FACT SHEET: SAFTEY ELEMENT - HAZARDS

Purpose and Requirements

State law requires general plans to include a Safety Element to identify and address natural and human-made hazards, as well as climate adaptation and resiliency.

As part of the City of Oakland's General Plan Update, the Safety Element presents a framework for minimizing risks posed by these hazards that may impact residents' health and welfare. This Element aims to protect residents, workers, and visitors from seismic and geologic hazards, fire hazards, hazardous materials, flooding, and other potential hazards that risk life and property. The Safety Element is supplemented by the Local Hazard Mitigation Plan, the Climate Change Vulnerability Assessment, and closely connected to the Environmental Justice and Housing Elements of the General Plan.

This fact sheet describes natural and human-made hazards that affect Oakland; areas and populations that are most vulnerable; and existing regulations, agencies, and City efforts that help reduce the risk of these hazards.

In the maps included below, census tracts with the highest social vulnerability are shown in red.

[1] Oakland Municipal Code Section 2.29.170.1

Safety and Racial Equity Goals

A guiding principle of Oakland's General Plan update is to advance the City's mission to "intentionally integrate, on a Citywide basis, the principle of 'fair and just' in all the City does in order to achieve equitable opportunities for all people and communities."[1]

The Safety Element's goals and policies prioritize "frontline communities", or vulnerable communities that will be affected 'first and worst' from climate change and environmental hazard impacts.

Social vulnerability indicators include:


Renters


Under 5 years old


Very low income


Non-U.S. Citizens


Without a vehicle


People with disabilities


Single parent families


Communities of color


65+ living alone


Limited English proficiency


Without a high school degree


Severely housing cost burdened

Geologic And Seismic Hazards

Oakland is located between the active Hayward and San Andreas fault zones, which have historically produced large earthquakes in the region.

There is a **72% chance** of a **magnitude 6.7 or higher** earthquake occurring in the next **30 years** in the San Francisco Bay area.

The main hazards that earthquakes can cause are strong ground shaking, landslides, and liquefaction. Liquefaction occurs when normally stable solids at or near the ground surface lose their strength and act like water. Liquefaction can move blocks of soil, placing strain on buried pipelines that can lead to leaks or pipe failure.

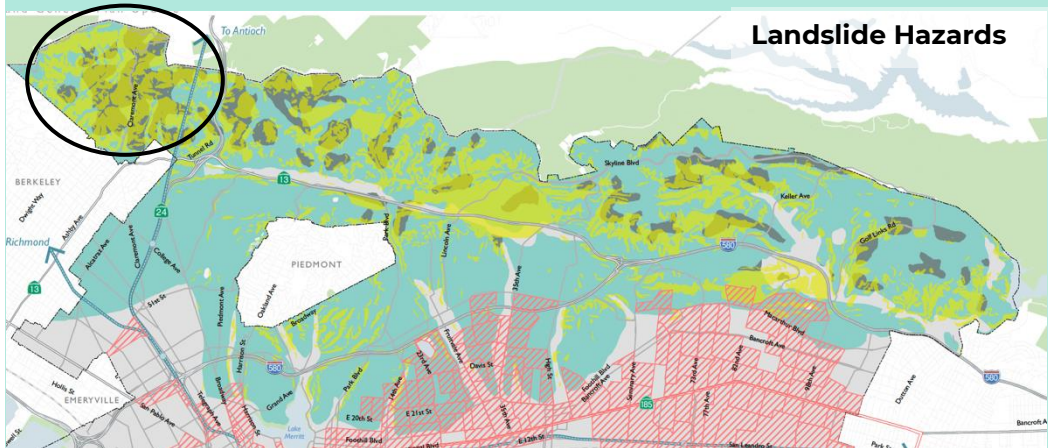
The primary geologic and seismic threats to Oakland are earthquake-related fire or landslide, impacts to City utility lifelines, and impacts to structures or buildings. While modern building codes require safety measures and earthquake-resistant design to help protect communities against structural hazards, many buildings in Oakland may have been built before these codes were in place. Proper design and construction can help to minimize loss and damage resulting from earthquake impacts.

Because of the large-scale nature of earthquakes, the entirety of Oakland is generally at risk of geologic hazards. See maps on the right.

