City of Belmont

Peninsula Resilience Planning

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 Belmont. 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 Belmont:

ISSUE 1: EMERGENCY PREPAREDNESS AND RESPONSE

General Overview

The City of Belmont employs a multipronged approach for mitigating, responding to, and recovering from emergencies. This section reviews Belmont's major evacuation routes, emergency alert systems, and other emergency response programming. State law (Senate Bill 99, or SB 99) requires that the Belmont 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/Rave Mobile Safety

San Mateo County Alert (SMC Alert) is the primary emergency alert system in Belmont. Messages sent vary from agency to 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, Chinese, Spanish, and Tagalog, among many others. Spanish, Chinese, and Japanese are the primary languages in Belmont among households that are not fluent in English.

Individuals can sign up for SMC Alert via the County's website: 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 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 Belmont.

The Genasys platform divides the city into 12 different zones to provide information tailored to impacted areas. Users of the app can choose the zone or zones for which they would like to receive alerts.

Major Evacuation Routes

If an evacuation is necessary in Belmont, it will be conducted by members of the Belmont Police Department. They will work closely with the San Mateo Consolidated 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.

Currently, no standard plan covers evacuations throughout San Mateo County and the City of Belmont does not possess 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.

Evacuation Constraints

Under SB 99, jurisdictions are required to identify residential parcels in a hazard area with access to fewer than two evacuation routes in a hazard zone. All of these parcels are at least a half mile from a major roadway and have access to only one emergency evacuation route. 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.

Potential Evacuation Routes

Primary emergency access and evacuation routes include Highway 101, State Route 92, Interstate 280, and State Route 82 (El Camino Real), and other local roadways that connect to these primary evacuation routes. All evacuation routes in Belmont face a potential disruption from a flooding or earthquake event

that may block roadways, damage the roadway surface, or collapse bridges and overpasses. In the event of widespread disruption to local evacuation routes, remaining evacuation routes may become congested, slowing down evacuation of a community or specific neighborhoods. This issue may be compounded since evacuation routes for Belmont may also serve as evacuation routes for surrounding communities in some cases, so potential disruptions may have regional effects.

Existing Programs and Regulations

Chapter 8 of the City's Municipal Code addresses civil defense and disaster relief. According to this section, the City of Belmont responds to disasters in accordance with the National Incident Management System (NIMS) at the federal level and the Standardized Emergency Management System (SEMS) at the state level. The City routinely participates in preparedness exercises using these systems. In a disaster, the City activates the Emergency Operations Center (EOC) on the second floor of City Hall. The City of Belmont, in coordination with San Mateo Consolidated Fire Department (SMCFD), has a written City Emergency Operations Plan (EOP), which articulates policies and procedures during an emergency.

Preparedness and Response Programs

San Mateo County and the City of Belmont 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 San Mateo County Emergency Management (SMCEM), funded in part through a Joint Powers Authority (JPA) governed by the Emergency Services Council, provides essential services that prepare and assist San Mateo County agencies in the event of a disaster or other emergency. SMCEM coordinates countywide preparedness, response, and protection services and activities for large-scale incidents and disasters. SMCEM 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. SMCEM is responsible for developing and maintaining plans and procedures for all jurisdictions within San Mateo County. In addition to creating plans, the SMCEM develops exercises to evaluate operational and response capabilities.

During significant incidents or emergencies, SMCEM is responsible for activating the County of San Mateo EOC to support local jurisdictions as needed. SMCEM 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.

San Mateo County Operational Area Emergency Services Council

The San Mateo County Operational Area Emergency Services Council is a JPA composed of 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 (SMOA). SMCEM, also known as the Department of Emergency Management, implements the EOP 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 SMOA 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 all data pertaining to emergency operations
- Directing and coordinating support of emergency response resources
- Maintaining contact and coordination with Disaster Operations Centers, Belmont'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 SMOA EOC is activated when local jurisdictions or County departments need emergency support. According to SEMS Regulations, the SMOA EOC must activate and use the SEMS when the following conditions exist:

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

The EOP assumes that cities and towns within the county will participate in the SMOA, that the SMOA is primarily responsible for emergency actions, and that the SMOA 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.

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 volunteer force of the San Mateo County Sheriff's Emergency Services Bureau.

Multijurisdictional Hazard Mitigation Plan

SMCEM 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 of California.

The SMCEM 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 Belmont 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 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.[1] 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 operates Emergency Medical Services (EMS), which provides emergency medical resources in response to 911 calls countywide.

The health emergency preparedness unit (HEP) strengthens the community's ability to respond to all types of public health and medical incidents. The HEP team continually collaborates with community stakeholders and organizations to facilitate response and recovery for public health and medical emergencies.

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.

City Plans and Initiatives

San Mateo Consolidated Fire Department

SMCFD officially commenced operations on January 13, 2019. The department was formed by the establishment of a JPA and represents the merger of fire departments in San Mateo, Foster City, and Belmont. At that time, it was the first JPA to commence operations in the State of California in nearly a decade.

SMCFD operates two fire stations in Belmont:

- Fire Station 14 at 911 Granada Street
- Fire Station 15 at 2701 Cipriani Boulevard

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.

Future Conditions

Climate change is expected to affect the frequency and severity of future natural hazards in Belmont, necessitating an adapted approach to emergency preparedness and response.

ISSUE 2: FLOOD HAZARDS

Flooding is the rising and overflowing of a body of water onto normally dry land. Flooding can be extremely dangerous, and even six inches of moving water can knock a person over during a strong current. Floods are among the costliest natural disasters in terms of human hardship and economic loss nationwide, significantly threatening the health and life of community members and causing substantial damage to structures, landscapes, and utilities. 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.

Floods are usually caused by large amounts of stormwater, either from a period of very intense precipitation or a long period of steady precipitation. There are four types of flooding that primarily affect San Mateo County.

- 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 form of flooding, dam failure, is discussed in greater detail below.

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 maps called Digital Flood Insurance Rate Maps (DFIRMs). The two main floodplains of concern are the 100- and 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 (1 in 500) chance of being flooded in any given year.

Several areas in Belmont fall within the 100-year Flood Zones, as shown in Figure 1. In southwestern Belmont, a 100-year flood zone is near Waterdog Lake and generally runs the length of Belmont Creek down to El Camino Real. East of US Highway 101, 100-year flood zone areas include the O'Neill Slough and marshland, including parcels with offices and residential development. The lower sections of Belmont Creek have experienced multiple flooding incidents during extreme winter events. As a result, the City has partnered with a number of stakeholders and agencies in the region to develop and implement a long-term approach to address creek maintenance and improvements.

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, usually associated with 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.

The County has identified the Upper Crystal Springs Reservoir and Notre Dame Dam as posing a potential dam failure hazard to the City of Belmont. Figure 2 illustrates areas in the city that would be affected by inundation if these dams failed.

Notre Dame Dam, built on Belmont Creek in the western hills of Belmont, creates the reservoir known as Waterdog Lake. While the land is owned by Notre Dame de Namur University, the entire property, including the earthen dam is leased and maintained by the City of Belmont under a 99-year lease. The

facilities are periodically inspected by the State of California Division of Dam Safety and the City of Belmont Department of Public Works.

Past Events

Flood Events

Belmont has experienced occasional significant flooding. On December 31, 2021, an atmospheric river impacted the Bay Area, resulting in significant rainfall across the San Francisco Bay Area. This resulted in significant rainfall for many Bay Area communities, including Belmont. Most notably, downtown San Francisco received 5.46 inches of rain, which is the second-wettest day on record. The Oakland Museum received 4.75 inches of rain, its wettest day since records began in 1970. Although not technically part of Belmont, mobile homes in the Harbor Industrial Area, which is part of Belmont's sphere of influence, have experienced widespread flooding in recent years.

