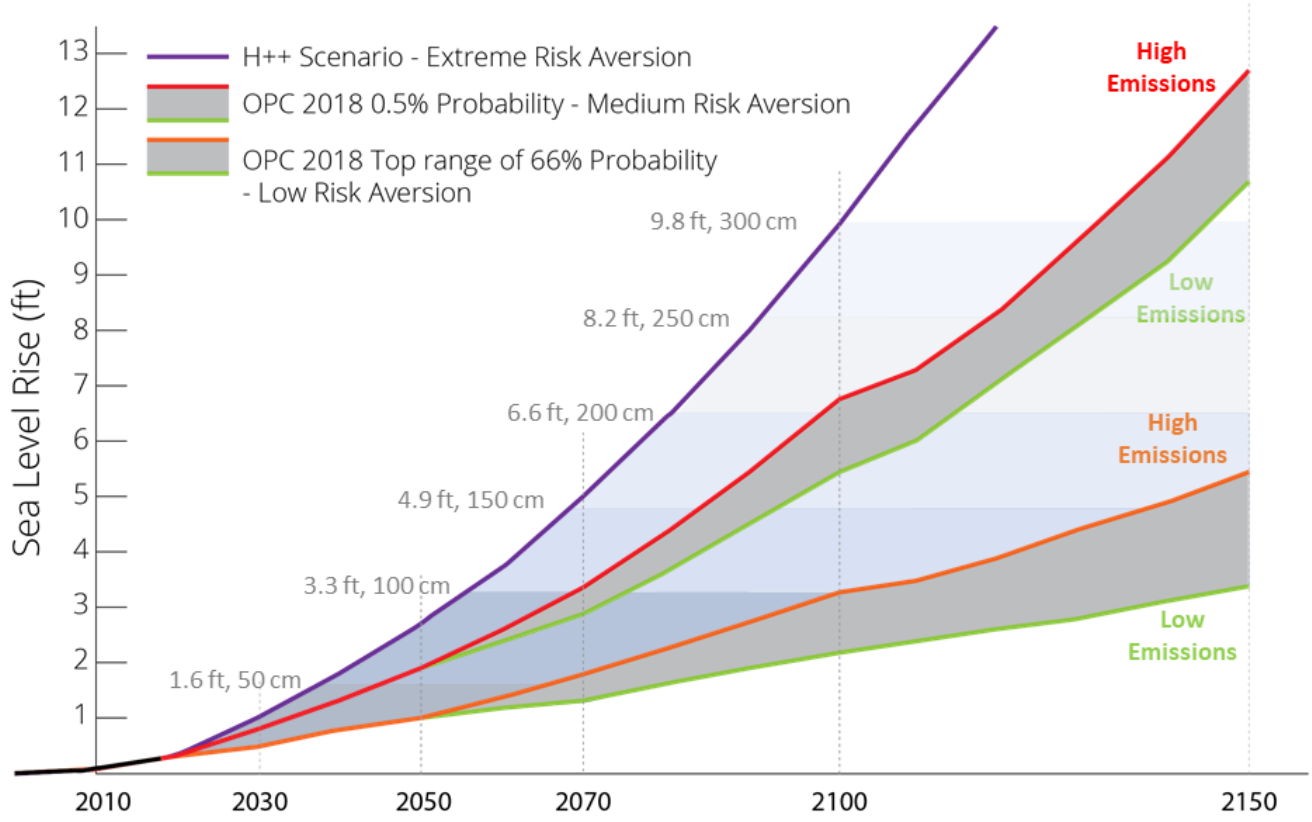
The climate in California is changing, and the effects, such as rising average temperatures, more intense storms, and higher sea levels, are expected to continue and worsen in the coming decades. Climate change is caused by an increase in greenhouse gases in the Earth's atmosphere, which is caused by the burning of fossil fuels. Greenhouse gases trap heat, causing average global temperatures to rise, which results in a multitude of effects. The amount of climate change the Earth will experience is dependent on the amount of greenhouse gases emitted, which in turn is dependent on human behavior. Therefore, climate change projections are surrounded by much uncertainty.

2.1 Sea Level Rise

Scientists predict that the frequency and intensity of coastal hazards will increase in the future with climate change. Sea level rise is one manifestation of climate change and is primarily caused by the expansion of warming ocean water and the melting of land ice as Earth's temperature rises. As the air gets warmer, the oceans and seas will absorb much of that excess heat. Added heat will cause the water to expand, increasing its volume. In addition, warmer temperatures will melt land-based ice sheets, contributing even more water to the oceans. As described in the sections below, an increase in sea level will affect the future rates of beach and bluff erosion, coastal flooding, and coastal storms, which will in turn impact coastal resources and development as they become more exposed to hazards over time.

To better understand the future hazards and risks associated with sea level rise, the City prepared a Sea Level Rise Vulnerability Assessment (City of Pismo Beach 2019), consistent with the CCC's adopted Sea Level Rise Policy Guidance (CCC 2018). The Vulnerability Assessment used a range of sea level rise projections, based on multiple greenhouse gas emissions scenarios. **Figure S-1** depicts the sea level rise projections utilized in the Vulnerability Assessment and indicates what Pismo Beach may potentially be subject to through approximately year 2150. **Figure S-1** also identifies the probability or likelihood that a particular sea level rise projection will occur by a given year. The "H++" scenario represents the extreme amount of sea level rise that could occur due to instability of the Antarctic ice sheet and does not have an associated likelihood or probability.

Figure S-1 Sea Level Rise Projections (feet) through 2150[1]

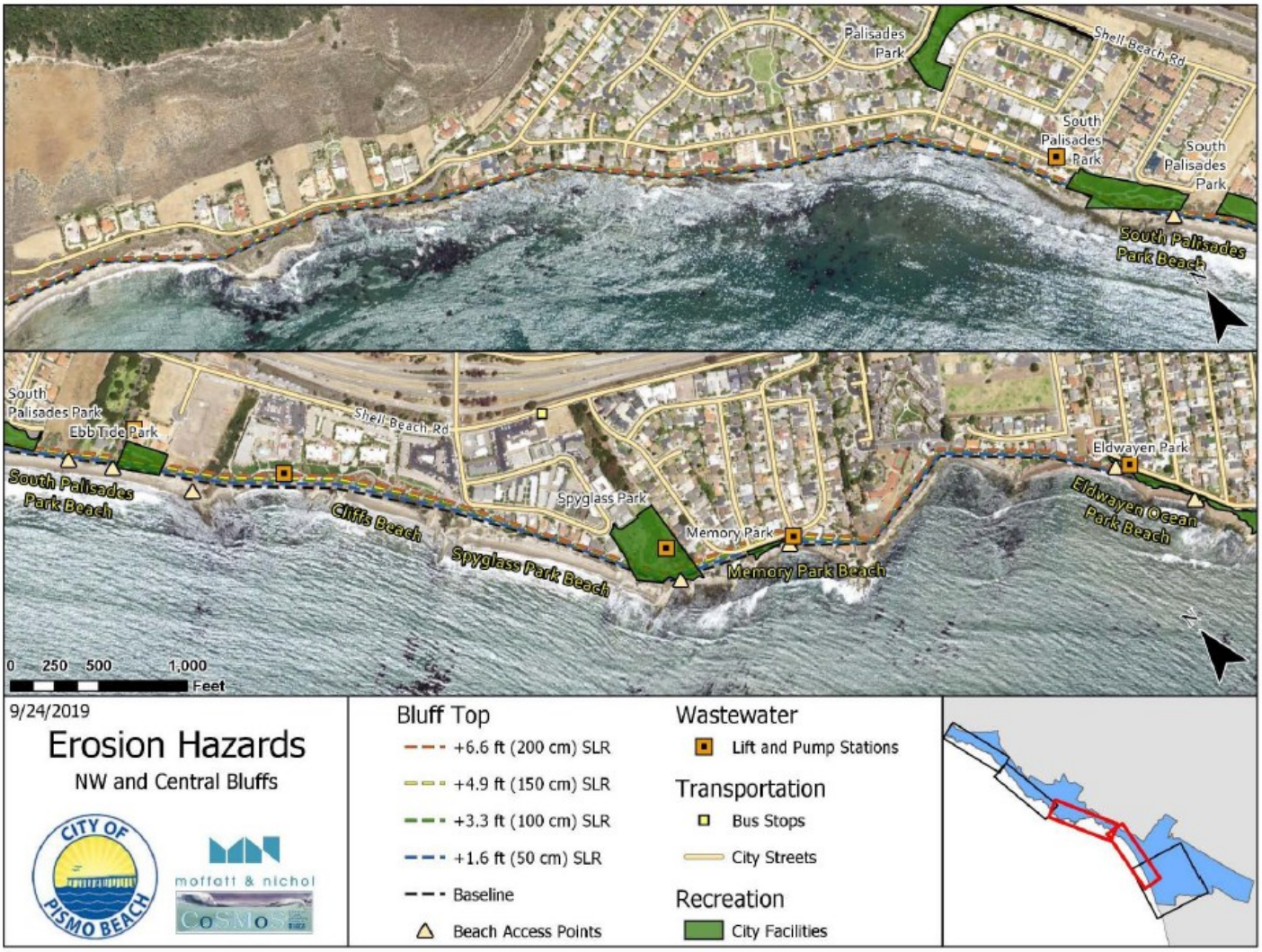


Source: Ocean Protection Council 2018.

Note: These sea level rise amounts are relative to mean sea levels as measured in 2000. The sea level rise projections were identified in the City of Pismo Beach *Sea Level Rise Vulnerability Assessment* (City of Pismo Beach 2019), which utilized projections developed in *State of California Sea-Level Rise Guidance: 2018 Update* (Ocean Protection Council 2018).

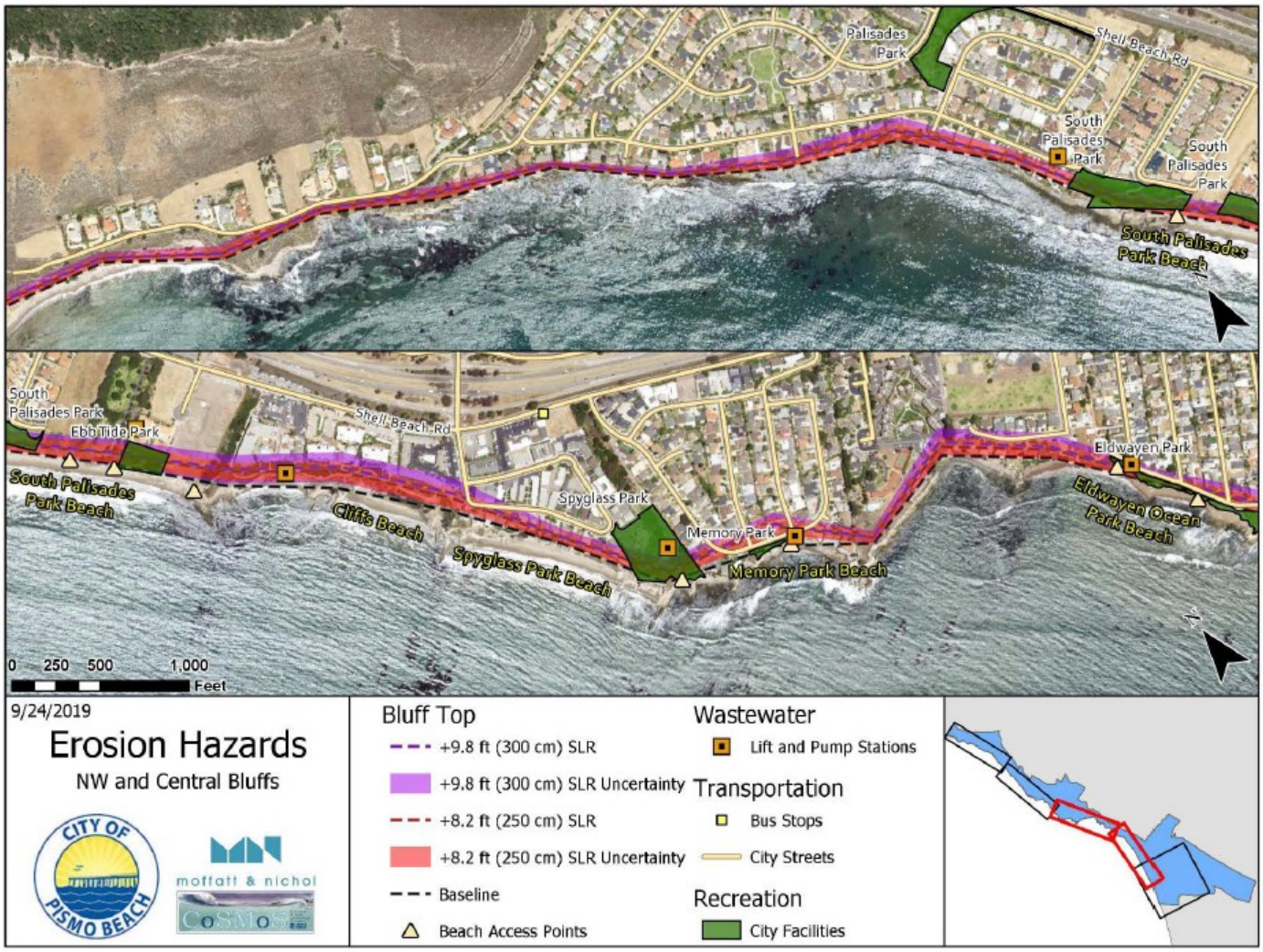
The Vulnerability Assessment uses these sea level rise projections, combined with coastal hazard models, to map areas that may be subject to coastal hazards with sea level rise (**Figures S-2 to S-9**). The maps include erosion hazards (**Figures S-2 to S-5**) and flood hazards (both non-storm and 100-year storm conditions) (**Figures S-6 to S-9**) with varying increments of sea level rise.

Figure S-2 Projected Bluff Erosion Hazards Along the Northwest Coastline of Pismo Beach – Current Conditions to up to 6.6 Feet of Sea Level Rise (SLR)



Source: City of Pismo Beach 2019.

Figure S-3 Projected Bluff Erosion Hazards Along the Northwest Coastline of Pismo Beach – Current Conditions to Up to 6.6 Feet of Sea Level Rise (SLR)



Source: City of Pismo Beach 2019.

Figure S-4 Projected Bluff and Shoreline Erosion Hazards Along the Central Coastline of Pismo Beach – Current Conditions to Up to 6.6 feet of Sea Level Rise (SLR)



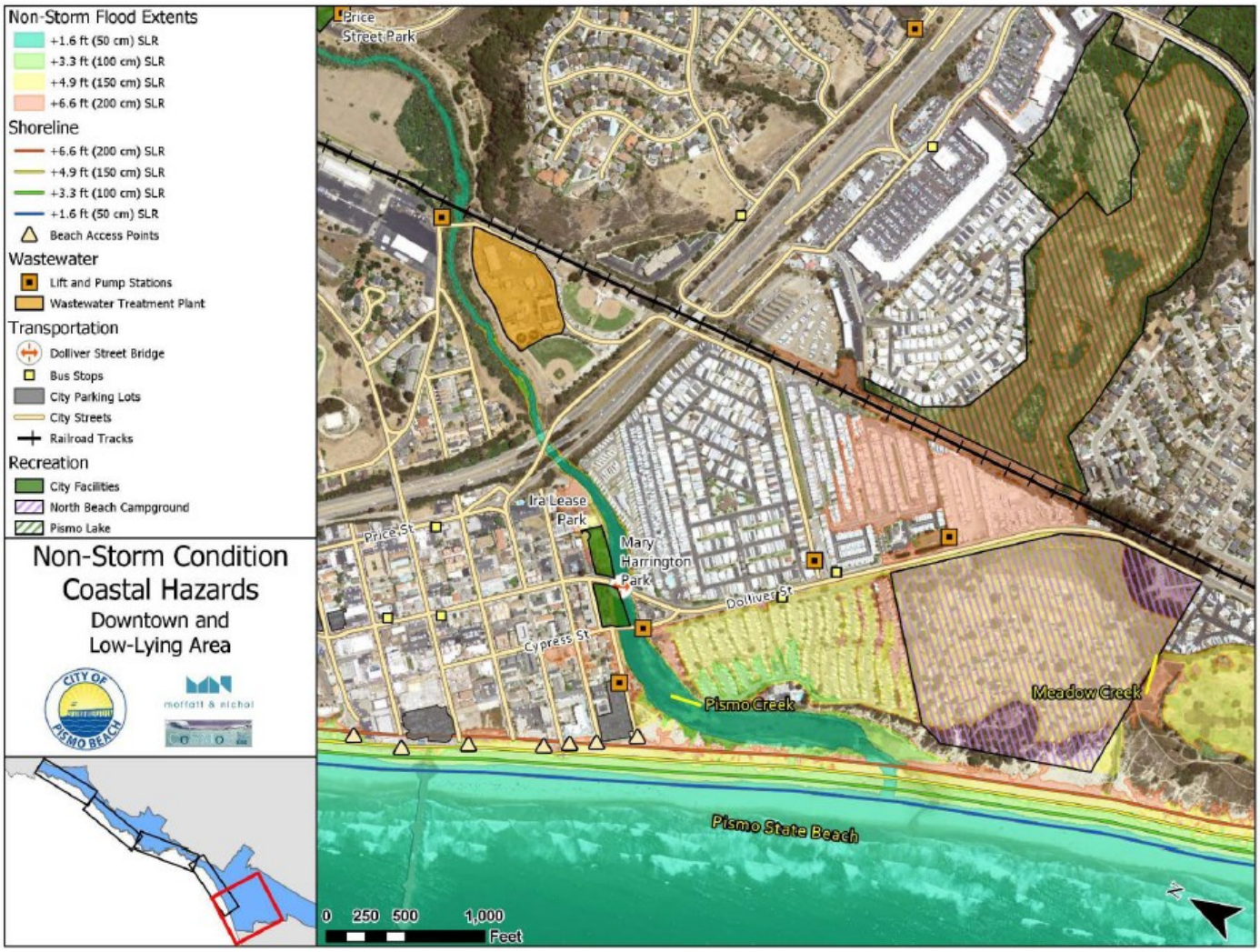
Source: City of Pismo Beach 2019.