Liquefaction and Landslides

Most of Oakland is at risk for violent shaking, while part of the Port, including Oakland International Airport is at risk for severe shaking. Beige and dark brown areas in the map below indicate low-lying coastal areas of Oakland and around Lake Merritt and the Channel that connects it to the Estuary are at highest sensitivity to liquefaction. Lower-income areas and communities of color are more likely to be affected by moderate to higher susceptibility to liquefaction.

Slopes at the greatest risk for landslides (areas shown in gray on the map) in the city are concentrated throughout the Oakland Hills (especially in the northern hills, circled) and within two miles south of Highway 13. Higher-income residents and white residents who make up the majority of the population in census tracts along the city's northern edge in the hills are more likely to be at risk of landslides.



City Programs

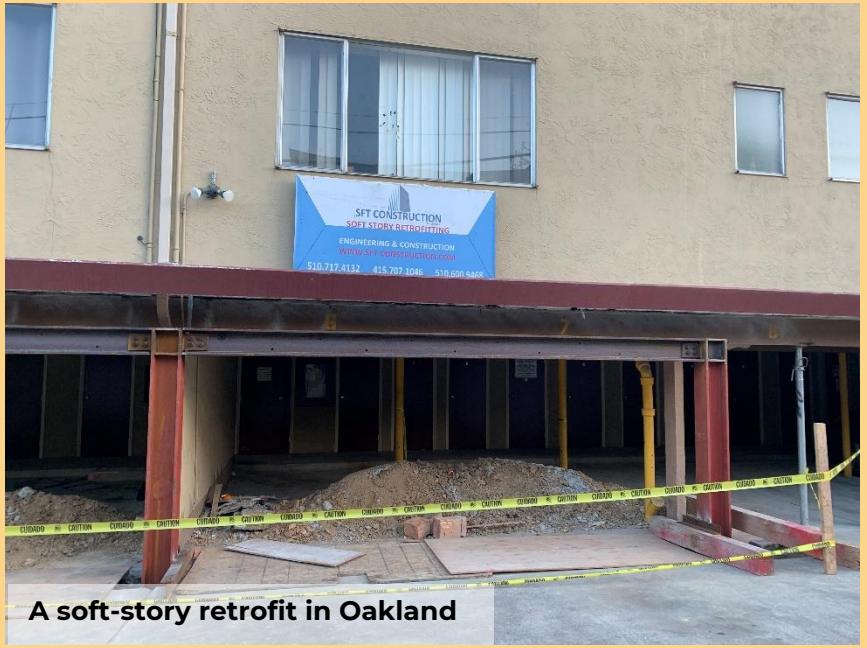
City of Oakland's Soft Story Retrofit Program: A soft-story building is a structure constructed before 1991 which has a large ground-floor opening (parking garage, store-front windows) with slender columns supporting the upper stories. Soft-story buildings are particularly likely to lean or collapse in an earthquake.

A 2009 ordinance (12966 CMS) mandated that owners of certain residential buildings provide simple and low-cost information to the City about their buildings' ground-floor structural supports (dimensions, materials, photographs, floor plan). The 2009 ordinance did not require any type of structural retrofit.

Effective January 22, 2019, City Council adopted ordinance No. 13516 that requires property owners to seismically strengthen these vulnerable buildings. Property owners of certain residential buildings identified has having a potential "soft-story" will be required to seismically retrofit their buildings.

REGULATIONS REDUCING RISK

- **Alquist-Priolo Act**: Established regulatory zones around the surface traces of active faults in California. Structures for human occupancy cannot be placed or built on active faults with potential for surface rupture and must be placed at a minimum distance from the fault.[1]
- **Seismic Hazards Mapping Act (SHMA):** Directs the Department of Conservation, California Geological Survey to identify and map areas prone to earthquake hazards of liquefaction, earthquake-induced landslides, and amplified ground shaking.
- **City of Oakland's Standard Conditions of Approval**: Applied to all projects that involve new structures, major additions, and subdivisions, and are located in an Earthquake Fault Zone per the Alquist-Priolo Act or in a seismic hazard zone per SHMA.



