City of Burlingame

Peninsula Resilience Planning

Draft Safety Element Background Report

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INTRODUCTION

This Safety Element Background Report discusses the natural and human-caused hazard issues that can affect the City of Burlingame (Burlingame). Each issue identified in this report includes a general overview of each hazard, how/where the hazard affects the city and its residents, information on past hazard events, current programs and regulatory frameworks in place to reduce the impacts associated with these hazards, as well as future conditions (including potential climate change impacts associated with these hazards). The intent of this report is to provide background information that informs how and why the goals, policies, and implementation actions within the updated General Plan Safety Element were developed.

The following are the key issues considered relevant to the City of Burlingame:

ISSUE 1: EMERGENCY PREPAREDNESS AND RESPONSE

General Overview

The City of Burlingame employs a multipronged approach for mitigating, responding to, and recovering from emergencies. This section reviews Burlingame's major evacuation routes, emergency alert systems, and other emergency response programming. State law (Senate Bill 99, or SB 99) requires that the Burlingame Safety Element identify residential areas with only one way in and out, as these may be areas where evacuations are constrained. State law (Assembly Bill 747, or AB 747) also requires that the Safety Element identify potential evacuation routes and their capacity, safety, and viability.

Emergency Alert Systems

SMC Alert

San Mateo County Alert (SMC Alert) is the primary emergency alerting system in Burlingame. SMC Alert is used by numerous San Mateo County agencies and messages are tailored to each agency. SMC Alert can be used to issue flood, fire, severe weather, or tsunami warnings; notify the community about the locations of emergency shelters; provide information about available evacuation routes; and activate special teams within the community, such as CERT volunteers. Some cities also use the system for smaller alerts, such as traffic accidents, fires, street closures, flooding, and related incidents. Community members opt in to receive SMC Alert messages and can receive alerts via email, cell phones, and voice messages to landline phones. Alerts are available in a wide variety of languages, including English, Spanish, Chinese,

and Tagalog, among many others. Individuals can sign up for SMC Alert via the County's website at https://www.smart911.com/smart911/ref/reg.action?pa=smcgov.

Rave Mobile Safety was adopted by the County in December 2022 as the new alerting platform for SMC Alert.

Wireless Emergency Alerts

Another alert system includes Wireless Emergency Alerts (WEAs) which are short emergency messages from authorized public alerting authorities that can be broadcast from cell towers to any WEA-enabled mobile device in a locally targeted area. Wireless providers primarily use cell broadcast technology for WEA message delivery. WEA is a partnership among FEMA, the Federal Communications Commission and wireless providers to enhance public safety.

Genasys EVAC/Zonehaven

Public safety agencies throughout San Mateo County use the Genasys EVAC app (formerly known as Zonehaven) to communicate areas that are being evacuated due to fire or other emergencies. Genasys is not an alert and warning system, but its EVAC tool provides first responders and public safety workers with tools to navigate the evacuation process, including information about when it is safe to return. Many jurisdictions within San Mateo County host evacuation plans and maps on the Genasys platform, including Burlingame.

The Genasys platform divides Burlingame into nine zones to provide information tailored to impacted areas. Community users of the Genasys AWARE/Protect app can choose the zone or zones for which they would like to receive alerts.

Major Evacuation Routes

If an evacuation is necessary in Burlingame, it will be conducted by members of the Burlingame Police Department. They will work closely with the Central County Fire Department, the San Mateo County Department of Emergency Management, and emergency responders in neighboring communities to make sure that evacuations are conducted as quickly and safely as possible.

There is currently no standardized county-wide evacuation plan and the City of Burlingame does not have a publicly available evacuation plan. The City is participating in the county-wide All-Hazards Evacuation Plan, which will analyze potential evacuation scenarios across San Mateo County, identify potential evacuation routes, and recommend improvements. This work began in 2024, and is expected to finish in 2025. The Safety Element will reference this study to meet the requirements of SB 99 and AB 747. Specific evacuation routes will vary depending on the nature of the emergency, but potential evacuation routes are likely to include Highway 101, SR-82 (El Camino Real), Trousdale Drive, Broadway/Airport Boulevard, California Drive, and Old Bayshore Highway.

Evacuation Constraints

Under SB 99, jurisdictions are required to identify residential parcels with access to fewer than two evacuation routes and in hazard zones as part of their Safety Element. Occupants and residents of these parcels may be unable to evacuate quickly in the event of an emergency, and are therefore more vulnerable to sudden or fast-spreading emergency conditions such as flash floods and wildfire.

Existing Programs and Regulations

Preparedness and Response Programs

San Mateo County and the City of Burlingame use a variety of programs, plans, and initiatives to manage and guide emergency response. Resources and programs include both County-operated and volunteer programs, City programs and resources, as well as participation in regional mutual-aid agreements.

County Initiatives

Department of Emergency Management

The County Department of Emergency Management or DEM, funded in part through a Joint Powers Authority (JPA) governed by the Emergency Services Council, provides essential services that prepares and assists San Mateo County agencies in the event of a disaster or other emergency. DEM coordinates countywide preparedness, response, and protection services and activities for large-scale incidents and disasters. DEM is responsible for alerting and notifying appropriate agencies within the county's 20 cities when disaster strikes, coordinating all responding agencies, and ensuring resources are available and mobilized during disasters. DEM is responsible for developing and maintaining plans and procedures for all jurisdictions within San Mateo County. In addition to creating plans, the DEM develops exercises to evaluate operational and response capabilities.

During significant incidents or emergencies, DEM is responsible for activating the County of San Mateo Emergency Operations Center (EOC) to support local jurisdictions as needed. DEM coordinates and contracts with the California Office of Emergency Services (CalOES) and Federal Emergency Management Agency (FEMA) during an emergency for federal and State support.

The Emergency Service Council consists of a member of the San Mateo County Board of Supervisors and a representative from each member's governing body.

San Mateo County Operational Area Emergency Services Council

The San Mateo County Operational Area Emergency Services Council is a JPA composed of city or town council representations from all local governments within the geographic area of the county, special districts, unincorporated areas, and participating nongovernmental entities. The Council is responsible for providing coordinated plans for the protection of people and property in the event of an emergency. The Council works in coordination with local government entities to review, approve, and recommend for adoption of emergency and mutual-aid plans and agreements, rules, ordinances, resolutions, and regulations by the Board of Supervisors and other legislative agencies.

Emergency Operations Plan and Center

The County's Emergency Operations Plan (EOP) establishes policies and procedures and assigns responsibilities to ensure the effective management of emergency operations within the San Mateo County Operational Area. The County's DEM implements the Emergency Operations Plan and activates the EOC.

The EOC provides a central location of authority and information and allows for face-to-face coordination among personnel who make emergency decisions. The following functions are performed in the San Mateo County Operational Area EOC:

- Coordinating emergency operations
- Releasing warning information

- Developing emergency policies and procedures
- Collecting and sharing information with county, city/town, special district, State agencies, military, federal agencies, and political representatives
- Maintaining maps, information display boards, and other data pertaining to emergency operations
- Analyzing and evaluating of all data pertaining to emergency operations
- Directing, and coordinating, support of emergency response resources
- Maintaining contact and coordination with Disaster Operations Centers, Burlingame's EOC, and the Coastal Region
- Providing emergency information and instructions to the public, making official releases to the news media and the scheduling of press conferences as necessary

The County EOC is activated when local jurisdictions or County departments need emergency support. According to SEMS Regulations, the County EOC must activate, and use the SEMS when the following conditions exist:

- A local government within the operational area has activated its EOC and requests activation of the County EOC to support its emergency operations.
- Two or more cities within the SMOA have declared a local emergency.
- The County and one or more cities have declared a local emergency.

The EOP assumes that cities and towns within the county will participate in the San Mateo County Operational Area, that it is primarily responsible for emergency actions, it will make resources available to local agencies.

San Mateo County Emergency Managers Association

The San Mateo County Emergency Managers Association is composed of Emergency Managers/Representatives from cities, towns, county departments, special districts, and community organizations within San Mateo County and is intended to support emergency management, training, and exercise planning. The 2023-2024 Executive Board includes representatives from the South San Francisco Fire Department, San Mateo County Department of Emergency Management, the East Palo Alto Police Department, the San Mateo Consolidated Fire Department, and San Francisco International Airport.

San Mateo County Sheriff's Office Emergency Services Bureau

The Sheriff's Office Emergency Services Bureau is made up of sworn specialized units and volunteer forces to respond to emergency law enforcement activities, search and rescue missions, evidence searches, and requests for mutual aid. San Mateo County Search and Rescue is a professional volunteer force of the San Mateo County Sheriff's Emergency Services Bureau. All units are available to respond to mutual aid requests throughout the County.

2021 San Mateo County Multijurisdictional Hazard Mitigation Plan

DEM published San Mateo County's 2021 Multijurisdictional Local Hazard Mitigation Plan (MJLHMP), a large regional and cross-jurisdictional effort to plan for the reduction of risk from natural and human-made disasters.

The MJLHMP assesses hazard vulnerabilities and identifies mitigation actions that jurisdictions will pursue to reduce the level of injury, property damage, and community disruption that might otherwise result

from such events. The MJLHMP addresses natural and human-caused hazards, including flooding, drought, wildfire, landslides, severe weather, terrorism, cyber threats, pandemic, and the impact of climate change on hazards, as well as other hazards.

Adoption of the MJLHMP helps the County remain eligible for various types of pre- and post-disaster community assistance, such as grants, from FEMA and the State government.

The DEM led the 2021 MJLHMP effort, in coordination with County departments, all 20 cities, and regional special districts. The process was informed by a steering committee and robust public engagement. Information about and recommended actions to reduce hazards specific to Burlingame is in Volume 2 of the MJLHMP.

Disaster Debris Management Plan

Disasters can produce substantial volumes of debris, creating hazardous conditions that endanger the public and disrupt the essential daily lifestyle and economy of the community. The County of San Mateo Disaster Debris Management Plan (DDMP) provides a comprehensive framework for management of debris following a disaster. It addresses the roles and responsibilities of government organizations as well as private firms and nongovernmental organizations that might have a role in debris operations. The County's Public Works Department serves as the lead department for debris management for unincorporated areas of the county.

County of San Mateo Health System

The County of San Mateo Health System (SMC Health) operates Emergency Medical Services (EMS), which provides emergency medical resources in response to 911 calls countywide. As of 2019, EMS responded to 90 percent of requests for advanced life support within 6 minutes and 59 seconds in metro and urban areas of San Mateo County. SMC Health includes a number of divisions, including the Emergency Medical Services-Health Emergency Preparedness Unit (HEP); Environmental Health Services; Public Health, Policy and Planning; and the San Mateo Medical Center.

HEP leads medical and health emergency preparedness and response activities across the health system. HEP Unit partners with the San Mateo County Healthcare Coalition to strengthen the healthcare community's ability to prepare for and respond to health and safety risks, including large-scale emergencies and surges in healthcare needs. HEP develops and coordinates exercises, drills, and training on an annual basis to ensure that SMC Health, local healthcare providers, and emergency medical services system partners sustain optimal response readiness.

The San Mateo County Healthcare Coalition (HCC) coordinates strategic planning activities between healthcare facilities of various healthcare delivery sectors, public health agencies, other government entities, and community partners to prepare for, respond to, and recover from emergencies and other incidents that impact public health.

San Mateo County Emergency Medical Services Agency uses ReddiNet as its countywide emergency communications system. ReddiNet allows the County to track hospital status, mass casualty incidents, hospital bed count, and facility assessments and to locate family members through access to the Family Reunification Center.[1]

Environmental Health Services ensures a safe and healthy environment in San Mateo County through education, regulation, and monitoring. Services include but are not limited to hazardous waste

management, restaurant inspections, housing inspections, medical waste disposal, water protection, water quality monitoring, and pollution prevention.

Public Health, Policy and Planning protects the health of everyone who lives, works, learns and plays in San Mateo County by preventing the spread of communicable diseases, delivering targeted health care services, and providing public health laboratory testing.

SMC Health is led by the Health Executive Council, which includes San Mateo County Health's chief, deputy chief, health officer, and other division and team leaders.

Mutual-Aid Agreements

In some cases, local emergency responders may not have the staff, vehicles, equipment, or other resources to fully respond to an emergency in their jurisdiction. In these instances, the local emergency commanders can request assistance from other communities. This external assistance is known as mutual aid. The California Disaster and Civic Defense Master Mutual Aid Agreement, an arrangement between State agencies and local governments, establishes a framework for mutual aid.

Mutual aid regions are established under the Emergency Services Act. Six mutual-aid regions numbered I-VI have been established within California. The San Mateo County Operational Area is part of the Mutual Aid Region II and the Coastal Administrative Region.

Burlingame Initiatives

The Central County Fire Department (CCFD) provides fire and emergency response services in Burlingame. The CCFD was established on April 20, 2004, through a Joint Powers Agreement between the City of Burlingame and the Town of Hillsborough, with essential support services provided by the two cities. In December 2014, the CCFD entered into an agreement with the City of Millbrae to provide fire protection services to Millbrae.

The CCFD is an all-risk emergency response and community service organization. The CCFD seeks to minimize risk to people, property, and the environment by responding to all fire, medical, rescue, and hazardous materials incidents. Administrative and nonemergency safety services include fire prevention and hazardous materials regulations, emergency medical services system management, and emergency preparedness and training. CCFD's personnel serve the communities with six engine companies and one truck company, strategically located in six fire stations, and administrative offices that include fire prevention, public education, training, and emergency preparedness. In 2022, response times for the CCFD ranged from 5 minutes and 27 seconds to 7 minutes and 34 seconds, depending on the severity of the incident. The average response time for all incidents was 5 minutes and 48 seconds.

CCFD sponsors the CERT Program for the City in collaboration with the Burlingame Neighbor Network volunteers and CERT Program Coordinators to provide ongoing training opportunities for residents virtually.

CCFD is governed by a Board of Directors consisting of two City Councilmembers each from the City of Burlingame and the Town of Hillsborough, with each representing their respective city in determining the level of fire, emergency medical, and disaster preparedness services to be provided by CCFD.

Future Conditions

Climate change is expected to affect the frequency and severity of future natural hazards in Burlingame, necessitating an adapted approach to emergency preparedness and response. See the Burlingame Vulnerability Assessment for details about how climate change will affect hazards in Burlingame.

ISSUE 2: FLOOD HAZARDS

General Overview

Flooding is the rising and overflowing of water onto land that is normally dry. Floods can happen during heavy rains, when ocean waves come on shore, or when dams or levees break. Floods can occur within minutes or over a long period, and may last days, weeks, or longer. Floods are the most common and widespread of all weather-related natural disasters. Floodwater can damage buildings and infrastructure, carry off structures or vehicles, and bury property under sediment. Standing water can cause damage to roads, foundations, and electrical circuits, as well as spread vector-borne illnesses. Other problems connected with flooding and stormwater runoff include erosion, degradation of water quality, and losses of environmental resources.

There are four types of flooding that primarily affect Burlingame.

- Riverine flooding, the most common type of flood event, occurs when a watercourse such as a stream or creek overruns its banks.
- Stormwater flooding, sometimes called “ponding”, occurs when rainfall and runoff accumulates in low-lying areas or areas with insufficient drainage, forming standing water.
- Flash floods are sudden events, typically caused by intense and localized storms. There is often little or no warning of flash floods, making them particularly dangerous.
- Shoreline floods occur when the ocean inundates normally dry lands by ocean waters, often a result of storm surges, tsunamis, or extreme high tide events.

Another source of flooding, dam failure, is discussed in greater detail below.

FEMA Regulatory Flood Zones

Flood hazard areas, also called floodplains, are the areas that become inundated by a flood. They are usually adjacent to rivers, creeks, or lakes, or along the ocean. Floodplains are officially mapped by FEMA, using Digital Flood Insurance Rate Maps (DFIRMs). The two main floodplains of concern are the 100- and the 500-year floodplain. The 100-year floodplain is the area that has a 1 percent (1 in 100) chance of being flooded in any given year, also known as a base flood. The 500-year floodplain is the area that has a 0.2 percent chance (1 in 500) of being flooded in any given year.

According to FEMA, Burlingame is primarily within the 500-year floodplain, and partially within Zone X - Area of Minimal Flood Hazard. However, properties along certain creeks, including Mills, Easton, Burlingame and Sanchez Creeks, certain areas west of California Drive, and on the bayside of Highway 101 lie within the 100-year floodplain and are subject to mandatory flood insurance requirements.

The Burlingame shoreline is protected by a nonfederal levee in front of Anza Lagoon. This levee protects a variety of important developments, including major hotels and recreational areas. Figure 1 shows the flood zones and levees in Burlingame.