Table 1 lists historical 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 Belmont (2005 – 2024)

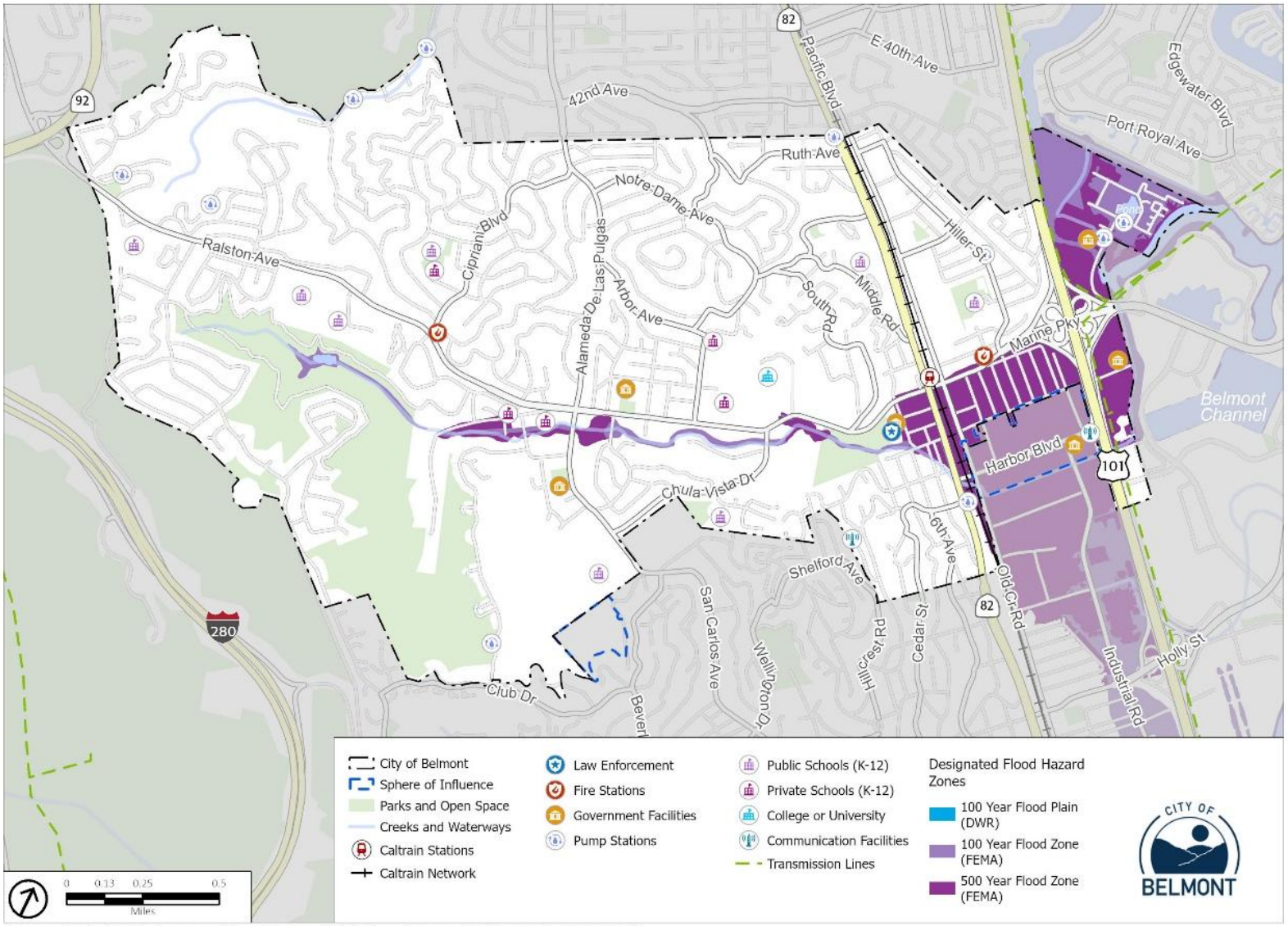
Date	Event	Locations
December 31, 2005	Flood	Countywide
January 1, 2006	Flood	Countywide
December 2 and 11, 2014	Flash Flood, Flood	Belmont, San Bruno, San Mateo County
January 16, 2020	Flood	Belmont, Colma, Henderson, Lomita Park, Bayshore, Atherton
December 13, 2021	Flood	Bayshore, Belmont
Winter 2022-2023	Flood	Countywide
March 1, 2024	Flood	Belmont
March 6, 2024	Flood	Belmont

Source: National Centers for Environmental Information, 2024.

Dam Events

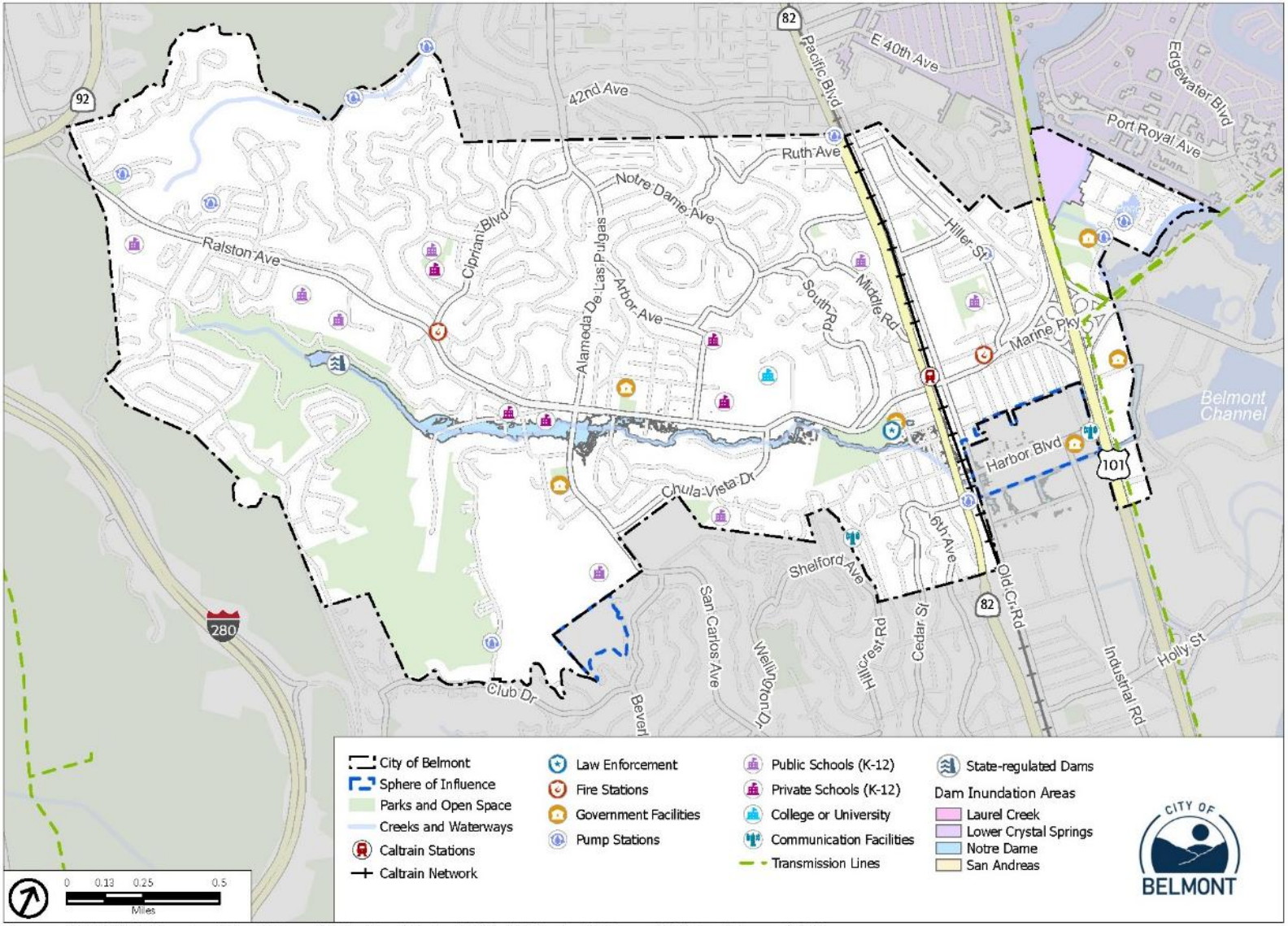
The only recorded dam failure in San Mateo County was the failure of a small dam in the community of El Granada in 1926.

Figure 1: Flood Hazard Zones



Source: ESRI, 2023; County of San Mateo, 2023; PlaceWorks, 2023; FEMA; DWR, 2021
*Sphere of Influence is being considered for future annexation.

Figure 2: Dam Inundation Areas



Source: ESRI, 2023; County of San Mateo, 2023; PlaceWorks, 2023; California Division of Safety of Dams, 2023
*Sphere of Influence is being considered for future annexation.

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 (USACE), FEMA, San Mateo County Sea Level Rise and Flood Control District (OneShoreline), San Francisco Public Utilities Commission (SFPUC), Federal Insurance Administration, and the California Department of Water Resources (DWR).

- The USACE identifies the need for and constructs major flood-control facilities. It also develops flood- and dam-inundation maps and reports.
- FEMA manages the National Flood Insurance Program, providing insurance to the public in communities that participate in the program. FEMA is the main federal government agency contact during natural disasters and publishes the DFIRMs, which identify the extent of flood potential in flood-prone communities based on a 100-year flood (or base flood) event.
- OneShoreline, formerly known as the San Mateo Flood Control District, plays a crucial role in protecting the county and its residents from floods. Established in 1959, it operates within specific flood zones and works towards several key objectives, which include controlling and mitigating flood risks, maintaining the health of waterways, planning for future flood events, and collaborating with other agencies to address regional flood control issues. In January 2020, the San Mateo Flood Control District expanded to be the San Mateo Sea Level Rise and Flood Control District, or OneShoreline, to address sea level rise, flooding, coastal erosion, and regional stormwater infrastructure.
- SFPUC maintains several flood control structures, such as levees, seawalls, and pump stations, to protect vulnerable areas from flooding. SFPUC creates and updates flood maps to identify areas at risk and inform development decisions. They also conduct risk assessments to evaluate potential flood impacts and guide mitigation efforts.
- The Federal Insurance Administration is the primary agency that delineates potential flood hazard areas and floodways through the DFIRMs and the Flood Boundary and Floodway Map. Flood insurance is required of all homeowners who have federally subsidized loans.