A soft-story retrofit in Oakland

Fire

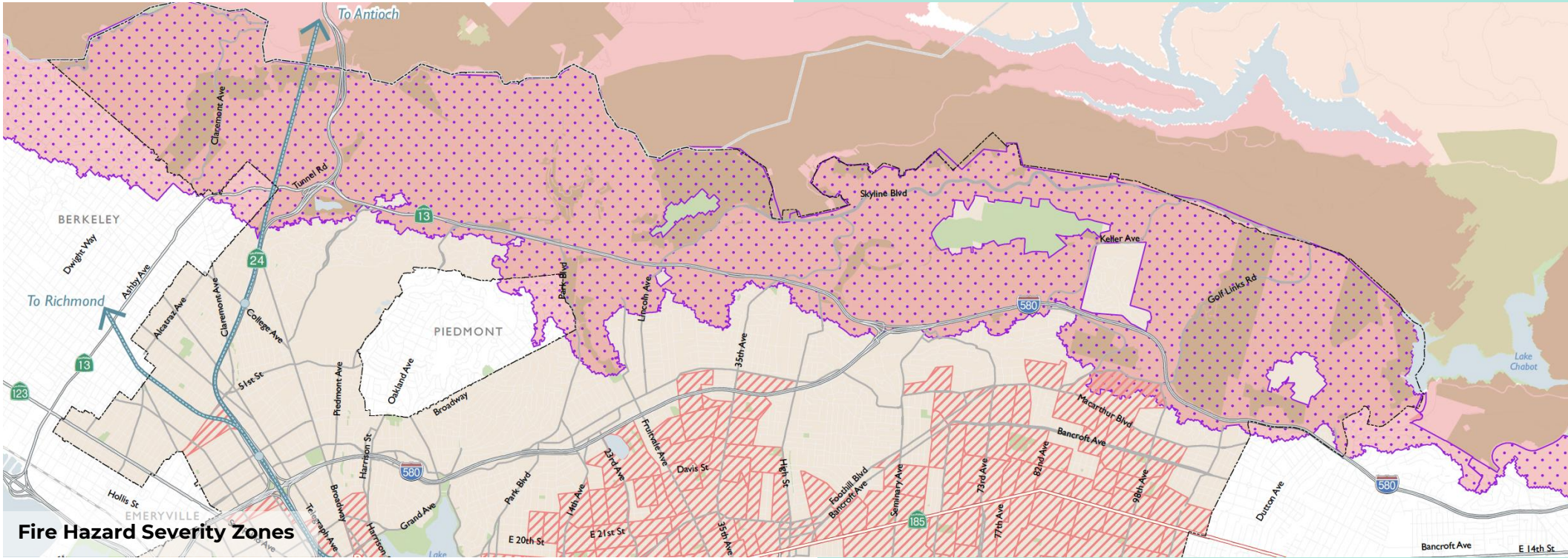
There are two types of fire threat in Oakland: wildfires and urban fires. A wildfire is any uncontrolled fire on undeveloped land that requires fire suppression. Oakland's most recent and significant wildfire, the 1991 Oakland Hills Fire (Tunnel Fire) killed 25 people, injured 150 others, burned 1,520 acres, destroyed thousands of homes, and caused $1.7 billion in losses. Major wildfires that occur outside the city also have major impacts on economies, health, and ecosystem function throughout the region.

An urban fire is a fire that usually starts within a building and can rapidly spread to nearby structures. They can usually be prevented through proper building code requirements, zoning, and fire flow minimums (water and pressure needed to fight fires).

Fire Hazard Severity Zones

Shown below in red, much of Oakland is designated as a very high fire hazard severity zone, an area designated by the California Department of Forestry and Fire Protection (CAL FIRE) that is more likely to burn or contain vegetation that could catch fire. Residents in the Oakland Hills (who are more likely to be higher-income and white) are at higher risk of exposure to wildfires. The purple dots show the areas where the City is responsible for providing fire protection (known as the Local Responsibility Area.)