Dam Failure

A dam failure is an uncontrolled release of water from a reservoir through a dam caused by damage or destruction to the dam or associated infrastructure. Water pipeline or aqueduct failures can create a similar sudden flood. These events can be the result of heavy rains that overwhelm the infrastructure, erosions or landslides, or other structural deficiencies, which may be exacerbated by intense rainfall or prolonged flooding. Dam and pipeline failures can range from minor to catastrophic and can potentially harm human life and property downstream from the failure. In addition, ecosystems and habitats can be destroyed by fast-moving floodwaters, debris, and sedimentation from inundation. Although dam and pipeline failures are very rare, these events are not unprecedented.

In a dam failure scenario, the greatest threat to life and property typically occurs in those areas immediately below the dam since flood depths and discharges generally decrease as the flood wave moves downstream. The primary danger associated with dam failure is the high-velocity flooding downstream of the dam and limited warning times for evacuation.

Parts of Burlingame are within the dam inundation zone for the Spencer Lake, San Andreas, Crocker, and Lower Crystal Springs Dams, as shown in Figure 2. Spencer Lake Dam and Crocker Dam are owned by the Town of Hillsborough. San Adreas Dam and Lower Crystal Springs Dam are owned by the City and County of San Francisco. All four dams are inspected by the California Department of Water Resources, Division of Safety of Dams (DSOD). All four dams were given Fair or Satisfactory ratings by the DSOD.[2]

Figure 1: Mapped Flood Hazard Zones and Levees

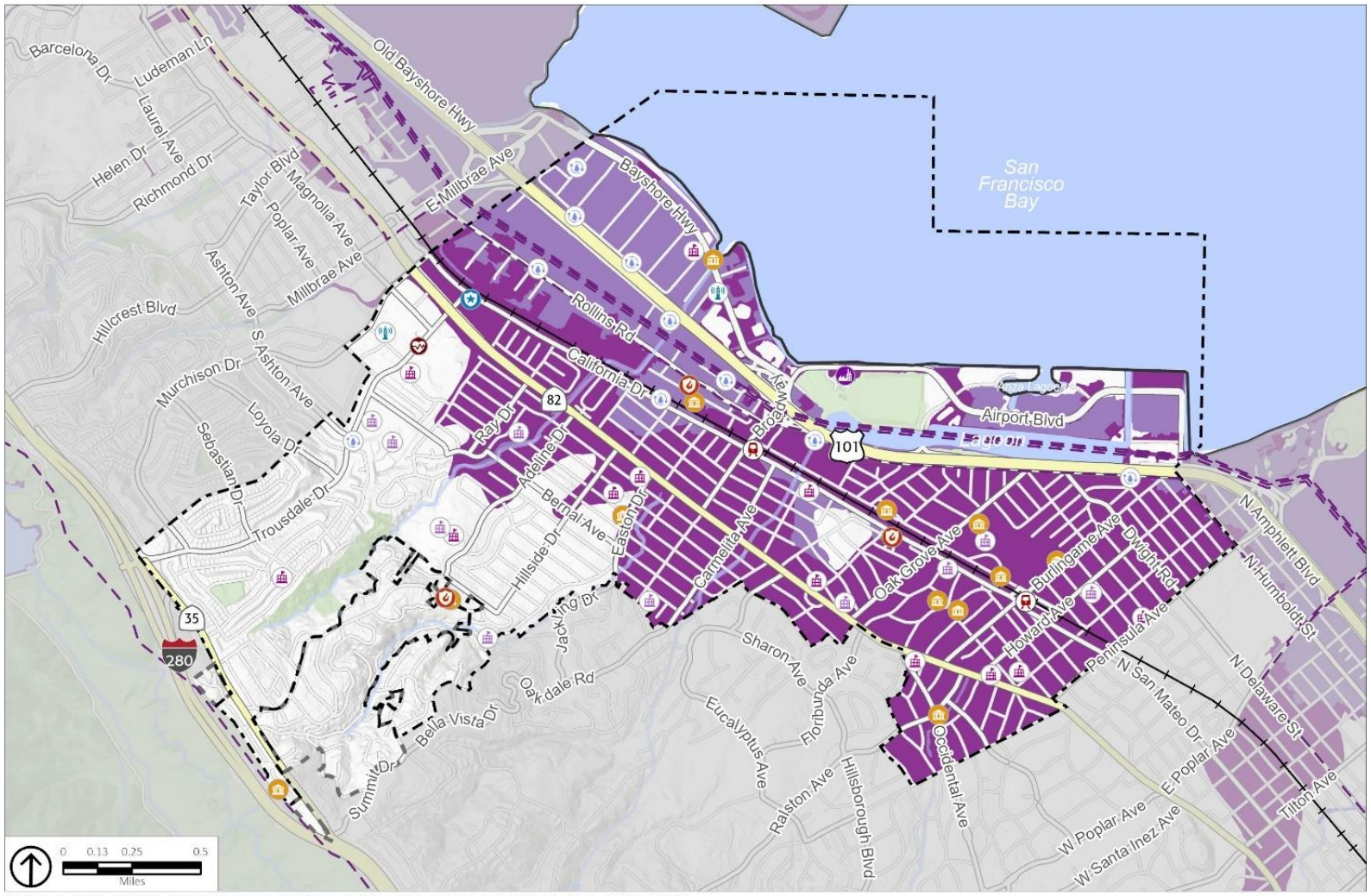
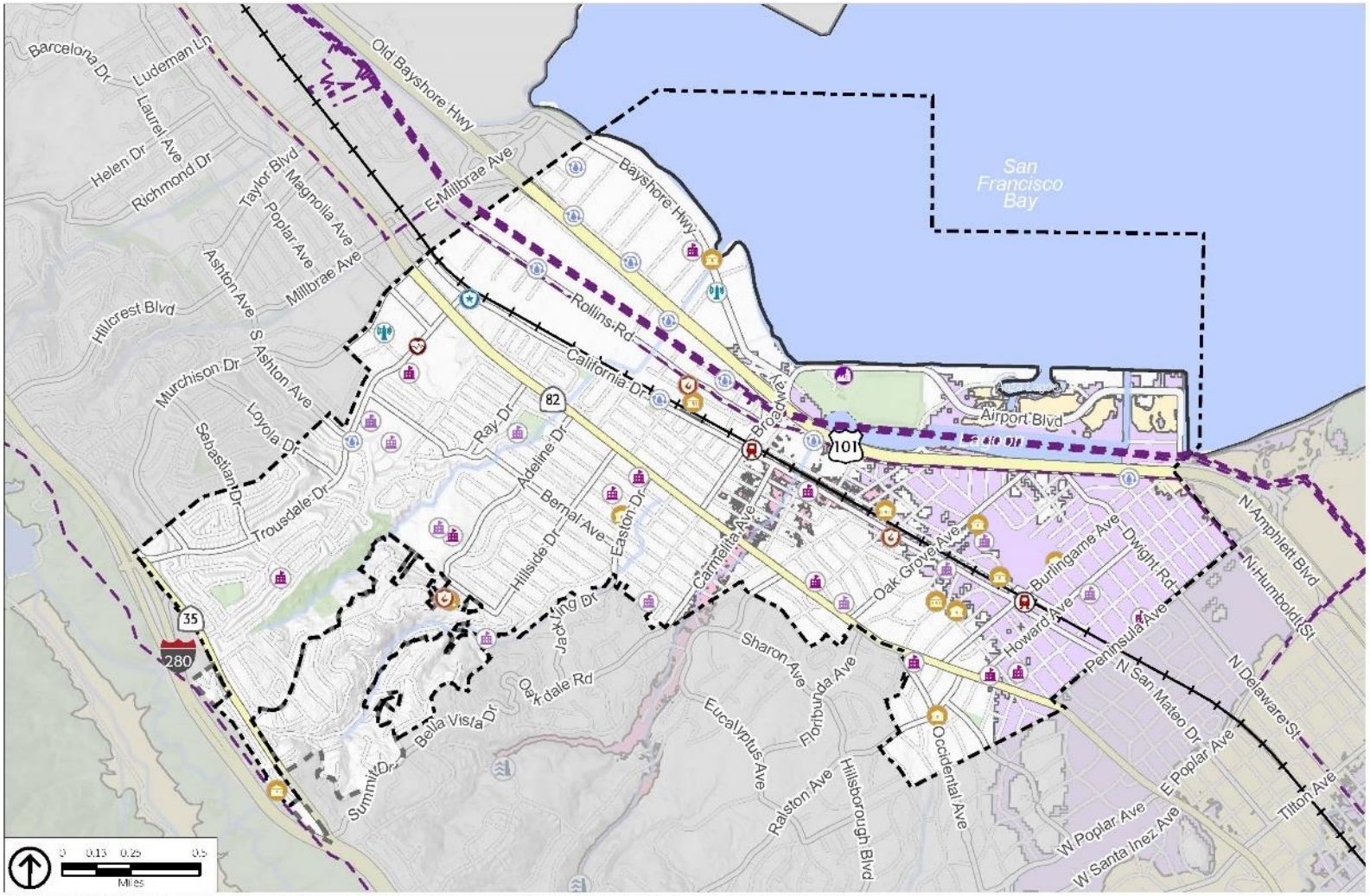


Figure 2: Dam Inundation Areas



Past Events

Floods have occurred both in Burlingame and the surrounding region, often triggered by major storms.

Table 1 lists recent San Mateo County flood events identified in the National Oceanic and Atmospheric Administration (NOAA) National Centers for Environmental Information (NCEI) Severe Storms Database (dating back to 1996), as well as previous flood events affecting the county for which federal disaster declarations were issued.

Table 1: History of Recent Flood Events in Burlingame (2005 – 2023)

Date	Event	Locations
December 31, 2005	Flood	Countywide
January 1, 2006	Flood	Countywide
December 2/11, 2014	Flash Flood, Flood	Belmont, San Bruno, San Mateo County
February 6, 2015	A strong winter storm impacted California. The storm brought heavy rain, gusty winds, and damage to trees and power lines, along with some minor flooding of urban areas. Heavy rain resulted in flooding of Southbound US Highway 101 offramp in Atherton.	Countywide
December 2015/ January 2016	El Niño rains in January 2016 brought more rain into the Bay Area in two days than the previous three Januarys combined.[3] Other than debris, some power outages, and transportation accidents, San Mateo County did not report any major issues.	Countywide
January 10/20, 2017	Flood	Sterling Park, North Fair Oaks, Burlingame
March 1, 2018	An upper-level system with a strong cold front moved through the Bay Area. This system brought widespread rainfall causing localized roadway flooding, strong winds, lightning, and small hail. A majority of the precipitation and subsequent impacts were seen in early March.	Countywide
April 7, 2018	A late season atmospheric river impacted San Mateo County in early April. Enough rain fell to cause minor/nuisance flooding across much of the region. Numerous flood advisories were issued. Storm total rainfall amounts up to 7 inches were reported.	Countywide
February 13-14, 2019	Flood	Bayshore, Burlingame

Date	Event	Locations
January 16, 2020	A potent cold front swept through the region on January 16, 2020, bringing widespread rain, gusty winds, low elevation snow, and thunderstorms. This system caused roadway flooding, downed trees, small hail, and snow at elevations as low as 2,400 feet. Numerous flights were delayed or canceled at San Francisco International Airport.	Countywide
October 24, 2021	Heavy rains overwhelmed the City's stormwater conveyance capacity and triggered flooding throughout the area west of Highway 101. Many businesses and property owners in the area were impacted, experiencing power outages and losing merchandise.	Burlingame
December 13, 2021	An atmospheric river impacted the Bay Area on December 31, 2021, resulting in significant rainfall across the San Francisco Bay Area. During the morning, a surface low developed west of San Francisco and the river stalled over the Bay Area. This resulted in significant rainfall totals for many Bay Area communities.	Countywide
December 31, 2022	A low-pressure system dropped heavy rain throughout the state. The system brought rainfall over a two-day period totaling ten inches in the coastal mountains. A flash flood watch was issued for the Santa Lucia Mountains and Dolan Burn Scar area, where up to 12 inches of rain fell. Roadway flooding caused a hard closure of State Route 92 between State Route 35 and State Route 1. Local residents and businesses experienced flooding and power outages.	Countywide
January 5 and 6, 2023	Heavy rains triggered sewer discharges, damaged water infrastructure, and resulted in school closures.	Burlingame
March 28, 2023	A cold front and associated upper-level low came through the Bay Area and Central Coast. The front brought steady precipitation to the region, while the upper-level low gave the area convective showers. Pea-sized hail was reported across portions of the region.	Countywide

Source: National Centers for Environmental Information, 2021.

Dam Events

The only recorded dam failure in San Mateo County was the failure of a small dam in the community of El Granada in 1926.

Existing Programs and Regulations

Flood Control Agencies and Activities

Agencies responsible for flood control in San Mateo County include the Unites States Army Corps of Engineers, San Mateo County Flood Control District (OneShoreline), Federal Insurance Administration, and the California Department of Water Resources (DWR).

Federal Insurance Administration

The U.S. Congress established the National Flood Insurance Program (NFIP) with the passage of the National Flood Insurance Act of 1968. The NFIP is administered by FEMA and enables property owners in participating communities to purchase insurance as protection against flood losses in exchange for state and community floodplain management regulations that reduce future flood damages.

United States Army Corps of Engineers (USACE)

The USACE operates projects and programs related to dam safety, levee safety, and emergency operations. Under the authority provided by Section 206 of the 1960 Flood Control Act, the USACE can provide the full range of technical services and planning guidance that is needed to support effective floodplain management. General technical assistance efforts under this program includes determining site-specific data on obstructions to flood flows, flood formation, and timing; flood depths, floodwater velocities; the extent, duration, and frequency of flooding; information on natural and cultural floodplain resources; and flood loss potentials before and after the use of floodplain management measures.

The USACE Flood Risk Management Program (FRMP) works to focus the policies, programs, and expertise of USACE toward reducing overall flood risk. This includes the appropriate use and resiliency of structures such as levees and floodwalls, as well as promoting alternatives when other approaches, such as land acquisition and flood proofing, to reduce flood risk.

Within Burlingame, the Pacific Gas and Electric Company (PG&E) Bay Waters Tower Maintenance Project falls under the jurisdiction of the USACE under the provisions of the Water Resources Development Act. Other USACE projects and permits in Burlingame include the Burlingame Annual Creek and Channel Maintenance Project, the San Mateo Highway 101/Broadway Interchange Reconstruction Project, Coyote Point Promenade Improvement Project, and Coyote Point Marina Maintenance Dredging Project.

California Department of Water Resources

DWR leads activities in California to reduce flood risk, maintain levees, forecast river levels based on weather conditions, promote wise use of floodplains, and provide emergency preparedness and response assistance.

DWR's role in flood preparedness includes working with communities to improve community safety and lower insurance premiums for residents; holding preseason briefings for emergency responders to learn about resources and coordinate with other local agencies to prepare for flood season; conducting meetings with flood emergency response partners and county emergency operation officials throughout the state; providing training in effective flood-fighting methods for mitigating flood; and providing grant funding for flood management projects, emergency preparedness, and feasibility studies. DWR can help affected communities obtain flood response resources through the Cal OES and works collaboratively with local, State, and federal agencies to collect and share weather and river runoff data via the California Data

Exchange Center. In the event of a major flood, DWR activates its Flood Operations Center to coordinate response between local agencies and provide technical assistance.

San Mateo County Flood Control District (OneShoreline)

The San Mateo County Flood and Sea Level Rise Resiliency District, also known as OneShoreline, is an independent government agency that works across jurisdictional boundaries to secure and leverage public and private resources for the long-term resilience of San Mateo County. OneShoreline plans and implements solutions to the climate change impacts of sea level rise, flooding, and coastal erosion. OneShoreline's major current priorities include working with cities and developers to incorporate consideration for future climate conditions in property and infrastructure planning and advancing new multi-jurisdictional projects. A key component of OneShoreline's work is to partner with municipalities to remove properties from the FEMA-defined floodplain.

Stormwater Infrastructure

Burlingame is within six sub-watersheds with seven major creeks: Millbrae Creek, Mills Creek, Easton Creek, Sanchez Creek, Terrace Creek, Ralston Creek, and Burlingame Creek. Creeks in Burlingame convey stormwater from the hills to the San Francisco Bay. These creeks existed long before Burlingame's incorporation in 1908 and constitute a critical natural stormwater conveyance system that protects homes, businesses, and transportation networks from flooding during storm events. Creeks west of El Camino Real that run through the side or rear of private properties are owned and maintained by those property owners.

The City has constructed and maintains a network of open ditches, subsurface drainage pipes, and pump stations that supplement the natural streams, carrying urban runoff and stormwater flows into San Francisco Bay. However, most of Burlingame's storm drainage infrastructure was constructed in the early twentieth century. Due to the age of the regional system, many of the storm drain systems have a 10-year design storm capacity, not the standard 30-year capacity for regional facilities. Some local storm drain systems also have less than a two-year design storm capacity, where the standard is also 10 years.