Figure S-5 Projected Bluff and Shoreline Erosion Hazards Along the Central Coastline of Pismo Beach – 8.2 feet to 9.8 feet of Sea Level Rise (SLR)



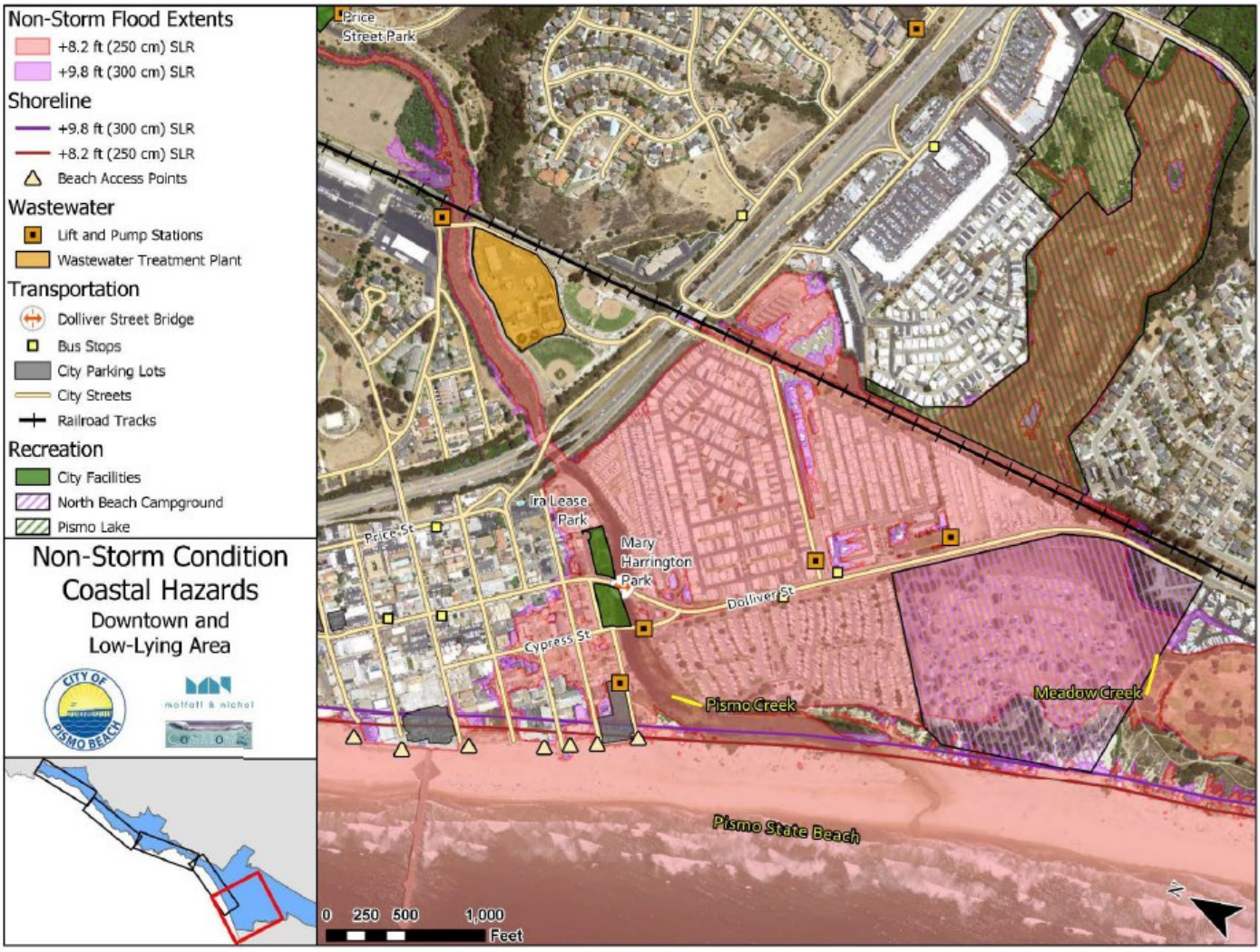
Source: City of Pismo Beach 2019.

Figure S-6 Projected Non-Storm Flood Hazards and Shoreline Erosion Along the Southern Coastline of Pismo Beach – Current Conditions to Up to 6.6 feet of Sea Level Rise (SLR)



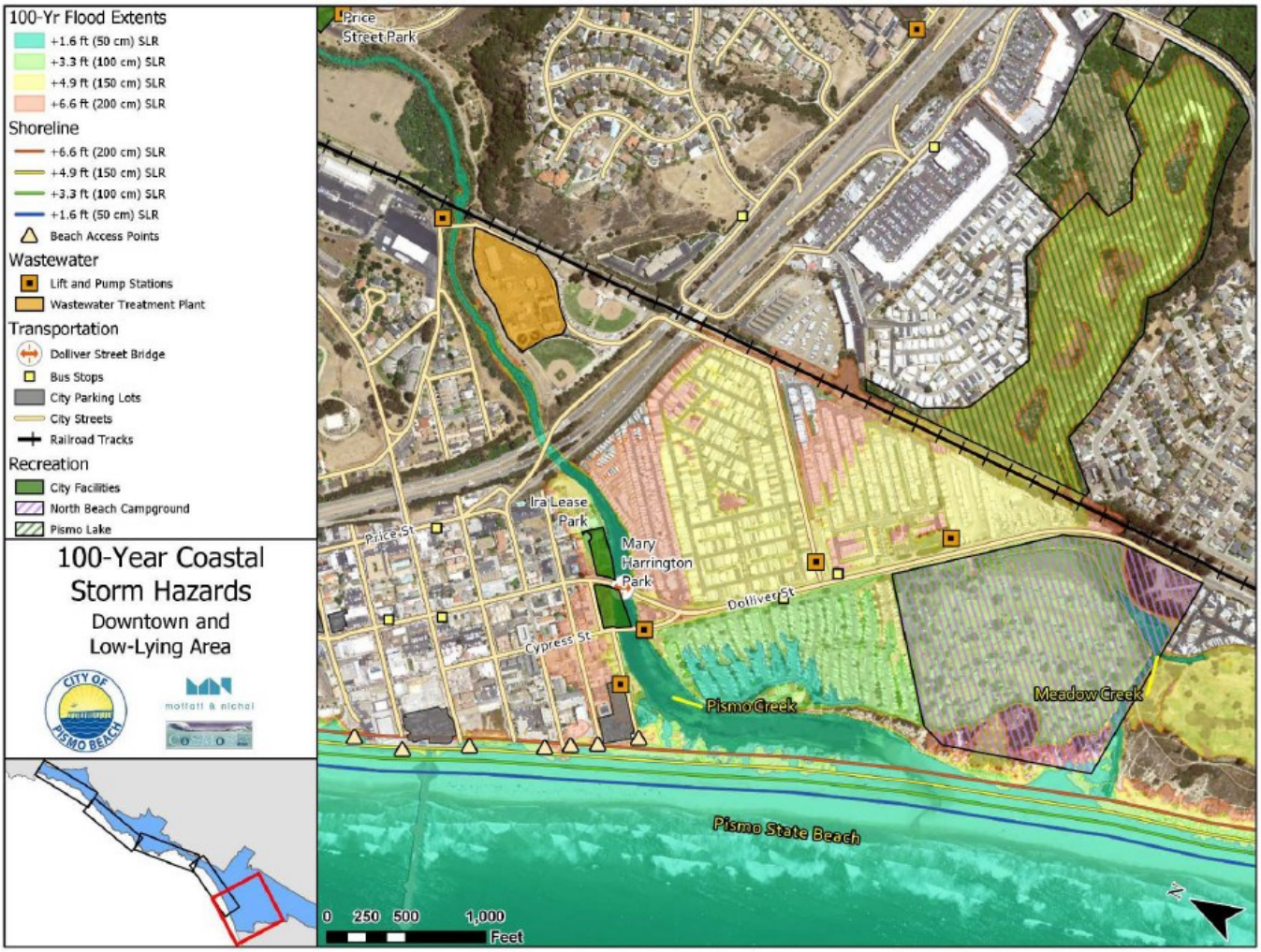
Source: City of Pismo Beach 2019.

Figure S-7 Projected Non-Storm Flood Hazards and Shoreline Erosion Along the Southern Coastline of Pismo Beach – 8.2 feet to 9.8 feet of Sea Level Rise (SLR)



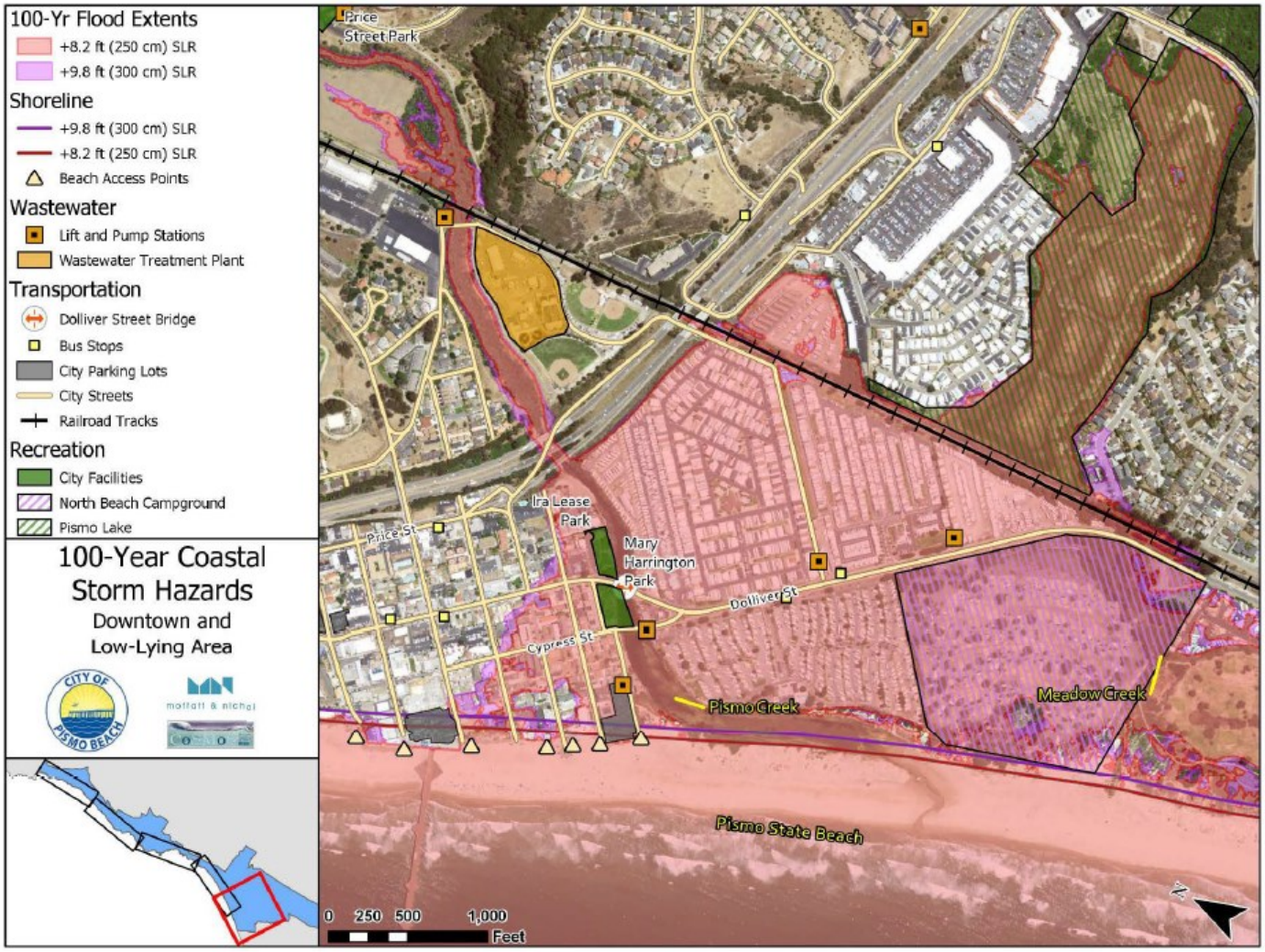
Source: City of Pismo Beach 2019.

Figure S-8 Projected 100-Year Storm Flood Hazards and Shoreline Erosion Along the Southern Coastline of Pismo Beach – Current Conditions to Up to 6.6 feet of Sea Level Rise (SLR)



Source: City of Pismo Beach 2019.

Figure S-9 Projected 100-Year Storm Flood Hazards and Shoreline Erosion Along the Southern Coastline of Pismo Beach – 8.2 feet to 9.8 feet of Sea Level Rise (SLR)



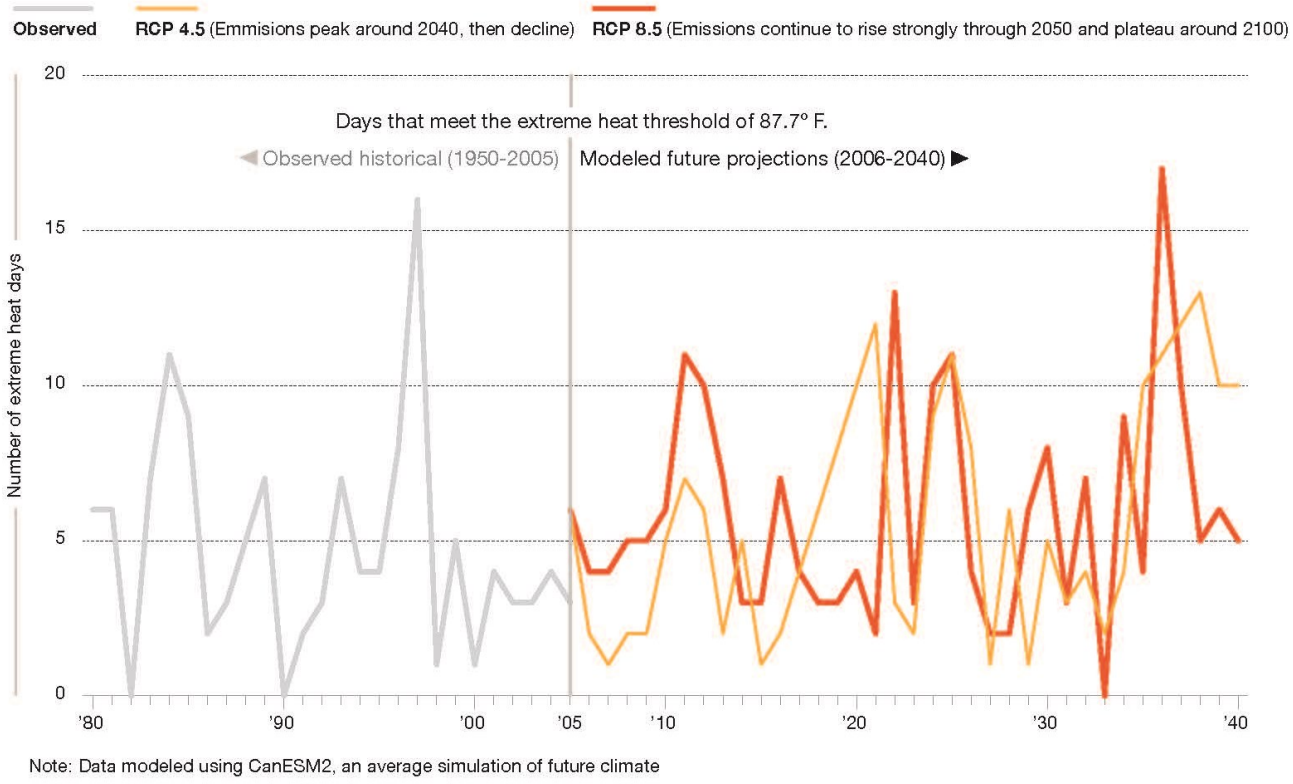
Source: City of Pismo Beach 2019.

After identifying the potential hazard areas, the City prepared a Sea Level Rise Adaptation Plan (City of Pismo Beach 2020a), which outlines a framework of options for adapting to potential future hazards with sea level rise and increasing the City's resilience. The results of the Vulnerability Assessment and the recommendations of the Sea Level Rise Adaptation Plan have been used to guide the development of the policies in this GP/LCP.

2.2 Extreme Heat

Days that reach or exceed 87.7°F in Pismo Beach are described as extreme heat days and are considered a health hazard. Because of climate change, the annual average temperature over the contiguous United States is projected to rise, leading to an increase in extreme heat days each year. As shown in **Figure S-10**, extreme heat days and prolonged heat waves are forecasted to become regular occurrences in the Pismo Beach area. Between the years 2020 to 2050, Pismo Beach is projected to experience five extreme heat days each year (CEC 2019). This represents one more day per year than Pismo Beach experienced on average from 1961 to 1990.

Figure S-10 Average Number of Extreme Heat Days



Source: CEC 2019.

Extreme heat exposure can be described as the frequency and degree to which a community or person experiences extreme heat. Localized factors such as shade, greenspace, and proximity to the ocean can affect how much certain neighborhoods or districts are exposed to extreme heat. The amount of non-natural surfaces, like asphalt, is another contributing factor that can create a heat-

island effect (i.e., areas that are significantly warmer than their surroundings due to human activities). This makes the affected area warmer during the day and limits its ability to cool off after the sun goes down. Another form of exposure to extreme heat is individual exposure. This occurs when a person must be outside during extreme heat events out of necessity. This can include outdoor workers or people who commute by walking or biking. It is important to consider these factors when addressing extreme heat as a hazard.

Sensitivity to extreme heat refers to people who experience greater impacts under the same level of heat exposure. People who are more sensitive to extreme heat include those with physiological factors such as low birthweight, children under 5, and adults over 65. Older adults and young children are more likely to experience adverse health effects, including hospitalization from heat stroke, at lower temperatures than the general population. As of 2017, 33.3% of Pismo Beach's population was over the age of 65 (U.S. Census Bureau 2019), increasing their sensitivity to extreme heat. Economic factors, such as poverty and the age of housing stock, can determine whether housing has air conditioning available, which also contributes to extreme heat sensitivity. In Pismo Beach, only 34% of households have access to air conditioning, making it more difficult to adapt to increased heat days. With rising temperatures due to climate change, sensitive populations may experience greater impacts and adverse health effects.

2.3 Air Quality

Air quality will decrease and air pollution will increase as a result of climate change, with added ozone production, increased wildfire frequency and intensity, and higher levels of allergens.

Ozone

Ground level ozone is an air pollutant and is involved in the creation of smog. Ozone is created through a photochemical reaction involving sunlight and other pollutants. The biggest contributor to ozone levels in Pismo Beach is vehicle exhaust. Increased extreme heat events are also projected to increase ground-level ozone.

Smoke

Due to an increased frequency of drought and overall warmer temperatures, the frequency and intensity of wildfires are expected to increase in the region, further described in Section 2.7. Smoke from wildfires contains various pollutants, and when wildfires burn, these pollutants can cause short- and long-term heart and lung diseases.