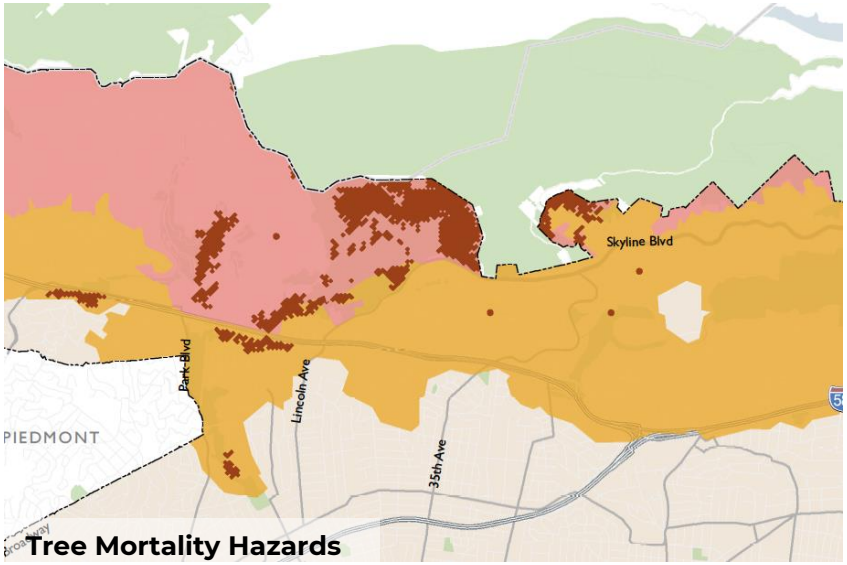
The entire city will also be impacted by wildfires occurring throughout the region due to impacts from air/wildfire smoke, water, and soil quality; damage to energy infrastructure and roads; and strain on local firefighting resources. Climate change will also lead to more events that can increase risk of fire, such as heat waves and droughts. Frontline communities will face these effects first and worst. For example, unhoused populations, outdoor workers, residents who live in poorly insulated or ventilated homes, and people who are already burdened by elevated pollution are increasingly at risk from the now-annual "smoke season."



Fire Hazard Severity Zones

The Oakland Hills is also part of the wildland-urban interface (WUI) area, where buildings are close to undeveloped land. Dead trees in the WUI increases the level of wood that can act as fuel and increases the level of fire hazard for adjacent communities.[1]

The California Public Utilities Commission (CPUC) maps high fire-threat areas where there is a higher risk for power line fires igniting and spreading rapidly. (light red is high risk, orange is medium risk). The map also below shows tree mortality high hazard zones in dark red mainly in the central Oakland hills. Tree die-back in East Bay Regional Parks (e.g., Reinhardt, Anthony Chabot) puts adjacent areas of Oakland at risk for wildfire impacts, including secondary impacts of air and water pollution, erosion, and landslides.



Tree Mortality Hazards

REGULATIONS REDUCING RISK

- **California Fire Code (Title 24, Part 9 of the California Code):** Establishes regulations to protect life and property from the hazards of fires in new and existing buildings and structures. These include regulations on water available for firefighting (peak load water supply), minimum road widths and clearances.
- **Oakland Municipal Code:** Adopted 2019 California Fire Code, includes vegetation management inspection program for properties in VHFHSZs and special construction requirements in fire hazard areas damaged by the 1991 Tunnel Fire.
- **Vegetation Management Plan:** Directs vegetation clearing and monitoring processes for more than 1,400 acres of City property plus 300 acres of roadside treatment areas.

RESPONSIBLE AGENCIES

- **California Department of Forestry and Fire Protection (CAL FIRE):** Manages fire prevention and response across the State through regulations, projects, conservation efforts, and educational programs.
- **Oakland Fire Department:** Primary emergency response service provider for the City of Oakland, and also engages in public education to mitigate fire risk.
- **Vegetation Management Unit (VMU):** Inspects properties in Oakland Hills to mitigate fire hazards.
- **Emergency Management Services Division (EMSD):** Works within Oakland Fire Department to respond to and mitigate any hazard that affects Oakland.

Hydrology and Flooding

Flooding becomes a hazard when water has the potential to damage property and threaten human life or health. Severe flooding can result from a combination of topographic features (like sloped land, or proximity to a body of water); severe weather or excessive rainfall; and characteristics like inadequate stormwater drainage or large amounts of paved surface. Historically, flooding has been the most frequent natural hazard occurring in Oakland, often associated with excess stormwater runoff. Oakland may also be affected by a tsunami and dam failure, but at a much lower risk than flooding from severe weather.