City Plans and Regulations

Chapter 7, Article IX, Floodplain Management Regulations of the City's Municipal Code, establishes regulations applied uniformly throughout the community to all publicly and privately owned land within flood-prone, mudslide (i.e., mudflow), or flood-related erosion areas.

Stormwater Infrastructure

The City's storm infrastructure consists of 28 miles of storm drainpipes and 10 storm pump stations.[2] The existing 28 miles of storm lines are made up of:

- Corrugated Metal Pipe (CMP) - 11,300 feet citywide, 2.1 miles
- Reinforced Concrete Pipe (RCP) - 132,800 feet citywide, 14.3 miles
- High-Density Polyethylene Pipe (HDPE) and Polyvinyl Chloride Pipe (PVC) - 61,526 feet citywide, 11.6 miles

In 2009, the City completed a storm drainage study that documented the existing City storm drainage system and identified drainage deficiencies. The estimated cost to correct the deficiencies was estimated at $44 million. These costs were updated in late 2013 to an estimated $55.6 million as follows:

- Repair and replacement of deficient pipe ($29.3 million)
- Installation of new storm pipes, where currently none exist, to help with storm and flooding issues ($20.2 million)
- Installation of Curb & Gutter Improvements ($3.3 million)
- Improvements to Belmont Creek to convey a 100-year flood event ($2.8 million)

Future Conditions

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

ISSUE 3: SEA LEVEL RISE

General Overview

Sea level rise is an increase in the ocean's surface height relative to the land. The two major causes of sea level rise are thermal expansion caused by warming of the ocean (since water expands as it warms) and increased melting of land-based ice, such as glaciers and ice sheets. Sea level rise is a gradual process, taking place over years or decades, affecting coastal communities and those along the bay shoreline. The sea level in the San Francisco Bay Area rose during the twentieth century at a rate of 2 millimeters per year, and projections suggest that it will rise at a higher rate during the twenty-first century—a pace that has not been exceeded in the past 2,800 years.[3] Rising seas increase the risk of flooding, storm surge inundation, erosion and shoreline retreat, and wetland loss. Belmont, and its buildings and infrastructure that line the shoreline, are already vulnerable to damage from storms, which will likely increase as the sea level continues to rise and move further inland.

Rising sea levels can cause the shoreline to flood more frequently and severely during storms or king tide events because ocean levels are higher during normal conditions. The most damaging events are large storm events that coincide with high tides and large waves. Additionally, shoreline flooding can move farther inland and to low-lying areas of the shoreline, causing flooding that may not have a means of draining.

San Mateo County is highly vulnerable to the effects of rising sea levels, and the economic value of property in areas at risk of sea level rise and shoreline flooding exceeds that of any other county in the Bay Area.[4] Accounting for population projections, the county is one of six counties in the nation (and the only one on the West Coast) with over 100,000 people living in an area affected by three feet of sea level rise.[5] If left unmanaged, future flooding and shoreline erosion could pose considerable risks to life, safety, critical facilities, natural and recreational assets, and the economy.

Sea Level Rise: San Mateo County

The county is already exposed to present-day flooding when large rain events coincide with high tides on the San Francisco Bay. The county becomes more highly vulnerable to flooding when considering the effects of rising sea levels. Future flooding and coastal erosion could pose considerable risks to life, safety, critical infrastructure, the county's natural and recreational assets, and the economy. To address the issue, the County performed a regional sea level rise vulnerability assessment (SLR VA) to evaluate the potential

impacts of future flooding and inundation. The SLR VA identifies that the assessed value of parcels in the project area exposed to near-term (present-day) flooding exceeds $1 billion, that the assessed value of parcels exposed to erosion and flooding in the long term (50–100 years) totals roughly $39.1 billion, and that more than 30,000 residential parcels and 3,000 commercial parcels may also be vulnerable in the long term. Furthermore, 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.

Given the severity of the risks from sea level rise in the county, actions to prepare for risks and reduce them are necessary. A combination of shoreline protection strategies, individual property and facility modifications, land use policies, and emergency flood preparedness actions will be needed to reduce impacts over the near and long term. Through the Sea Change San Mateo County Initiative, the County intends to facilitate countywide coordination on sea level rise policies, building standards, and the development of a countywide sea level rise strategy.

The Vulnerability Assessment identifies what is vulnerable to sea level rise among built and natural assets, explores public health and risks from cascading impacts, and discusses what these factors mean for policy and planning purposes.

Sea Level Rise: Scenarios

The SLR VA used three sea level rise scenarios to evaluate potential impacts to communities. These three scenarios are referenced when discussing potentially affected assets and infrastructure within the community.[6]

The methodology employed used existing data on projections of sea level rise hazards to understand the geographic extent to which the county could be exposed to inundation. Table 2 shows the three sea level rise scenarios selected for the evaluation.

Table 2. Sea Level Rise Scenarios

BASELINE SCENARIO	1% annual chance flood (present-day extreme flood also known as 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

The 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.

As shown in Figure 3, the scenarios indicate the projected extent of flooding should the project area experience a 1 percent chance annual storm plus sea level rise. The baseline scenario shows the possible extent of flooding with a 1 percent annual chance storm. The mid-level scenario shows the possible extent of flooding during a 1 percent chance annual storm plus 3.3 feet of sea level rise. The high-end scenario shows the possible extent of flooding during a 1 percent chance annual storm plus 6.6 feet of sea level rise. However, each parcel shown to be affected within a given scenario may not necessarily be inundated. The scenarios only show what kind of flooding is possible. In the event of a storm, inundation may take place in a variable and unpredictable manner. 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.[7]

The report findings highlight that many of the assets have cross-cutting vulnerabilities (i.e., multiple and indirect sources of vulnerability) and may have more than one point of exposure to sea level rise. Additional information from the SLR VA is available online: https://www.smcsustainability.org/wp-content/uploads/2018-03-12_SLR_VA_Report_2.2018_WEB_FINAL.pdf

Sea level rise resulting from global climate change has the potential to alter the frequency and magnitude of flooding in low-lying areas of East Belmont. According to the City's Climate Action Plan, historical records show that the sea level in San Francisco Bay has risen about seven inches over the past 100 years.

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. It 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, quicker 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 Belmont by increasing liquefaction susceptibility during earthquakes. Figure 4 shows the potential emergent groundwater areas in a high-end sea level rise scenario in the city.

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 8 inches. [8]

Existing Programs and Regulations

Sea Level Rise Management Agencies and Activities

A number of agencies in San Mateo County and within the greater 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.