The City continues its efforts to minimize flooding in Burlingame with the construction of storm drain improvement projects outlined in the Capital Improvement Program (CIP) that was created with the resident-approved storm drain fee in May 2009. City Plans and Regulations

Chapter 18.22 of the City's Municipal Code addresses flood damage prevention. This chapter includes methods and provisions for restricting or prohibiting uses that are dangerous to health, safety, and property due to water or erosion hazards; requiring that uses vulnerable to floods be protected against flood damage at the time of initial construction; controlling the alteration of natural floodplains, stream channels, and natural protective barriers that help accommodate or channel floodwaters; controlling filling, grading, and other development that may increase flood damage; and preventing or regulating the construction of flood barriers that may increase flood hazards in other areas.

Chapter 25.12.050 of the Municipal Code, Public Access, Flood and Sea Level Rise Performance Guidelines addresses flood protection and sea level rise resilience for zoning districts along the Burlingame Bayfront.

The City's Green Infrastructure Plan, while primarily intended to improve stormwater quality, also confers flood protection benefits to the city. The Green Infrastructure Plan discusses how green infrastructure projects will be prioritized, identified, and tracked to comply with stormwater quality requirements.

The City has also published the Creekside Property Owner's Manual, which provides guidance and education on the importance on creeks and erosion prevention.

Future Conditions

Climate change is expected to affect the frequency and severity of future flood hazards in Burlingame. Please review the Burlingame Vulnerability Assessment Report for details.

ISSUE 3: SEA LEVEL RISE

General Overview

Burlingame is already exposed to present-day flooding when large rain events coincide with high tides on the San Francisco Bay. The city becomes more at risk of flooding when considering the effects of rising sea levels. Future flooding and coastal erosion could pose considerable risks to life, safety, critical infrastructure, the City's natural and recreational assets, and the economy. To address the issue, the County, in partnership with incorporated cities, performed a regional sea level rise vulnerability assessment (SMC SLR VA) to evaluate the potential impacts of future flooding and inundation. The SMC SLR VA revealed:

- Depending on the severity of sea level rise, between 20 and 813 acres may be inundated in the City of Burlingame.
- Depending on the severity of sea level rise, up to 2,400 people, 741 acres of urban land, 604 residential parcels, and 333 commercial parcels could be inundated.
- Bayshore Highway, Highway 101, and the City's flooding, stormwater, energy, and emergency response facilities and infrastructure are vulnerable to inundation.
- Flooding, erosion, and sea level rise not only directly threaten people and property in the sea level rise hazard areas, but they also affect all communities in the county, even those on high ground. Such indirect effects are present because assets and infrastructure in the sea level rise areas provide critical services and functions to communities outside these areas.

Sea Level Rise: Scenarios

The SMC SLR VA used three sea level rise scenarios to evaluate potential impacts to communities (see Table 2). These three scenarios are referenced when discussing potentially affected assets and infrastructure within the community. Burlingame's projected sea level rise scenarios are presented in Figure 3. [4] According to California's 2024 guidance on sea level rise, communities should plan for as much as approximately 3 feet (36 inches) of sea level rise by 2070, and as much as 6.6 feet (79.2 inches) by 2100.[5]

Table 2: Sea Level Rise Scenarios

Baseline	1% annual chance flood (present-day extreme flood, also known as a 100-year flood)
Mid-Level Scenario	1% annual chance flood + 3.3 feet of sea level rise
High-End Scenario	1% annual chance flood + 6.6 feet of sea level rise

Notes: The SMC SLR VA used sea level rise inundation data from the United States Geological Survey (USGS) and from Point Blue's *Our Coast, Our Future* tool, which provided the best available data at the time. The best available science on sea level rise projections at the time was the National Research Council's *Sea Level Rise for the Coasts of California, Oregon, and Washington*. The scenarios were also informed by regional sea level rise guidance documents, such as the California Coastal Commission's August 2015 *Sea Level Rise Guidance, Interpretive Guidelines for Addressing Sea Level Rise in Local Coastal*

Programs and Coastal Development Permits. The methodology incorporated strategies from the San Francisco Bay Conservation and Development Commission's *Adapting to Rising Tides* (ART) project.

Sea level rise has secondary effects beyond inundation. As sea levels rise, the dense saltwater moves inland beneath the ground/soil, which forces up the layer of the less dense fresh groundwater that floats above it. In many coastal areas, even a few inches of sea level rise can raise the fresh groundwater table enough to flood basements of homes and buildings, escape through cracks in sewer lines, and damage underground infrastructure hindering its effectiveness. Groundwater can also seep into toxic sites (e.g., oil wells, fuel storage tanks) from below, releasing hazardous materials and spreading these pollutants far beyond the limits of the original contamination areas. Low-lying inland areas could flood from below by emergent groundwaters, faster than coastal floodwaters overtop the shoreline. This rising groundwater will create potential exposure pathways that could impact not only the environment, but public health as well. Rising groundwater can further impact Burlingame by increasing liquefaction susceptibility during earthquakes. Figures 4 and 5 show the potential emergency groundwater by sea level rise areas in a mid and high end scenario in the city.

Burlingame's existing shoreline does not include FEMA-accredited levees or flood walls, and largely consists of a patchwork of raised pathways and shoreline embankments interspersed with short, concrete walls. It is one of the few areas on the Peninsula not protected by natural wetlands or levees.

The Burlingame Bayfront has a hard-edge seawall along the waterfront. This low-lying area is composed primarily of fill materials. The Bayfront extends about 2.5 miles along the San Francisco Bay and contains recreation and open spaces, office buildings, and restaurants and hotels in proximity to San Francisco International Airport. Old Bayshore Highway and Airport Boulevard are the area's primary access routes and connect travelers from the airport to the major hotels in the Bayfront. These hotels provide significant income to the City; 35 to 40 percent of the City's annual general fund budget comes from transient occupancy taxes from Bayfront hotels. The roads also protect underground water mains and utilities that supply the businesses and hotels and provide access to a wastewater treatment plant. The regional Bay Trail also runs along the Bayfront, providing pedestrian and bicycle recreation opportunities.

Figure 3: Projected Sea Level Rise

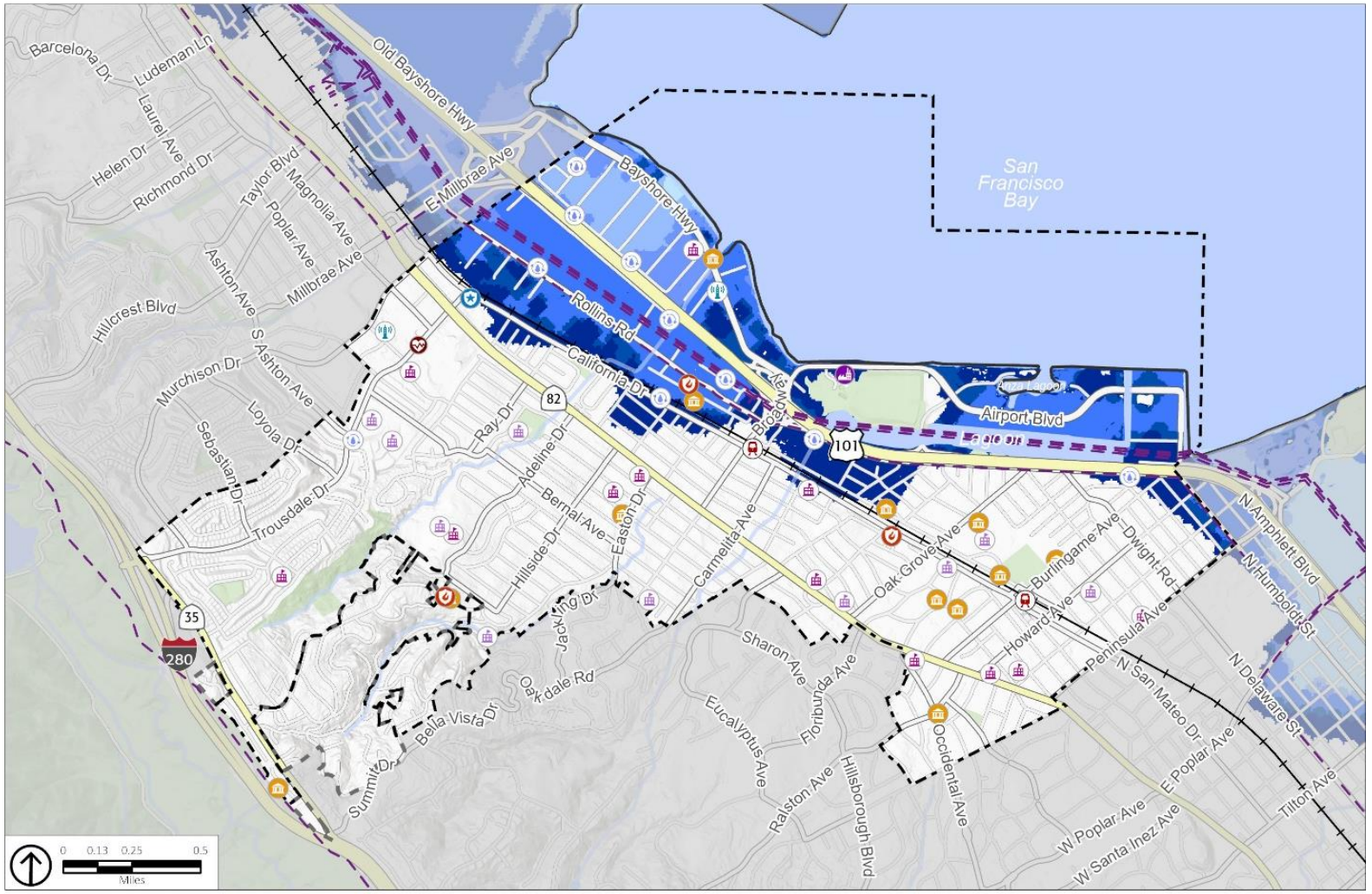


Figure 4: Emergent Groundwater, Mid-level Sea Level Rise Scenario

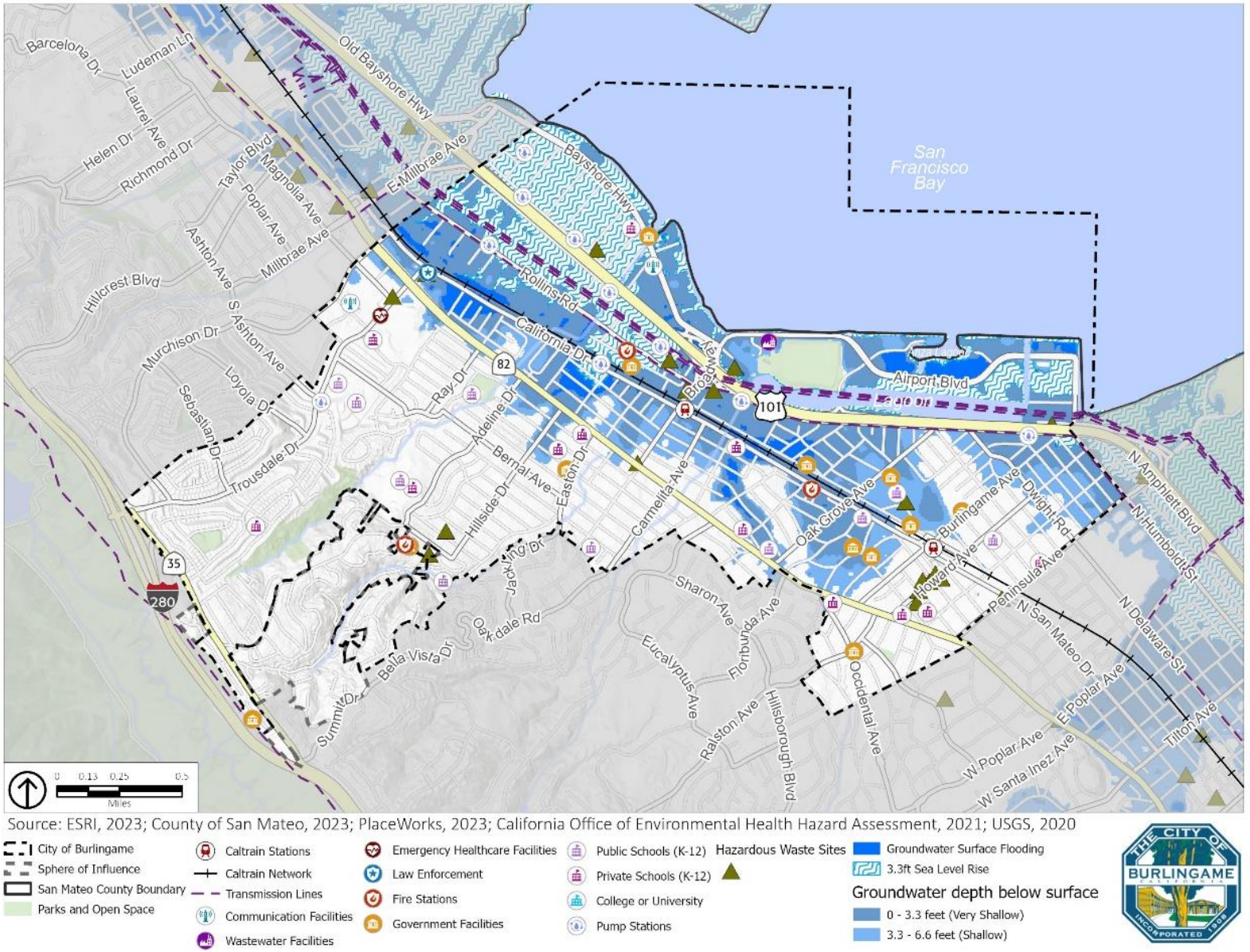
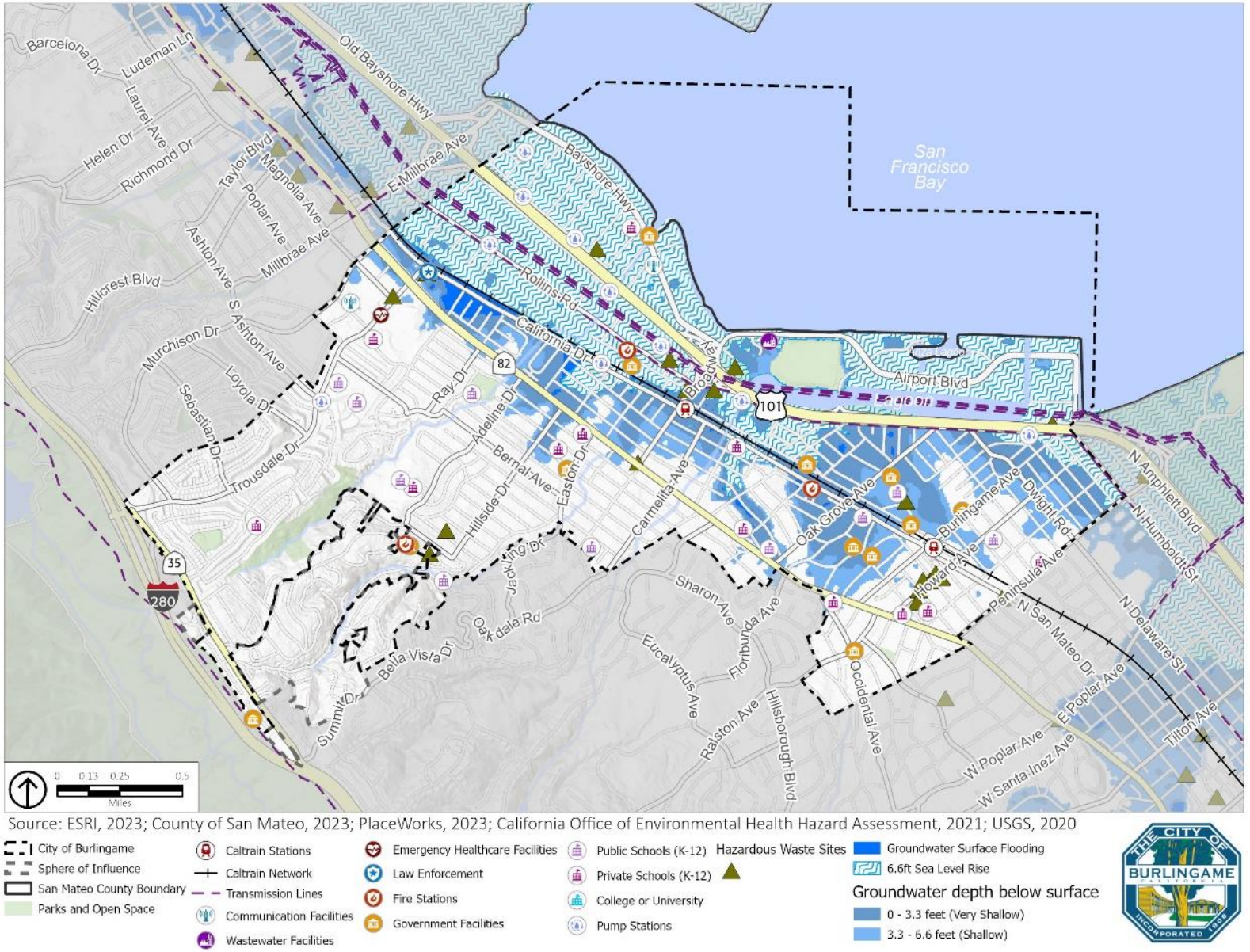


Figure 5: Emergent Groundwater, High Level Sea Level Rise Scenario



Past Events

Sea level rise is a dynamic phenomenon that is constantly evolving, the impacts of which are often not experienced as singular events. Over the past century, the water levels in San Francisco Bay have risen by eight inches.[6]

Existing Programs and Regulations

Sea Level Rise Management Agencies and Activities

Several agencies in San Mateo County and within the greater San Francisco Bay Area participate in the process of planning for and managing sea level rise, including the Bay Conservation and Development Commission, Adapting to Rising Tides, Sea Change San Mateo County, Bay Adapt, OneShoreline, and the San Mateo County Resource Conservation District. Major reports and initiatives developed by these agencies include the *County of San Mateo South Coast Sea Level Rise Vulnerability Assessment & Adaptation Report, County of San Mateo Sea Level Rise Vulnerability Assessment*, and the report *Sea Level Rise & Overtopping Analysis for San Mateo County's Bayshore*.