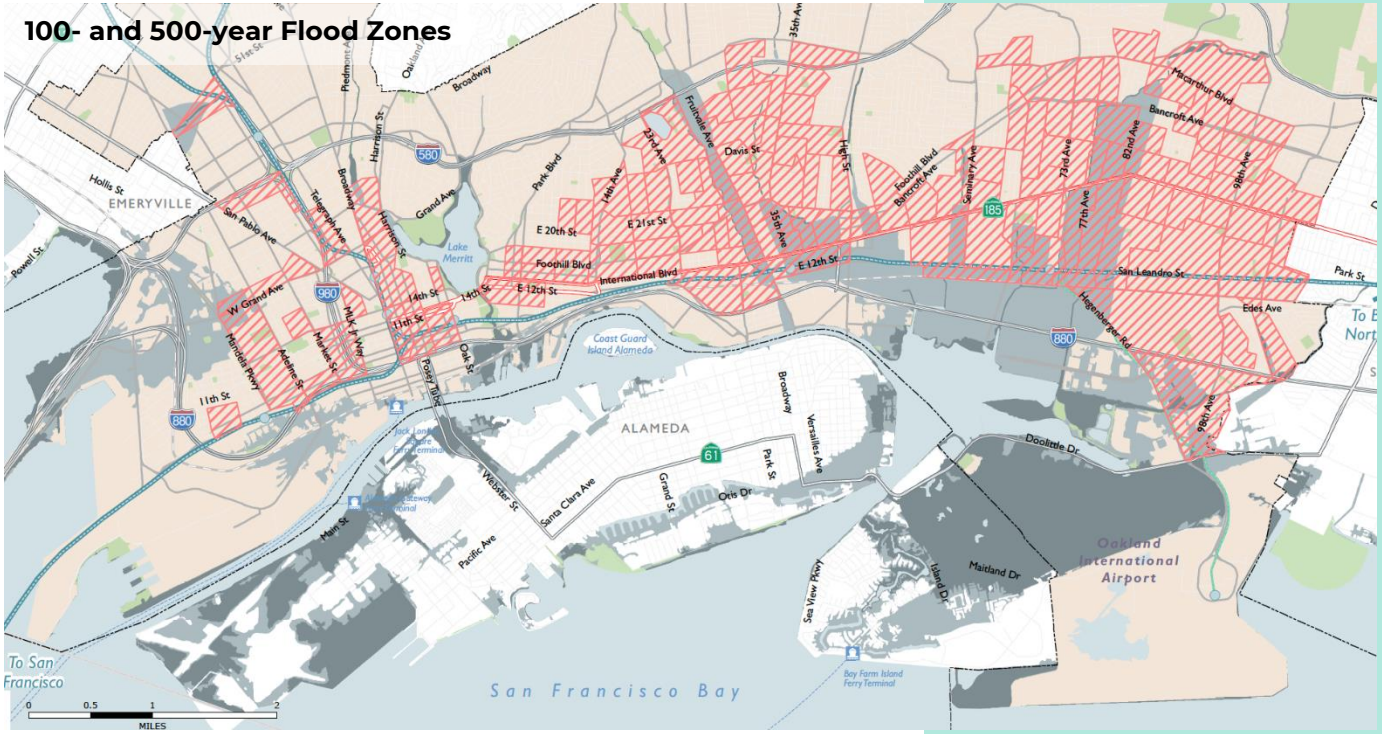
Flood hazards are mapped by the Federal Emergency Management Agency (FEMA) as part of the National Flood Insurance Program.

Flood Hazards

The main flooding threats in Oakland are along the shoreline of the San Francisco Bay, Oakland Estuary, and San Leandro Bay. Areas near Lake Merritt and Glen Echo Creek, Arroyo Viejo, Lion, Sausal, and Peralta creeks are at the most risk of being impacted. Most of the City's developed shoreline is not in the current 100-year Flood Zone, except the north part of the Oakland International Airport.

Lower-income areas and communities of color make up a greater proportion of census tracts in Oakland's flatlands that are at risk from flood hazards. Neighborhoods at risk of flood hazards primarily include Central/East Oakland, Coliseum/Airport, and census tracts in Eastlake/Fruitvale, and West Oakland. The dam breach inundation area affects the majority of Central/East Oakland as well as parts of Eastlake/Fruitvale and North Oakland.