Allergens

With warmer seasonal air temperatures due to climate change, the flowering time of plants can lengthen and result in more pollen released into the air. This has the potential to increase allergic reactions and

asthma attacks (CDC 2019). As these events occur more frequently, people are likely to miss school and work more often, and to visit the hospital in extreme cases.

3. Hazards

Pismo Beach is potentially vulnerable to a variety of hazards. The City has experience responding to some of the hazards that have occurred historically. Others, such as those influenced by climate change, present a new challenge for the City and its residents. The Safety Element addresses existing and potential future risks associated with the following hazards and their effects in Pismo Beach:

- Bluff erosion
- Flooding
- Coastal storms
- Geologic and seismic events
- Tsunami
- Wildfire
- Hazardous materials and wastes

After identifying the potential hazard areas, the City prepared a Sea Level Rise Adaptation Plan (City of Pismo Beach 2020a), which outlines a framework of options for adapting to potential future hazards with sea level rise and increasing the City's resilience. The results of the Vulnerability Assessment and the recommendations of the Sea Level Rise Adaptation Plan have been used to guide the development of the policies in this GP/LCP. The Vulnerability Assessment and Adaptation Plan may be used as guidance when implementing the GP/LCP, but only to the extent that they are consistent with any other provisions of the certified LCP.

3.1 Bluff Erosion

Bluff erosion is typically grouped into two general categories: (1) bluffs can suddenly erode or fail in episodic events, usually during a single storm event or season; or (2) bluffs can erode gradually through grain-by-grain erosion. Erosion rates often vary from parcel to parcel based on several factors, including the geologic makeup of the bluff, the presence of shoreline protection, drainage patterns, etc.

Approximately 5 miles of the northwest portion of Pismo Beach's shoreline consists of bluffs ranging in height from 10 to 100 feet. The bluff-backed beaches of this area are often narrow and steep, making them especially susceptible to seasonal effects. These narrow beaches provide little protection from intense winter storms, exposing the bluffs to direct wave impact and potentially significant erosion.

The Santa Maria River represents the largest source of sediment for Pismo Beach, with additional sediment provided by smaller creeks including the Arroyo Grande Creek and San Luis Obispo Creek. Bluff erosion likely only supplies sediment for beach formation at the base of a given bluff and most sediment is supplied by fluvial sources that currently have impaired sediment supply capabilities.

Historically, bluff erosion in Pismo Beach has occurred episodically, with several feet to several tens of feet of the bluff eroding in a single season or storm event. In 1978, bluff erosion caused by severe storms damaged eight homes. In 1998, bluff failures damaged five City roads. In 2009 and 2011, the

beginnings of bluff erosion at State Highway 1 and the sewage pumping station at Shell Beach led to emergency stabilization work to protect the vulnerable areas and infrastructure.

While many of the bluff-top parcels are vulnerable to erosion hazards under existing conditions, each increment of sea level rise will exacerbate these hazards. Sea level rise will result in additional wave energy at the base of the bluffs and will increase the potential for bluff collapse. **Figures S-2 to S-5** depict potential future bluff erosion conditions with varying amounts of sea level rise.

Because bluff erosion is unpredictable and episodic, it is difficult to forecast this type of hazard with much certainty over large areas or long time frames; however, current best available science indicates that bluff erosion has the potential to impact a variety of development types and coastal resources. According to the Vulnerability Assessment (City of Pismo Beach 2019), vulnerable assets include private residences, visitor-serving accommodations, public recreation areas and access ways, and critical public infrastructure. The Vulnerability Assessment predicts that the first row of development from the bluff edge is most likely to be vulnerable to bluff erosion hazards until extreme sea level rise scenarios are reached, at which point development landward of the first row of development could also become threatened. In addition to private development, there are a number of vulnerable storm drain outlets that terminate at the bluff face, multiple wastewater lift stations that have already been affected by bluff erosion hazards, and utility infrastructure that is buried beneath the bluff-top roads, including Ocean Boulevard and Price Street, all of which may be subject to bluff erosion hazards both currently and in the future. In addition, the City maintains several bluff-top parks that are vulnerable to erosion hazards and the Chapman Estate, which is located on a corner-like bluff-top lot that has experienced bluff erosion and collapse in the past and is expected to worsen with sea level rise.

Past bluff erosion conditions have led to the construction of a variety of shoreline protection devices along the City's bluffs; portions of the bluffs have been lined with riprap and multiple types of seawalls, including concrete, shotcrete, terrace, and wooden pile. In addition to devices constructed by private property owners, the City has constructed shoreline protective devices to address erosion threats to critical public infrastructure, including devices at the Andrews Street Lift Station near Memory Park, Vista del Mar Lift Station near Eldwayen Ocean Park, and Cypress Street Lift Station. Constructed sand berms have also been utilized as a temporary bluff protection measure at the northwest limit of Pismo State Beach. The ability of existing shoreline protective devices to tolerate the increased wave action associated with sea level rise, and to continue to serve their protective function, will vary parcel by parcel, depending on the age, condition, and exposure of a given device.

3.2 Flooding

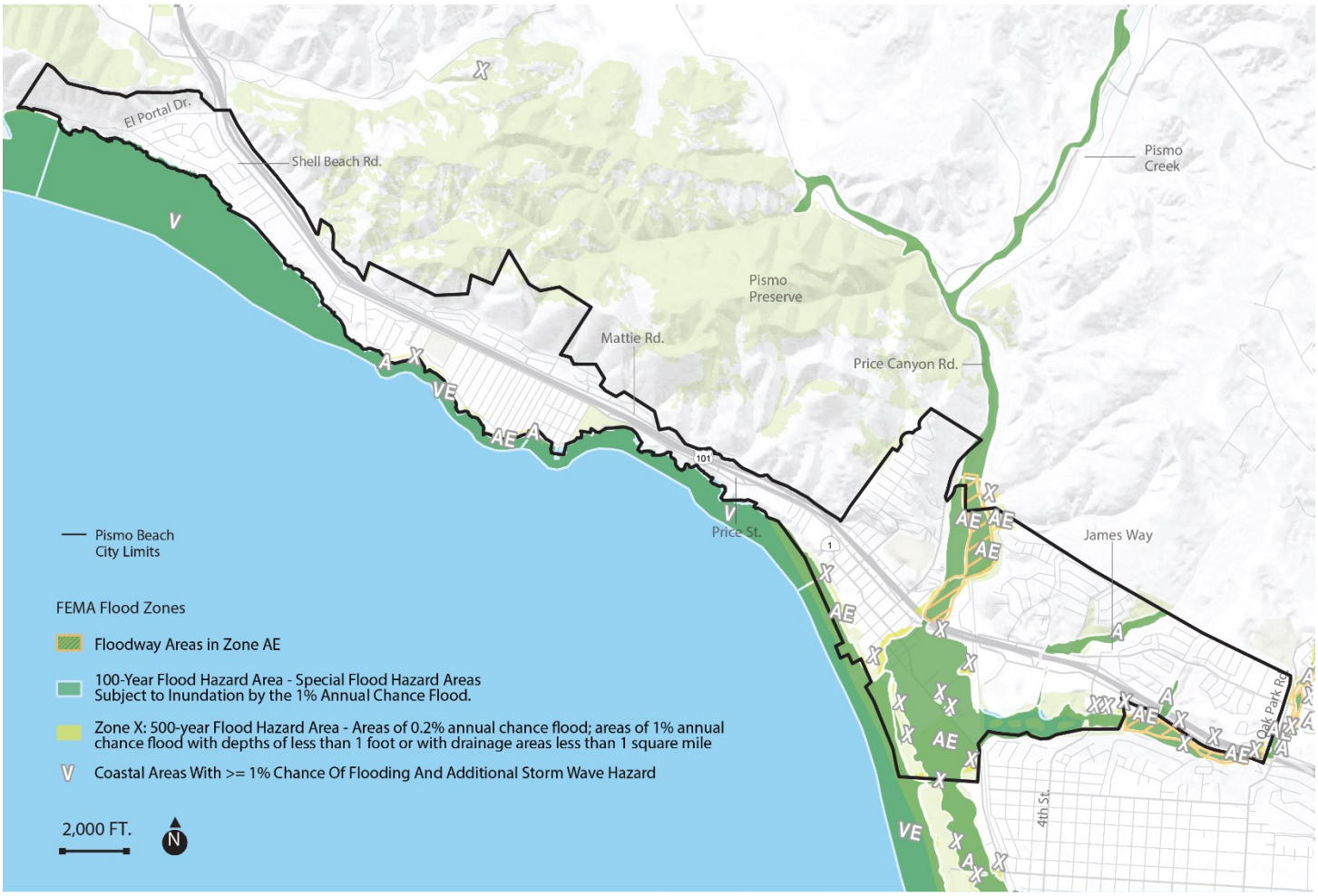
Floods are among the most frequent and costly natural disasters in terms of human hardship and economic loss and are usually caused by weather events. Floods can cause immediate substantial damage to structures, natural features, and utilities, as well as immediate life and safety issues and

prolonged health concerns. Warning systems and evacuation procedures are of critical importance to reduce life and safety impacts from flood hazards.

Generally, flooding occurs in low-lying areas near creeks and other waterways; this area adjacent to a river or stream channel is the floodplain. In its common usage, the floodplain most often refers to the area that would be inundated by the 100-year flood, or the flood that has a 1% chance of being equaled or exceeded in any given year. The 500-year flood is the flood that has a 0.2% chance of being equaled or exceeded in any given year. A 500-year flood event would be slightly deeper and cover a greater area than a 100-year flood event. The potential for flooding can change and increase through various land use changes and changes to the land surface, such as conversion of natural land to asphalt. **Figure S-11** depicts the current Federal Emergency Management Agency (FEMA) special flood hazard area maps.

The City has undertaken efforts to reduce the effects of flooding on its citizens. The City has been a FEMA National Flood Insurance Program participating community since 1984 and will continue to comply with the National Flood Insurance Program. This includes ongoing activities such as enforcing local floodplain development regulations in the Floodplain Overlay Zone, including issuing permits for appropriate development in Special Flood Hazard Areas, and ensuring that this development is mitigated in accordance with the regulations. This also includes periodic reviews of the floodplain ordinance to ensure that it is clear and up to date and reflects new or revised flood hazard mapping. Pismo Beach does not currently have any Repetitive Loss or Severe Repetitive Loss properties.

Figure S-11 FEMA Special Flood Hazard Map



Source: FEMA 2017. Map intended for planning purposes only.

Pismo Beach is susceptible to various types of flood hazards, including riverine or fluvial flooding, coastal storm flooding, and flooding caused by dam failure.

Coastal floods come from large waves in the Pacific Ocean and can be affected by storm surge. Coastal floods can be very dangerous when high waters are combined with the destructive forces of waves. In low-lying coastal areas, storm surge and flooding can reach many miles from the shoreline, flowing up rivers and across flat land. Sea level rise will increase the frequency and intensity of coastal flood hazards. Coastal storm hazards are addressed in more detail in Section 2.3 Coastal Storms.

Riverine or Fluvial Flooding

Riverine or fluvial flooding is defined as the condition when a watercourse (e.g., river or channel) exceeds its capacity. This typically occurs as a result of prolonged rainfall, or rainfall that is combined with already saturated soils from previous rain events. The onset and duration of riverine floods may vary from a few hours to many days. Factors that directly affect the amount of flood runoff include precipitation amount, intensity and distribution, the amount of soil moisture, seasonal variation in vegetation, snow depth, and water-resistance of the surface due to urbanization.

Pismo Beach has two areas that are vulnerable to potential fluvial flood hazards: the Pismo Creek/Price Canyon and Meadow Creek/Pismo Marsh drainage ways (**Figure S-11**). Much of the development along Pismo Creek, south of U.S. Highway 101, falls within the FEMA 1% Annual Chance Flood Hazard Zone, or the 100-year floodplain (**Figure S-11**).

The majority of the Meadow Creek floodplain within the City limits is contained within the California Department of Fish and Wildlife Pismo Creek Ecological Preserve. The preserve is bounded on all sides by slopes, which rise over the 100-year flood level, thus containing flooding within the Preserve boundary. Meadow Creek leaves the Preserve at State Highway 1, which crosses the creek via a low-lying bridge. The creek channel occasionally floods State Highway 1, the commercial property to the north of the creek at State Highway 1, and the North Beach campground during periods of heavy storm flows. The level of flooding is also affected by tidal conditions.

With the aid of the U.S. Army Corps of Engineers, the City has made some alterations to the Pismo Creek channel to reduce flood hazards. Nevertheless, the area of Pismo Beach most prone to coastal and fluvial flooding is between the southern side of its Downtown and the southern City boundary, including the banks of Pismo Creek, Pismo Lake, and the visitor facilities, mobile home communities, and attractions between U.S. Highway 101 and the coastline. The City has also begun the Bello Bridge Replacement Project, which will replace the aging Bello Bridge (constructed in 1913) with a new bridge that is able to withstand flooding hazards and provides an important link across Pismo Creek for both residents, visitors, and emergency responders.

The Pismo Beach Wastewater Treatment Plant is located near Pismo Creek and partially situated within the FEMA regulatory floodway. The plant was originally constructed in the 1950s and provides wastewater treatment services to Pismo Beach and several neighboring communities to the south. The

plant appears to be protected from the current main channel of Pismo Creek northeast of U.S. Highway 101 by a large levee. The Vulnerability Assessment did not predict tidal or extreme storm flooding on the protected side of this levee in any sea level rise scenario, including extreme ones (City of Pismo Beach 2019).

Flooding from streams and rivers that meet the ocean can also be affected by sea level rise. The dry beach fronting Pismo Creek can sometimes form a sand barrier at the creek mouth, causing water to pond behind the beach berm during a stream or river flooding event until the berm is breached. As sea level rise pushes the beach berm landward and upward, the elevation at which breaching occurs will also increase, leading to additional flooding around the creek mouth. As depicted on **Figures S-6 to S-9,** shoreline erosion and increased water surface elevations in Pismo Creek will significantly increase coastal flooding risks to development southeast of Pismo Creek, including the RV resort and mobile home park. These low-lying areas will also be exposed to increasing flood hazards due to the potential for barrier beach flooding during relatively minor flood events on Pismo Creek.

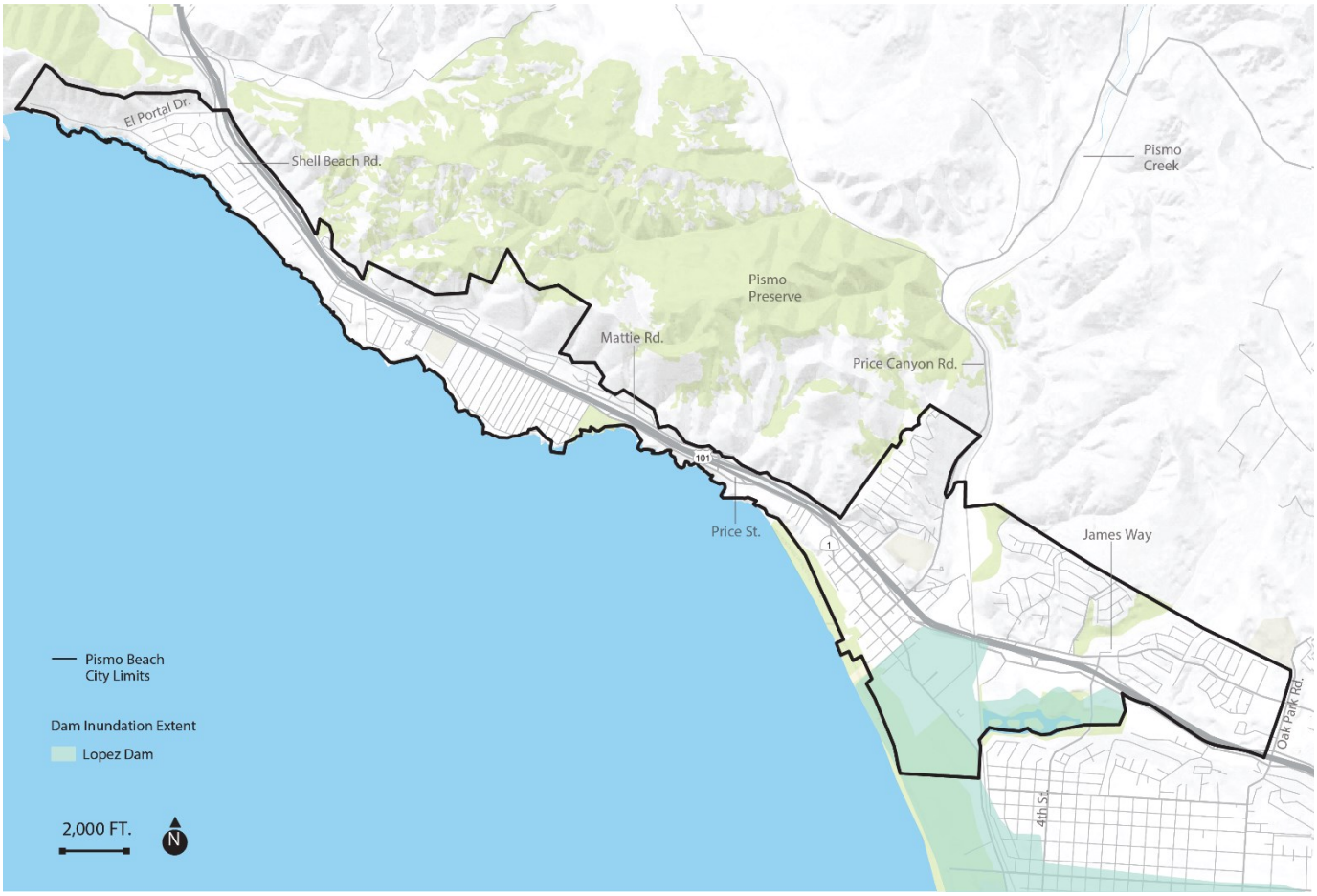
Increased coastal flooding with sea level rise will also affect development in the southeast portion of Downtown, with development first exposed to flooding during large storms and then eventually exposed to tidal flooding with greater amounts of sea level rise. Eventually, non-storm high tide events combined with sea level rise may resemble current storm flooding events. Multiple pump and lift stations in the Downtown area are already exposed to flooding hazards during extreme fluvial storm events. Tidal flooding is not expected to reach these pump stations until sea level rise exceeds 6.6 feet.

People who are unable to evacuate are the most vulnerable to flooding. In Pismo Beach, households without cars and older adults are the most vulnerable. Approximately 40% of housing units in Pismo Beach are occupied by renters, who are less likely to have flood insurance and are more likely to be displaced in a flood.