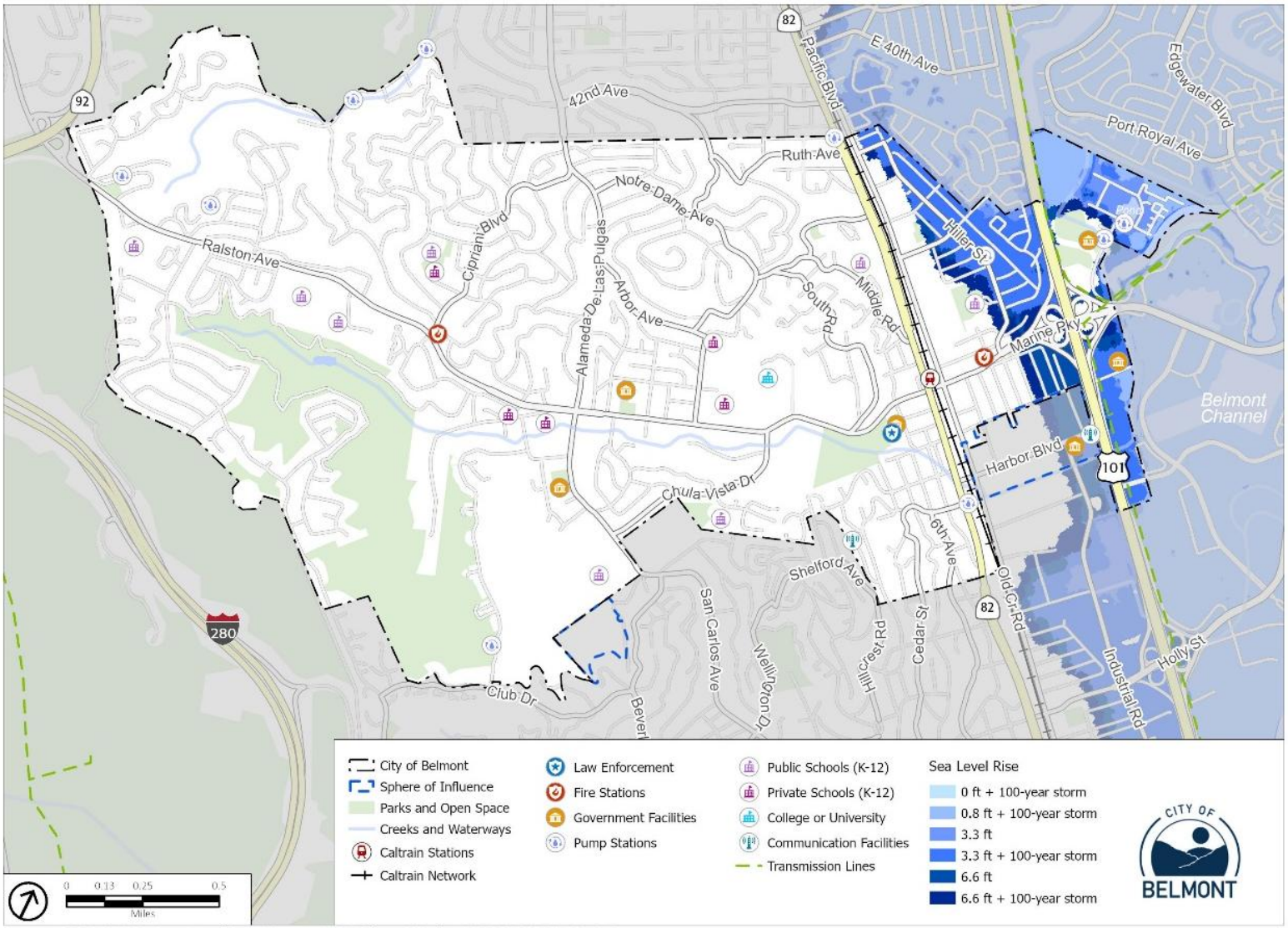
The *County of San Mateo South Coast Sea Level Rise Vulnerability Assessment & Adaptation Report* documents the projected extent of coastal hazards, projected impacts to assets, and economic impacts to different resource sectors, then begins to identify feasible adaptation strategies and approaches that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

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 community groups to create a prepared and stronger San Mateo County. Belmont is participating in this program.

Future Conditions

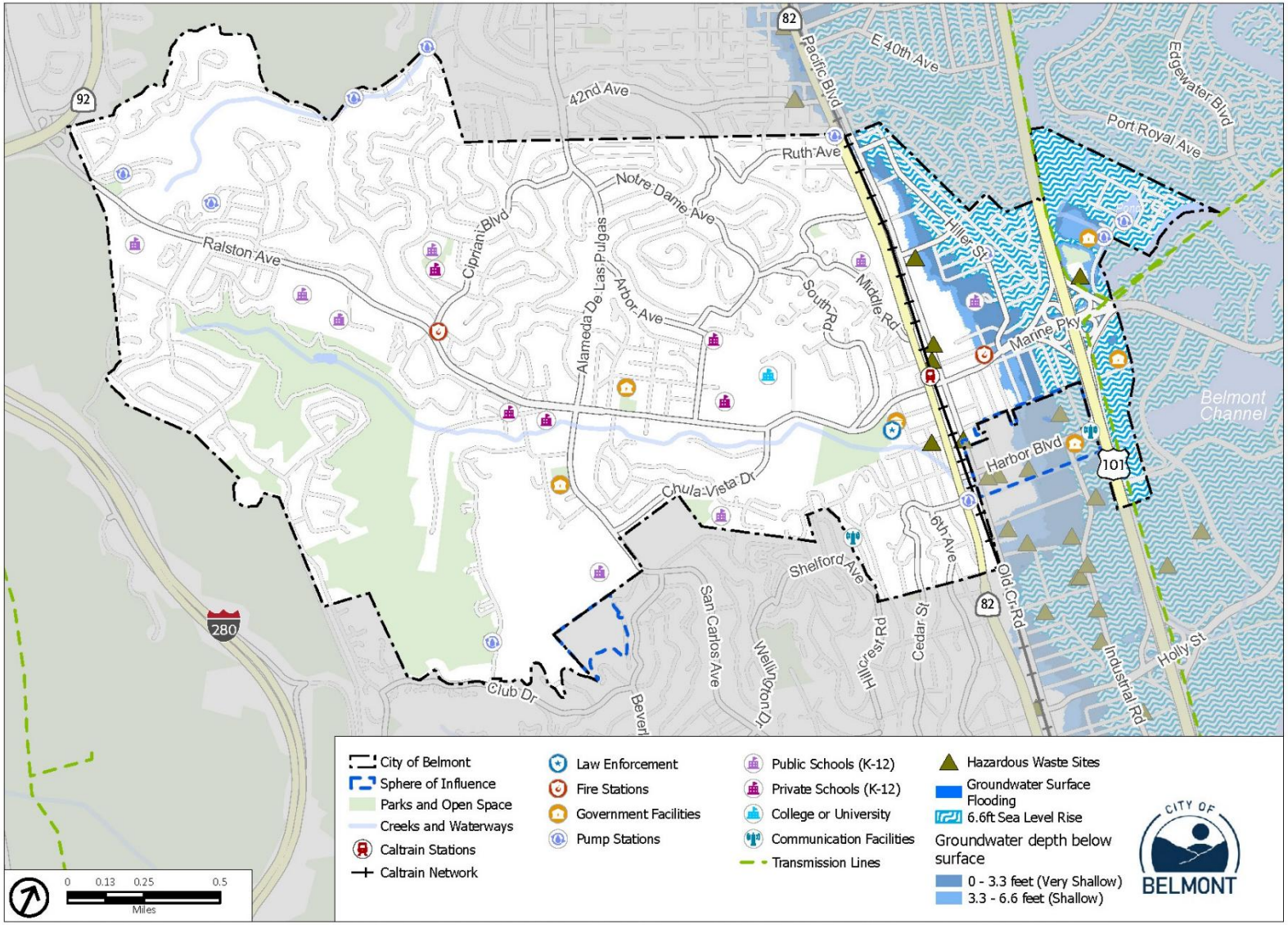
Climate change is expected to affect the frequency and severity of future sea level rise in Belmont. Please review the Belmont Vulnerability Assessment Report for details.

Figure 3: Projected Sea Level Rise



Source: ESRI, 2023; County of San Mateo, 2023; PlaceWorks, 2023; USGS CoSMoS
*Sphere of Influence is being considered for future annexation.

Figure 4: Emergent Groundwater, High-End Sea Level Rise Scenario



Source: ESRI, 2023; County of San Mateo, 2023; PlaceWorks, 2023; California Office of Environmental Health Hazard Assessment, 2021; USGS, 2020
*Sphere of Influence is being considered for future annexation.

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.

The San Francisco Bay Area is one of the most seismically active regions of the United States. There are approximately 30 known faults in the Bay Area that are considered capable of generating earthquakes. A major earthquake can cause the most damage of any hazard to the city. While there are no active fault lines within the city boundary, the closest fault zone, the San Andreas Fault Zone, is approximately one mile to the west from the city boundary. The San Andreas Fault Zone is the predominant fault system in California and has generated some of the largest and most destructive earthquakes in California. Belmont would likely experience severe to violent ground shaking from a San Andreas Fault earthquake.[9]

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.[10] 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.

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. A shake map shows the variation of ground shaking in a region immediately following significant earthquakes.

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

Belmont 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 5). The primary seismic hazard for Belmont 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 San Andreas Fault lies approximately one mile to the west of Belmont.

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.[11]

A rupture along the peninsula would cause extremely violent ground shaking throughout the county. The bay margins are likely to experience liquefaction in a major earthquake.

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 17 miles to the east of Belmont.