100- and 500-year Flood Zones

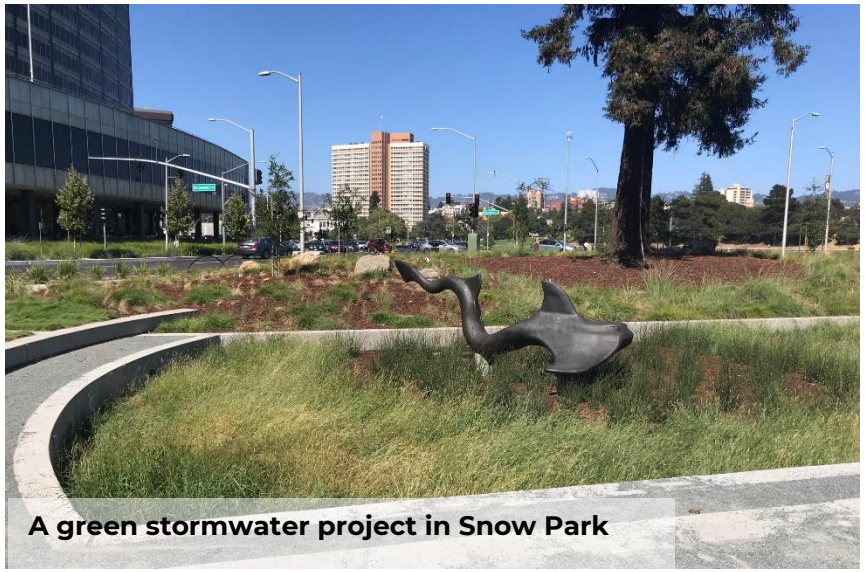


The 100-year Flood Zone, which has a **1% annual chance flood risk (dark gray)**, and 500-year Flood Zone (light gray), which has a **0.2% annual chance flood risk**, are depicted in the map on the left.

City Efforts Reducing Risk

The City of Oakland is developing a new Storm Drainage Master Plan to help address storm-induced flooding in areas with inadequate stormwater drainage. The Plan will include a comprehensive examination of its storm drainage system, model flooding conditions, and create a list of high-priority capital projects for future work.

In 2019, the City of Oakland developed a Green Stormwater Infrastructure Plan to protect and restore watersheds within the City. "Green Stormwater Infrastructure" describes practices and facilities that capture and reuse or clean stormwater runoff to reduce the volume of runoff and improve water quality.



A green stormwater project in Snow Park

[2] California Ocean Protection Council, 2020. Strategic Plan to Protect California's Coast and Ocean 2020-2025