Dam Failure

Along with Grover Beach and Arroyo Grande, Pismo Beach is among the communities in the County at risk of a dam failure incident. The Lopez Dam, a high hazard earthen dam located upstream from the community, poses a great risk to Pismo Beach if an incident was to occur. According to the County's HMP, Failure of the Lopez Dam would inundate areas within the southern portion of the City limits (County of San Luis Obispo 2019) (**Figure S-12**).

Figure S-12 Dam Inundation



Source: County of San Luis Obispo 2019. Map intended for planning purposes only.

Most of the properties that would be impacted by failure of the dam are residential. Flooding from failure of the Lopez Dam could require mass evacuations and easily overwhelm local response capabilities to save lives. Impacts to life safety will depend on the warning time and the resources available to notify and evacuate the public. Loss of life could result, and there could be associated health concerns as well as negative effects to local buildings and infrastructure.

3.3 Coastal Storms

Coastal storms include tidal flooding, storm surge, and wave action. Coastal storms are volatile and can cause sea levels to temporarily rise much higher than is customary. Storm surge, the most damaging feature of a coastal storm, is the rise in water produced by a storm over and above expected tides. It is caused by the high winds and low atmospheric pressure of a coastal storm and forces water onto shore. Storm surge often results in an increased amount of coastal damage from wave run-up and flooding. The potency of the storm surge can be affected by the intensity and speed of a wave, along with the particular features of the coastline. The combination of storm surge, wave power, and wind produced by a storm can further enhance the destructive forces along the coast. Because coastal storms can occur suddenly, they are most dangerous for those who cannot evacuate quickly.

The area near Downtown and the pier is currently exposed to coastal erosion, wave run-up, and flooding during extreme storm events. The City has requested FEMA disaster recovery funds for coastal storm damages for at least three storms since 1970. Like many coastal California cities, Pismo Beach experienced heavy damages during the 1982-1983 El Niño season. This storm season caused approximately $5.5 million in damages, including collapsing the last 400 feet of the pier, significant bluff failures, and structural losses along the Downtown waterfront. Concrete seawalls have lined areas near the pier since the 1970s and continue to be used today, in addition to steel sheet pile seawalls. Along the Downtown area of the City, the sandy beach area that includes Pismo State Beach is also susceptible to erosion. This potentially impacts beach recreation and coastal access opportunities for many visitors of the City and Pismo State Beach.

With climate change, the frequency, direction, and intensity of storms may transform, causing changes in the occurrences of high sea level extremes. But even if the storm system remains unchanged, sea level rise will amplify the exposure of the coast to storm-driven impacts. The effect of storms on coastal hazards is evident in **Figures S-6 and S-7**, which depict coastal hazards with sea level rise under non-storm conditions, and **Figures S-8 and S-9**, which depict coastal hazards with sea level rise and a 100-year flood event. A comparison of the two sets of figures shows the significant increase in hazards under storm conditions. Extreme amounts of sea level rise, combined with a 100-year storm event, could result in significant hazards in the low-lying Downtown area of Pismo Beach. Loss of the beach from sea level rise will exacerbate these impacts by reducing the natural storm buffer from wave attack for the downtown area. With extreme 6.6 feet of sea level rise, the shoreline is projected to retreat all the way to the back-beach line of development, leaving little or no dry beach remaining at Pismo State Beach (**Figure S-8**). Impacts to the RV resort are possible under lower sea level rise scenarios and potential impacts past Dolliver Street (including the railroad corridor, mobile home communities, and RV resort) are possible under greater amounts of sea level rise even without a storm event (**Figure S-7**) (City of Pismo Beach 2019).

3.4 Geologic and Seismic

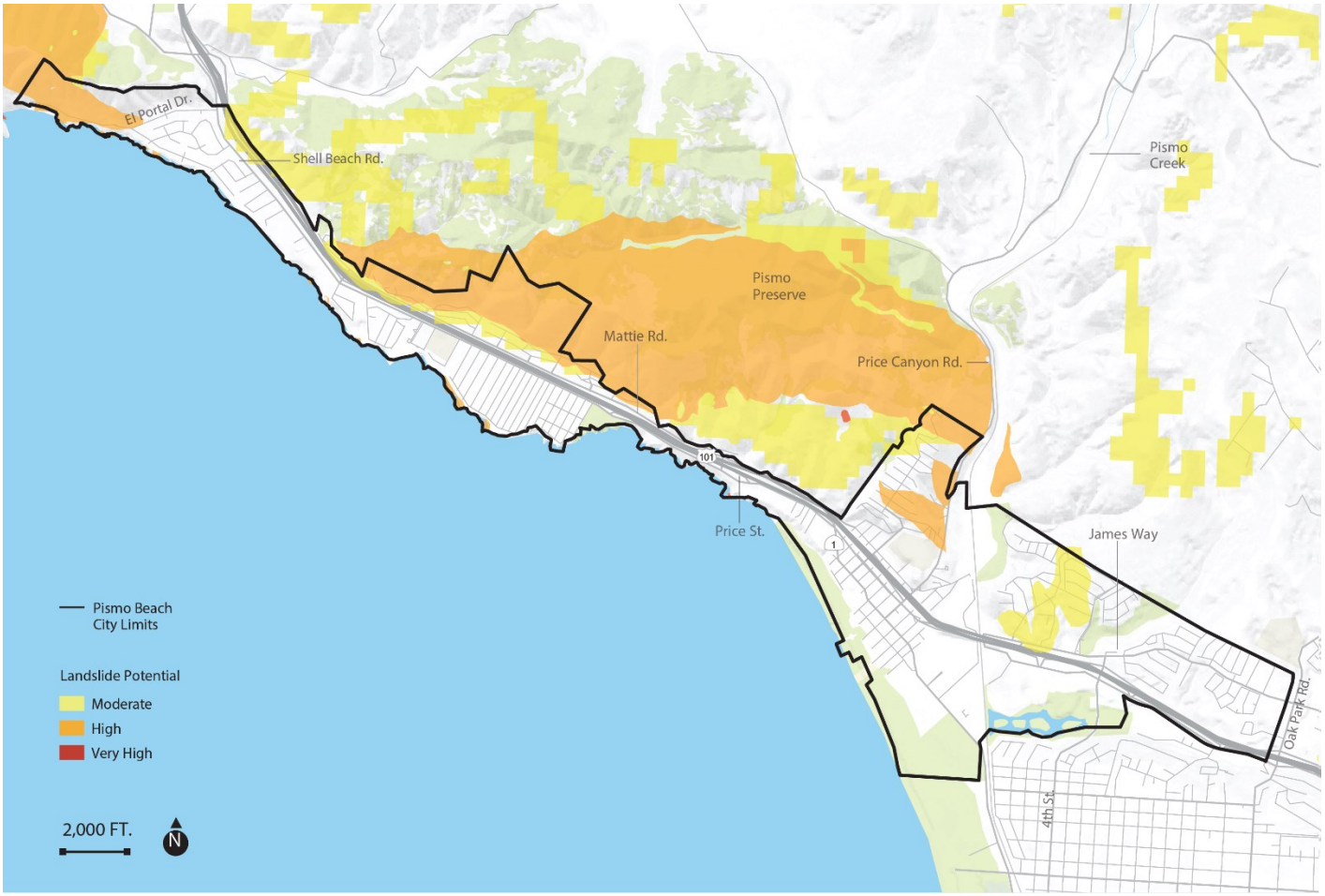
Pismo Beach is vulnerable to geologic and seismic hazards that include landslides and slope instability, earthquakes, and liquefaction.

Landslides/Slope Instability

Landslides are a geological hazard caused by disturbances in the natural stability of a slope. They can be triggered by numerous factors, such as droughts, heavy rain, soil erosion or earthquakes. Different types of landslides vary in speed, as do the possible effects of the landslide. While slower moving landslides can cause gradual damage, rapid landslides, such as mudslides, can quickly destroy property and become life-threatening. The potential for unexpected and significant damage to property and human life increases the importance for appropriate landslide mitigation measures.

Geologists have documented a history of landslide events in Pismo Beach. Earthquake-induced landsliding was observed in the Pismo Beach foothills after the 2003 San Simeon earthquake. Much of the Pismo Foothills abutting Pismo Beach to the north and east are considered a high landslide risk (County of San Luis Obispo 2019). **Figure S-13** displays the areas in Pismo Beach at risk of a landslide.

Figure S-13 Landslide Risk Areas



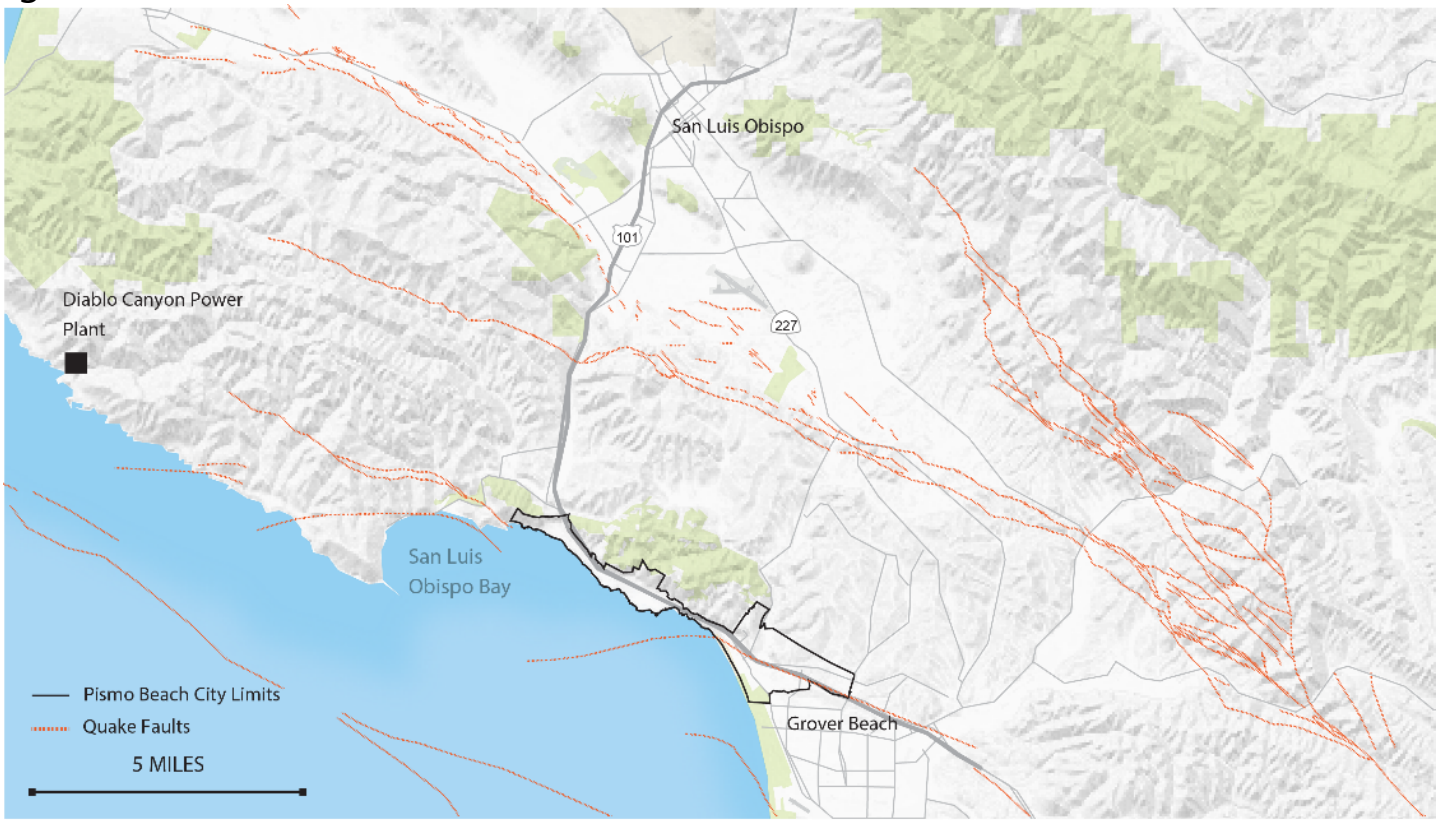
Source: County of San Luis Obispo 2019. Map intended for planning purposes only.

Landslide risk areas are generally limited to portions along the foothills to the north of Pismo Beach. While much of these areas are undeveloped, they are uphill from developed areas and could impact development in the event of a landslide. Furthermore, Pismo Beach is among the communities in the County that has the most properties in the Moderate and High Landslide Potential areas. According to the County's HMP, approximately 950 residential properties are located in moderate or high-risk areas, along with four critical facilities, all microwave service towers (County of San Luis Obispo 2019). With fast-acting hazards, there may be little time for evacuation once the event has begun; therefore, those least able to evacuate, such as older adults and those without access to a car, are the most vulnerable to landslides.

Seismic

While there are no Alquist-Priolo Earthquake Fault Zones within City limits, Pismo Beach is exposed to seismic hazards from movement along several regional faults. Alquist-Priolo earthquake fault zones are regulatory zones surrounding the surface traces of active faults in California. The Alquist-Priolo Special Studies Zone Act (1994) defines an active fault as one that has ruptured in the last 11,000 years (DOC 2019). Maps of earthquake fault zones have been published by the California Geological Survey in accordance with the Alquist-Priolo Special Studies Zone Act. Seismic hazards, including active and potentially active faults near the City, are depicted on **Figure S-14**. The Wilmar Avenue Fault is the only fault within City limits, and it terminates on the south end of the City. The Wilmar Avenue fault is exposed in the sea cliff near Pismo Beach and is considered potentially active but poses a moderate risk of fault rupture hazard to the Cities of Grover Beach and Arroyo Grande.

Figure S-14 Faults Near Pismo Beach



Source: DOC 2019. Map intended for planning purposes only.

Historically, the faults that have caused seismic activity in Pismo Beach have originated from movement along the southern segment of the San Andreas Fault, which is approximately 40 miles northeast of Pismo Beach. The largest historical earthquake that impacted Pismo Beach was the Bryson earthquake, a magnitude 6.2 event in November 1952. The Bryson earthquake caused damage to older, brick masonry buildings in Pismo Beach, but no deaths or injuries were reported. Due to their unpredictability, sensitivity to seismic hazards is different from many other hazards. The age of a

home is one indicator of sensitivity to an earthquake; new standards for homebuilders have created more resilient foundations and homes. Homeowners with lower incomes are disproportionately impacted by geologic hazards due to a lack of capital to rebuild.

Fire Stations 63 and 64, the Police Annex, and Police Department/Emergency Operations Center are vulnerable to an earthquake event. The two public schools in the City of Pismo Beach, Judkins Middle School and Shell Beach Elementary, and the Happy Time Cooperative Preschool are all considered to be vulnerable to earthquake hazards.

Peakload Water Requirements

It is important to identify peakload water demand and supply when discussing seismic risks because large seismic events have the potential to destroy or incapacitate normal water supply. According to the 2020 Water Master Plan Update, the City's current water demands are 1,736 acre-feet per year (which is equal to an average day demand of 1.55 million gallons per day) (City of Pismo Beach 2020b). According to the 2020 Water Master Plan Update, future water demands are expected to increase over time, reaching 2,229 acre-feet per year (1.99 million gallons per day) by buildout in 2045 (City of Pismo Beach 2020b). Demands are typically evaluated using three primary scenarios: average day demand, maximum day demand, and peak hour demand. Using 2011 through 2015 water consumption and production records, the City's 2020 Water Master Plan Update found the average day demand to be 1.55 million gallons per day, the maximum day demand to be 2.64 million gallons per day, and peak hour demand to be 3.95 million gallons per day (City of Pismo Beach 2020).

The City's existing water supply comes from three sources: Lopez Reservoir, the State Water Project, and groundwater wells. The City owns and operates two wells that pump from the Santa Maria Valley Groundwater Basin and have a combined pumping capacity of 1,550 gallons per minute (SLO County HMP 2019). If a local earthquake occurs, local water piping would be at risk, and water from Lopez Lake, the groundwater wells, and recycled water could become temporarily out of service. Earthquakes farther away could also impact the State Water Project. In the event of a loss of water sources, the City has an emergency connection with the City of Arroyo Grande and an opportunity to purchase water allocations from Lopez Lake through the Water Conservation District or State Water Project subcontractors (City of Pismo Beach 2020b).