The San Mateo County Flood and Sea Level Rise Resiliency District (known as OneShoreline) began operating in 2020 to coordinate countywide efforts to combat the harms of sea level rise caused by climate change. OneShoreline provides expertise in the complex process of designing and building for sea level rise, working with cities and developers to build resilience through planning and coordinating multi-jurisdictional flood mitigation projects. OneShoreline's County of San Mateo Sea Level Rise Vulnerability Assessment provides an overview of what is at risk from current and future flooding and erosion in the County.

The County of San Mateo South Coast Sea Level Rise Vulnerability Assessment & Adaptation Report documents the projected extents of coastal hazards, projected impacts to assets, and economic impacts to different resource sectors, then begins to identify feasible adaptation strategies and approaches that may reduce sea level rise risk over time.

The Sea Level Rise & Overtopping Analysis for San Mateo County's Bayshore presents an assessment of San Mateo County's shoreline exposure to flooding or inundation from sea level rise scenarios of 0 to 66 inches and extreme tide events from the 1-year to the 100-year extreme tide event. This analysis uses the San Francisco Bay Conservation and Development Commission's ART methodology.

Led by the County of San Mateo, SeaChange San Mateo County is a program working to address the challenge of sea level rise by working together with and providing resources to local governments, stakeholder agencies, and communities groups to create a prepared and stronger San Mateo County. Burlingame is participating in this program.

City Plans and Regulations

The City of Burlingame completed a comprehensive update of the Zoning Code in 2021. The new Zoning Code provides guidelines for new development along the Bayfront to be resilient to sea level rise. New development is required to maintain a buffer zone extending 100 feet inland from the San Franciso Bay Shoreline to accommodate and maintain built and natural shoreline infrastructure for sea level rise protection, environmental enhancement, and public access trails (building encroachments may be accommodated within the 100-foot buffer zones provided that the City determines that such

encroachments do not inhibit a planned infrastructure project.. Chapter 25.12 in Article 2 includes the Bayfront Commercial District, and Section 25.12.050 provides public access, flood, and sea level rise performance guidelines. As part of Chapter 25.12, the City adopted the Map of Future Conditions, which maps the City's Sea Level Rise Overlay Area. Chapter 25.12 establishes the following requirements for new commercially or industrially zoned construction that falls within the Sea Level Rise Overlay:

- The lowest building finished floor elevation shall be the Base Flood Elevation (BFE) on the FEMA DFIRM in place at the time the project application is deemed complete, plus at least three feet.
- For properties with frontage on San Francisco Bay, Anza Lagoon, Bay Front Channel, and Burlingame Lagoon, properties must maintain a buffer zone of 100 feet from the shoreline.
- New construction within the Overlay Area must capture 100 percent of drainage from impervious surfaces. In any contract for the sale of real estate in the Overlay Area, the seller shall include in the contract a real estate disclosure of all hazards associated with anticipated sea level rise, groundwater inundation, and flooding.

Future Conditions

Climate change is expected to affect the frequency and severity of future sea level rise hazards in Burlingame. Please review the Burlingame Vulnerability Assessment Report for details.

ISSUE 4: SEISMIC HAZARDS

General Overview

An earthquake is the vibration of the earth's surface following a release of energy in the earth's crust. This energy can be generated by a sudden dislocation of the crust or by a volcanic eruption. Most destructive quakes are caused by dislocations of the crust as stress builds up along sections of the crust. When the stress exceeds the strength of the rocks or the friction holding the halves of the fault together, the crust breaks and snaps to a new position. In the process of breaking, vibrations called "seismic waves" are generated. These waves travel outward from the source of the earthquake at varying speeds.

Geologists have found that earthquakes reoccur along faults, which are zones of weakness in the earth's crust. When a fault experiences an earthquake, there is no guarantee that all the stress has been relieved. Another earthquake can still occur. In fact, relieving stress along one part of a fault may increase it in another part. California is seismically active because of movement of the North American Plate and the Pacific Plate to the west. The major fault between these plates, the San Andreas Fault, runs through San Mateo County.

The sliding movement of the surface of the earth on either side of a fault is called fault rupture. Fault rupture begins below the ground surface at the earthquake hypocenter, typically between 3 and 10 miles below the ground surface in California. If an earthquake is large enough, the fault rupture will travel to the ground surface, potentially destroying structures built across its path.

Faults are more likely to experience earthquakes if they have more rapid rates of movement, have experienced recent earthquakes, experience greater total displacements, and are aligned so that movement can relieve the accumulating tectonic stresses. Geologists classify faults by their relative hazards. "Active" faults, which represent the highest hazard, are those that have ruptured to the ground surface during the Holocene period (about the last 11,000 years). "Potentially active" faults are those that displaced layers of rock from the Quaternary period (the last 1,800,000 years). The majority of the seismic hazards are on well-known active faults. However, inactive faults, where no displacements have been recorded, also have the potential to cause earthquakes.

Earthquake Classification

Earthquakes are typically classified by the amount of energy released, measured in magnitude, or by the impact on people and structures, measured in intensity.

Magnitude

An earthquake's magnitude is a measure of the energy released at the source of the earthquake. Magnitude is commonly expressed by ratings on the moment magnitude scale (Mw), the most common scale used today.[7] This scale is based on the distance a fault moved and the force required to move it. The scale is presented in Table 3.

Table 3: Moment Magnitude Scale

Classification	Magnitude
Great	8 or greater
Major	7.0 to 7.9
Strong	6.0 to 6.9
Moderate	5.0 to 5.9
Light	4.0 to 4.9
Minor	3.0 to 3.9
Micro	Less than 3.0

Source: San Mateo County, 2021, *2021 Local Hazard Mitigation Plan*.

Intensity

The most commonly used earthquake intensity scale is the modified Mercalli intensity scale. Ratings of the scale as well as the perceived shaking and damage potential for structures are shown in Table 4. The modified Mercalli intensity scale is generally represented visually using shake maps, which show the expected ground shaking at any given location produced by an earthquake with a specified magnitude and epicenter. The intensity of an earthquake varies depending on the distance from the earthquake, the rock and soil conditions at sites, and variations in the propagation of seismic waves from the earthquake due to complexities in the structure of the earth's crust.

Table 4: Mercalli Scale and Peak Ground Acceleration Comparison

Modified Mercalli Scale	Perceived Shaking	Potential Structure Damage	
		Resistant Buildings	Vulnerable Buildings
I	Not felt	None	None
II to III	Weak	None	None
IV	Light	None	None
V	Moderate	Very Light	Light
VI	Strong	Light	Moderate
VII	Very Strong	Moderate	Moderate/Heavy
VIII	Severe	Moderate/Heavy	Heavy
IX	Violent	Heavy	Very Heavy
X to XII	Extreme	Very Heavy	Very Heavy

Source: San Mateo County, 2021.

Fault Locations

Burlingame is in a region of high seismicity because of the presence of the San Andreas Fault that bisects the county, the Hayward Fault across the bay to the east, and the San Gregorio Fault to the west (see Figure 6). The primary seismic hazard for Burlingame is potential ground shaking from these three large faults.

San Andreas Fault

The San Andreas Fault spans the boundary of the Pacific and North American plates, running 810 miles from the Gulf of California through the Mendocino fracture zone off the shore of northern California. The edge of the San Andreas Fault overlaps with the far western boundary of Burlingame. The San Andreas

Fault has three segments. The southern segment extends from the Gulf of Mexico to Parkfield, in Monterey County. The central segment extends from Parkfield to Hollister, in San Benito County. The northern segment extends northwest from Hollister, through San Mateo County, including Daly City and San Bruno, to its junction with the Mendocino fracture zone and the Cascadia subduction zone in the Pacific Ocean. The San Andreas Fault has a 21 percent chance of generating a magnitude 6.7 or greater earthquake in the next 30 years.[8]

A rupture along the peninsula would cause extremely violent ground shaking throughout the city.

Hayward Fault

The Hayward Fault is a 45-mile-long fault that parallels the San Andreas Fault in the East Bay. The Hayward Fault extends through some of the Bay Area's most populated areas, including San Jose, Oakland, and Berkeley. The Hayward Fault is approximately 16 miles east of Burlingame.

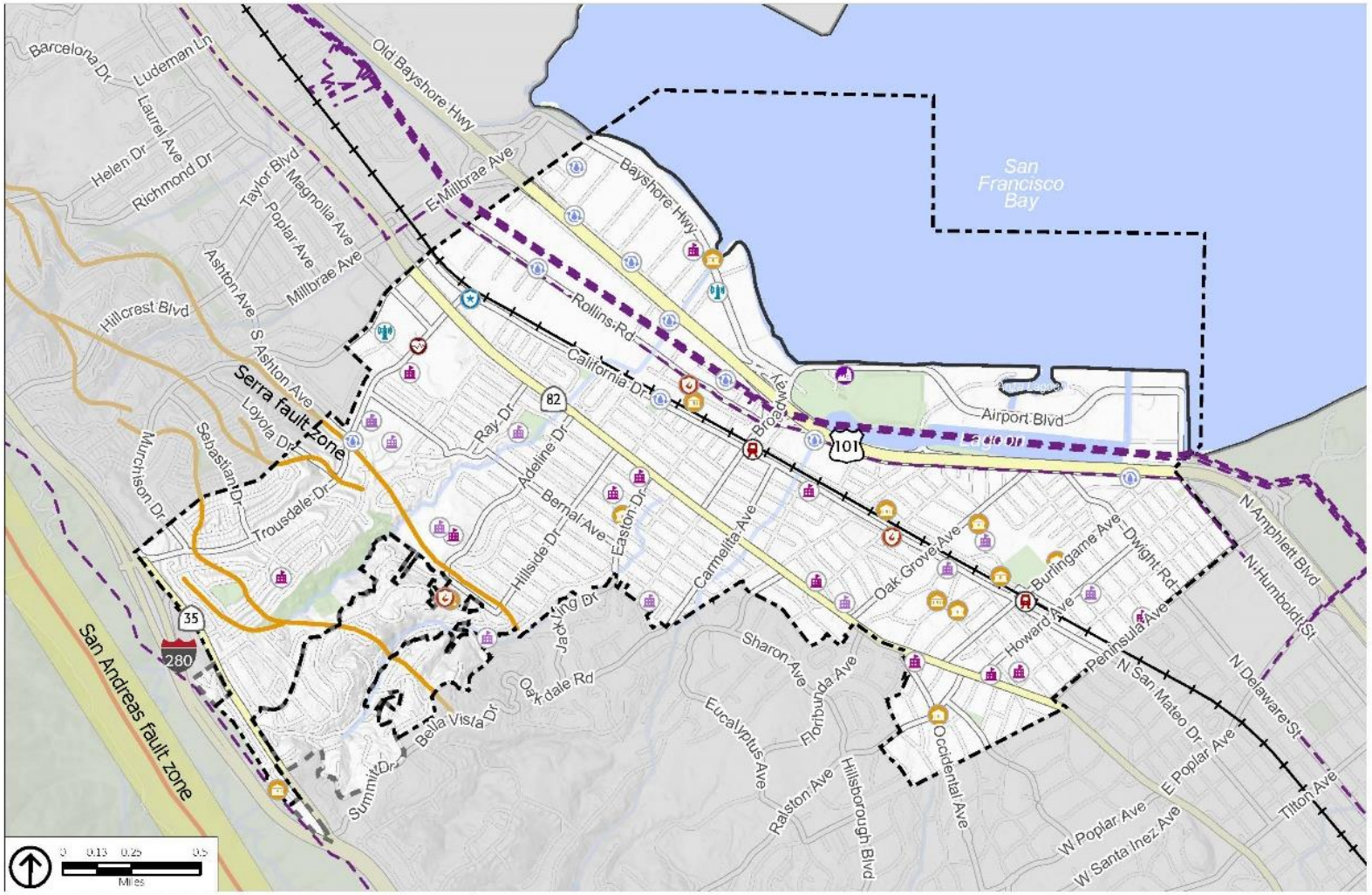
The Hayward Fault has a 31 percent chance of producing a magnitude 6.7 or greater earthquake in the next 30 years.[9] An earthquake of this magnitude has regional implications for the entire Bay Area, as the Hayward Fault crosses numerous transportation and resource facilities, such as highways and the Hetch Hetchy Aqueduct. Disruption of the Hetch Hetchy system has the potential to severely impair water service to San Mateo County. The Hayward Fault is increasingly becoming a hazard priority throughout the Bay region because of its increased chance for activity and its intersection with multiple highly populated areas and critical facilities.

San Gregorio Fault

The San Gregorio Fault is a northwest-trending right-lateral slip deformation near the western edge of San Mateo County, crossing briefly over uninhabited land in San Mateo County around Pillar Point at Half Moon Bay. The fault runs from southern Monterey Bay through Bolinas Bay, where its north section intersects with the San Andreas Fault offshore north of San Francisco. San Gregorio is the principal active fault west of the San Andreas for the Bay Area region. The San Gregorio Fault is approximately 23 miles to the southwest of Burlingame.

The San Gregorio Fault is one of the less studied fault lines, the result of its primary location offshore and its proximity to the better-known San Andreas Fault and Hayward Fault. Its probability of experiencing a magnitude 6.7 or greater earthquake within the next 30 years is 6 percent—significantly less than San Andreas Fault or Hayward Fault.[10] However, the location of the fault poses a significant threat to San Mateo County.

Figure 6: Regional Faults and Alquist-Priolo Fault Zones



Earthquake-Related Hazards

In addition to shaking and surface rupture, earthquakes can also cause landslides (discussed separately), liquefaction, and tsunamis.

Liquefaction

Soil liquefaction occurs when water-saturated sands, silts or gravelly soils are shaken so violently that the individual grains lose contact with one another and float freely in the water, turning the ground into a pudding-like liquid. Buildings and foundations lose load-bearing strength and may sink into what was previously solid ground. Unless properly secured, hazardous materials can be released, causing significant damage to the environment and people. As shown in Figure 7, the majority of the city east of California Drive and north of Morrell Avenue is very highly susceptible to liquefaction. Moderate risk zones occur throughout the city.

Tsunami

A tsunami is a series of high-energy waves that radiate outward like pond ripples from an area where a generating event occurs, arriving at shorelines over an extended period. Tsunamis are often referred to as local or distant. The type of tsunami depends on the location of the source of the tsunami and where it may strike land. The source of a local tsunami is close to the coast or shoreline and may arrive in less than one hour. The danger is greatest for local tsunamis because warning time is limited.[11]

In the open ocean, a tsunami may be only a few inches or feet high, but it can travel with speeds approaching 600 miles per hour. As a tsunami enters the shallow waters near a coastline, its speed diminishes, its wavelength decreases, and its height increases greatly. At the shoreline, tsunamis may take the form of a fast-rising tide, a cresting wave, or a bore (a large, turbulent wall-like wave). The first wave is usually followed by several larger and more destructive waves.

At some locations, the advancing turbulent wave front will be the most destructive part of the tsunami wave. In other situations, the greatest damage will be caused by the outflow of water back to the sea between crests, sweeping away items on the surface and undermining roads, buildings, bulkheads, and other structures. This outflow action can carry enormous amounts of highly damaging debris, resulting in further destruction. Ships and boats may be forced against breakwaters, wharves, and other craft, or be washed ashore and left grounded after the withdrawal of the seawater.