RESPONSIBLE AGENCIES

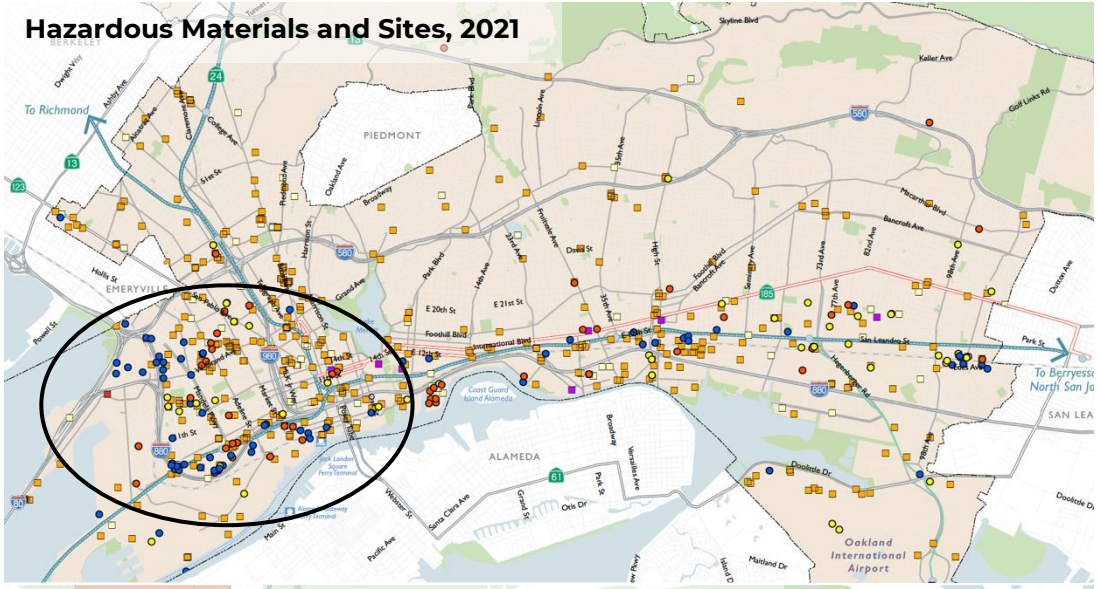
- **FEMA:** Responsible for managing the 100-year floodplain. Requires local governments that are covered by the National Flood Insurance Program to pass and enforce a floodplain management ordinance that specifies minimum requirements for any construction within the 100-year floodplain.
- **California Ocean Protection Council (OPC):** Current guidance from the State's OPC calls for local jurisdictions to prepare for at least 3.5 feet of sea-level rise by 2050.[2]
- **The California Department of Water Resources:** Engages in flood management and flood emergency response programs.
- **San Francisco Bay Regional Water Quality Control Board:** Enforces waterway protection and pollution control regulations in Oakland.
- **Bay Conservation and Development Commission:** Holds regulatory jurisdiction over the San Francisco Bay and its shoreline.
- **Alameda County Flood & Water Conservation District:** Oversees and maintains Alameda County's flood control systems.
- **The Port of Oakland:** Oversees permitting and construction of projects in its jurisdiction.
- **Emergency Management Services Division (EMSD):** Works within Oakland Fire Department to respond to and mitigate any hazard that affects Oakland.

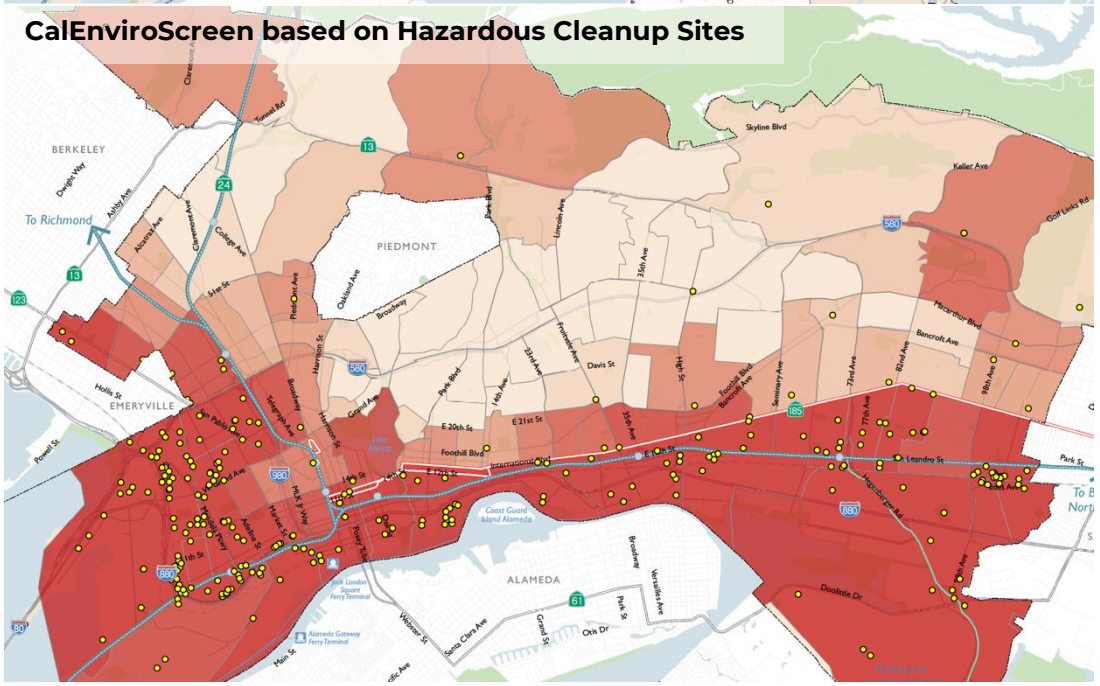
Human-Made Hazards

Exposure to hazardous materials can result in a variety of negative health outcomes that reduce life expectancy, including lung damage, cancer, heart disease, and low birth weight infants.[3] Hazardous sites and materials also threaten environmental quality and may cause soil and groundwater contamination.