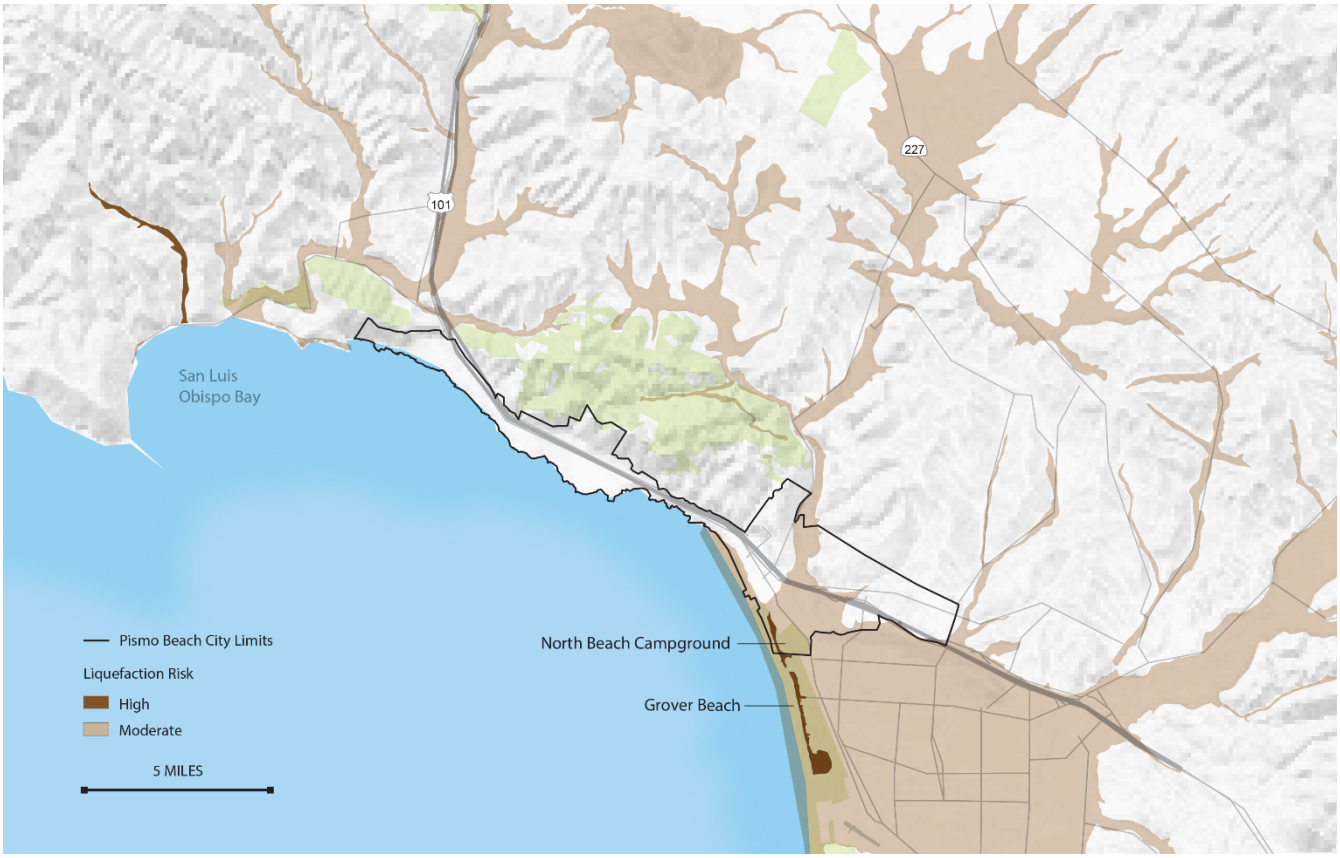
Liquefaction

As a coastal community, liquefaction also poses a risk to the City. Liquefaction, the result of ground-shaking causing fine-grained, saturated soils to liquefy and act as a fluid, generally occurs during significant earthquake activity and has been a major cause of earthquake damage in Southern California. In addition to soil type, the duration of ground shaking is also an important factor in causing liquefaction to occur. The larger the earthquake magnitude, and the longer the duration of strong ground shaking, the greater the potential there is for liquefaction (County of San Luis Obispo

2019). Structures located on saturated granular soils such as silt or sand may experience significant damage during an earthquake due to the instability of structural foundations and the moving earth.

Areas with high liquefaction risk are located along the beach to the west of the North Beach Campground and at the mouth of Pismo Creek (**Figure S-15**). While there are several properties located in an area of moderate liquefaction, government/utility properties are the most vulnerable property type, with a total of 20 properties located in an area of moderate liquefaction risk (County of San Luis Obispo 2019). Areas of moderate liquefaction risk can be found in the southernmost coastal area of Pismo Beach and along Pismo Creek (County of San Luis Obispo Planning and Building Department 2016). These are all areas with low density uses and no development.

Figure S-15 Liquefaction Risk Areas



Source: County of San Luis Obispo 2019. Map intended for planning purposes only.

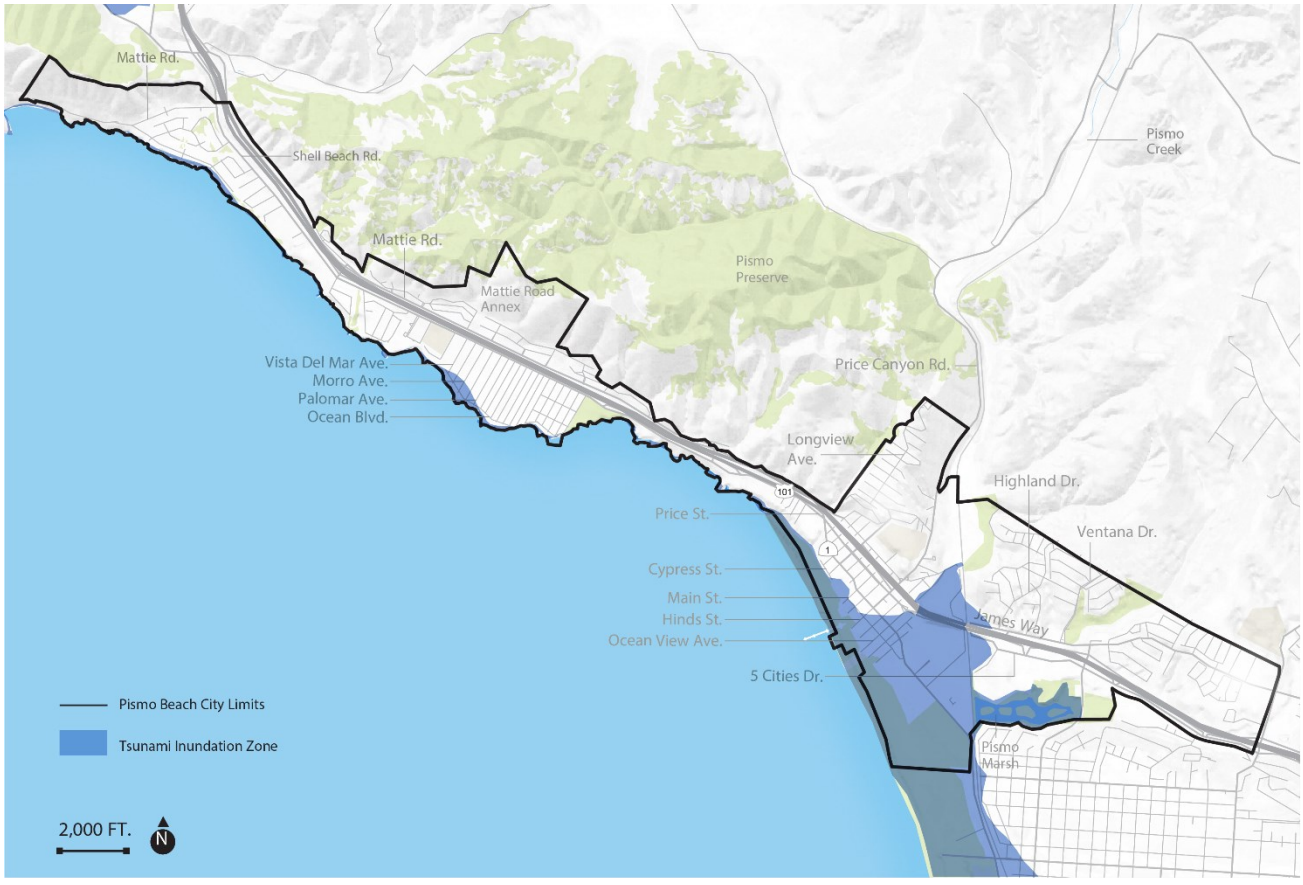
3.5 Tsunami

A tsunami is a series of ocean waves caused by an underwater seismic disturbance, such as sudden faulting or landslide, and is primarily generated by earthquakes occurring below or near the ocean floor. In the deep ocean, tsunami waves can move with a speed exceeding 500 miles per hour and a wave height of only a few inches. As they reach shallow waters off the coast, tsunami waves slow down, and water can pile up into a wall reaching 30 feet or higher.

Tsunami inundation poses a risk to all coastal communities in the County. Offshore faults and related seismic activity could cause a tsunami event off the coast of Pismo Beach, even if the faults are thousands of miles away. Pismo Beach has had a history of tsunami events, with eight events occurring in the last 141 years. Most of these events resulted in little to no wave run-up, except for the 1927 event that resulted in wave run-ups of 6 feet, the 1960 event that had run-ups of over 4 feet, and the 2010 and 2011 events that had wave run-ups under 4 feet.

Much of the development in Pismo Beach is protected from tsunami hazards by the high bluffs, dune systems, and wide beaches; however, the low-lying areas where Pismo Creek meets the ocean are considered to be at moderate risk of tsunami hazards (**Figure S-16**). With sea level rise, tsunami inundation areas could be greater.

Figure S-16 Tsunami Inundation Zones



Source: CalEMA 2019. Map intended for planning purposes only.

The following areas were noted in the City's 2014 Local HMP as being the highest risk from tsunamis (City of Pismo Beach 2014):

- Development located near the mouth of Pismo Creek
- State Parks North Beach Campground
- State Route 1 to the Pacific Ocean from Franklin to Hinds
- U.S. Highway 101 to the Pacific Ocean from Hinds to Price Canyon
- James Way to the Pacific Ocean from Price Canyon to 4th Street

There are approximately 430 properties vulnerable to the impacts of a tsunami. Of the properties at risk, almost 350 are residential, with a majority being multifamily residential. This equates to almost 900 residents being at risk of tsunami events. This number can increase drastically in the summer months when Pismo Beach and the surrounding destinations are filled with visitors who may not be familiar with the risk tsunamis pose or evacuation routes. Quick and efficient response is crucial because tsunamis are difficult to predict, since they are generally predicated by a large earthquake occurring elsewhere. To minimize this risk, the City coordinated with County of San Luis Obispo Office of Emergency Services to develop consistent evacuation signage that will soon be installed.

3.6 Wildfire

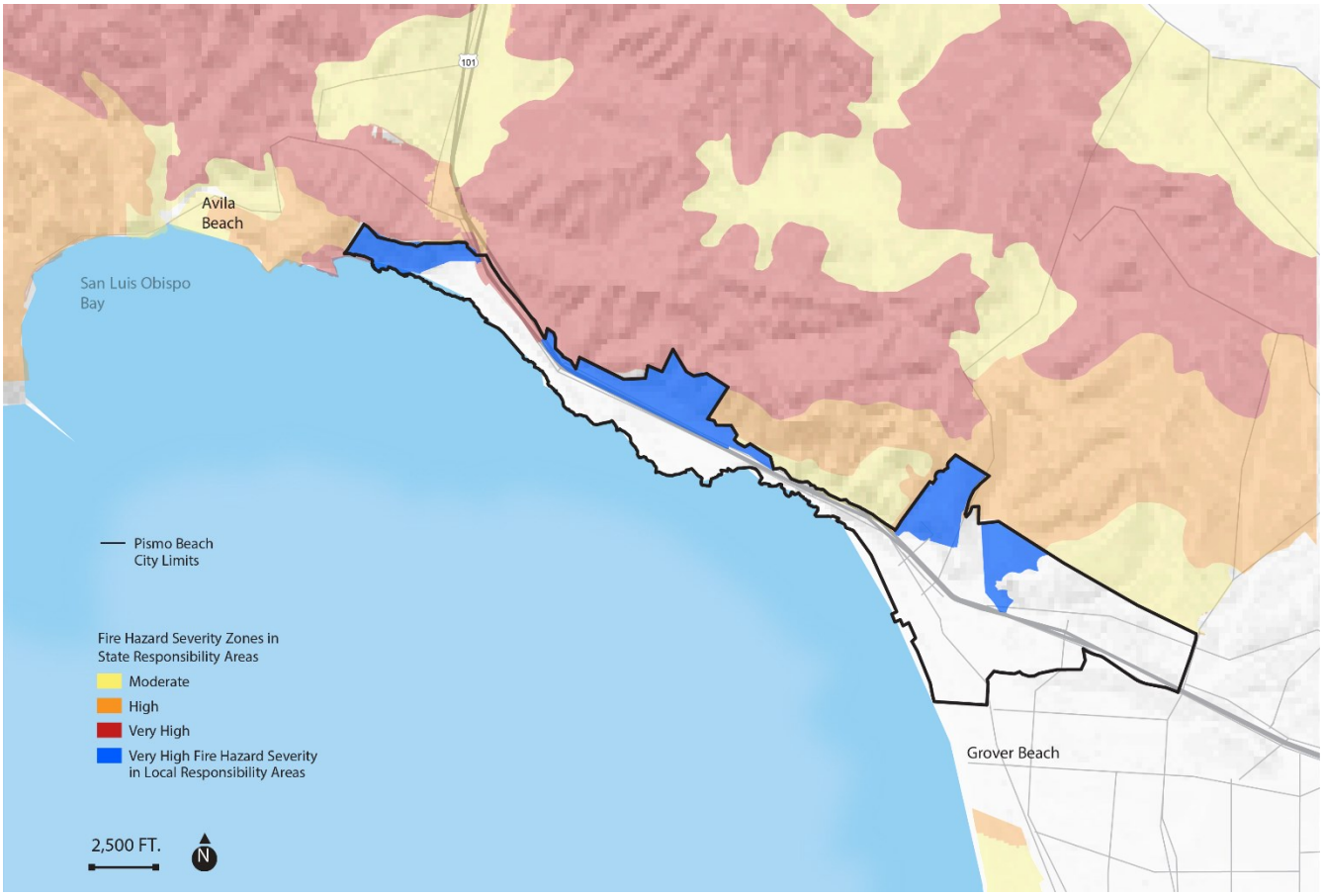
Wildfires are the most common type of natural disaster in California, and over the last two decades, destruction caused by wildfires in the United States has significantly increased. Wildfires are uncontrolled fires in areas of undeveloped land, wildlands, or rural areas. The most influential factors on fire activity are weather and climate. Under warmer temperatures, vegetation experiences longer dry periods more frequently. The dried-out vegetation then becomes fuel for bigger, more damaging fires during wildfire season. Wildfires can ignite from lighting strikes, sparks from power lines, or human activities; however, unplanned ignitions, accidental or intentional, are caused by humans about 85% of the time (USGS 2019). Generally, the risk of fire increases in the late summer and early autumn during prolonged dry periods, especially after wet winters that allow fuel to grow. These risks are expected to increase with the changing climate; as rising temperatures and frequent periods of drought become common occurrences, so will longer, more destructive fire seasons.

Pismo Beach, like the greater County, is at risk of suffering substantial damage from fire events. Wildfires are most likely to start outside the City limits in open space areas. Pismo Beach is bordered to the north and west with open space. Infrequent burns occur naturally in these open spaces, and significant wildfire events are a common occurrence in the Los Padres National Forest, approximately 20 miles east of the City limits (County of San Luis Obispo 2019). In Pismo Beach, the prevailing wind patterns, especially the Santa Ana Winds that are accompanied by warm temperatures, high wind speeds, and low humidity, are another dominant factor that increase the wildfire risk (County of San Luis Obispo 2019)., A large number of damaging wildfires have occurred in the County, notably the

Chimney Fire (2016), the Weferling Fire (1960), the Las Pilitas Fire (1985), the Chispa Fire (1989), the Highway 41 Fire (1994), the Highway 58 Fire (1996), and the Logan Fire (1997) (CAL FIRE and San Luis Obispo County Fire 2013). The fires burned approximately 400,000 acres, destroyed numerous structures, and cost millions of dollars to suppress (CAL FIRE and San Luis Obispo County Fire 2013).

CAL FIRE has created data mapping "High Fire Hazard Severity Zones," which outline areas with higher likelihood of exposure to fire, based on factors such as the nature of the vegetation in the area. CAL FIRE designated Pismo Beach as being at an increased risk from wildfires and a priority community to work with to prepare and mitigate potential fire risk. **Figure S-17** depicts the Fire Hazard Severity Zones map for Pismo Beach.

Figure S-17 Fire Hazard Severity Zones



Source: CAL FIRE 2007. Map intended for planning purposes only.

As shown in **Figure S-17**, Fire Hazard Severity Zones, the areas of greatest risk to fire hazards in Pismo Beach are the northern portion of the City reaching into the foothills, northeast near Price Canyon, and northwest toward Avila Beach. Approximately 26% of the City is in a Very High Fire Hazard Severity Zone.

As human development continues to encroach on natural areas, human life and property are more susceptible to fire hazard. The risk of wildland fires is greatest near the City limits where development meets rural areas of combustible vegetation (County of San Luis Obispo 2019). This encroachment occurs in areas called the wildland-urban interface (WUI). The WUI is defined by CAL FIRE as an area that lies within the High and Very High Fire Hazard Severity Zones. Wildland fires result in a high risk for personal injury, loss of life of inhabitants of the area and firefighters, and losses of structures and personal property. Wildfires in or near the WUI frequently require emergency evacuation and sheltering, often for many days. Analysis from the County's HMP identified approximately 1,000 properties in Pismo Beach that are located within the Very High Fire Hazard Severity Zone. The majority of the properties were categorized as residential. There is one critical facility, a microwave service tower, located in the very high severity wildfire zone.

Wildfires can destroy homes, businesses, and critical infrastructure. Major wildfires can also increase vulnerability to other hazards when they destroy groundcover. If heavy rains follow a major fire, flash floods, heavy erosion, land subsidence and mudflows can occur. These secondary effects of wildfires, including landslides, introduction of invasive species, and changes in water quality, are often more disastrous than the fire itself (USGS 2019). Fire hazard susceptibility is related to the ability to evacuate, similar to tsunami events. Evacuation is especially important because it should be noted that wildfires can, at times, be outrun. Like other hazards, those who are unable to evacuate, such as older adults and those who lack transportation, are most vulnerable to fire hazard in Pismo Beach.

Although a large portion of fires occur in wildland or WUI areas, fires in urban areas are still a possible hazard. Urban fire occurs primarily in cities or towns with the potential to rapidly spread to adjoining structures. These fires damage and destroy homes, schools, commercial buildings and vehicles. Modern building codes and practices have helped reduce their effects over the years, as building materials greatly affect the susceptibility of a structure to fire; however, other factors such as the age of construction and landscape materials can still contribute to the risks associated with urban fire hazard.

While attention is often focused on the potential damages from wildfire in the WUI, wildfire also presents a threat to critical infrastructure, including flood water conveyances and water conveyances critical to municipal water supplies (USGS 2014). Providing protection during a fire is a critical function of a water distribution system. Fire flow requirements are typically set by the jurisdiction's Fire Chief using requirements set forth in the California Fire Code. Historically, the City's fire flow requirements are 1,500 gallons per minute in residential areas, 2,500 gallons per minute in commercial areas, and 4,500 gallons per minute in the Downtown area while maintaining a residual pressure of 20 pounds per square inch throughout the distribution zone. Overall, the distribution system can meet fire flow requirements in most residential areas but has difficulty meeting fire flow requirements in the Downtown area and commercial zones along Five Cities Drive. Further analysis and recommended fire flow projects within the City's distribution system to meet the required fire flow are provided in the City's 2020 Water Master Plan.

The changing climate, specifically the rising temperatures and increasing temporal variability of water availability, is substantially increasing wildfire risk in many areas. To minimize the City's fire hazard risks, the City of Pismo Beach Fire Department has a cooperative fire protection agreement with CAL FIRE and the San Luis Obispo County Fire Department. There are two fire stations in Pismo Beach; Station #63 is located at 2555 Shell Beach Road and Station #64 is located at 990 Bello Street (see **Figure S-18** below).