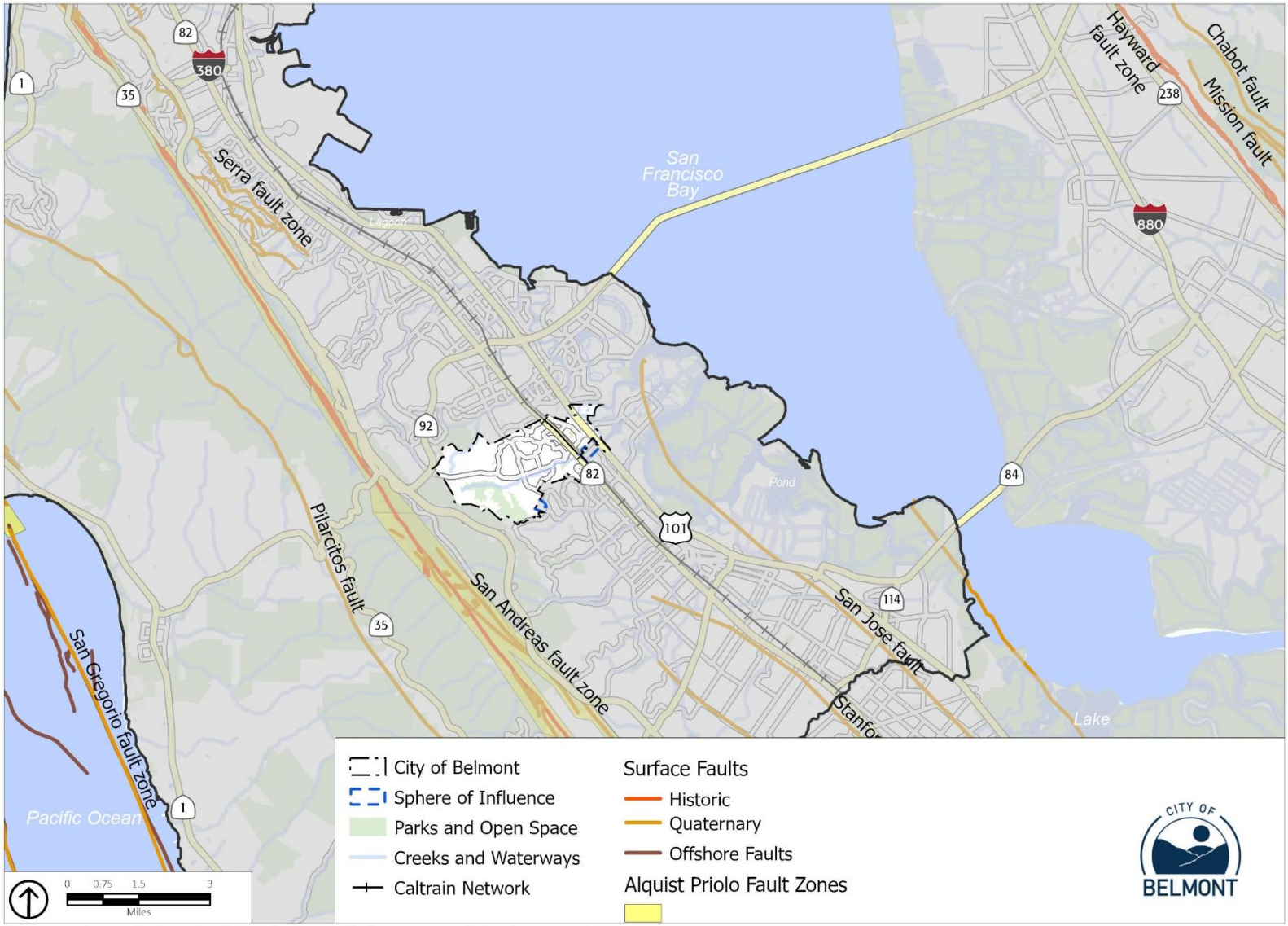
The Hayward Fault has a 31 percent chance of producing a magnitude 6.7 or greater earthquake in the next 30 years.[12] An earthquake of this magnitude has regional implications for the entire Bay Area, as the Hayward Fault crosses numerous transportation and resource facilities, such as highways and 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 12 miles to the west of Belmont.

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[13]—significantly less than San Andreas Fault or Hayward Fault. However, the location of the fault poses a significant threat to San Mateo County.

Figure 5: Regional Faults and Alquist-Priolo Fault Zones



Source: ESRI, 2023; County of San Mateo, 2023; PlaceWorks, 2023; USGS, 2020
*Sphere of Influence is being considered for future annexation.

Earthquake-Related Hazards

In addition to shaking and surface rupture, this can also include 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.

The soils underlying Belmont are particularly susceptible to liquefaction, as shown in Figure 6, which has serious implications for older structures that were built before State and local building codes were updated (in the early 1970s) to be more resilient against seismic and soils-related hazards. Much of the lowland areas of East Belmont, as well as the land near Belmont Creek have potential liquefaction hazards. In Belmont, liquefaction from seismic events may result in low to moderate risk to the northeast corner of the city and along Belmont Creek.

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 can be induced by earthquakes, landslides, and submarine volcanic explosions. 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.

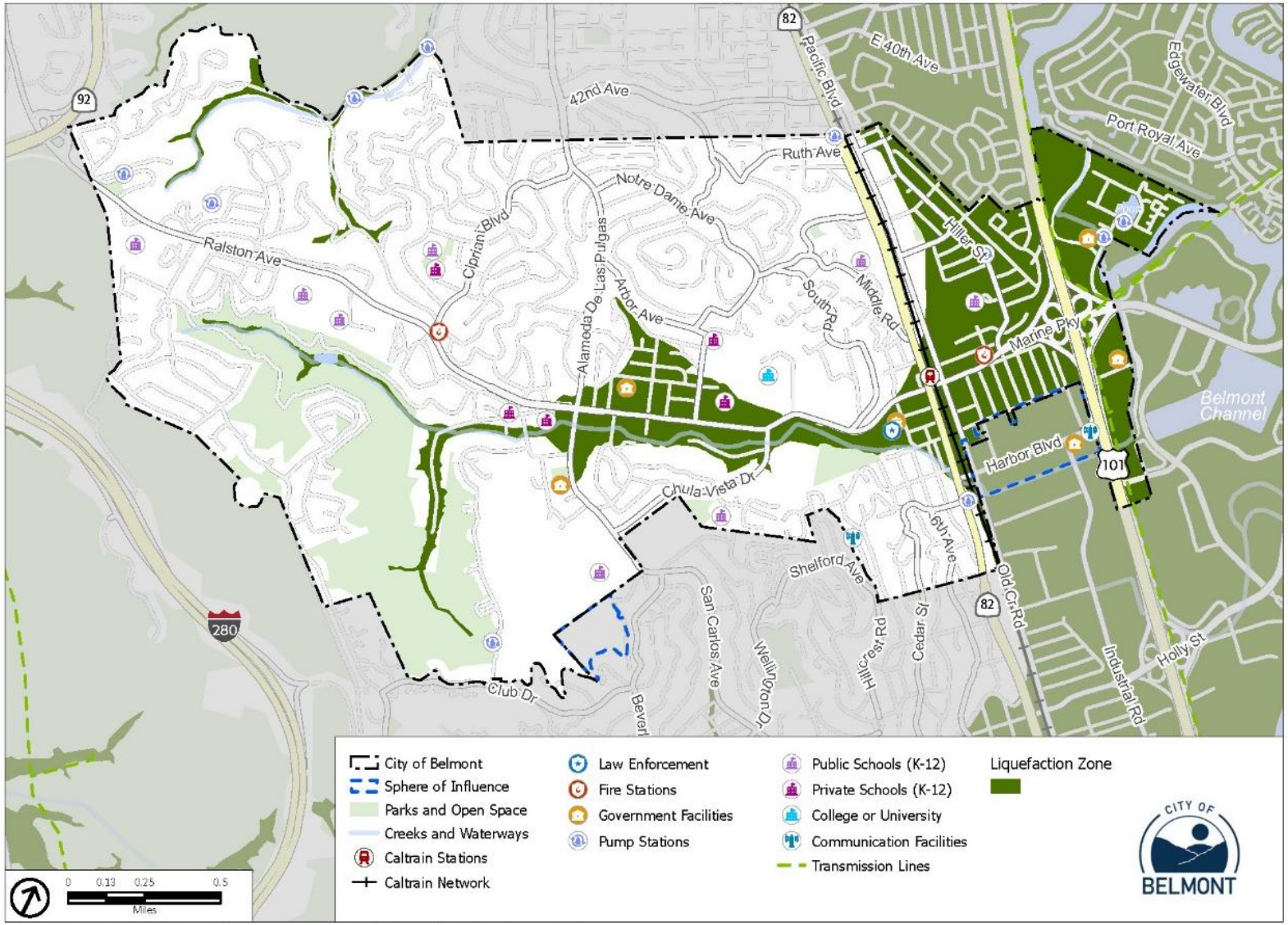
Tsunamis are often referred to as local or distant. The type of tsunami depends on the location of the source of the tsunami and where it may strike land. The source of a local tsunami is close to the coast or shoreline and may arrive in less than one hour. The danger is greatest for local tsunamis because warning time is limited.[14]

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. [15]

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.