Tsunamis affecting the Bay Area are most likely to be generated by very distant subduction faults such as those in Washington and Alaska, but local tsunamis can be generated from strike-slip faults (such as the small one that was triggered by the 1906 earthquake). The 2011 Honshu, Japan, earthquake caused tsunami damage in Santa Cruz, Crescent City, and Berkeley marinas.[12]

There is a tsunami warning system for the Pacific Ocean, involving 26 countries with numerous seismic stations, water level stations and information distribution centers. The warning centers issue tsunami watches, warnings, and advisories. A watch is issued when a large earthquake has occurred far away from the region and the threat is still being determined. The warning system is activated when a Pacific basin earthquake of magnitude 6.5 occurs or an earthquake is widely felt along the North American coast.

CalOES has prepared a series of maps showing the potential inundation line for a tsunami runup along the San Francisco Bay shoreline from a number of extreme, yet realistic, tsunami data sources. The entirety of Burlingame's shoreline east of US Highway 101 is vulnerable to tsunami-induced inundation, as shown in Figure 8.

Figure 7: Liquefaction Hazard Areas

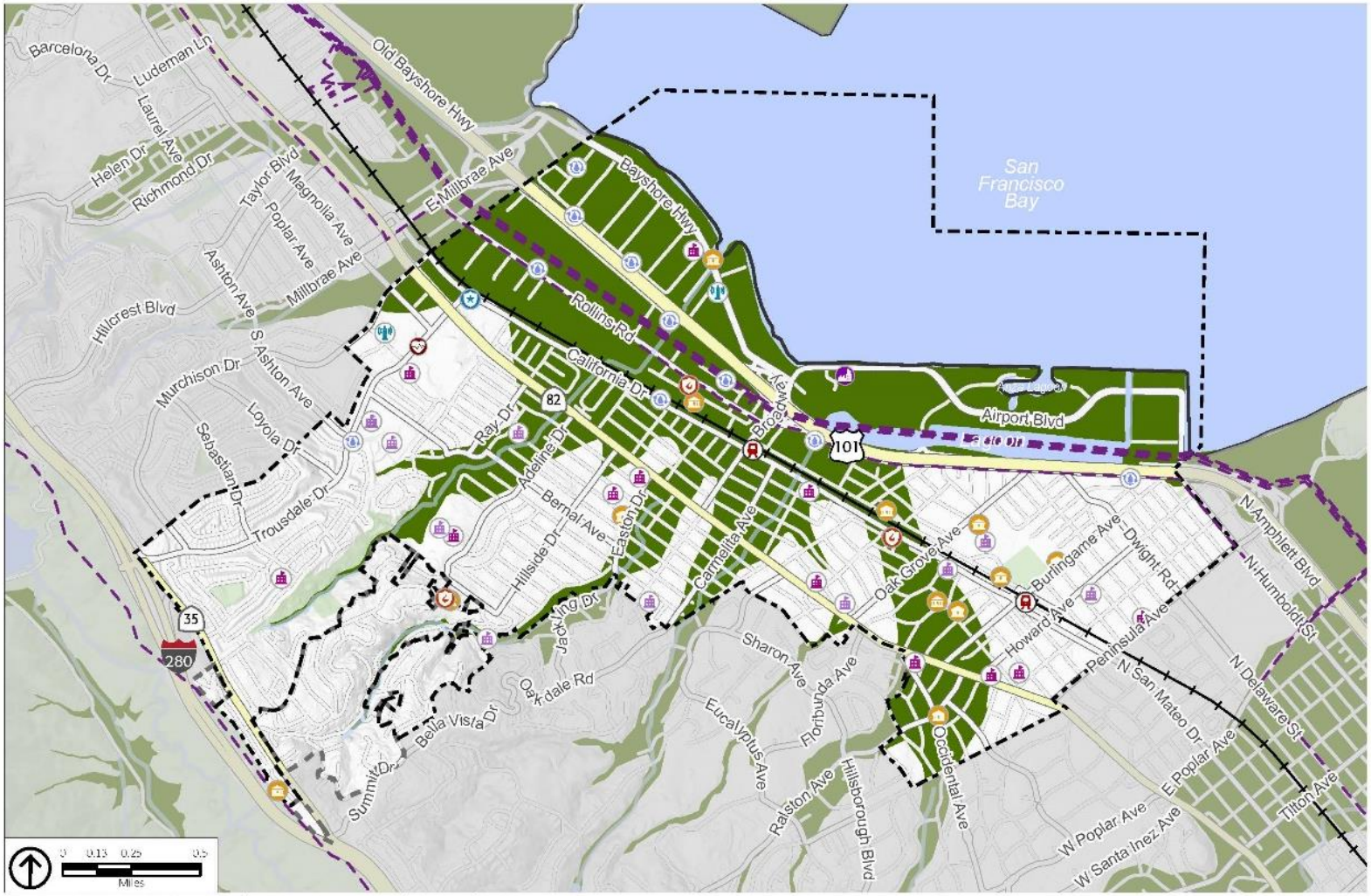
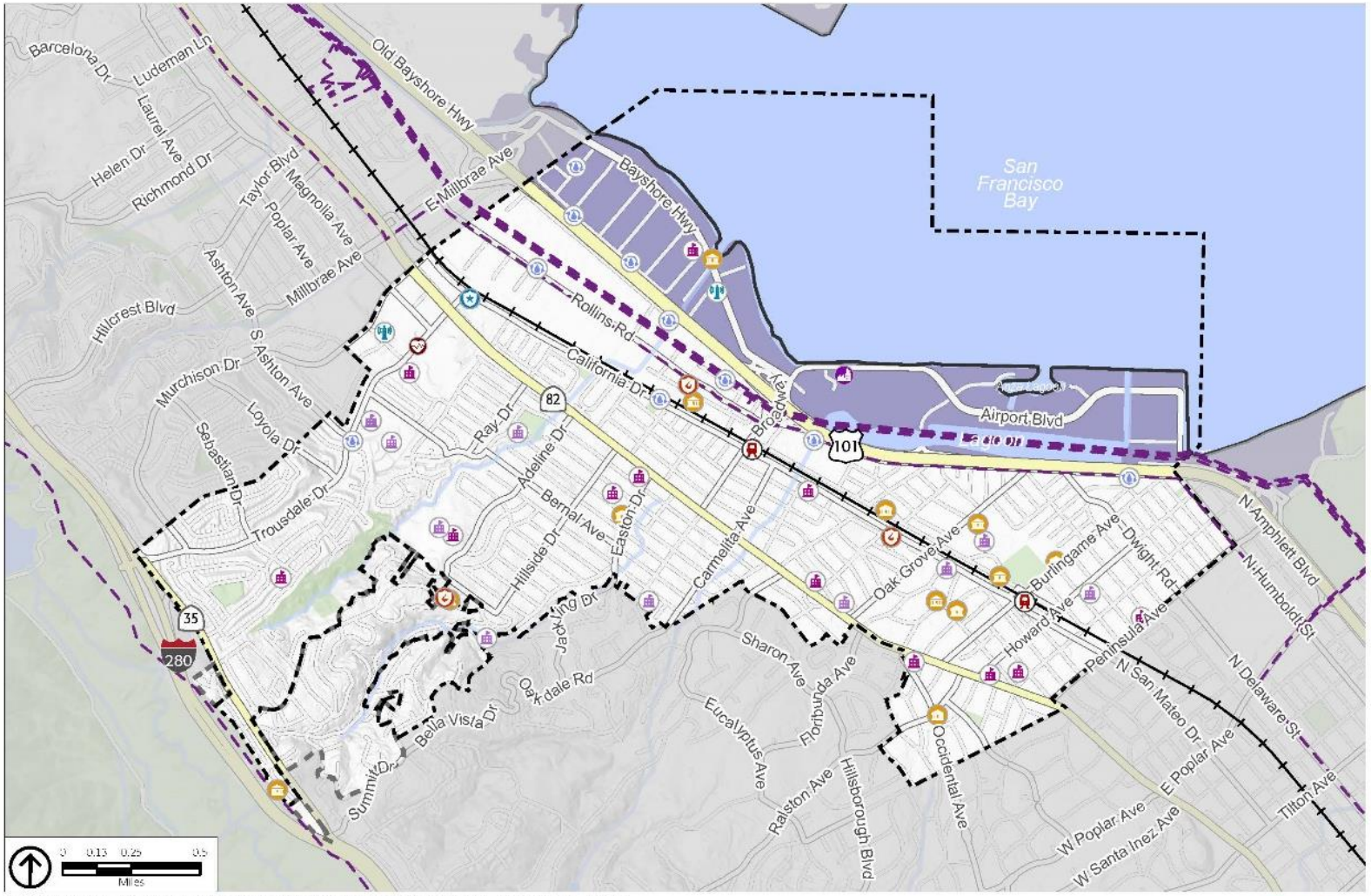


Figure 8: Tsunami Hazard Areas



Source: ESRI, 2023; County of San Mateo, 2023; PlaceWorks, 2023; CGS, 2021

- City of Burlingame
- Sphere of Influence
- San Mateo County Boundary
- Parks and Open Space
- Creeks and Waterways
- Caltrain Stations
- Caltrain Network
- Transmission Lines
- Communication Facilities
- Wastewater Facilities
- Emergency Healthcare Facilities
- Law Enforcement
- Fire Stations
- Government Facilities
- Public Schools (K-12)
- Private Schools (K-12)
- College or University
- Pump Stations
- Tsunami Hazard Zone

Past Events

Table 5 lists recent earthquakes with a magnitude of 5.0 or greater within 100 miles of San Mateo County. The last significant (greater than magnitude 6.0) seismic event in the San Mateo vicinity was the 7.1 magnitude San Andreas Loma Prieta Earthquake in 1989, which originated 10 miles northeast of Santa Cruz. Other significant local earthquakes include the 1906 earthquake in San Francisco and the 2014 Napa earthquake. Although the 1906 earthquake is most associated with the City of San Francisco, San Mateo County was also greatly affected.

Table 5: Recent Earthquakes Magnitude 5.0 or Larger Within 100-Mile Radius of San Mateo County

Date	Location	Epicenter Location
3/22/1957	5.3	Daly City
3/31/1986	5.70	12 miles east-northeast of Milpitas, CA
10/17/1989	7.1	10 miles northeast of Santa Cruz, CA
9/3/2000	5.17	8 miles northwest of Napa, CA
8/10/2001	5.50	9 miles west of Portola, CA
10/31/2007	5.6	10 miles northeast of San Jose, CA
8/24/2014	6.0	6 miles southwest of Napa, CA

Source: San Mateo County. 2021. 2021 Local Hazard Mitigation Plan.

Existing Programs and Regulations

Chapter 18.28 of the City's Municipal Code establishes the Unreinforced Masonry Building Hazard Reduction Program and provides minimum standards for structural seismic resistance. This seismic hazard reduction program is consistent with California Health and Safety Code Sections 19160 through 19168 and Government Code Sections 8875 through 8878.

California Health and Safety Code Sections 19160 through 19168 concern earthquake hazardous building reconstruction and establishes that cities may assess the earthquake hazard in its jurisdiction and identify buildings subject to its jurisdiction as being potentially hazardous in the event of an earthquake. This includes unreinforced masonry buildings. Section 19162 grants cities the authority to establish seismic retrofit standards for those buildings and structures identified as hazardous.

Sections 8875 through 8878 of the Government Code establishes State seismic safety standards. Section 8875.2 requires local building departments to identify all potentially hazardous buildings within their respective jurisdictions and to establish a mitigation program for potentially hazardous buildings, including notification to the legal owner that the building is considered hazardous in the event of an earthquake.

Future Conditions

The frequency and severity of future seismic hazards in Burlingame is expected to continue.

ISSUE 5: LANDSLIDES

General Overview

A landslide is a mass of rock, earth or debris moving down a slope. They occur when a slope loses its structural integrity and can no longer hold itself together. Landslides can move slowly or very quickly. Mudslides, a type of landslide, are rivers of rock, earth, organic matter, and other soil materials saturated with water. They develop in the soil overlying bedrock on sloping surfaces when water rapidly accumulates in the ground, such as during heavy rainfall.

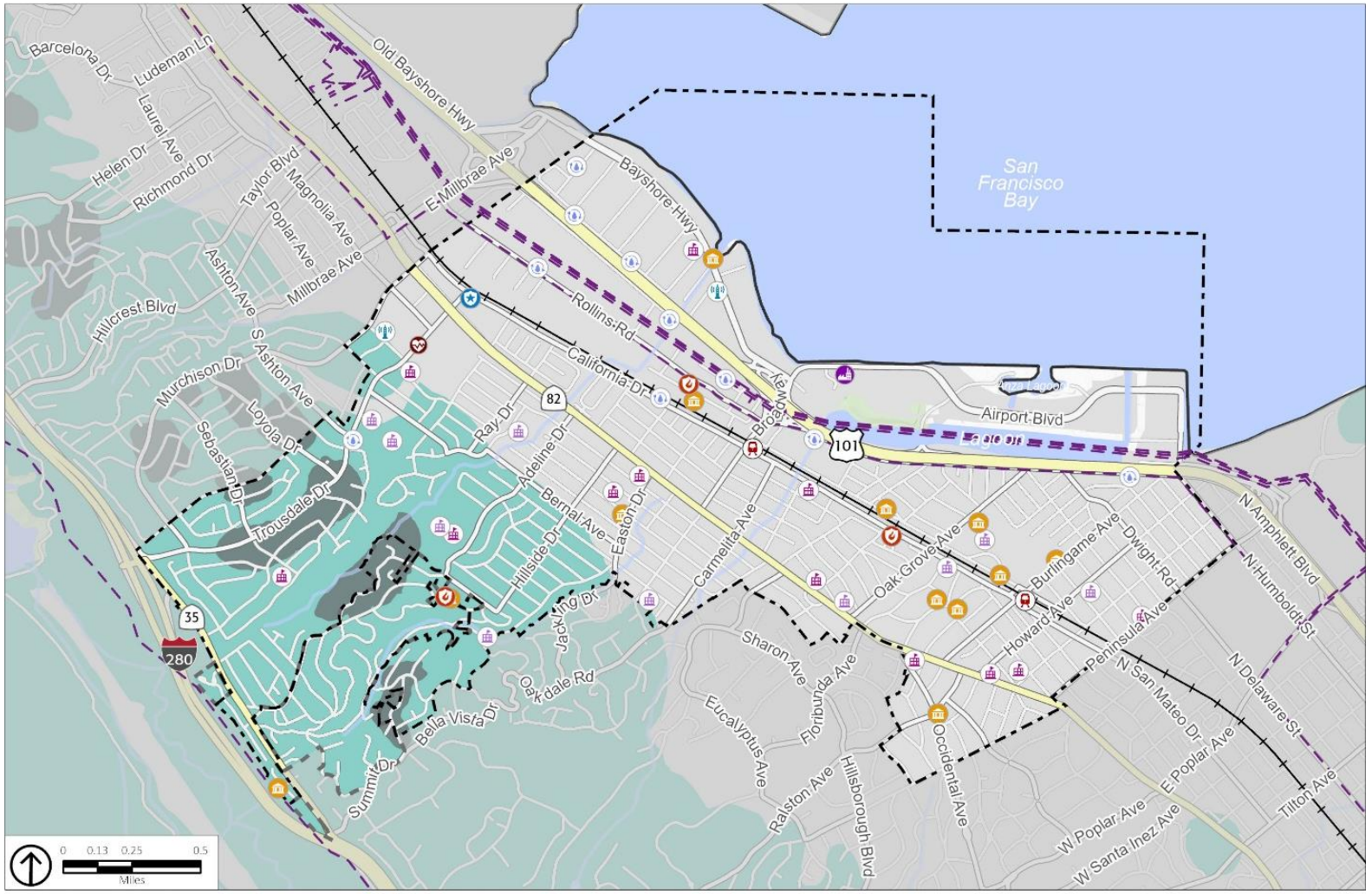
Slides are caused by a combination of geological and climate conditions and the influence of urbanization. They can be initiated by storms, earthquakes, fires, or human modification of the land. The sites of large landslides are typically areas of previous landslide movement that are periodically reactivated by significant precipitation or seismic events. In San Mateo County, landslides typically occur during and after severe storms that saturate steep, slide-prone soils. Most weather-induced landslides in the county occur in the winter after the water table has risen. Landslides that result from earthquakes can occur at any time. The probability of a landslide in the county in any given year is high.

Landslides in hillside terrain can pose a serious hazard to downslope property and structures. They can disrupt roadways and other infrastructure lifelines, destroy private property, and cause flooding, bank erosion, and rapid channel migration. Landslides can travel miles from their source, growing as they descend and pick up debris.

The degree of local landslide hazard depends on soil type and steepness of slope. Soil type is a key indicator for landslide potential and is used by geologists and geotechnical engineers to determine soil stability for construction standards. Other factors that increase landslide risk include a slope greater than 33 percent, a history of landslide activity in the last 10,000 years, and stream or wave activity, which can cause erosion and undercut a bank and cause the surrounding land to become unstable. Wildfire can also make landscapes more susceptible to landslides, flash floods, and debris flows.