3.7 Hazardous Materials and Waste

Hazardous materials are substances that may have negative effects on human health or the environment. Hazardous materials are identified as being toxic, flammable, explosive, corrosive, infectious, radioactive, or a combination of these characteristics. These materials can enter floodways, causing health concerns and polluted water supplies. Exposure to hazardous materials may cause injury, illness, or death. Factors affecting the severity of an accidental release include toxicity, quantity, dispersal characteristics, location of release in relation to population and sensitive environmental areas, and efficacy of response and recovery actions. Hazardous material incidents can result from a variety of events, such as earthquake damage or other natural phenomena; human error; equipment failure; intentional dumping; mobile accidents on a waterway, roadway, or railroad; or radiological accidents. A primary threat in Pismo Beach is from transportation accidents involving hazardous materials, as vast quantities of materials are transported throughout the County by truck and rail. Specifically, Pismo Beach is potentially exposed to the effects of a possible hazardous material incident due to its proximity to U.S. Highway 101 and the railroad. The County of San Luis Obispo Hazardous Materials Emergency Response Plan works to establish the County's response organization, command authority, responsibilities, functions, and interactions required to mitigate hazardous material incidents (County of San Luis Obispo 2013).

The California Office of Emergency Services Warning Center reports 54 hazardous materials incidents in Pismo Beach from 1994 through October 2018 (County of San Luis Obispo 2019); however, this number likely excludes a number of unreported minor spills. Pismo Beach constitutes just 3% of the hazardous materials incidents reported countywide during the same time frame and averages out to roughly 2.2 incidents per year. Only around 6% of reported hazardous materials incidents result in injuries, fatalities, or evacuations. There are no significant hazardous materials facilities located in the City limits.

3.8 Radiation

Located approximately 8 miles southwest of Pacific Gas and Electric's Diablo Canyon Nuclear Power Plant, Pismo Beach sits within the plant's Emergency Planning Zone. An Emergency Planning Zone is a roughly 10-mile radius around a nuclear power plant as determined by the Nuclear Regulatory Commission and U.S. Environmental Protection Agency. The potential for a hazardous situation arises from the presence and transport of highly radioactive nuclear fuel within the City limits.

Radioactive waste from the plant is stored on site. The plant is permitted to run until 2025, when the plant's permits will expire and will not be renewed (PG&E 2019). Energy production operations will be shut down indefinitely over time, with storage continuing on site until further notice (City of Pismo Beach 2014). While extremely unlikely, an earthquake or tsunami could potentially release the nuclear waste stored on site and expose Pismo Beach to radiation.

4. Disaster Preparedness, Response, and Recovery

Since the threat of many hazards cannot be avoided completely, it is important to minimize the City's exposure and risk from hazards as much as feasible, to understand who is most vulnerable to a hazard, and to prepare the City for responding to and recovering from hazards. The City's website provides individuals, families, and businesses with "Community Emergency & Disaster Preparedness" information, including resources and information on how to prepare for an emergency (City of Pismo Beach n.d.). The Preparedness web page also provides information specific to individuals with various disabilities such as mobility, vision, hearing, and special medical needs. The County of San Luis Obispo Emergency Operations Plan further discusses evacuation routes and disaster preparedness, response, and recovery for extraordinary emergencies associated with natural disasters, technological incidents, and national security within or affecting the County (County of San Luis Obispo 2016).

Vulnerable Community Members

Compared to California as a whole, Pismo Beach is a relatively healthy and affluent community. With a score between 5% and 10%, Pismo Beach falls well below the state's 75% threshold for determining disadvantaged communities based on social vulnerabilities (such as poverty or English language proficiency) and pollution burden (such as air quality and proximity to hazardous waste sites) (OEHHA 2018). Additionally, the City's two census tracts are in the top 25% for living conditions according to the Healthy Places Index (CDPH 2018).

Although Pismo Beach is not considered disadvantaged as defined by the state, specific people and populations in Pismo Beach may be more vulnerable to certain hazards. Children, pregnant women, older adults, and those with certain preexisting conditions are considered a "sensitive population" due to their physiological susceptibility. Additionally, people with fewer economic resources, limited mobility, lack of access to transportation, lower English language proficiency and education, and uncertain citizenship can be considered vulnerable because they have fewer resources to adapt, evacuate, or access information.

In Pismo Beach, the most notable vulnerable population is older adults. As of 2017, 33.3% of Pismo Beach's population was over the age of 65, which is nearly triple the state average of 12% (U.S. Census Bureau 2019; OEHHA 2018). Older adults experience more extreme health events per year, as they experience heat stroke and other heat-related illnesses at lower temperatures than the general population.

Three key groups may have a hard time evacuating from a hazard or disaster event: (1) those who have limited English skills and may not receive adequate warning, (2) those without a car, and (3) older adults who may not be able to drive at night and have limited social connections. In Pismo Beach, most households have a least one adult member with strong English language skills. However, 7% of households do not have access to a car. Again, because approximately one-third of the population in Pismo Beach is over the age of 65, a significant percentage of the population in impacted areas may have a hard time evacuating and therefore would be vulnerable to a disaster event.

Critical Infrastructure

Infrastructure assessed here includes emergency response facilities, critical and non-critical public facilities, and evacuation routes. The County of San Luis Obispo Office of Emergency Services oversees response to emergencies by coordinating evacuations, evacuation routes, and emergency facilities.

Emergency Response Facilities

Emergency response facilities are those which are activated and used to respond to an emergency or hazard. In Pismo Beach there are two fire stations located at 990 Bello Street and 2555 Shell Beach Road. There are also two police stations, as shown on **Figure S-18**. Pismo Beach has 11 emergency services facilities, and it is important that they remain operable during an emergency or after a disaster. Some of these emergency service facilities may be vulnerable to hazards, hindering their ability to support response efforts.

Figure S-18 Emergency Response Facilities



Critical Facilities

Critical facilities are facilities essential to the City's continued functioning, or are public buildings used to gather people or equipment during the response or recovery from a hazard. City Hall, various public offices, the wastewater treatment facility, lift stations, the water treatment plant, water-pressure booster stations, wells, and water reservoirs are all considered critical. Hospitals, fire stations, and local law enforcement stations are also typically considered critical, and according to FEMA, should be given special consideration when considering hazard mitigation. There are seven lifeline utility systems within Pismo Beach, including six microwave service towers and one wastewater treatment plant.

Non-critical Public Facilities

Non-critical facilities are those that can be used in hazard recovery to gather resources, distribute information, or serve as shelters. These facilities are flexible and may or may not necessarily be used during a hazard or emergency event. Some non-critical facilities in Pismo Beach include the eight schools and the Shell Beach Library. In the event of an emergency, these entities would coordinate with City staff for potential shelter availability.

Evacuation Routes

The City also has planned evacuation routes, based on the specific hazard type and location. The routes generally include major roads and highways. In Pismo Beach this would include, most notably, U.S. Highway 101, which traverses through the center of the City along its entire length, Oak Park Boulevard, and Price Canyon Road. Many areas of Pismo Beach, including Pismo Heights, Price Canyon, and Shell Beach, have limited accessibility. In addition, some evacuation routes may include some of Pismo Beach's 18 bridges; however, according to the County's HMP, the bridges within the City limits that cross U.S. Highway 101 are vulnerable to an earthquake event and, in some cases, may also be at risk of other hazards such as flooding from tsunami, Lopez Dam failure, or large storm event (County of San Luis Obispo 2019). To improve evacuation, the City has been coordinating with San Luis Obispo County Office of Emergency Services regarding consistent emergency evacuation signage and will soon install them. Other transportation facilities within or near Pismo Beach include Oceano County Airport and the San Luis Obispo County Regional Airport. Both airports are outside the City limits but could affect the City if these facilities were impacted by a disaster (County of San Luis Obispo 2019).

5. Goals, Policies, and Actions

Goal-1 – A well prepared and educated community that can quickly and effectively respond to and recover from a hazardous event.

Policy 1.1 – Hazard Education Programs. Develop education and outreach programs to prepare the City for hazard events.

Action 1.1a – General Hazard Awareness Campaigns. Information on potential disasters, appropriate preparations, and planned responses shall be disseminated as widely as possible to the media and general public. Special attention should be afforded to those groups particularly susceptible to seismic, fire, and flooding hazards including, but not limited to, school districts, agencies involved with the aged, and agencies involved with handicapped persons. All information should be produced in English and Spanish.

Action 1.1b – Emergency Alerts. Advertise the "Alert Center" at community events and at City Hall to encourage sign-ups. Allow members of the public to sign up for alerts in English or Spanish.

Action 1.1c – Seismic Hazard Education. Develop an "Earthquake Education Program" for residents that illustrates what steps an individual can take to prepare for and mitigate the effects of earthquakes. Coordinate with Community Emergency Response Teams (CERT) where applicable. School districts and agencies related to aged, handicapped, and seismically susceptible industries should be encouraged to develop education programs relative to seismic awareness.

Action 1.1d – Dam Failure Outreach. Work with the County to develop a public outreach program that informs property owners located in the dam or levee inundation areas about voluntary flood insurance.

Action 1.1e – Outreach and Local Training. Coordinate with the San Luis Obispo Regional Hazardous Materials Response Team for outreach and local training.

Policy 1.2 – Emergency Disaster Response Programs. Regularly update plans and agreements with other agencies to respond to changing hazard risks.

Action 1.2a – San Luis Obispo County Multi-Jurisdictional Hazard Mitigation Plan. Coordinate across City departments and seek to align the City's portion of the County's Multi-Jurisdictional Hazard Mitigation Plan (HMP; County of San Luis Obispo 2019) with the General Plan/Local Coastal Program (GP/LCP) to ensure that proactive adaptation efforts are coordinated and responses to damage from future hazards, including with climate change, are streamlined. Identify future adaptation projects that meet the goals of both the GP/LCP and HMP and leverage Federal Emergency Management Agency (FEMA) funding opportunities for hazard mitigation and other related funding mechanisms to implement such projects.

Action 1.2b – Emergency Response Plan. Develop and maintain a multi-hazard emergency response plan that conforms to state and federal requirements. Objectives of the plan shall be:

1. To save lives and property;
2. To provide a basis for direction and control of emergency operations;
3. To provide for continuity of government;
4. To repair and restore essential systems and services;
5. To provide for the protection, use, and distribution of remaining resources;
6. To coordinate operations with other neighboring jurisdictions;
7. To enable the City to be self-sufficient in the weeks following a severe disaster event;
8. To provide for emergency medical facilities, temporary shelter, emergency communication equipment, and emergency food and water supplies;
9. To establish a priority system for roads, services, and other vital needs during an emergency event;
10. To train volunteers to assist police, fire, and civil defense personnel after an emergency event; and
11. To anticipate an accident during the transportation of hazardous materials, including an accident on the Southern Pacific rail line or U.S. Highway 101.

Action 1.2c – Coordination with Stakeholder Agencies. The City shall consult with regional, state, and federal agencies on the effects of climate change on local hazards, including sea level rise. This should include coordination with California Department of Transportation (Caltrans), California State Parks, Union Pacific Railroad, San Luis Obispo Regional Transit Authority, South County Transit, and other stakeholder government agencies that own/manage public infrastructure along the shoreline. This coordination should aim to protect public access to the coast and minimize the impacts of sea level rise on assets such as Pismo State Beach (including the North Beach campground and the Monarch Butterfly Grove), U.S. Highway 101, Dolliver Street Bridge, Pismo Lake Ecological Reserve, and the railroad. The intent of this coordination should be the implementation of planning solutions before coastal hazards are accelerated by sea level rise and impacts start to occur. Such consultation shall help prevent the squeeze of the beach between rising sea levels and infrastructure and shall work to maintain a minimum beach width that supports public access, recreation, beach ecology, and the function of the beach as a buffer for coastal hazards.

Action 1.2d – Essential Public Services. The City shall prepare and maintain a program to coordinate, repair, and restore essential public services and utility systems following disaster-caused interruptions.

Action 1.2e – Mutual Aid. Continue to use and refine existing Auto Aid plans with surrounding agencies.

Action 1.2f – Citizen Response. Encourage citizens to participate in programs, including the South San Luis Obispo County Community Emergency Response Team (CERT), which

train volunteers to assist police, fire, and civil defense personnel to perform effectively after a disaster event.

Action 1.2g – Evacuation. Highways most suitable as evacuation routes are U.S. Highway 101, State Highway 1, and Price Canyon Road. The City shall establish minimum road widths and maintenance schedules for critical evacuation routes. Continue to coordinate with the County of San Luis Obispo Office of Emergency Services and participate in regional efforts to develop and implement response plans that the City's emergency services can adopt for evacuation in the case of a hazard event, such as a tsunami warning.

Action 1.2h – Hazardous Materials Regulation. Regulate the location, use, storage, and transportation of hazardous and toxic materials to protect the public and the environment from these hazards.

Policy 1.3 – Critical Facilities. Design critical facilities to operate under hazardous conditions, including with climate change.

Action 1.3a – Existing Facilities. All critical facilities constructed prior to 1948 shall be reviewed by City staff and/or a structural engineer for potential hazards, including hazards as they are influenced by climate change. If such facilities are anticipated to experience a greater number or severity of hazards incidents, including flooding, bluff erosion, or wildfire, City staff shall provide recommendations for on-site improvements or opportunities for relocation to decrease risk and maintain operational function.

Action 1.3b – New Facilities. All new critical facilities shall:

1. Shall not be located in a hazard zone, including a flood or fire hazard zone, unless this location is critical to its function, and there are no feasible alternative sites;
2. Shall be designed to continue to function after a major earthquake; and
3. Shall have sufficient back-up power supply on site.

Policy 1.4 – Sea Level Rise Resiliency. Support efforts to develop a better understanding of sea level rise and participate in coordination and collaboration to increase resiliency.

Action 1.4a – GP/LCP Updates. The City will conduct an evaluation at least every 10 years to determine whether additional policies and/or actions are necessary for inclusion in the GP/LCP in order to better address the impacts of sea level rise and other coastal hazards. Such GP/LCP amendments may include updates to hazard overlay maps, policies, and/or the zoning code if such updates are needed to address changed conditions, updates to the best available science that provides new information and alters the projected timing or amount of sea level rise, and/or changes to the sea level rise adaptation strategies based on the observed efficacy of whatever adaptation strategies have been implemented. The scope of each update is expected to vary depending on the extent to which conditions have changed over time.

Action 1.4b – Sea Level Rise Information. The best available scientific information regarding sea level rise projections and effects shall be considered in the preparation of findings and recommendations for all geologic, geotechnical, hydrologic, coastal hazards, and engineering investigations.

Action 1.4c – Sea Level Rise Monitoring. The City, or other entity authorized by the City, shall conduct monitoring and shall keep a record of all monitoring data and reports to track the increase in local sea levels over time. The City shall establish a baseline condition for each of the following monitoring methods within 5 years of the date of certification of the GP/LCP. Monitoring sites and methods shall be consistent in timing, location, and technique. The City should collaborate with other local, regional, state, and federal entities to establish consistent monitoring methods and to collaboratively track the effects of sea level rise, where feasible. Supplementary surveys should be performed immediately following any significant bluff or shoreline erosion events. Monitoring shall include the following:

1. **Beach Monitoring**. Conduct annual or seasonal beach profile surveys documenting shoreline width, slope, height, or other features as necessary. This data will be useful to verify projected rates of shoreline retreat along the Downtown and low-lying study areas and quantify the efficacy of any beach nourishment or additional sediment management activities. The City will use the beach width data collected within 5 years of certification of the LCP as a baseline for future monitoring.
2. **Bluff Monitoring**. Conduct coastal bluff surveys in the northern portion of the City at 5-year intervals using technology such as LIDAR to document the bluff top and toe position, nearshore slope, bluff face slope, and other bluff features as needed. This monitoring will provide actionable data in the face of uncertain projections and be useful for the site-specific geologic hazard analyses that are required for development along the bluffs. The City will use the bluff data collected within 5 years of certification of the LCP as a baseline for future monitoring. Opportunities to coordinate and collaborate with other agencies on large-scale studies and efforts should be pursued.
3. **Fluvial Monitoring**. Fluvial flooding conditions from Pismo Creek shall be monitored, e.g., frequency of overbank/flood events.

Action 1.4d – Additional Research. Encourage opportunities to conduct additional research on combined fluvial and coastal flood hazards in the low-lying areas bordering Pismo Creek and Meadow Creek.

Action 1.4e – Inventory of Existing Shoreline Protective Devices. The City shall support CCC efforts to establish an inventory of all existing shoreline protective devices, and provide relevant information such as their associated design lives, capacity to function under near-term sea level rise scenarios, and a general assessment of the existing principal structure the device is needed

to protect, as it is available. The City shall identify maintenance and improvement requirements for the existing, city-owned protective devices and an initial feasibility analysis of alternatives to shoreline protection or opportunities to minimize and mitigate adverse impacts to coastal resources. As part of necessary maintenance or replacement of an existing, city-owned protective device, opportunities to incorporate additional protective capacity to account for sea level rise hazards should be included. Any maintenance and improvement of existing shoreline protective devices shall be consistent with the requirements of the GP/LCP.

Action 1.4f – Public Outreach. The City shall promote public outreach to disadvantaged communities and especially sensitive populations in public decision-making regarding coastal hazards. Ensure that opportunities to participate are not denied on the basis of background, culture, race, color, religion, national origin, income, ethnic group, age, disability status, sexual orientation, or gender identity.

Action 1.4g – Regional Sediment Management Planning. To increase efficiency and reduce costs, the City should advocate for regionally coordinated sediment management programs that benefit multiple jurisdictions, including those outlined in the County of San Luis Obispo Coastal Regional Sediment Management Plan (May 2016). The City should consider taking a more active role in regional planning by appointing a local elected official to represent Pismo Beach on the San Luis Obispo Council of Governments Policy Advisory Committee, which serves as the implementation body for the County of San Luis Obispo Coastal Regional Sediment Management Plan.