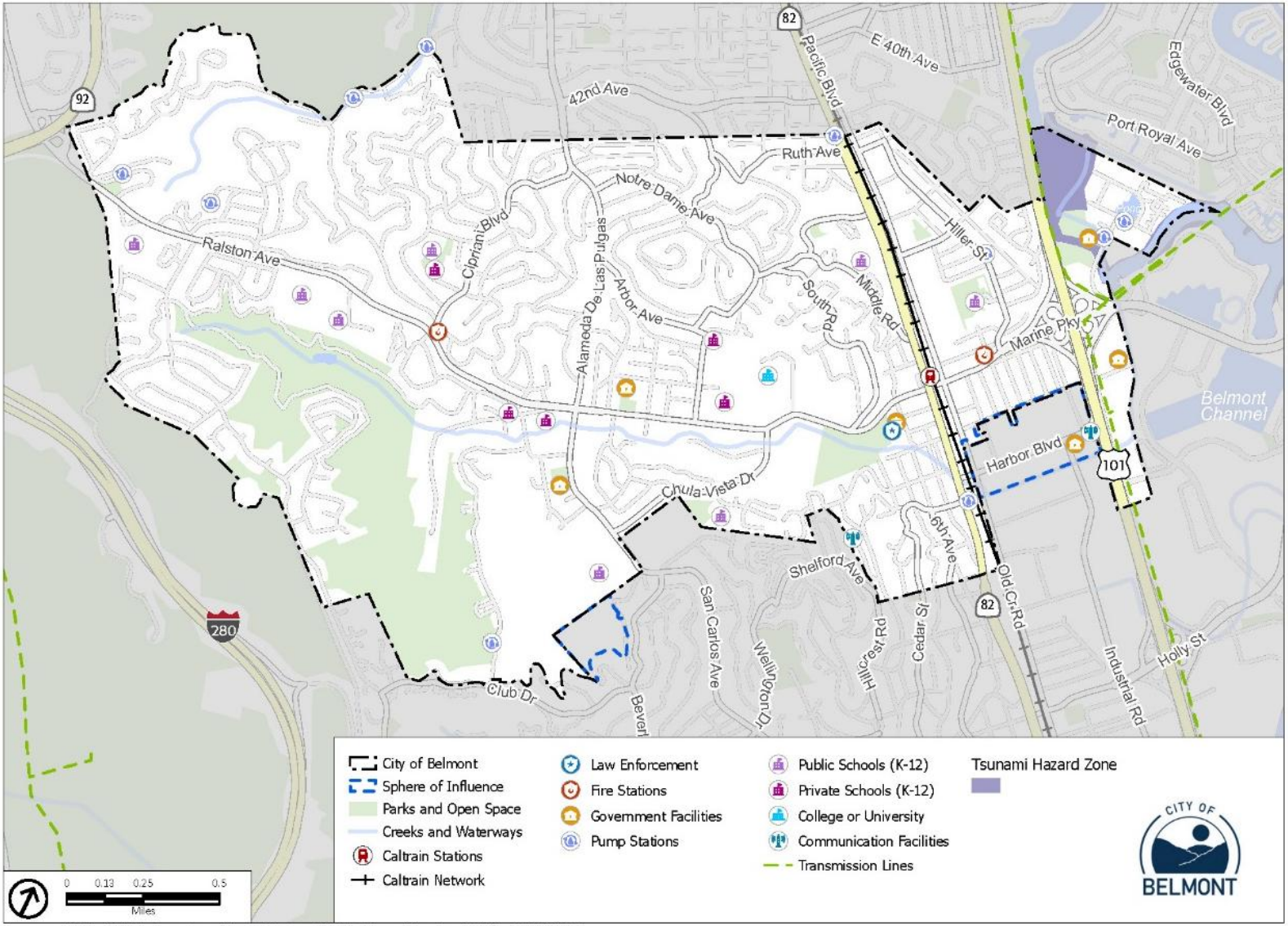
Belmont's position within San Francisco Bay limits the potential for tsunami damage. However, tsunamis may impact areas of the city directly adjacent to the bay. As illustrated in Figure 7, Tsunami Hazard Areas, the northeastern area of the city near Belmont Slough and O'Neil Sough are vulnerable to tsunami inundation.

Figure 6: Liquefaction Hazard Areas



Source: ESRI, 2023; County of San Mateo, 2023; PlaceWorks, 2023; CGS, 2021
*Sphere of Influence is being considered for future annexation.

Figure 7: Tsunami Hazard Areas



Source: ESRI, 2023; County of San Mateo, 2023; PlaceWorks, 2023; CGS, 2021
*Sphere of Influence is being considered for future annexation.

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 was associated with the City of San Francisco, Belmont was also greatly affected.

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

Date	Magnitude	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.

Existing Programs and Regulations

Chapter 7, Article IV of the City's Municipal Code contains the City's Residential Code and Building Code, both of which establish standards for seismic safety in new construction and major renovations. Article XI also contains a seismic hazard identification program for unreinforced masonry buildings given the city's geographic area of high seismic risk, due to its proximity to both the San Andreas and Hayward Faults.

Future Conditions

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

ISSUE 5: GEOLOGIC HAZARDS

General Overview

Common geologic hazards include landslides and erosion.

Landslide

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 and soil 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 geologist 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.

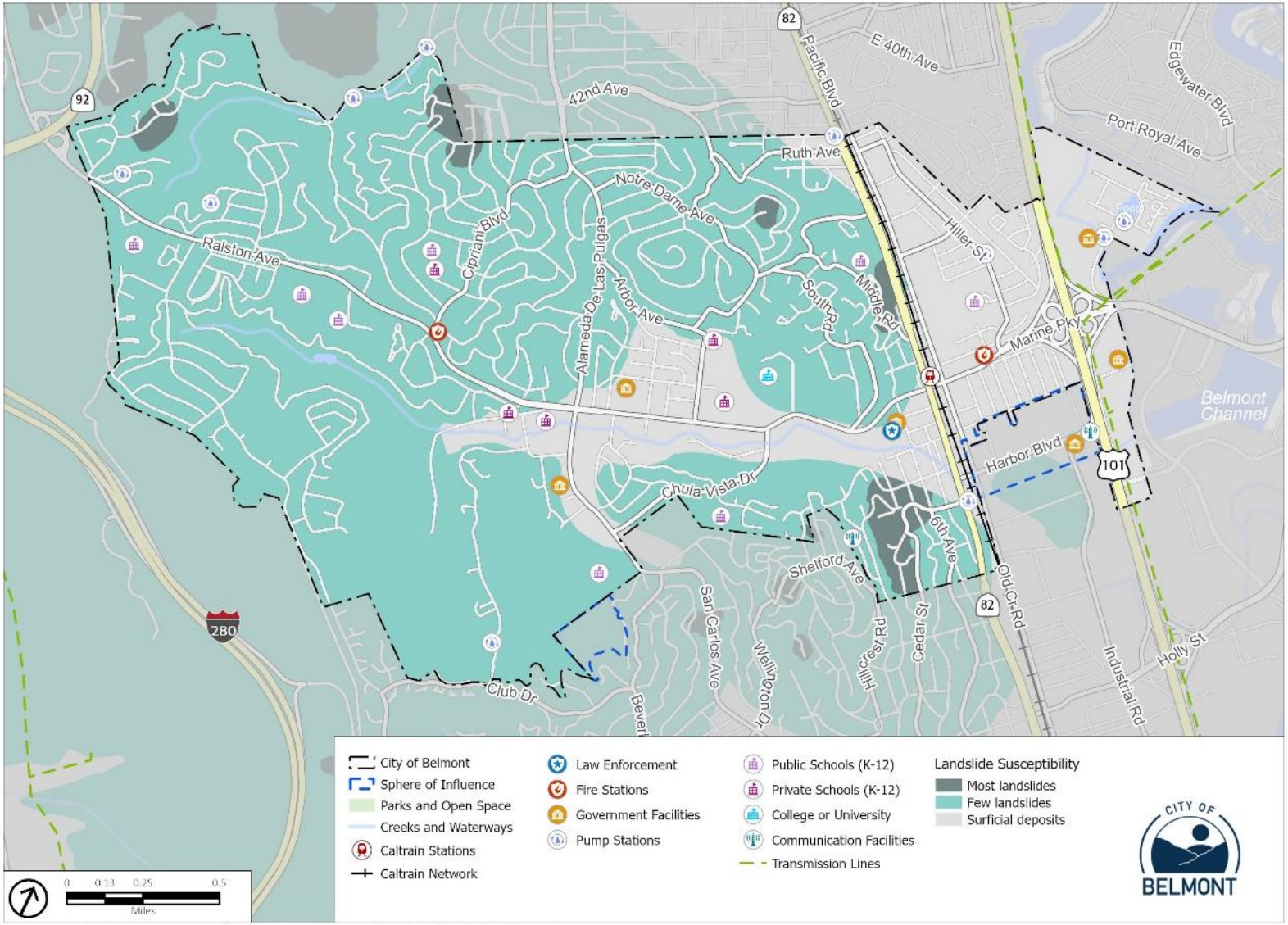
Landslide-susceptible areas are characterized by steep slopes, downslope creep of surface materials, and unstable soil conditions. In Belmont, this hazard is primarily in areas of northwest Belmont, but there is one large hazard area in southwest Belmont in the Sunnyslope neighborhood, as shown in Figure 8. Although infrequent, small landslides in Belmont generally occur in the residential hills on an annual basis (i.e., Western Hills and San Juan Hills areas). Landslides present the greatest geologic hazards to the hillsides in the city. Landslides range from small, shallow deposits made up of soil and weak bedrock materials to large, deep landslides involving a large amount of bedrock.