Figure 9 shows landslide hazard areas within Burlingame. Landslide hazard areas are scattered throughout the city but are most prominent within the eastern, steeper slopes of the city.

Figure 9: Landslide Hazard Areas



Past Events

There are limited accounts of landslides occurring within Burlingame. However, landslides have occasionally occurred within the city and San Mateo County (see Table 6).

Table 6: Past Landslide Events in San Mateo County

Date	Event Type
December 17, 2005, to January 12, 2006	A series of winter storms caused flooding, landslides, and mudslides in the region. Damage estimates for the San Mateo County region exceeded $100 million. Three homes were nearly wiped out by mudslides.
April 2006	Severe storms resulted in debris flowing across the county. The hardest hit areas were water-soaked hillsides in Brisbane, Broadmoor, and El Granada. In total, 83 damage sites were documented throughout San Mateo County. Damage was estimated at nearly $13 million, with at least $6 million charged to county road damage. A slide caused Highway 1 at Devil's Slide to be closed for several months. A landslide also blocked lanes on State Route 84.
Winter 2017	A series of severe winter storms caused flooding and mudslides across San Mateo County.
March 2023	Highway 84 between Foxhill Road and Portola Road was closed due to landslide triggered by severe weather. The slide resulted in the failure of approximately 250 feet of roadway on March 8, 2023. On March 22, 2023, a landslide on the 600 to 800 blocks of Patrol Road in Woodside impacted approximately 30 homes. Residents were urged to evacuate, and Patrol Road was closed.
September 8, 2023	A landslide shut down eastbound Highway 84 west of Highway 35. The road was closed for several hours.
January 2023	Damage from the January 2023 storms caused a landslide on the Ed Taylor Loop Trail.[13] The City is expected to spend $1.5 million in 2025 to repair this damage.

Source: San Mateo County. 2021. 2021 Local Hazard Mitigation Plan.

Existing Programs and Regulations

Chapter 18.20 of the City's Municipal Code establishes standards for grading, excavation, and fills, which require that any graded slope that may be subject to erosion be protected by planting trees, shrubs, or groundcover; by berms, terracing, or lined ditches; or by a combination of these methods. Municipal Code Chapter 25.20 establishes a Hillside Overlay Zoning District, which is intended to minimize erosion and fire danger associated with development on hillsides. Chapter 25.20 requires that each structure be located in the most accessible, most geologically stable portion or portions of a site and that structures be aligned with the natural slopes of the site. This chapter also establishes standards for retaining walls and landscaping in hillside areas.

The City's Parks Division issues annual reminders to residents reminding them not to discharge onto City property.

Future Conditions

Climate change is expected to affect the frequency and severity of future landslide hazards in Burlingame. Please review the Burlingame Vulnerability Assessment Report for details.

ISSUE 6: FIRE HAZARDS

General Overview

Fire hazards include both wildfires and urban fires. The combination of complex terrain, Mediterranean climate, and productive natural plant communities, along with ample natural ignition sources, has created conditions for extensive wildfires. Historically, the fire season extended from early summer through late fall of each year during the hotter, dryer months, although it is increasingly a hazard that can occur year-round. Fire conditions arise from a combination of high temperatures, low-moisture content in the air and plant matter, an accumulation of vegetation, and high winds.

Three types of fires are of concern to Burlingame: (1) wildfires, (2) wildland-urban interface (WUI) fires, and (3) structural fires.

Wildland Fire

A wildland fire is any uncontrolled fire on undeveloped land that requires fire suppression. Wildland fire can occur naturally and are important to many ecosystem processes; however, most are started by people. Wildland fires occur on mountains, hillsides, and grasslands. Fuel, weather, and topography are primary factors that affect how wildland fires spread. The climate of San Mateo County and the surrounding area keeps the grass dry and more readily combustible during fire season.

Wildland-Urban Interface Wildfires

The WUI is an area where buildings and infrastructure mix with areas of flammable wildland vegetation, allowing fires to easily spread to buildings and structures. Hundreds of homes now border major forests and brush areas in California. Human-caused fires are the leading cause of WUI fires, and with thousands of people living near and visiting wildland areas, the probability of human-caused fires is growing.

Fire Hazard Areas

The California Department of Forestry and Fire Protection (CAL FIRE) is the State's primary regulatory body responsible for wildfire hazard planning. CAL FIRE has designated 248 acres of Burlingame as a wildfire hazard zone, including 91 acres identified as a Very High fire hazard severity zone. Burlingame's fire hazard severity zones are all in the hillside neighborhoods, near Interstate 280. Figure 10 shows the wildfire hazard zones present in Burlingame.

The city contains land designated as wildland-urban interface. These areas are primarily located along the western boundary of the city and in hillside areas.

Wildfire Protection Responsibility Areas

Hundreds of agencies have fire protection responsibility for wildland and WUI areas in California. Local, state, tribal, and federal organizations have primary legal (and financial) responsibility for wildfire protection. In many instances, two fire organizations have dual primary responsibility for the same parcel of land—one for wildfire protection, and the other for structural or improvement fire protection. CAL FIRE designates lands into responsibility areas based on who is financially responsible for fire protection services.

Local Responsibility Areas

Local Responsibility Areas (LRAs) are areas protected by local agencies, including city and county fire departments, local fire protection districts, and CAL FIRE when under contract to local governments. LRAs may include flammable vegetation and WUI areas where the financial and jurisdictional responsibility for improvement and wildfire protection is that of a local government agency. All of Burlingame is in the LRA.

State Responsibility Areas

State Responsibility Areas (SRAs) include unincorporated areas and State lands where the State/CAL FIRE has financial responsibility for fire protection. CAL FIRE can also provide fire protection services by contract to cities and counties. The unincorporated areas in the hills above Burlingame are in the SRA.

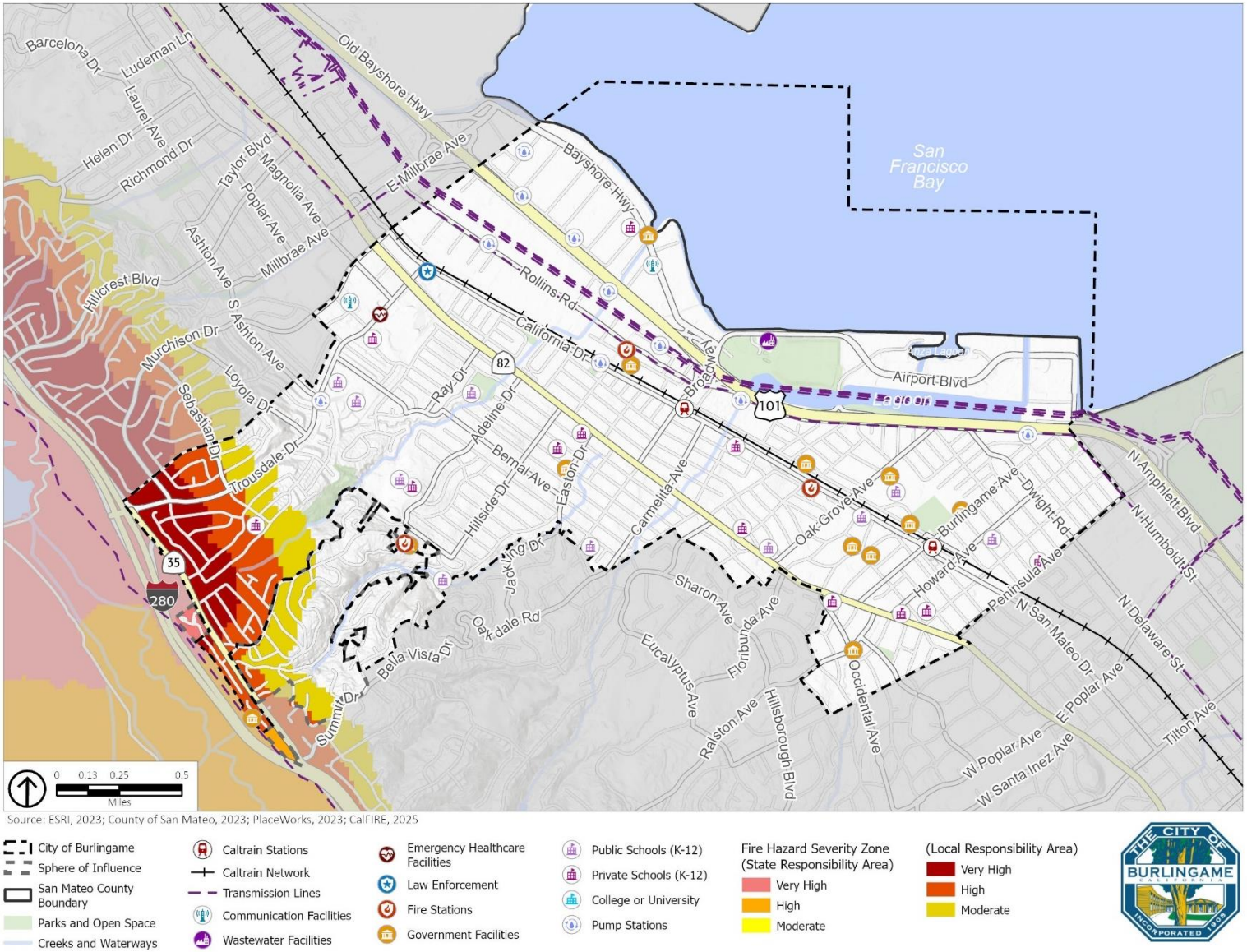
Structural Fires

Structural fires occur in built-up environments, destroying buildings and other human-made structures. These disasters are often due to faulty wiring or mechanical equipment, or combustible construction materials. The absence of fire alarms and sprinkler systems can exacerbate the damage associated with a structural fire. Structural fires are largely from human accidents, although deliberate fires (arson) may be a cause of some events. Older buildings that lack modern fire safety features may face greater risk of damage from fires. To minimize fire damage and loss, the local Fire Code, based on the State Fire Code, sets standards for building and construction. They require the provision of adequate water supply for firefighting, fire-retardant construction, and minimum street widths, among other things.

Secondary Hazards

Wildfires can generate a range of secondary effects, which in some cases may cause more widespread and prolonged damage than the fire itself. Wildfires cause the contamination of reservoirs, destroy transmission lines, and contribute to flooding. They strip slopes of vegetation, exposing them to greater amounts of runoff. This in turn can weaken soil and cause landslides or mudslides. Wildfires that burn hot and for long durations bake soil, thus increasing the imperviousness of the ground. This increases the runoff during storm events, and subsequent chance of flooding.

Figure 10: CAL FIRE Fire Hazard Severity Zones



Past Events

While San Mateo County has a prolific fire history, few of its fires have caused sufficient damage to trigger a state or federal disaster declaration. Notable fires of record are the November 1929 fire near Montara that destroyed 25 homes, a church, and cattle, and the August 2020 CZU Lightning Complex in Santa Cruz and San Mateo Counties, caused by a reported 12,000 lightning strikes.

The CZU Lightning Complex fires burned in San Mateo and Santa Cruz Counties starting on August 16, 2020. This fire destroyed 1,490 structures, damaged 140 others, and caused one injury and one fatality. Fires burned in both Butano and Big Basin Redwoods State Parks, where several historic buildings were destroyed, including the visitor's center at Big Basin. The fire burned a total of 86,509 acres.[14] According to CAL FIRE, the CZU Lightning Complex fire was the 12th most destructive California wildfire as of 2023. While Burlingame was not within the path of the blaze, residents and businesses experienced poor air quality.[15]

Although San Mateo County has not experienced many major wildfire events, nearby Alameda County has demonstrated some worst-case scenario fires that could occur in other Bay Area counties. At the time it occurred, the October 1991 Oakland/Berkeley Hills "Tunnel Fire" was the most damaging fire (now the third-most damaging) and the second deadliest (currently the third deadliest) fire in California. This WUI fire resulted in 25 lives lost, including a fire battalion chief and an Oakland police officer, 148 people injured, and 2,900 structures destroyed. The blaze started from a grass fire in the Berkeley Hills and burned 1,600 acres. According to the Insurance Information Institute the estimated private property loss was $1.7 billion.

Existing Programs and Regulations

CAL FIRE Wildfire Mapping

CAL FIRE has modeled and mapped wildfire hazard zones using a computer model that designates moderate, high, or very high FHSZs. FHSZ ratings are derived from a combination of fire frequency (how often an area burns) and expected fire behavior under severe weather conditions. CAL FIRE's model derives fire frequency from 50 years of fire history data. Fire behavior is based fuel loads (such as the level and type of vegetation), weather conditions (temperature, wind, precipitation, humidity, etc.), slope and elevation, fire ignition patterns, and expected rate-of spread. It accounts for flying ember production, which is the principal driver of the wildfire hazard in densely developed areas, as well as the relative density of vegetative fuels that can serve as sites for new spot fires within the urban core and spread to adjacent structures. The model refines the zones to characterize fire exposure mechanisms that cause ignitions to structures.

CAL FIRE periodically reviews and revises the FHSZ boundaries based on updated modeling and scientific information. Individuals should consult the most recent available mapping, available from CAL FIRE's Fire and Resource Assessment Program (FRAP) at https://frap.fire.ca.gov/.

County Fire Management and Response

Santa Cruz and San Mateo Counties updated their joint Community Wildfire Protection Plan (CWPP) in 2018. A CWPP is a tool for communities to identify landscape scale hazards and take strategic action to reduce wildfire risk for healthier ecosystems and more resilient communities. The updated CWPP assesses hazards and priorities within the two counties, identifies at-risk communities, and provides fuel reduction

recommendations for high-priority areas. The CWPP can also aid communities to apply for State and federal funding for fire prevention projects and programs.

Wildfire Fuel Management Program

This five-year Wildfire Fuel Management Program is a plan developed by the San Mateo County Parks Department designed to identify and prioritize wildfire fuel reduction projects. The program identifies the projects deemed to have the highest priority to be completed during the selected timeframe. This process involves direct collaboration between department field staff and natural resource management staff to identify the necessity and scope of various projects within park properties and completion of a systematic ranking process of projects to determine which are of the highest priority for the treatment plan timeframe. The plan outlines how the projects will be implemented and then stipulates how these fuel breaks will be maintained in the future. Although no current fuel management activities are proposed in or around Burlingame, this program may assist with these activities.

Central County Fire Department

As described in the Emergency Preparedness and Response section above, the Central County Fire Department is the city's primary provider of fire response services. The Fire Department's Fire Prevention Division provides a comprehensive fire safety plan review for land development, new building construction, interior remodel projects, and fire suppression and alarm systems. The Fire Department performs periodic construction inspections to ensure that completed projects conform to both State and local fire safety regulations.

City Fire Management and Response

Municipal Code Chapter 11.08 requires property owners to remove weeds from their property and in the abutting one-half of the street in front, and the alley, if any, behind their property. Title 17 of the Municipal Code contains the City's Fire Code. This chapter adopts the California Fire Code and the International Fire Code.

The California Fire Code contains regulations for safeguarding life and property from the hazards of fire and explosion and hazardous materials, as well as provisions to assist emergency response personnel. The International Fire Code contains provisions to safeguard life and property from fires and explosion hazards. Topics include general precautions, emergency planning and preparedness, fire department access and water supplies, fire alarm systems, and the storage and use of hazardous materials.

Burlingame's Parks Division works with City staff, CAL FIRE inmate crews, and contractors to engage in fuel-reduction activities. In 2022, the City received a grant to expand these efforts. The City also engages in public outreach for fire prevention.

Future Conditions

Climate change is expected to affect the frequency and severity of future fire hazards in Burlingame. Please review the Burlingame Vulnerability Assessment Report for details.

ISSUE 7: SEVERE WEATHER

General Overview

Severe weather is generally any destructive weather event, but usually occurs in San Mateo County as localized storms that bring heavy rain, hail, thunderstorms, and strong winds. Severe weather is usually

caused by intense storm systems, although types of strong winds can occur without a storm. The most common severe weather events that have historically impacted San Mateo County are heavy rains (usually a result of atmospheric rivers), thunderstorms, and windstorms. Utilities may temporarily turn off power to specific areas to reduce the risk of fires caused by electric infrastructure, an action called a public safety power shutoff (PSPS) event.

Atmospheric Rivers

Atmospheric rivers are long, narrow regions in the atmosphere that transport water vapor from the tropics. When the atmospheric rivers make landfall, they release this water vapor in the form of precipitation, often causing heavy rains that can lead to flooding and mudslide events. These events can cause significant injuries, disrupt travel, and damage property. However, they also play a critical role in replenishing California's water supply.

Fog

Fog forms when air close to the ground can no longer hold all the moisture it contains, causing the excess moisture to condense as a low cloud. This occurs either when air is cooled to its dew point or the amount of moisture in the air increases. Heavy fog is particularly hazardous because it can restrict surface visibility. Severe fog incidents can close roads, cause vehicle accidents and airport delays, and impair the effectiveness of emergency response. Cool marine air and fog are common in the Bay Area in the summer.