Action 1.4h – Opportunistic Beach Nourishment. In coordination with the CCC and other permitting agencies, the City shall explore the potential for opportunistic beach nourishment to serve as a viable adaptation strategy for the bluffs region of the City and to reduce the adverse impacts of both current and future beach and bluff erosion. Potential sediment sources that should be considered include material dredged from Port San Luis and upland sources for construction or maintenance of flood control infrastructure such as debris basins and channels. The City should consider how replenishment options may need to change over time as sea level rises. Any beach nourishment program for sediment deposition shall:

1. Be designed to minimize adverse impacts to beaches, marine resources, onshore and offshore ecological resources, restoration sites, water quality, coastal access, and recreational activities;
2. Be designed to match existing beach sediment size and aesthetics as closely as feasible;
3. Consider the method, location, and timing of placement. Opportunistic sediment removed from catchment basins may be disposed of in the littoral system if it is tested and found to be safe and of suitable grain size and type. The program shall identify and designate

appropriate beaches or offshore feeder sites in the littoral system for placement of suitable materials from catchment basins;

4. Incorporate appropriate mitigation measures for any unavoidable coastal resource impacts;
5. Include adequate monitoring protocols to measure impacts on beach width and elevation, as well as impacts on biological resources; and
6. Sand retention devices may be necessary in conjunction with sand nourishment to protect public beaches in danger of erosion, but should be sited and designed to first avoid, then minimize and mitigate adverse impacts to coastal resources to the maximum feasible extent, consistent with California Coastal Act Section 30235.

Beach nourishment in the Downtown area of the City should also be considered; however, a detailed study of the potential impact of sea level rise and beach nourishment on fluvial flooding must be part of any feasibility analysis.

Action 1.4i – Capital Improvement Projects. Incorporate the probability of sea level rise and coastal hazards into the Capital Improvement Planning process as an effective way to ensure that public projects account for future hazard risks and as an opportunity to include strategies that build adaptive capacity into coastal infrastructure. The City shall facilitate a science-based approach to sea level rise hazard analysis for capital improvement projects by identifying a design life and risk tolerance, consistent with the requirements of this element and current state and federal guidance. For future facility or infrastructure development, as necessary, the City will analyze and evaluate a combination of structural and non-structural adaptation measures as part of a Coastal Development Permit (CDP) or other processes (e.g., public works plan) with a preference towards non-structural solutions, including beach nourishment, dune restoration or living shorelines, and relocating infrastructure, unless the structural solutions are less environmentally damaging.

Action 1.4j – Nature-Based Adaptation. Encourage the establishment of pilot programs that utilize soft or natural shoreline protection methods, such as dune restoration, living shorelines, rocky intertidal habitat restoration, and other "green" infrastructure as alternatives to hard shoreline protective devices. Soft shoreline protection devices shall be fully evaluated for coastal resource impacts, and shall only be approved if found consistent with the GP/LCP policies related to shoreline protection. The City should consider how these options may need to change over time as sea level rises and identify adaptive management strategies for maintenance over time and/or removal if deemed necessary. Opportunities to study and monitor such projects over time and share lessons learned with other jurisdictions should be encouraged.

Action 1.4k – Incentives and Funding. The City should explore the feasibility of potential funding mechanisms and incentives for adaptation implementation that may include, but are not limited to, a Coastal Geological Hazard Abatement District; tax incentive programs, grant

program, or direct cost share assistance program for shoreline landowners; a transfer of development rights program; and a development impact fee program.

Goal-2 – A community that minimizes damage to public and private property from hazards.

Policy 2.1 – Minimize Risk. New development shall be sited and designed to minimize hazard risk and to be resilient to natural and anthropogenic hazards.

Action 2.1a – Building and Safety Codes. Require new development to meet the requirements for any applicable hazard zone within which it exists. Use the planning and technical criteria presented in this element as basic guidelines for all new development.

Action 2.1b – Industrial, Commercial, and Utility Development. Evaluate new industrial, commercial, and utility development to ensure that construction and operation of the project will not cause hazardous conditions at an unacceptable level of risk.

Action 2.1c – Site Design. Require new development to avoid portions of sites with high hazard levels to the maximum feasible extent and consistent with the requirements of this element.

Action 2.1d – Hazardous Materials. A use permit shall be required for any commercial or industrial use involving potentially hazardous materials. Hazardous waste management plans shall be required as a condition of approval for such permits.

Policy 2.2 – New Development in Coastal Hazard Areas. Require development to minimize risks to life and property in coastal hazard areas, ensure stability and structural integrity, and neither create nor contribute significantly to erosion, geologic instability, or destruction of the site or surrounding area or in any way require the construction of protective devices that would substantially alter natural landforms along bluffs and cliffs.

Action 2.2a – Coastal Hazard Areas. Areas where coastal hazards exist include those areas vulnerable to bluff erosion hazards and flooding hazards as mapped by the Pismo Beach Coastal Hazards Vulnerability Assessment (City of Pismo Beach 2019) and depicted on **Figures S-2 through S-9**. Development located partially or wholly in a site within the coastal hazard areas shall comply with all applicable GP/LCP policies related to the relevant coastal hazard. Activity on these parcels may require additional development controls to minimize risks unless a site or project-specific study proves otherwise.

Action 2.2b – Risk Aversion. The level of risk aversion for development in the coastal zone is used to determine which sea level rise scenario should be evaluated in a coastal hazard analysis (Action 2.2d). Risk aversion is based on the type of development and considers the level of acceptable risk associated with that development type, as well as the ability of that

development to adapt to or recover from hazard conditions. Risk aversion for a particular development should be determined based on the following general definitions and guidelines:

1. **Low Risk Aversion**: This level of risk aversion may be used for projects that would have limited consequences should they be exposed to hazards and/or a higher ability to adapt, such as sections of unpaved coastal trail, public accessways, and other small or temporary structures that are easily removable and would not have high costs if damaged. The upper value for the "likely range" of sea level rise (which has approximately a 17% chance of being exceeded) should be evaluated over the anticipated lifespan of these development types.
2. **Medium-High Risk Aversion:** Development with a medium-high level of risk aversion have greater consequences and/or a lower ability to adapt to coastal hazards, and include projects such as residential and commercial structures. The 1-in-200 chance (or 0.5% probability of exceedance) should be evaluated over the anticipated lifespan of development with this level of risk aversion.
3. **Extreme Risk Aversion:** This level of risk aversion should be used for projects with little to no adaptive capacity that would be irreversibly destroyed or significantly costly to repair following a hazards incident, and/or would have considerable public health, public safety, or environmental impacts. Development types with this level of risk aversion may include new wastewater treatment plants, power stations, highways, or other critical infrastructure. Coastal hazard evaluations for these development types should consider the H++ scenario, which accounts for extreme ice loss.

Action 2.2c – Anticipated Lifespan of Development. The anticipated lifespan of development in the coastal zone is used to determine the amount of sea level rise that should be evaluated in the coastal hazard analysis (Action 2.2d), according to a development's appropriate risk aversion. The anticipated lifespan of development is not an entitlement to retain the structure, nor does it guarantee safety over that period. A development's anticipated lifespan is generally defined by the following time frames, unless a site or project-specific analysis proves otherwise:

1. Temporary structures or portable/moveable construction: up to 5 years
2. Ancillary development or amenity structures (e.g., detached garages, sheds, gazebos, public restrooms): 25 years
3. Mobile homes: 30–55 years
4. Residential or commercial structures: 75–100 years
5. Critical infrastructure:
    - Asphalt roadways: 25–50 years
    - Concrete pavement: 50–75 years
    - Bridges: 75 years
    - Water mains: 100 years

- Storm drains: 100 years
- Electrical and gas: 100 years

Action 2.2d – Coastal Hazard Analysis. CDP applicants for non-exempt development within a coastal hazard area shall submit a site-specific coastal hazard analysis that evaluates potential coastal hazards at the site, including with sea level rise. This coastal hazard analysis shall:

1. Be prepared by a qualified professional, and use the best available science;
2. Provide an analysis of the site's potential exposure to coastal hazards, including but not limited to inundation, flooding, wave run-up and overtopping, erosion;
3. Assess the potential change in coastal hazards due to the effects of sea level rise. The amount of sea level rise to be considered shall be based on the anticipated lifespan of the proposed development and according to an appropriate level of risk aversion for the proposed development type, as defined in **Actions 2.2b and 2.2c**, and be based on the best available science (**Action 1.4b**);
4. Assume no reliance upon existing or future shoreline protective devices; and
5. If the proposed development cannot fully minimize hazard risks by avoiding all coastal hazards without reliance upon existing or future shoreline protection, the report shall discuss possible adaptation responses to the hazards to reduce risk as feasible and mitigate impacts to coastal resources.

Action 2.2e – New Development. New, non-exempt development, including substantial redevelopment, in a coastal hazard area shall be sited to avoid hazards, taking into account predicted sea level rise over the anticipated lifespan of the development, as defined in **Actions 2.2b and 2.2c**. If hazards cannot be completely avoided, then development shall be sited and designed to protect coastal resources and minimize risks to life and property to the maximum extent feasible.

Action 2.2f – Minimum Use for Compromised Properties. Where full adherence to all GP/LCP policies, including for setbacks and other hazard avoidance measures, would preclude a reasonable economic use of a legal property, and where removal or relocation of the development are not possible, the City may permit the minimum development necessary to ensure conformance with existing laws and avoid a takings of private property. Continued use of an existing structure, including with any permissible repair and maintenance (which may be exempt from permitting requirements), may provide a reasonable economic use. If development is allowed pursuant to this policy, it must be consistent with all GP/LCP policies to the maximum extent feasible.

Action 2.2g – Waiver of Future Shoreline Protection. New, non-exempt development, including substantial redevelopment, shall be sited and designed to avoid the need for shoreline protective devices over the anticipated lifespan of the development, except when such

development is coastal-dependent and there is no feasible alternative that avoids the need for a shoreline protective device (and in such cases those devices shall be limited to the maximum feasible extent). A CDP for development in a coastal hazard area shall be conditioned to require the property owner to record a deed restriction that acknowledges and agrees:

1. That pursuant to California Coastal Act Section 30235 and **Policy 3.1** and **Action 3.1a**, the owner has no right to construct shoreline protection to protect the new development approved pursuant to the permit; and
2. That expressly waives any right to apply to construct such protection pursuant to California Coastal Act Section 30235 and **Policy 3.1** and **Action 3.1a**.

Action 2.2h – Assumption of Risk. A CDP for new development, including substantial redevelopment, in a coastal hazard area shall be conditioned to require the property owner to record a deed restriction that acknowledges and agrees:

1. That the site may be subject to hazards, including those identified on Figures S-2 to S-9 and/or identified pursuant to the site-specific hazard analysis required per **Action 2.2d**;
2. To assume all such hazard risks; and
3. To unconditionally waive and indemnify any claim of damage or liability against the City, its officers, agents, and employees for injury or damage from such hazards.

Action 2.2i – Removal of Development. Except for coastal-dependent development, a CDP for new development, including substantial redevelopment, in a coastal hazard area shall be conditioned to require the property owner to record a deed restriction that acknowledges and agrees that the development shall be removed and the affected area restored to its previous or natural condition if:

1. The City has issued a final order that the development is not to be occupied currently and permanently due to the imminent threat from coastal hazards or sea level rise to the health and safety of its occupants;
2. The City has determined that services to the site can no longer be maintained (e.g., utilities, roads) due to coastal hazards or sea level rise;
3. The development requires new and/or augmented shoreline protective devices that conflict with LCP or relevant California Coastal Act policies;
4. The development becomes unstable, loses structural integrity, or becomes threatened by coastal hazards or sea level rise; and/or
5. The development becomes located on public trust lands and authorization to retain the development is not obtained.

For new development, where relocation and/or structure removal might be necessary at some time in the future, ensure that foundation designs or other aspects of the development will accommodate future relocation and/or structure removal. Such relocation and/or removal shall be demonstrated in final plans, and may be phased over time. Alternative design options should

be considered and employed where appropriate and if site conditions allow, such as constructing smaller structures, increasing finished floor elevations, and installing wall flood vents.

Action 2.2j – Debris Removal. In the event that portions of the development fall to a public accessway, body of water, or beach before they are removed, the landowner shall remove all recoverable debris associated with the development from the public accessway, body of water, or beach, and shall lawfully dispose of the material in an approved disposal site. Such removal shall require a CDP.

Action 2.2k – Land Divisions. Any land division, including but not limited to lot line adjustments and subdivisions, of property in the Coastal Hazard Overlay Zone shall be reviewed for consistency with GP/LCP policies. New parcels that do not have an adequate building site area to comply with the setback standards and other hazard avoidance provisions of these policies shall not be created.

Policy 2.3 – Redevelopment in Coastal Hazard Areas. Require that alteration and redevelopment of existing structures in coastal hazard areas, including legal non-conforming structures, avoid or minimize new development in hazardous locations.

Action 2.3a – Substantial Redevelopment. For purposes of this GP/LCP, substantial redevelopment shall be defined as alterations that involve (1) additions to an existing structure, (2) exterior and/or interior renovations, and/or (3) demolition or replacement of an existing principal structure, or portions thereof, located in a coastal hazard area. An existing structure shall be considered redeveloped when such development consists of any alteration or addition to an existing structure, exterior and/or interior renovation, and/or demolition of an existing residence or principal structure or portions thereof, which results in either:

1. Replacement (including demolition, renovation, reinforcement, or other type of alteration) of 50% or more of any major structural component, including exterior walls, floor structure, roof structure or foundation, as calculated by linear feet, surface area, volume, or weight. Major structural components are considered individually (i.e., percentages are calculated by the individual structural component being altered, and are not additive between different structural components); or
2. Additions and alterations to an existing structure that result in a 50% or more increase in floor area.

Changes to individual major structural components and floor area are measured cumulatively over time starting from Month Date, Year (the effective date of certification of this GP/LCP). If development constitutes a substantial redevelopment as defined herein, a CDP shall be required, and the development meeting this definition must be brought into conformance with all coastal resource protection policies in the GP/LCP.

Action 2.3b – Improvements to Nonconforming Structures. Principal and accessory structures lawfully built along a coastal bluff or shoreline area prior to the effective date of this GP/LCP (Month, Year) that do not conform to the policies of the GP/LCP shall be considered legal nonconforming structures. Such structures may be maintained and repaired, as long as the maintenance or repairs do not increase the size or degree of nonconformity. Additions and improvements to such structures that are not considered a substantial redevelopment, as defined herein, may be permitted provided that such additions or improvements do not increase the size or the degree of the nonconformity and comply with the current policies and standards of the GP/LCP, and the remaining portion of the structure complies with the laws and regulations in effect when the structure was established. Complete demolition and reconstruction or substantial redevelopment shall require the entire structure to be brought into conformance with the policies and standards of the GP/LCP, including any requirement for a CDP. When a principal structure is removed, all nonconforming accessory development and/or unpermitted development shall be removed.

Policy 2.4 – Bluff Erosion Hazards. New development and substantial redevelopment on bluff tops shall be sited and designed to avoid coastal hazards and to protect coastal resources.

Action 2.4a – Hazards Overlay Zone. Areas where bluff-top hazards exist, including areas projected to be impacted by erosion with sea level rise and identified on **Figures S-2 to S-9**, shall be included within and subject to the requirements of the Hazards Overlay Zone.

Action 2.4b – Bluff Setbacks. All structures shall be set back a safe distance from the top of the bluff in order to retain the structures over the anticipated lifespan of the development, and to neither create nor contribute significantly to erosion, geologic instability, or destruction of the site, or require construction of protective devices that would substantially alter natural landforms along bluffs and cliffs. The City shall determine the required setback based on the results of a site-specific analysis required per GP/LCP **Actions 2.2d and 2.4c.**

Action 2.4c – Bluff-top Guidelines/Geologic Studies. In addition to the coastal hazard analysis required per **Action 2.2d**, a site-specific geologic report conducted by a licensed Geotechnical Engineer or a certified Engineering Geologist shall be required for all coastal bluff-top parcels where new development or substantial redevelopment is proposed. The geologic report shall establish the geologic setback line, landward of which development should be sited so that it will not be in danger from erosion or failure over the anticipated life of the development without the need for shoreline protective devices. The setback line shall account for the amount of erosion anticipated over the life of the development, considering the effects of sea level rise, plus an additional setback to ensure structural stability under future conditions. The report shall consider, describe, and analyze the following:

1. A site-specific erosion control plan that ensures the development would not contribute to the erosion or failure of any bluff face;
2. Cliff geometry and site topography, including an extension of the surveying work beyond the site as needed to depict unusual geomorphic conditions that might affect the site;
3. Historic, current, and foreseeable cliff erosion and possible changes in shore configuration and sand transport, including an investigation of recorded land surveys and tax assessment records in addition to the use of historic maps and photographs where available. The cliff erosion analysis shall consider the expected long-term average coastal bluff retreat rates over the anticipated lifespan of the development, shall include retreat rates due to a range of projected sea level rise scenarios based on the current best available science, and shall use a scenario that assumes that any existing shoreline protective device is not in place;
4. A quantitative slope stability analysis demonstrating a minimum factor of safety against sliding of 1.5 (static) or 1.1 (pseudostatic, k=0.15 or as determined through analysis by the geotechnical engineer), using shear strength parameters derived from relatively undeformed samples collected at the site;
5. The anticipated bluff retreat over the expected life of the structure shall be added to the setback necessary to assure that the development will maintain a minimum factor of safety against land sliding of 1.5 (static) and 1.1 (pseudo static) for the life of the structure;
6. The geologic conditions of the site, including soil, sediment and rock types and characteristics in addition to structural features, such as bedding, joints, and faults;
7. Evidence of past or potential landslide conditions, the implications of such conditions for the proposed development, and the potential effects of the development on landslide activity;
8. The potential impact of construction activity on the stability of the site and adjacent area;
9. Ground and surface conditions and variations on site, including potential hydrologic changes caused by the development (i.e., introduction of irrigation water to the ground water system) or alterations in surface drainage;
10. The potential erodibility of the site and mitigation measures to be used to ensure minimized erosion problems during and after construction (i.e., landscaping and drainage design);
11. The potential effects of seismic forces resulting from a maximum credible earthquake; and
12. Any other factors that might affect slope stability.

Action 2.4d – New Minor Development and Accessory Structures in Bluff Setbacks. Minor development and non-permanent accessory structures such as ~~decks,~~ patios, fencing, and walkways, which are at grade and do not require permanent foundations, concrete footings or permanent grouting may be located seaward of the geologic setback line required by **Action 2.4b**, but no closer than 10 feet to the bluff edge, provided such accessory structures:

1. Are consistent with all other applicable GP/LCP policies;

2. Do not require a shoreline protective device and do not use a foundation that could serve as a shoreline protective device, such as caissons, or that requires landform alteration;
3. Are sited and designed to be easily relocated landward or removed without significant damage to the bluff area;
4. Will be relocated and/or removed and the affected area restored to natural conditions when threatened by erosion, geologic instability, and/or other coastal hazards; and
5. Will be removed by the landowner in the event that portions of the development fall to the bluffs, beach, or ocean pursuant to a CDP (unless no CDP is required) and the material lawfully disposed of in an approved disposal site.

~~5.~~6. A CDP is not required if the minor development complies with these provisions.