Landslides may occur on slopes of 15 percent or less, but the probability is greater on steeper slopes. Above 30 percent, conventional single pad type construction is unsuitable, and construction requires substantial grading and retaining walls. Slopes in Belmont that are greater than 30 percent are primarily in the western area of the city, especially in the Western Hills and San Juan Hills plan areas. Figure 8 illustrates areas in Belmont that are most susceptible to landslides.

Erosion

Belmont is also susceptible to hazards related to erosion, or the geological process in which earthen materials are worn away and transported by natural forces, such as water or wind, causing the soil to deteriorate. Eroded topsoil can be transported into streams and other waterways. Water erosion is the removal of soil by water and transportation of the eroded materials away from the point of removal. The severity of water erosion is influenced by slope, soil type, soil water storage capacity, nature of the underlying rock, vegetation cover, and rainfall intensity and period. The impact of soil erosion on water quality becomes significant, particularly as soil surface runoff. Highly erosive soil can damage roads, bridges, buildings, and other structures.

Figure 8: Landslide Hazard Areas



Source: ESRI, 2023; County of San Mateo, 2023; PlaceWorks, 2023; USGS
*Sphere of Influence is being considered for future annexation.

Past Events

There is a limited history of recorded landslide events within Belmont. However, residents may have been impacted by road closures and damage to structures and infrastructure resulting from landslides that occurred in other parts of the county. Table 6 summarizes the impacts of past major landslide events within San Mateo County.

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 a 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.

Source: National Centers for Environmental Information, 2024.

Existing Programs and Regulations

Chapter 9 of the City's Municipal Code contains requirements pertaining to excavation, grading, filling, and clearing. It establishes requirements for grading permits, procedures for issuing grading permits, specifies minimum standards for grading and removal of vegetation, including protected trees, and provides for the enforcement of grading requirements.

Future Conditions

The frequency and severity of future geologic hazards in Belmont is expected to continue.

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 Belmont: (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. Wildfires 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. Belmont has a substantial risk of wildland fires, with many areas of high and very high threat within the city, particularly in the western areas of the city.

The City's main challenges regarding fire hazards are:

- Actively Managing the Wildland Urban Interface. Belmont's residents enjoy close contact with hillsides and woodlands. This natural amenity facilitates the risk of proximity to wildland fires. Preparedness is essential, and the City's and SMCFD's fire prevention activities, especially its Vegetation Management Program, are important.
- Maintaining and Enhancing Evacuation Routes. It is critical that road capacity exists for local residents, workers, and visitors to evacuate in case of an environmental disaster, including fire.

Fire Hazard Areas

CAL FIRE establishes Fire Hazard Severity Zones (FHSZs) designating each as moderate, high, or very high severity. Incorporated areas such as Belmont are considered local responsibility areas. According to CAL FIRE, 971 acres of Belmont are designated as a Moderate FHSZ. This zone covers large areas of the hillside neighborhoods, including areas around Waterdog Lake Open Space, Hidden Canyon Park, and San Juan Canyon Open Space. Figure 9 shows the FHSZs in and around Belmont.

Wildfire Protection Responsibility Areas

Hundreds of agencies have fire protection responsibility for wildland and WUI fires 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. The California Department of Forestry and 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.

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.

Wildland-Urban Interface Fires

The WUI is an area where urban development is intermixed with wildland vegetation, or when pockets of wildland vegetation occur within developed areas. SMCFD has separated WUI areas into Interface Risk and Wildland Risk categories. The interface zone contains dense housing or other structures next to vegetation but has little wildland vegetation that can burn in a wildfire. The wildland zones have higher concentrations of wildland vegetation with fewer structures and may have limited access and/or steeper terrain that makes controlling wildfires more difficult. 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.

Wildland fires occur infrequently but typically cause more damage than urban fires. WUI areas, where high-value structures such as homes meet highly flammable native vegetation, are more vulnerable to fire, and as a result of serious wildland fires throughout the state in recent years, are subject to more stringent fire-prevention regulations on development. Areas under WUI designation are at high risk of wildfire. There are two geographical areas within Belmont that can be characterized as WUI areas: the canyons common to the Western Hills and the San Juan Canyon. In these locations, many homes are located immediately adjacent to open space that includes the physical features found in WUI areas.

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.

The risk of urban fires is highest where older single-family homes, multifamily residences, and business facilities are clustered close together, increasing the possibility of rapid spread to an adjoining building. The risk to life and property can be reduced by adopting and funding adequate levels of fire protection and ensuring new buildings are built and existing buildings are upgraded to include fire-resistive features that conform to modern fire and building codes.

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 failures on slopes. Wildfires that burn hot and for long durations can bake soil, especially those high in clay content, thus increasing the imperviousness of the ground. This increases the runoff generated by storm events, and subsequent flooding events.

Although wildfires occur infrequently, Belmont is at risk of experiencing a major wildfire due to heavily wooded open space within its city limits. Additionally, it is vulnerable to smoke from wildfires taking place across the region and state. Limited air monitoring resources within the city have historically made it difficult to determine the scale of the impact and to provide adequate air quality warnings.

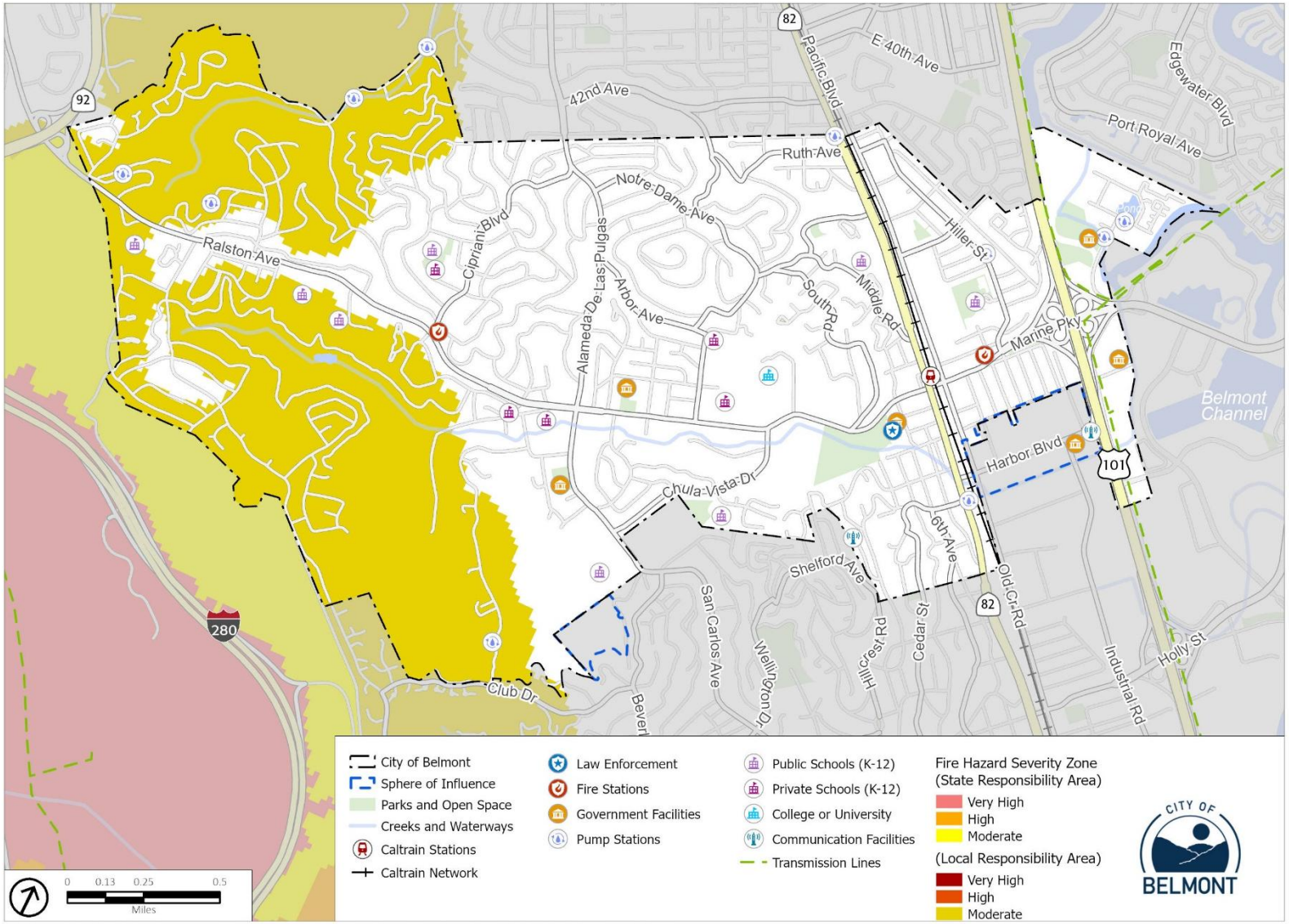
Past Events

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. While there have been few wildland fires within Belmont itself, the city has been affected by smoke from wildfires throughout the state and region.