Thunderstorms

A thunderstorm is a rain event that includes thunder and lightning. According to NOAA's National Severe Storms Laboratory, a thunderstorm is classified as "severe" when it contains hail with a diameter of one inch or greater, wind gusts exceeding 57.5 miles per hour (mph), or tornado. Lightning can cause forest and brush fires and deaths and injuries to livestock and other animals. According to the National Lightning Safety Institute, lightning causes more than 26,000 fires in the United States each year. "Lightning sieges" are extreme lightning events in which lightning strikes multiple points at once. In August 2020, an estimated 12,000 lightning strikes caused a set of fires known as the CZU Lightning Complex in San Mateo and Santa Cruz Counties.[16]

Windstorms

Windstorms are generally short-term events involving winds or gusts of over 50 to 60 mph that are strong enough to cause property damage. Wind speeds can reach up to 100 mph and produce a damage path extending for hundreds of miles.

Windstorms can cause significant property damage, threaten public safety, and have adverse economic impacts from business closures and power loss. Falling trees and branches can damage buildings, power lines, and other property and infrastructure. During wet winters, saturated soil causes trees to become less stable and more vulnerable to uprooting from high winds. Utility lines brought down by summer thunderstorms have also been known to cause fires, which start in dry roadside vegetation. Downed trees and power lines, and damaged property also can be major hindrances to emergency response and disaster recovery. Emergency response operations can be complicated when roads are blocked or when power supplies are interrupted. Industry and commerce can suffer losses from interruptions in electric service and from extended road closures.

Secondary Hazards

Major riverine or urban flooding can result from heavy rain. Rain falling on saturated soils on slopes or on areas recently burned by wildfire may lead to landslides. Lightning during thunderstorms presents a risk of starting a wildfire.

Poor air quality is a secondary impact of severe weather. Cold weather may trap air pollutants near the ground surface through an inversion layer.

Electricity utilities throughout California, including PG&E, have begun to occasionally "de-energize", or turn off the electricity for power lines that run through areas where there is an elevated fire risk. This is intended to reduce the risk of power lines sparking or being damaged and starting a wildfire. A PSPS event may occur at any time of the year, usually during high wind events and dry conditions. PSPS events may be limited to specific communities, or they may affect broad swaths of the state. Given the long, connected nature of power supply systems, a shutoff event targeted to a small at-risk area can affect a larger area outside the risk zone. The duration of a shutoff is related to the severe weather that triggers it. However, a shutoff typically ends within 24 hours after the severe weather has passed.

Past Events

Table 7 lists past severe weather events in San Mateo County as recorded by NOAA since 1950.

Table 7: Past Severe Weather Events

Date	Type	Description
February 13, 2000	Heavy Rain	Widespread rain with 24-hour accumulations of more than 5 inches occurred over the area on Feb 13 – 14. Urban and small stream flooding occurred in most counties of the area. Many roads including Highway 1 and Highway 116 were closed. Twenty-nine people were evacuated in Pescadero due to high waters. Several houses in Daly City were abandoned and eventually destroyed due to mudslides.
March 20, 2005	Tornado	A F1 tornado with a 3-mile length and 30-yard width impacted San Mateo County. The tornado damaged approximately 60 structures.
December 17, 2005 – January 3, 2006	Severe Storms, Flooding, Mudslides, and Landslides	Federal disaster declaration issued (DR-1628)
March 29 – April 16, 2006	Severe Storms, Flooding, Landslides, and Mudslides	Federal disaster declaration issued (DR-1646)
January 4, 2008	High Wind	A very strong cyclone slammed into the San Francisco and Monterey Bay areas bringing inland and coastal flooding, and winds as high as 81 mph. Thousands of residences and businesses were without power, some of which were without power for several days due to high winds toppling power lines. Millions of dollars of property damage was reported.

Date	Type	Description
February 15, 2009	High Wind	An eastern Pacific storm produced strong wind and heavy rain as it moved through the San Francisco Bay Area. Over 61,000 Bay Area customers lost power. High wind knocked down numerous trees in the Santa Cruz Mountains causing Highway 9 and Highway 236 to close.
April 14, 2009	High Wind	High winds along the San Francisco Bay Area shoreline caused numerous power outages and downed trees. A big rig blew over in the westbound lane of the San Mateo Bridge closing the entire bridge for more than an hour. Shortly afterwards a 70-foot fishing vessel was blown into the bridge after losing power. The Redwood City Mesonet observation site reported a gust of 57.5 mph.
May 2, 2009	Dense Fog	Dense fog along with a slippery road surface caused eight traffic collisions along Highway 17 in the Santa Cruz County mountains.
October 13, 2009	High Wind	Heavy rain combined with very strong wind through Northern and Central California to cause numerous trees, tree limbs, and power and telephone poles to fall. PG&E reported over 277,000 customers had lost power in the San Francisco and Monterey Bay areas with $13 million dollars in damage. Record-breaking heavy rain led to flooding and debris flows. In San Mateo County, at least 47 trees and 31 sets of power lines were knocked over. Wind also caused power outages across San Mateo County. Approximately 58,000 community members lost power during the storm.
February 15, 2011	High Wind	Strong and gusty wind developed ahead of a long wave trough. A mesonet automated weather reporting system measured a wind gust of 60 mph at midnight. Other automated observation systems around the area above 1,000 feet in elevation reported gusts up to 83 mph. Overall, more than 6,500 customers lost power in the San Francisco Bay Area.
December 21, 2012	Heavy Rain	A series of storm systems, part of a large Atmospheric River type of pattern, impacted the area during late December 2012. From December 21 through 26, heavy rain, gusty winds, flooding, and mudslides occurred across the Bay Area in these consecutive events. Downed trees, powerlines, and flooded roadways impacted community members.
February 9, 2015	Heavy Rain	The storm brought heavy rain, gusty winds, and damage to trees and power lines along with some minor flooding of urban areas. A 72-hour rainfall total of 5.43 inches was measured from Emerald Lake Hills at elevation 472 feet.
October 2019	PSPS	PG&E induced outage due to extreme weather conditions.

Date	Type	Description
October 2021	Severe Storms, Heavy Rain, Flooding	A weather phenomenon known as a bomb cyclone hit the San Francisco Bay Area, resulting in flooding, debris, power outages, and road closures throughout Burlingame. The cyclone included gale-force winds and an immense amount of rain.[17]
December 13, 2021	Heavy Rain	An atmospheric river impacted the Bay Area on December 31st, resulting in significant rainfall across the San Francisco Bay Area. During the morning, a surface low developed west of San Francisco and the river stalled over the Bay Area. This resulted in significant rainfall totals for many Bay Area communities. Most notably, downtown San Francisco received 5.46 inches of rain which is the second wettest day on record. The Oakland Museum received its wettest day since records began in 1970, with 4.75 inches of rain.
December 2022	Severe Storms, Heavy Rain, Flooding	Heavy rain resulted in localized flooding. Several businesses lost power and incurred costs associated with damaged merchandise.[18]
January 2023	Severe Storms, Heavy Rain, High Wind	Several days of heavy rain resulted in a tree falling on power lines, which damaged power lines and blocked Caltrain service for several hours. Sewer discharges were reported in Burlingame. School was also cancelled for two days.[19,20 21]22
February 2023	High Wind	Strong sustained winds caused multiple public and private tree failures. Vehicles and buildings damaged. Power outages for several days. Caltrain railway blocked. Several trees in active failure removed to prevent damage
March 2023	Severe Storms, Heavy Rain, High Wind	Severe weather caused over 50 fallen trees and downed power lines, railways blocked, and damaged a traffic light.[23] Tree failures on El Camino Real, Oak Grove Avenue, Burlingame Avenue and Airport Boulevard caused road closures for days. Hundreds of trees were determined compromised and necessitated removal.

Sources: National Centers for Environmental Information, 2021.

Existing Programs and Regulations

The City's Municipal Code contains several provisions for reducing the impacts of severe weather. Chapter 11.06 provides protections for urban trees that can absorb stormwater, Chapter 12.16 establishes underground utility districts, and Chapter 18.07 permits streamlined permitting processes for small residential rooftop solar systems.

PG&E's Community Wildfire Safety Program includes efforts to underground powerlines, improve the strength of electric poles and covered powerlines, enhance powerline safety settings, and manage trees and vegetation near powerlines. These activities are intended to reduce the frequency of PSPS events. PG&E aims to send alerts about upcoming PSPS events to potentially affected residents in order to provide more time to prepare. Extra alerts are available to those who rely on power for certain medical needs. Alerts are available in 16 languages.

Future Conditions

Climate change is expected to affect the frequency and severity of future severe weather hazards in Burlingame. Please review the Burlingame Vulnerability Assessment Report for details.

ISSUE 8: DROUGHT

General Overview

Drought is a significant decrease in water supply relative to what is needed to meet typical demand, leading to a water shortage for some activity, group, or environmental sector. While drought is a normal occurrence for Mediterranean climates such as that of San Mateo County, long and severe droughts have the potential to impact ecosystems and economic activity across the entire community. Most droughts are defined based on declines in average precipitation levels, declines in agricultural production, declines in streamflow and groundwater levels, or socioeconomic impacts from water shortages.

The severity of any given drought depends on the degree of moisture deficiency, the duration, and the size and location of the affected area. The longer the duration of the drought and the larger the area impacted, the more severe the potential impacts. While drought does not typically directly result in loss of life or damage to structures, drought can have widespread impacts on the environment and the economy. Potential drought impacts include increased costs for water straining household finances and reducing commercial profits, reduced habitat and food supply for plants and animals, and increased risk of wildfire. A prolonged lack of precipitation dries out vegetation and makes plants more vulnerable to pests, both of which can increase susceptibility to wildfires.

Drought response is determined case by case, and response priorities are typically based on imminence of potential water shortages. The U.S. Drought Monitor recognizes a five-point scale for drought events: D0 (abnormally dry), D1 (moderate drought), D2 (severe drought), D3 (extreme drought), and D4 (exceptional drought). During severe drought conditions, water shortages are common and water restrictions may be imposed to meet essential community needs.

Droughts can affect groundwater storage as reserves are drawn down in anticipation of or in response to drought impacts, or as reduced precipitation causes groundwater supplies to be replenished at a slower rate. Drought affects groundwater sources more slowly than it affects surface water supplies, but groundwater supplies generally take longer to recover. This can lead to a reduction in groundwater levels and problems such as reduced pumping capacity or wells going dry. It can take groundwater supplies years to recover from heightened use during droughts. This reduced replenishment of groundwater affects streams. Much of the flow in streams comes from groundwater, especially during the summer when there is less precipitation. Reduced groundwater levels mean that even less water will enter streams during periods of low precipitation.

The City of Burlingame purchases all of its potable water from the SFPUC Regional Water System (RWS). Approximately 85 percent of the water supply to the SFPUC RWS originates in the Hetch Hetchy watershed, in the Sierra Nevada Mountains, and flows down the Tuolumne River into the Hetch Hetchy Reservoir. The remaining 15 percent of the water supply originates in the Alameda and Peninsula watersheds, including the San Antonio Creek, Upper Alameda Creek, Arroyo Hondo watershed, San Mateo Creek watershed, and Pilarcitos Creek watershed. Drought conditions locally and within the Hetch Hetchy watershed affect how much water is available to Burlingame to meet essential community needs.

Past Events

San Mateo County has a history of severe droughts. DWR's hydrologic data from the early 1900s shows multi-year droughts from 1912 to 1913, 1918 to 1920, 1922 to 1924, and 1928 to 1934. The 1929 to 1934 drought established the criteria for designing storage capacity and yield for large Northern California reservoirs. The following sections describe the most recent prolonged droughts that have impacted the planning area.

1976 to 1977 Drought

California had a severe drought due to lack of rainfall during the winters of 1976 and 1977. 1977 was the driest period on record in California at that time, with the previous winter recorded as the fourth driest in California's hydrological history at that time. The cumulative impact led to widespread water shortages and severe water conservation measures statewide. Over $2.6 billion in crop damage was recorded in 31 counties. FEMA declared a drought emergency (Declaration 3023-EM) on January 20, 1977, for all California counties.

1987 to 1992 Drought

California received precipitation well below average levels for four consecutive years. While the Central Coast was most affected, the Sierra Nevada range in Northern California and the Central Valley counties were also affected. During this drought, only 56 percent of average runoff for the Sacramento Valley was received. In 1991, the State Water Project sharply decreased deliveries to water suppliers. By February 1991, all 58 counties in California were experiencing drought. Urban areas as well as agricultural areas were impacted.

2007 to 2009 Drought

The state proclaimed a statewide drought emergency on June 4, 2008, after spring 2008 was the driest spring on record. On February 27, 2009, the state proclaimed a state of emergency for the entire state as severe drought continued. State courts imposed what was, at the time, the largest court-ordered water restriction in state history.

2012 to 2017 Drought

This drought set several records for the state. The period from 2012 to 2014 ranked as the driest three consecutive years for statewide precipitation. Calendar year 2014 set new records for statewide average temperatures and for low water allocations from the State Water Project. Calendar year 2013 set minimum annual precipitation records for many communities. Detailed executive orders and regulations addressed water conservation and management. The statewide drought emergency was lifted in April 2017.

2020 to 2023 Drought

The U.S. Department of Agriculture declared a drought disaster that included San Mateo County on April 21, 2020. April 2021 was the third driest April in the past 127 years. Between April and December 2021 San Mateo County was at the D3—Extreme Drought level, putting the county at risk for wildfire on a year-round basis. Excessive rainfall and flooding in late December 2022 and early January 2023 alleviated some of the drought conditions. Governor Newsom officially eased drought restrictions in March 2023. As of October 2023, San Mateo County was not considered to be in a state of drought.

Regulatory Framework

Bay Area Water Supply and Conservation Agency

Burlingame is a member of the Bay Area Water Supply Conservation Agency (BAWSCA) is the main water provider for much of San Mateo County. It allows many of San Mateo County's cities, water districts, and private utilities to coordinate to ensure the continual water supply necessary to maintain health, safety, and economic wellbeing of the community. BAWSCA agencies manage two-thirds of water consumption from the Hetch Hetchy Water System. BAWSCA applies a long-term water supply strategy for its customers throughout the Bay Area. This strategy recognizes that drought year shortfalls can be significant, resulting in system-wide cutbacks of up to 20 percent. BAWSCA focuses on identifying options for filling all or portions of the drought year supply shortfall.

In 2009, BAWSCA developed a Water Conservation Implementation Plan, which aims to help BAWSCA member agencies evaluate potential water savings the cost-effectiveness of various water conservation measures and to develop a regional plan for water conservation measures to serve as a guideline for member agencies. BAWSCA's core water conservation programs include the Water Efficient Landscape Education Program, Water-Wise Gardening in the Bay Area landscape education tool, native garden tours and symposiums, regional Water Conservation Database, Qualified Water Efficient Landscaper Training program, regional water demand and conservation savings projections, and development of the "Making Conservation a Way of Life" Strategic Plan.

In August 2017, BAWSCA released a drought report outlining state and local demand management actions to reduce water use, water supply actions, and regulatory and policy support.

BAWSCA has developed Drought Implementation Plans for both the SFPUC and BAWSCA. However, these plans do not specify trigger levels.

San Francisco Public Utilities Commission

Burlingame obtains its water from the San Francisco Public Utilities Commission (SFPUC). The SFPUC issued its most recent Urban Water Management Plan (UWMP) in 2021. The UWMP provides an overview of water deliveries and uses, water supply sources, and water conservation programs. It also includes discussions on supply and demand projections out to 2045, available water supplies to meet existing and future demands under a range of water supply conditions, and measures to reduce long-term water demand, including the Water Shortage Contingency Plan. The SFPUC engages in a number of other water conservation activities, including groundwater monitoring and development of water recycling projects, which help support system-wide water conservation.

City of Burlingame

The City of Burlingame published its most recent UWMP in 2021. The UWMP is a foundational planning document and includes descriptions of historical and projected water demands, water supplies, and reliability over a more than 20-year planning horizon. This document also describes the actions the City is taking to promote water conservation, both by the City itself and affiliated agencies and includes a plan to address potential water supply shortages such as drought or other impacts to supply availability (the Water Shortage Contingency Plan).

Burlingame adopted its Water Conservation in Landscape Ordinance (Chapter 18.17 of the Burlingame Municipal Code) in March 2010. This ordinance applies to new and rehabilitated landscapes with irrigated landscape areas over 1,500 square feet on projects subject to City review and approval. This ordinance incentivizes water savings associated with inclusion of low-water use plants and high-efficiency irrigation systems to minimize outdoor water use. Chapter 15.07 of the Municipal Code, Wasteful Water Use Restrictions and Chapter 18.19, Indoor Water Conservation, also support water conservation.

Future Conditions

Climate change is expected to affect the frequency and severity of future drought conditions in Burlingame. Please review the Burlingame Vulnerability Assessment Report for details.