Policy 2.5 – Flood Hazards. New development and substantial redevelopment in flood hazard areas shall be sited and designed to avoid hazards and protect coastal resources.

Action 2.5a – Flood Plain Zoning. Areas subject to flooding, including those shown on the most current FEMA Flood Insurance Rate Maps (FIRMs) and areas projected to be impacted by flooding with sea level rise as shown on **Figures S-2 to S-9**, shall be mapped within and subject to the requirements of the Floodplain Overlay Zone.

Action 2.5b – Restrictions on Development Within the 100-Year Floodplain. Development in the Floodplain Overlay shall not result in an obstruction to flood control or adversely affect migrating tidelands, coastal wetlands, estuaries, or other sensitive habitat areas within the floodplain.

Action 2.5c – Shoreline Setbacks. All structures shall be setback a sufficient distance to avoid flood hazards, including those associated with wave run-up from a 100-year storm event, accounting for sea level rise and long-term shoreline retreat, over the anticipated lifespan of the development. Structures that cannot feasibly avoid all flood hazards shall be setback as far as possible and minimize flood risks as required by **Action 2.5d**.

Action 2.5d – Floodplain Zoning Standards. Development within the floodplain shall adhere to the following standards:

1. Within flood hazard areas as mapped by the FEMA, development shall meet the minimum elevation requirements as determined by the Pismo Beach Building Code of the Base Flood Elevation assigned to the specific flood zones on a FIRM, or the sea level rise amount projected for the anticipated lifespan of the development, whichever is greater.
2. Within areas that are not within FEMA mapped flood zones but are identified on **Figures S-2 to S-9**, development shall be constructed such that the lowest habitable finished floor exceeds the projected sea level rise expected at the site for the anticipated lifespan of the structure. If it is infeasible for new development, including redevelopment, to avoid flood hazards completely, development should be sited and designed to minimize risks from

flooding, including as influenced by sea level rise, over the anticipated life of the development, and constructed using design techniques that will limit damage caused by floods. Based on a site-specific coastal hazard analysis, flood hazard mitigation design techniques may include, but shall not be limited to:

a. Locating only nonhabitable space below the flood hazard elevation;
b. Elevating mechanical and utility installations;
c. Eliminating basements;
d. Using flood vents and anchoring structures where appropriate; and
e. Other appropriate mitigation measures identified in the most recent FEMA regulations.

3. No habitable structure shall be approved for construction within the area of the 100-year floodplain unless the applicant demonstrates that the finished floor elevations are at least 1 foot above the projected elevation of the 100-year flood, except as allowed by FEMA regulations.
4. No new fill, structure, or other obstruction shall be permitted to be placed or constructed within a flood-way unless a detailed hydrologic study has been prepared by the applicant and approved by the City Engineer ensuring that the proposed project will not obstruct passing floodwaters in any way.
5. No new development shall be allowed in the 100-year floodplain that will contribute to or increase flood hazards on the same or other properties, or which would require construction of flood-control devices.
6. In addition to the coastal hazard report required per **Action 2.2d**, any application for development on a parcel any portion of which is within the boundary of the 100-year floodplain shall be required to submit a hydrological engineer's report which assesses the nature of the flood risks, identifies the boundary of the 100-year floodplain, and specifies the protective measures that should be undertaken to attain compliance with the City's floodplain zoning and with FEMA regulations.

Policy 2.6 – Geologic and Seismic Hazards. Land areas subject to hazards associated with steep slopes, slope instability, and/or drainage problems shall be included in the Hazardous Overlay and Protection Zone. Generally, all lands in excess of 10% slope shall be included.

Action 2.6a – Development Review in Seismic Hazard Areas. Geologic reports shall be required and shall be reviewed by the appropriate decision-making body, prior to approval of any development permits for any projects located within the Hazardous Overlay Zone.

Action 2.6b – Landslide Hazards. Prohibit development in landslide risk areas without a site-specific slope stability analysis.

Action 2.6c – Liquefaction Hazards. Prohibit development in areas of high potential liquefaction without a site-specific analysis of liquefaction potential**.**

Action 2.6d – New Construction Across Faults. Prohibit new construction directly astride or across known faults, or fault zones. Nonstructural land uses shall not be allowed.

Action 2.6e – Brick and Masonry Nonreinforced Buildings. Reduce the hazards from brick or masonry nonreinforced buildings by requiring building strengthening or demolition as these properties make substantial redevelopments.

Action 2.6f – Pipelines. Target pipelines in seismic areas for upgrades and automatic seismic shut-off switches on pipelines that supply natural gas to customers.

Policy 2.7 – Fire Hazards. Minimize the City's fire risk through careful siting of development and appropriate vegetation management.

Action 2.7a – Wildfire and Climate Change. Monitor wildfire mapping and hazard conditions for future changes in conditions as a result of climate change.

Action 2.7b – Vegetation Management. Maintain the City's vegetation management program that provides vegetation management services to elderly, disabled, or low-income property owners who lack the resources to remove flammable vegetation from around their homes. The program is approved by the California Department of Forestry and Fire Protection (CAL FIRE).

Action 2.7c – Fuel Modification Program. Continue to implement a fuel modification program, which includes residential maintenance requirements and enforcement, plan submittal and approval process, guidelines for planting, and a list of undesirable plant species. Require builders and developers to submit their plans, complete with proposed fuel modification zones, to the local fire department for review and approval prior to beginning construction. Fuel modification shall be designed and implemented consistent with the requirements of the Conservation and Open Space Element regarding fuel modification in habitat areas.

Action 2.7d – Funding and Incentives. Develop and provide funding and/or incentives for defensible space measures (e.g., free chipping day, free collection day for tree limbs).

Action 2.7e – Annexation. The City shall require a wildland fire analysis and plan as part of all future annexations that include an area designated by CAL FIRE as a Fire Hazard Severity Zone. At a minimum, these plans shall specify:

1. Fuel clearance and management techniques consistent with the Federal Land Assistance, Management, and Enhancement Act of 2009;
2. Adequate right-of-way for emergency response vehicles and evacuation;
3. Standards for traffic signals;
4. Standards for the placement of electrical utilities;
5. Provision of adequate water supply for the approved density; and
6. Level of service and response time from the fire department.

Action 2.7f – New Structures in the Wildland-Urban Interface (WUI). New structures in areas designated by CAL FIRE as a Fire Hazard Severity Zone shall:

1. Prohibit locating any critical infrastructure in the WUI, unless it is critical to health and safety;
2. Include building setbacks and fuel breaks consistent with the most recent building code;
3. Utilize fire-resistant building materials consistent with the most recent building code or best practices;
4. Ensure adequate water supply and fire flow to protect the additional structure; and
5. Evaluate the adequacy of access routes to and from hazard areas relative to the degree of development or use (e.g., road width, road type, length of dead-end roads).

Action 2.7g – ~~Cluster Subdivisions~~Fire Hazard Severity Zones. The City shall encourage the clustering of development outside of the highest Fire Hazard Severity Zones.

Action 2.7h – Interjurisdictional Cooperation. Continue enhancing interjurisdictional communication systems between public agencies with responsibility for fire protection.

Goal-3 – A community that maintains its unique physiographic character, including its sandy and rocky beaches, to conserve soil resources and prevent excessive erosion due to wind and water.

Policy 3.1 – Shoreline Protective Devices. Permit revetments, breakwaters, groins, seawalls, cliff retaining walls, and other such construction that alters natural shoreline processes only when required to serve coastal-dependent uses or to protect existing structures or public beaches in danger from erosion and when designed to eliminate or mitigate adverse impacts on local shoreline sand supply.

~~**Action 3.1a – Shoreline Protective Devices.** New shoreline protective devices, such as seawalls, caissons, revetments, groins, breakwaters, and riprap shall be permitted only when necessary to protect existing principal structures, coastal dependent uses, and public beaches in danger of erosion, in conformance with California Coastal Act Section 30235 and all other policies and standards of the City's GP/LCP. Nonstructural alternatives shall be used and prioritized wherever feasible to protect coastal resources, such as beach nourishment, drainage and native landscape improvements, or relocation. If no feasible alternative is available, shoreline protection structures shall be designed and constructed to eliminate or mitigate adverse impacts on local shoreline sand supply, habitat, scenic views, and other coastal resources and to maintain public access to and recreation along the shoreline. Design and construction of protective devices shall minimize alteration of natural landforms, and shall be constructed to minimize visual impacts.~~

Action 3.1a – Temporary Shoreline Protection Devices ~~for Critical Infrastructure~~. New shoreline protective devices may be permitted when necessary to protect public-serving uses and critical infrastructure (e.g. wastewater, transportation infrastructure) when such infrastructure is necessary to protect and provide essential services, water quality, public health

and safety, etc. Permits for shoreline protection shall include conditions requiring the Permittee to acknowledge that the Coastal Development Permit only authorizes the development for an initial, temporary period, during which time the Permittee must develop a longer-term sea level rise adaptation approach that, if feasible and consistent with other applicable LCP policies, does not rely on armoring. Shoreline protection shall be consistent with other GP/LCP policies and requirements regarding shoreline protection, including but not limited to ~~least environmentally damaging alternative (**Action 3.1a**),~~ siting and design (**Action 3.1g**), monitoring (**Action 3.1g~~h~~**), and impact mitigation (**Action 3.1h~~i~~**). Nonstructural alternatives shall be used and prioritized wherever feasible to protect coastal resources, such as beach nourishment, drainage and native landscape improvements, or relocation. If no feasible alternative is available, shoreline protection structures shall be designed and constructed to eliminate or mitigate adverse impacts on local shoreline sand supply, habitat, scenic views, and other coastal resources and to maintain public access to and recreation along the shoreline. Design and construction of protective devices shall minimize alteration of natural landforms, and shall be constructed to minimize visual impacts.

Action 3.1b – Repair and Maintenance of Existing Shoreline Protective Devices. Non-exempt repair and maintenance of existing, legally established shoreline protective devices may be permitted pursuant to a CDP only if the activities do not result in an enlargement or extension of the armoring. Repair and maintenance activities shall not result in a seaward encroachment of the shoreline protective device or substantially impair public trust resources. Unless destroyed by natural disaster, the replacement of 50% or more of a shoreline protective device shall not be considered repair and maintenance, but instead constitutes a new replacement structure that requires a CDP and must conform to the GP/LCP policies and requirements.

Applications for non-exempt repair and maintenance of an existing, legally established shoreline protective device shall include a re-assessment of the need for the device, the need for any repair or maintenance of the device, and the potential for the device's removal based on changed conditions, such as sea level rise. In addition to the coastal hazard analysis required per **Action 2.2d**, applications for non-exempt repair and maintenance of shoreline protective devices shall include an evaluation of the age, condition, and economic life of the existing structure the device is required to protect; changed geologic site conditions, including but not limited to changes relative to sea level rise; and impacts to coastal resources, including but not limited to public access and recreation. Any such allowable repair and maintenance projects shall include measures to address and mitigate for any coastal resource impacts the device may have, including with respect to public views and public recreational access, and should also identify opportunities to include public access features within the device, such as walkways, viewing platform, etc.

Action 3.1c – Review of Existing Shoreline Protective Devices. All new bluff-top/shoreline development or substantial redevelopment of an existing principle structure on lots with a legally established shoreline protective device shall, as a condition of development, require an assessment of the continued efficacy and necessity of such protective device. The new development and/or redevelopment on the site shall be designed and sited in a manner that does not require or rely on the use of a shoreline protective device to ensure geologic stability. As a condition of permitting demolition or modification of development already present on site, any existing shoreline protective device associated with the development that is causing adverse impacts to coastal or public trust resources and that is under the applicant's control shall be removed if it is no longer necessary to protect remaining principal structures on the property or adjacent principal structures that are still entitled to retain shoreline armoring.

Action 3.1d – Protection for Accessory Structures. No shoreline protective device shall be allowed for the sole purpose of protecting a new or existing accessory structure.

Action 3.1e – Shoreline Protective Device Duration. CDPs that authorize the expansion, alteration, and/or repair of existing shoreline protective devices or new shoreline protective devices shall, through conditions of approval, limit authorization of such devices to the life of the primary structure requiring protection. This authorization shall expire when the primary structure requiring protection is: (1) substantially redeveloped, (2) no longer present, or (3) no longer requires a protective device, whichever occurs first. The property owner shall apply for a CDP to remove the shoreline protective device within 6 months of a determination by the City ~~or CCC~~ that the device is no longer warranted because the structure is no longer present, is redeveloped, or no longer requires protection. The removal of the shoreline protective device for which authorization has expired shall be required prior to the commencement of construction of any new development on the site.

Action 3.1f – Siting and Design of Protective Devices. Shoreline protective devices shall be sited and designed to be compatible with the surrounding vegetation and natural landforms in order to minimize adverse impacts on coastal resources to the maximum extent feasible. The design plan approved pursuant to the CDP shall demonstrate that:

a. The device will be colored/constructed with concrete or other approved material that has been colored with earth tones that are compatible with the adjacent area, and the color shall be maintained throughout the life of the structure;
b. The device will be textured for a natural look to blend with the surrounding soil and/or vegetation, as applicable.
c. Drought-tolerant, non-invasive vegetation shall be used to cover and camouflage the structure, where such planting is feasible;

d. Mitigation measures shall be utilized to offset all unavoidable impacts to coastal resources on or adjacent to the development site;
b. The device shall minimize and mitigate for any impairment and interference with shoreline sand supply and coastal waters;
c. Any potential adverse impacts on archaeological resources have been avoided or mitigated;
d. Any geologic hazards presented by construction in or near earthquake or landslide hazard zones shall be addressed;
e. Public recreational access shall be protected and enhanced where feasible, including by minimizing the displacement of beach and incorporating public access features within the device, such as walkways, viewing platform, etc.;
f. The device has been sited and designed to avoid encroachment onto current public trust resources or migrating public trust boundaries, and the applicant acknowledges that the boundary between public land (tidelands) and private land may shift with rising seas and the structure may eventually be located on public trust lands; and
g. The device shall be, if necessary, designed to combine with drainage improvements to control erosion from surface and groundwater flows.

Action 3.1g – Monitoring. The CDP for any shoreline protective device shall require the device to be regularly monitored by an engineer or engineering geologist familiar and experienced with coastal structures and processes. The property owner shall submit monitoring reports to the City ~~and/or the CCC~~ every 5 years from the date of CDP issuance until its expiration, evaluating whether or not the shoreline protective device is still required to protect the structure(s) it was designed to protect. Each monitoring report shall contain the following:

a. An evaluation of the condition and performance of the approved shoreline protection device, including an assessment of whether any weathering or damage has occurred that could adversely impact future performance of the device;
b. An analysis of erosion trends, annual retreat, or rate of retreat of natural landforms on the subject site, such as a bluff;
c. A description of any migration or movement of rock that has occurred on the site; and,
d. Recommendations for repair, maintenance, modifications or other work to the device.

If monitoring demonstrates that the shoreline protective device has fallen into disrepair, is failing, or presents a nuisance or safety hazard, the City may require repair or modifications to the protective device to correct the problem and that may be subject to a CDP unless exempt per **Action 3.1c**.

Action 3.1h – Impact Mitigation. New shoreline protective devices shall be required to mitigate impacts to shoreline sand supply (including sand lost due to the device's encroachment, sand lost from fixing of the back of the beach, and sand lost from the bluff protected by the device), public

access and recreation, and any other relevant coastal resource impacts in 20-year increments, starting with the building permit completion certificate date. Permittees shall apply for a CDP amendment prior to the expiration of each 20-year mitigation period, proposing mitigation for coastal resource impacts associated with the retention of the shoreline protective device beyond the preceding 20-year mitigation period, and such application shall include consideration of alternative feasible mitigation measures in which the permittee can modify or remove the shoreline protective device to lessen its impacts on coastal resources.

Impacts shall be mitigated through options such as providing equivalent new public access or recreational facilities or undertaking restoration of nearby beach habitat. If such options are not feasible, proportional in-lieu fees may be used as a vehicle for impact mitigation provided that such in-lieu fees are deposited in an interest-bearing account managed by an appropriate local/regional governmental body and used only for acquisition or improvements of coastal public access, biological restoration, or other relevant mitigation in the vicinity of the project. New shoreline protective devices may not be approved if they cannot adequately eliminate or mitigate adverse impacts on local shoreline sand supply.

Policy 3.2 – Bluff Management. Manage natural bluff features to conserve soil resources and prevent excessive erosion due to wind and water.

Action 3.2a – Development on Bluff Face. No new development shall be permitted on any bluff face, except engineered staircases or accessways to provide public beach access where no feasible alternative means of public access exists, and pipelines for scientific research or coastal-dependent industry. Drainpipes shall be allowed only where no other less environmentally damaging drain system is feasible, and the drainpipes shall be designed and placed to minimize impacts to the bluff face, toe, and beach. Drainage devices extending over the bluff face shall not be permitted if the property can be drained away from the bluff face, toe, and beach. Any development permitted on a bluff face per this section shall:

a. Be designed and constructed to minimize landform alteration of the oceanfront bluff face;
b. Not contribute to further erosion or cause, expand, or accelerate instability of the bluff;
c. Be visually compatible with the surrounding areas;
d. Avoid the need for shoreline protection to the maximum extent feasible; and
e. Be sited and designed to be easily relocated or removed without significant damage to the bluff or shoreline.

Action 3.2b – Bluff-top Lot Drainage and Erosion. New development, including substantial redevelopment, on a bluff-top lot shall provide adequate drainage and erosion control facilities that convey site drainage in a non-erosive manner away from the bluff edge to minimize hazards, site instability, and erosion.

Action 3.2c – Bluff-top Landscaping. All landscaping for new bluff-top development or redevelopment shall consist of native, non-invasive, drought-tolerant, and fire-resistant species. Any permanent irrigation system shall be low volume (drip, micro jet, etc.) and shall only be permitted on the street-facing portion of the lot. Irrigation systems along the bluff or shoreline portion of a lot shall only be allowed on a temporary basis for initial plant establishment (90 days) and shall be removed after vegetation has established. Excessive irrigation on bluff lots is prohibited. Temporary bluff-top landscaping must be set back from the bluff edge by at least ten feet.

Policy 3.3 – Alteration of Rivers and Streams. Channelizations, dams, or other substantial alterations of rivers and streams shall incorporate the best mitigation measures feasible, and be limited to (1) necessary water supply projects, (2) flood control projects where no other method for protecting existing structures in the flood plain is feasible and where such protection is necessary for public safety or to protect existing development, or (3) developments where the primary function is the improvement of fish and wildlife habitat.

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