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. According to CAL FIRE, the CZU Lightning Complex fire was the 12th most destructive California wildfire as of 2023. This fire triggered air quality concerns across the Bay Area. The Bay Area Air Quality Management District issued 25 consecutive days of air quality alerts in the Bay Area, including Belmont.

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.

Figure 9: CAL FIRE Fire Hazard Severity Zones



Source: ESRI, 2023; County of San Mateo, 2023; PlaceWorks, 2023; CAL FIRE 2024 and 2025
*Sphere of Influence is being considered for future annexation.

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 on 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. This plan is an important tool for the City to reduce wildfire risk and aid in future planning endeavors when creating City policies and mitigation actions.

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 Belmont, this program may assist with these activities.

Fire Safety Chipping Program

The Belmont Fire Safety Chipping Program is a free, annual initiative designed to help residents reduce wildfire risk by removing hazardous, flammable vegetation from their properties. The program is specifically targeted at property owners west of Alameda de las Pulgas in Belmont and is coordinated by the City of Belmont Parks and Recreation Department in partnership with SMCFD, with funding support from a CAL FIRE grant.

City Fire Management and Response

SMCFD, described in the Emergency Preparedness and Response section (Issue 1), provides fire response services in the city.

Municipal Code Chapter 7 Buildings – Article IV Construction Regulations – Division 7 – Fire Code enacts the Fire Prevention Code and 2022 California Fire Code. Adherence to these code requirements ensure new development within the city meets the latest fire code requirements, like the proper use of fire-resistant building materials, proper use of clearances around structures to reduce ignitions, and proper site design to accommodate equipment and personnel responding to fire incidents.

SMCFD Ordinance No. ORD-2022-001 (Fire Code Ordinance) modifies the 2022 California Fire Code with California Amendments and the 2021 International Wildland Urban Interface Code. The modifications to California building standards, adopted by the ordinance, are enacted to provide a safer, more protected environment in response to local conditions, including local climatic, geological, and topographical conditions.

Future Conditions

Climate change is expected to affect the frequency and severity of future fire hazards in Belmont. Please review the Belmont 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.

Public Safety Power Shutoff

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.

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.

Windstorms

Windstorms are generally short-term events involving winds or gusts of over 50 to 60 miles per hour (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. Storms can also increase the frequency of erosion along coastal cliffs.

PSPS events are secondary hazard events that result from high winds. PSPS events can impact emergency management activities. A loss of power can make it more difficult for homes or businesses to receive emergency notifications. Traffic lights and other traffic-control systems may not work, which can complicate any evacuation needs and may hinder emergency response. Although critical public health and safety facilities often have backup generators, the loss of power may also disable other key infrastructure systems.

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

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 February 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.
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.
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.
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 through December 26, 2012	Heavy Rain, Flooding	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.

Date	Type	Description
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.
December 2022 through January 2023	Severe Storms, Heavy Rain, Flooding	Heavy rain triggered flooding of San Francisquito Creek. Flooding damaged property and buildings, flooded Highway 101, downed trees, and caused power outages.

Source: National Centers for Environmental Information, 2024.

Existing Programs and Regulations

PG&E offers generator and battery rebates, which helps to address power outages associated with severe weather.

Future Conditions

Climate change is expected to affect the frequency and severity of future severe weather in Belmont. Please review the Belmont 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 compared to historic levels, leading to declines in agricultural production, declines in streamflow and groundwater levels, and/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.

The City of Belmont receives its water from the Mid-Peninsula Water District. Currently, all of the Mid-Peninsula Water District's water supply is provided by the SFPUC. Most of the water supply is drawn from the Sierra Nevada through the Hetch Hetchy Regional System, and the rest is produced by the SFPUC from its local watersheds and facilities in Alameda and San Mateo Counties. None of the alternative water sources within Belmont, including surface water, groundwater, and recycled water, are currently viable or financially feasible to be developed.

Past Events

San Mateo County has a history of severe droughts. DWR 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.

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 (National Integrated Drought Information System, 2021).[16] 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.

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.

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.

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.

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.

Existing Programs and Regulations

Bay Area Water Supply and Conservation Agency

Belmont is a member of the Bay Area Water Supply and Conservation Agency (BAWSCA), which 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

Belmont obtains its water from the 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.

Mid-Peninsula Water District

The MPWD issued its most recent 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 MPWD engages in several other water conservation activities, including water waste prevention ordinances, metering, conservation pricing, public education and outreach, and water conservation program promotion, which help support system-wide water conservation.

Municipal Code

Chapter 25.2, Water Conservation, of the Belmont Municipal Code establishes water conservation regulations.

SFPUC offers water conservation programs, which include the Onsite Water Reuse Program, Westside Enhanced Water Recycling Project, and Alternative Water Supply Program. Additionally, the MPWD offers rebate programs that address water conservation. These programs include Lawn Be Gone! Rebate, Rain Barrel Rebate Program, Smart Irrigation Controller Instant Rebate Program, and Irrigation Hardware Rebates.

Future Conditions

Climate change is expected to affect the frequency and severity of future drought conditions in Belmont. Please review the Belmont 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 Belmont, extreme heat is a daytime temperature above 91.6 degrees Fahrenheit (°F), and a warm night is a nighttime low of above 58.5°F.[17] 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. 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.[18] 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.[19] 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 record 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 the NOAA in recent years. This is not an exhaustive list of all extreme heat events in and around Belmont, but highlights of major recent events.

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

Date	Description
	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, 2024.

Belmont has historically experienced an average of four extreme heat days per year. Within recent years, extreme heat days have been most frequent in September.[20]

Existing Programs and Regulations

Chapter 7 of the Municipal Code, including the Green Building Standards Code, establishes standards for constructing new buildings and significantly renovating existing ones. These standards include requirements for increased energy efficiency and insulation, 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. Additionally, cooling centers are located at the Belmont Public Library and Twin Pines Senior and Community Center.

Future Conditions

Climate change is expected to affect the frequency and severity of future extreme heat in Belmont. Please review the Belmont 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.[21]

San Mateo County also dealt with effects from the 1918 to 1920 Spanish 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.[22]

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.[23] Thirteen cases of Zika were reported in the county in 2015-2016. No detections of West Nile virus occurred in San Mateo County in 2022.[24] According to testing conducted by the San Mateo County Mosquito and Vector Control District, approximately 3 percent of San Mateo ticks carry the agent for Lyme disease.[25]

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 Belmont. Please review the Belmont 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.

Hazardous materials and waste within Belmont are managed by the Certified Unified Program Agency (CUPA), a local administrative agency within the San Mateo County Environmental Health Services Division. 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.

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[i] produced by the RWQCB and the DTSC EnviroStor database[26] indicates six toxic substance sites, including one active site. This site is a voluntary cleanup site at 815 Old County Road. The project consists of vacant land formerly occupied by the Belmont Iceland ice rink, which operated from 1956 to 2016. The site will be redeveloped with a five-story multifamily residential development, including

[i] A review of LUST sites occurred on December 11, 2023.

approximately 177 units.[27] Hazardous materials sites are primarily located in eastern Belmont, concentrated in the Belmont Village priority development area and the harbor industrial area. Most of the sites in Belmont are LUST sites. Many of these sites are automobile-related, such as gas stations or auto repair shops. Two school sites, associated with Ralston Middle School and Carlmont High School, are listed as under investigation. Belmont also currently has sites undergoing remediation for contamination with hazardous materials. Some contaminated sites are on vacant parcels or properties with the potential to redevelop. Contamination does not render these sites unusable, but may require time and funding for cleanup, and in some cases, may limit allowable land uses.

If a hazardous material spill poses an imminent public health threat, SMCFD will contact appropriate agencies, such as the County Department of Environmental Health, DTSC, and CalOES, and cooperate with them to address the situation. The transport of hazardous materials/wastes and explosives through the city is regulated by the California Department of Transportation (Caltrans). Highway 101 is open to vehicles carrying hazardous materials/wastes. The SMCFD, SMCEM, and San Mateo County Environmental Health Services Division are responsible for hazardous materials accidents at all locations within the city.

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.

Since 1970, there have been no reported roadway hazardous materials incidents in Belmont.[28]

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 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.

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 SMCFD through a contractual agreement between the County of San Mateo and the Emergency Services Council.

Future Conditions

The frequency and severity of future hazardous materials releases in Belmont 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.

CONCLUSION

This background report provides details on the issues that are discussed at a higher level in the City of Belmont's 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 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.

ENDNOTES

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