ISSUE 9: EXTREME HEAT

General Overview

State guidance and the Cal-Adapt database define extreme heat as temperatures that are hotter than 98 percent of the historical high temperatures for the area, as measured between April and October of 1961 to 1990. Days that reach this level are called extreme heat days. In Burlingame, extreme heat is a daytime temperature above 87.4 degrees Fahrenheit (°F), and a warm night is nighttime low of above 58.6°F.[24] An event with five extreme heat days in a row is called a heat wave. Extreme heat affects community members' safety and increases community costs and energy generation as it continues. These events can also exacerbate wildfires and impact water supplies. High demand for power for air conditioning during extreme heat can stress and overwhelm the electrical grid, leading to brownouts or power loss. Extreme heat events may degrade the quality of roadways and railways, resulting in closures and travel delays.

Health impacts are the primary concern with these hazards, though economic and service impacts are also an issue. The Center for Disease Control and Prevention (CDC) recognizes extreme heat as a substantial public health concern. Historically, NOAA data indicates that extreme heat kills about 175 Americans annually, although this number has increased in recent years.[25] From 2004 to 2018, studies by the U.S. Department of Health and Human Services indicate that there is an average of 702 deaths annually that are directly or indirectly linked to extreme heat.[26] According to the California Climate Adaptation Strategy, heat waves have claimed more lives in California than all other declared disaster events combined.

Extreme heat events are dangerous because people exposed to extreme heat can suffer a number of heat-related illnesses, including heat cramps, heat exhaustion, and (most severely) heat stroke. Areas with lower extreme heat thresholds are not necessarily at lower risk, as persons and community assets used to cooler temperatures may be less prepared for extreme heat events.

Extreme temperatures can harm plants and animals that are not well adapted to these events, including natural ecosystems. Extreme heat can increase the temperature of water in lakes, streams, creeks, and

other water bodies, especially during drought conditions when water levels are lower. In some cases, water temperatures may exceed comfortable levels for several plants and animals, causing ecological harm. Outdoor workers in construction or landscaping are also much more exposed to the elements than most people, so they are more susceptible to extreme heat conditions and the potential illnesses associated with extreme temperatures.

Indirectly, extreme heat puts more stress on power lines, causing them to run less efficiently. The heat also causes more demand for electricity (usually to run air conditioning units), and in combination with the stress on the power lines, may lead to brownouts and blackouts.

Secondary Hazards

During heat waves, the air becomes stagnant, and traps emitted pollutants, often resulting in increases in surface ozone. Heat waves and drought also dry out vegetation and provide more fuel for wildfires whose smoke is a serious health hazard.

Past Events

In 2022, a combination of heat advisories and an excessive heat warning were issued for parts of Monterey Bay and its near coastal valleys, the San Francisco Bay Shoreline, and Marin Coastal Mountains from September 4th through 8th, along with a heat advisory for the Central Coast, San Francisco, and coastal North Bay on September 6th. Several daily high temperature records were shattered, along with a handful of monthly and all-time records. Reports of power outages, heat-related illnesses and deaths were received. Counties opened and operated one or more cooling centers to provide relief from the heat.

Table 8 lists some past extreme heat events in San Mateo County as recorded by NOAA in recent years. Locally, the city historically experienced an average of four extreme heat days per year. Within recent years, extreme heat days have been most frequent in September.

Table 8: Selected Recent Extreme Heat Events

Date	Description
July 22, 2006	High temperatures reached as high as 103°F with low temperatures at night only falling into the lower 70s.
May 17, 2009	High pressure aloft centered over Reno, Nevada along with weak offshore flow at the surface caused temperatures to rise to near 100°F in the inland valleys of north-central California. Temperatures rose into the upper 80s to mid-90s across the peninsula of the San Francisco Bay Area. High temperatures resulted in heat exhausted individuals, blown electric transformers and power outages
September 1, 2017	A strong upper-level ridge brought widespread hot temperatures to the Bay Area. Numerous daily and monthly records were broken as well as a few record max temperatures. Three San Mateo County community members died over the weekend because of the heat.
June 10, 2019	The combination of high pressure and strong offshore flow resulted in an early season heat wave across the Bay Area from June 9th to the 11th. Multiple daily records were broken across the region and multiple power outages were reported due to the heat. The heat wave across the region triggered power outages knocking out service to 57,000 people across nine counties over a two-day period.
August 19, 2020	A prolonged and oppressive heat wave swept the Central Coast and Bay Area for almost a week from August 14th to August 19th with widespread record-breaking

	temperatures observed across the region. Multiple days of triple digit temperatures afternoon highs were recorded inland with some coastal locations even reaching the mid-90s.
July 21, 2022	A strong ridge of high pressure developed over the area, allowing temperatures to soar into the 90s to low 100s for all areas, except parts of the immediate coastline. A heat advisory was issued for all but coastal zones from late morning through the evening of June 21st.
September 6, 2022	A strong ridge of high pressure encompassed the Western United States from September 1st through 8th, leading to anomalously hot temperatures along the California coast. A combination of heat advisories and an excessive heat warning was issued for parts of Monterey Bay and its near coastal valleys, the San Francisco Bay Shoreline, and Marin Coastal Mountains from September 4th through 8th, along with a heat advisory for the Central Coast, San Francisco, and coastal North Bay on September 6th. The heat wave shattered several daily record high temperature records, along with a handful of monthly and all-time records. There were also reports of power outages, heat related illnesses and deaths due to the high temperatures.

Source: National Centers for Environmental Information, 2021.

Existing Programs and Regulations

Chapter 18.30 of the City's Municipal Code adopts the Green Building Standards Code. This code contains requirements for energy efficiency in residential and non-residential buildings, which can help keep indoor air temperatures cooler during extreme heat. These buildings may also have more efficient air conditioning systems, keeping power demands lower and helping to reduce the chance of blackouts by reducing stress on the electrical grid. The Burlingame Community Center, Burlingame Main Library and Easton Library may serve as cooling centers during high heat events.[27]

Future Conditions

Climate change is expected to affect the frequency and severity of future extreme heat hazards in Burlingame. Please review the Burlingame Vulnerability Assessment Report for details.

ISSUE 10: HUMAN HEALTH HAZARDS

General Overview

Human health hazards are bacteria, viruses, parasites, and other organisms that can cause diseases and illness in people. Some of these diseases may cause only mild inconvenience, but others are potentially life threatening. These diseases can be and often are carried by animals such as mice and rats, ticks, and mosquitos. Warmer temperatures and high levels of precipitation can lead to increased populations of disease-carrying animals, creating a greater risk of disease and increased rates of infection. Diseases regularly spread by animals include West Nile virus, Zika virus, and Lyme disease.

Human health hazards and diseases can be local, regional, or even global events. The severity of disease outbreaks varies. Transmission rates depend on local weather and environment, and fatality rates depend on local conditions such as care system quality and capacity, and the general health and immunity of the local population.

Past Events

San Mateo County, like the rest of the United States, was included in the March 2020 FEMA major disaster declaration for the COVID-19 coronavirus pandemic. As of winter 2023, approximately 62 cases of COVID-19 were reported in the county each day and the County has reported a total of 184,001 COVID-19 cases and 912 deaths since monitoring began in January 2020.[28]

West Nile virus was detected in one bird in Burlingame in 2023, although it was not detected in people.[29]

San Mateo County Health received confirmation on April 1, 2016, from the California Department of Public Health (CDPH) that the first San Mateo County resident had tested positive for Zika virus. The individual was infected with Zika virus while traveling abroad fully recovered.[30] Thirteen cases of Zika were reported in the County between 2015 and 2016.[31] No detections of West Nile virus occurred in San Mateo County in 2022. According to testing conducted by the San Mateo County Mosquito and Vector Control District, approximately 1 to 3 percent of San Mateo ticks carry the agent for Lyme disease.[32] [33]

San Mateo County also dealt with effects from the 1918-1920 flu pandemic. Camp Fremont, a military base in Menlo Park, reported the first death in September 1918. By December of that year, 131 community members had died of the flu.

Existing Programs and Regulations

San Mateo County Health provides health services, including vaccination clinics, disease testing, and emergency response support, to residents of San Mateo County. The San Mateo County Mosquito and Vector Control District is San Mateo County's community-based mosquito control program. This program uses several methods to help control the risk of disease in San Mateo County, including surveillance, prevention, and control of mosquito populations. The Health Alert Center for San Mateo County allows community members to view all alerts and emergencies put out by the County Health Department.

Contact tracing is a public health practice that health departments use to identify and notify people who have been exposed to someone with an infectious disease. Public health departments have used contact tracing for decades to fight the spread of infectious diseases like measles, tuberculosis, syphilis, and HIV.

There is not much warning time for health or pandemic events. The most commonly relied upon warning signal is the appearance of early cases of a disease within a population. The Health Alert Network is the CDC's primary method of sharing cleared information about urgent public health incidents with public information officers; federal, state, territorial, tribal, and local public health practitioners; clinicians; and public health laboratories. The Health Alert Network collaborates with federal, state, territorial, tribal, and city/county partners to develop protocols and stakeholder relationships to ensure a robust interoperable platform for the rapid distribution of public health information.

Future Conditions

Climate change is expected to affect the frequency and severity of future human health hazards in Burlingame. Please review the Burlingame Vulnerability Assessment Report for details.

ISSUE 11: HAZARDOUS MATERIALS

General Overview

Hazardous materials are materials that pose a significant risk to public safety or human or environmental health. These include toxic chemicals, flammable or corrosive materials, petroleum products, and unstable or dangerously reactive materials. They can be released through human error, malfunctioning or broken equipment, or as an indirect consequence of other emergencies. Facilities that hold hazardous materials include hazardous waste storage and treatment facilities, laboratories, hospitals, water and wastewater treatment plants, waste management facilities, fueling stations, and automotive shops. The release of hazardous materials can occur as a result of natural hazard events, such as earthquakes and other geologic hazards, floods, or severe weather. Hazardous materials can also be released accidentally during transportation, as a consequence of vehicle accidents.

A release or spill of hazardous materials could result in fire, explosion, toxic cloud, or direct contamination of water, people, and property. The effects may involve a local site or many square miles. The large-scale release of hazardous materials in combination with events such as flooding or severe weather can spread contaminants across a wide area and amplify the potential long-term impacts on human and ecological health. Health problems may be immediate, such as corrosive effects on skin and lungs, or gradual, such as the development of cancer from a carcinogen. Damage to property could range from immediate destruction by explosion to permanent contamination by a persistent hazardous material.

The City's major industrial and office areas, such as the Bayfront and Rollins Road neighborhoods, are particularly vulnerable to hazardous materials incidents because of the hazardous materials associated with industrial activities.

Several state agencies monitor hazardous materials/waste facilities. Potential and known contamination sites are monitored and documented by the Regional Water Quality Control Board (RWQCB) and the California Department of Toxic Substances Control (DTSC). A review of the leaking underground storage tank (LUST) list[1] produced by the RWQCB and the DTSC EnviroStor database shows five known sites within Burlingame, none of which are classified as active. GeoTracker is the Water Boards' data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater. GeoTracker contains records for sites that require cleanup, such as Leaking Underground Storage Tank (LUST) Sites, Department of Defense Sites, and Cleanup Program Sites. A review of the GeoTracker database identified 126 hazardous sites within Burlingame. Fifteen of these sites are open. Open sites are LUST cleanup sites and cleanup program sites. Open sites include gas stations, auto centers, cleaners, the Burlingame Police Station, and housing developments. Hazardous materials sites occur throughout the city, but generally occur at higher densities in the more highly developed commercial and industrial areas of the city.

Figure 13: Hazardous Materials Sites in Burlingame
This map is not currently included in this background report. It will be prepared at a later date and will be added to the report before it is released to the public.

Past Events

On September 9, 2010, a 30-inch-diameter natural gas transmission pipeline in San Bruno ruptured and released vast quantities of natural gas. The escaping gas ignited and initiated structure fires in the community surrounding the pipeline. Eight people lost their lives, 51 people required in-patient hospitalization, and 38 homes were destroyed. PG&E estimated the property damage from the rupture to be over $220 million.

Smaller hazardous materials incidents have historically occurred periodically in Burlingame. 140 hazardous materials incidents have been reported in Burlingame since 2006. 96 of these incidents were related to sewage leakage or spills, 55 were related to railroad hazards, 22 were related to petroleum exposure, and the remaining six incidents were due to other causes. 46 incidents occurred in proximity to the railroad, 16 occurred at businesses, and 14 occurred along waterways.[34]

Existing Programs and Regulations

In 1993, the Unified Hazardous Waste and Hazardous Materials Management Regulatory Program was established to protect public health and safety, restore and enhance environmental quality, and sustain economic vitality. A Certified Unified Program Agency (CUPA) manages hazardous materials and waste at a local level. The CUPA consolidates, coordinates, and makes consistent the regulatory activities of several hazardous materials and hazardous waste programs, including Hazardous Materials Management, California Accidental Release Prevention, Hazardous Waste Management, Underground Storage Tanks, Aboveground Storage Tanks, and Emergency Response. In 1996, San Mateo County Environmental Health Services was designated by the State Secretary for Environmental Protection as the CUPA for San Mateo County.

Hazardous materials response, mitigation, and cleanup for San Mateo County is managed by the Belmont Fire Protection District's Hazardous Materials Team through a contractual agreement between the County of San Mateo, the Emergency Services Council, and the Belmont Fire Protection District.

The San Mateo County Hazardous Materials Team is a partnership between Belmont Fire Protection District, San Mateo County Environmental Health, and the San Mateo County Department of Emergency Management (DEM) through the San Mateo County Emergency Services Council. It has been providing service to all areas of San Mateo County since 1984. The Response Team is staffed 24/7/365 with seven cross-trained firefighters from Belmont, as well as an Environmental Health and an DEM Officer.

A complete list of active and inactive hazardous waste regulated facilities is currently available on the County's Open Data site. This website is maintained by the California Environmental Protection Agency and includes activities related to hazardous materials and waste, state and federal cleanups, impacted ground and surface waters, and toxic materials.

Countywide Hazardous Materials Emergency Response Team

Hazardous materials response, mitigation, and cleanup for San Mateo County is managed by the Belmont Fire Protection District's Hazardous Materials Team through a contractual agreement between the County of San Mateo, the Emergency Services Council, and the Belmont Fire Protection District.

Future Conditions

The frequency and severity of future hazardous materials releases in Burlingame will depend on the scale of future activities. Increases in the frequency and severity of other natural hazards, such as floods or landslides, can affect the frequency and severity of future hazardous materials releases.

ISSUE 12: AIRPORT HAZARDS

General Overview

Burlingame residents and businesses have access to San Francisco International Airport (SFO), one of the busiest airports on the western seaboard. In addition, Mills-Peninsula Medical Center operates an emergency medical heliport on an elevated platform within the site. While the airport and heliport provide welcome resources for world travel and emergency response, they also present unique risks and land use compatibility issues for Burlingame. Common airport hazards include excessive noise, exposure to hazardous materials, unpleasant odors, and risk airplane crashes and associated damage to structures and infrastructure and loss of life.

Residing near the end of airport runways and downwind of departing aircraft, the majority of Burlingame's neighborhoods are exposed to noise that is very different to that from overflights. During ground operations, low frequency noise may become a disturbance. These operations include engine maintenance run-ups, reverse thrust on landing to slow the aircraft to a safe stop, back-blast in areas behind aircraft taxiing and taking off.[35]

Past Events

Residents regularly report exposure to noise and unpleasant odors coming from the airport.[36, 37]

Regulatory Framework

SFO is responsible for the noise impacts within the immediate vicinity of the airport. The primary mechanism for controlling airport hazards in Burlingame is the Airport Land Use Compatibility Plan for the Environs of San Francisco International Airport. This document regulates aircraft noise, as well as building height, safety policies, and compatibility criteria for areas within the Plan's jurisdictional boundary. Applicable City land use and development plans and ordinances are reviewed for consistency by the City/County Association of Governments Board of Directors, acting as the San Mateo County's Airport Land Use Commission.

The SFO Roundtable was formed to address community noise impacts from aircraft operations at SFO by monitoring a performance-based noise mitigation program, interpreting community concerns, and attempting to achieve noise mitigation through the collaborative efforts of the Federal Aviation Administration (FAA), SFO management, and local government. The Roundtable includes representatives from local cities, County Board of Supervisors, and the U.S. Congress representative.

Future Conditions

The frequency and severity of future airport hazards in Burlingame will depend on the scale of future activities.

CONCLUSION

This background report provides details on the issues that are discussed at a higher level in the City of Burlingame Safety Element, serving as a foundation for associated goals, policies, and implementation actions. It is a technical appendix to the main Safety Element document. It is not necessary to be familiar with this background report in order to understand or use the Safety Element, but some readers may find this supplemental information helpful. This background report also contains information that is required by the California Government Code as part of the Safety Element, but which does not need to be included in the main Safety Element document.

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