There are approximately 1,700 documented hazardous materials sites currently identified within the city shown on the top right.[4,5] Most of these sites are concentrated in areas with industrial land uses in the southern half of the city and West Oakland. More than half of sites have been "closed," meaning they have completed remediation (or "cleanup"). Almost 25% of all sites are actively being remediated and 5% of these sites are operational facilities that are currently certified to handle hazardous materials. [6]

The bottom right map shows hazard per census tract by proximity to hazardous sites. Each census tract is assigned a "Cleanup Site Percentile" (a score) based on the amount and types of Cleanup Sites present. Each score fits into a range of percentiles. Each range of percentiles is assigned a shade of red: the darkest red representing the highest hazard. The census tracts with the greatest hazard are **Port Upper for cleanup sites, Acorn Industrial for hazardous waste sites, Fitchburg for toxic releases, and Melrose for solid waste sites and proximity to industrial zones.**





[3] 2045 general Plan Update: Oakland Map Atlas, 2022 https://cao-94612.s3.amazonaws.com/documents/Map-Atlas_Revised.pdf
[4] More information about CalEnvirostor and hazardous site determinations in Oakland is available in the Oakland Map Atlas.
[5] 2045 general Plan Update: Oakland Map Atlas, 2022 https://cao-94612.s3.amazonaws.com/documents/Map-Atlas_Revised.pdf
[6] Environmental Justice and Racial Equity Baseline. City of Oakland, CA, Mar. 2022, https://cao-94612.s3.amazonaws.com/documents/Equity-Baseline_revised4.15.22.pdf.

Social Vulnerability

BIPOC communities disproportionately experience more pollution burden than majority white communities. Data from Alameda County of Public Health (ACPHD) shows that average life expectancy can vary by as much as 15 years across one mile depending on race.[7] Environmental Justice Communities are also often found closest to Oakland's shoreline, placing them at increased risk of contamination from rising groundwater and flooding.[8]

These disproportionate impacts are the result of decades of discriminatory land-use decisions that concentrate industrial uses and pollution hazards in BIPOC communities. The City is working to reduce the effects of pollution and hazardous materials, while also prioritizing adaptation measures for these vulnerable groups.

RESPONSIBLE AGENCIES

- **The United States Environmental Protection Agency (EPA):** Tracks air pollutants and sets National Ambient Air Quality Standards (NAAQS) based on the latest scientific information regarding their impacts on human health or welfare. Maintains the 'Cortese List', which provides information on the location of hazardous materials release sites.
- **California Air Resources Board (CARB):** Establishes emission standards for mobile air pollution sources and has developed programs to encourage cleaner cars and fuels. They also identify and control toxic air pollutants.
- **California's Department of Resources Recycling and Recovery (CalRecycle):** Coordinates the state's recycling and waste management programs and maintains a database for solid waste facilities, operations, and disposal sites in California.
- **The Department of Toxic Substances Control (DTSC):** Tracks facilities that handle hazardous waste.
- **The California Office of Environmental Health Hazard Assessment:** Lead agency for assessing health risks posed by environmental contaminants, including impacts from climate change.
- **The State Water Resources Control Board (SWRCB)**: Protects water quality across California using regulations, spreading public awareness, and compiling data.
- **The Bay Area Air Quality Management District (BAAQMD or "Air District"):** Regulates toxic air contaminants and continually assesses public health risks.
- **San Francisco Bay Regional Water Quality Control Board:** Enforces waterway protection and pollution control regulation in Oakland.
- **The Alameda County Waste Management Authority:** Provides refuse and recycling collection services for the County
- **The Alameda County Department of Environmental Health (ACDEH):** Coordinates and enforces local, state, and federal management of hazardous materials and environmental protection programs in the County.

[7] Oakland 2030 Equitable Climate Action Plan (ECAP). City of Oakland. (n.d.). https://www.oaklandca.gov/projects/2030ecap

[8] See the Climate Change Vulnerability Assessment for the City of Oakland for further discussion of the cascading impacts of flooding and groundwater intrusion.
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