City of Oakland
2016-2021 Local Hazard Mitigation Plan
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CITY OF OAKLAND

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Photo by Greg Linhares. City of Oakland.

City of Oakland

2016-2021 Local Hazard Mitigation Plan

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1. Introduction

The City of Oakland's 2016-2021 Local Hazard Mitigation Plan (2016-2021 LHMP) is intended to assess the risks to assets in the City and to the people of Oakland, from natural and human-caused hazards. The Plan reviews risks from hazards, identifies mitigation measures to reduce those risks, and presents an implementation program for the next five years. The Hazard Mitigation Plan functions as an appendix to the *Safety Element* of the Oakland General Plan, and a compliment to the City's ongoing disaster, emergency, and resilience planning.

1.1 Background

Hazard mitigation is any sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards. Hazard mitigation is most effective when a long-term plan is developed *before* a disaster occurs. A hazard mitigation plan identifies the hazards a community or region faces, assesses their vulnerability to the hazards and identifies specific actions that can be taken to reduce the risk from the hazards.

This 2016-2021 City of Oakland Local Hazard Mitigation Plan assesses the risks to Oakland from a number of natural and human-caused hazards, and describes those actions that the City is taking, or will take to reduce or mitigate the effects from those hazards. The Hazard Mitigation Plan functions as an appendix to the *Safety Element* of the Oakland General Plan.

As noted by the California Office of Emergency Services (CalOES) in the most recent State Multi-Hazard Mitigation Plan:

> The term "natural disaster" refers to destructive events involving natural forces such as droughts, earthquakes, floods, hurricanes, landslides, mudslides, storms, tornados, tsunamis, high or wind-driven waters, wildfires, and volcanic eruptions.
>
> By contrast, "human-caused" disasters include acts of war and terrorism, as well as disasters with a technological component such as dams and levee failures, nuclear accidents and radiological releases, major truck and rail transportation accidents, oil and other hazardous materials spills, and airplane crashes.
>
> It is important to realize, however, that distinctions among natural, human-caused, and technological disasters are often artificial when taking into account the human decisions underlying settlement patterns that conflict with natural hazards. For example, Hurricane Katrina on the Gulf Coast was both a natural and human-caused disaster involving the construction of urban areas over time in naturally hazardous areas below sea level only partially protected by construction of inadequate levees. To the extent

that disaster losses could be made preventable through mitigation, natural disasters can also be considered human- caused"[1]

1.2 Disaster Mitigation Act of 2000

The Federal Disaster Mitigation Act of 2000 (DMA 2000) emphasizes planning for disasters prior to their occurrence, and makes mitigation planning a requirement. DMA 2000 outlines a process which cities, counties, and special districts can follow to develop a Local Hazard Mitigation Plan. Approval of this plan is a requirement for pre- and post-disaster funds from the Federal Emergency Management Agency (FEMA). The California Governor's Office of Emergency Services (CalOES) reviews the Plans, prior to submission to FEMA. Local Hazard Mitigation Plans must be updated by local jurisdictions every five years.

1.3 Purpose and Scope

To become a more resilient and disaster-safe City of Oakland, the Hazard Mitigation Plan provides a direction for: reducing the potential for loss of life, property damage, and environmental degradation from natural disasters, while accelerating economic recovery from those disasters.

For this 2016-2021 Local Hazard Mitigation Plan (2016-2021 LHMP), the Port of Oakland has included its hazard mitigation projects and proposals, which address known risks to the Port's Airport and Maritime operations from Earthquakes, Liquefaction and flooding, as well as from projected sea-level rise.

1 STATE OF CALIFORNIA MULTI-HAZARD MITIGATION PLAN CHAPTER 4 –RISK ASSESSMENT OVERVIEW, accessed at http://www.caloes.ca.gov/HazardMitigationSite/Documents/005-SHMP%202013%20Chapter%204.pdf

1.4 Area at a Glance

Figure 1: Map of Oakland in the Region

<u>The City of Oakland</u>

Founded in 1852, the City of Oakland (City) is located on the eastern shore of the San Francisco Bay. Oakland is home to 413,775 people, making it the 8th largest city in California. The City's geography spans nearly 56 square miles, and is framed by 19 miles of San Francisco Bay coastline to the west, and rolling hills to the east. The City is bordered on the north by the cities of Berkeley and Emeryville and to the south by the city of San Leandro. To the west and across the estuary channel is the city of Alameda and to the east, Alameda and Contra Costa Counties. The City's elevation is 42 feet above sea level.

Oakland is home to 413,775 people, making it the 8th largest city in California. Oakland represents 12% of the population of the San Francisco--Oakland Urban Area. Oakland is growing more rapidly than California as a whole; between 2010 and 2014, Oakland's population grew 6%, while the state's population grew 4%. Oakland is the county seat of Alameda County.

Oakland is a terminus for three major railways, the eastern touchdown for the Oakland-San Francisco Bay Bridge, and several major freeways.

Oakland has more than 75 different and vibrant neighborhoods and commercial corridors, and more than 100 parks totaling over 2,500 acres. It is the only city in the United States with a natural saltwater lake wholly contained within its borders (115-acre Lake Merritt).

Oakland is also quite densely populated, with 7,000 people per square mile. The City is also one of the most ethnically diverse major cities in the nation, with major representation from Hispanic and Latino, Asian, African- American and Caucasian residents speaking over 125 languages and dialects, as well as one of the country's largest LGBT communities.

Oakland houses the nation's 5th busiest port. The Port of Oakland began in 1927, and operates the Port and Oakland International Airport, the Container Port and also owns additional waterfront property that it leases as commercial real estate, in Jack London Square and in the Oakland Airport Business Park. The Port Board consists of seven members nominated by the Mayor and appointed by the City Council. The Port employs 500 full time employees, and has an operating budget of $330 million for FY 2016.

1.5 Demographics

The City of Oakland is growing from the 390,700 at the time of the 2010 U.S. Census; there were 397,000 people in the American Community Survey, and 413,775 in 2016[2], as shown in Table 1. The City is home to approximately 154,000 households.

The last three decades have brought significant changes to Oakland. Before 1980, Oakland had experienced three decades of population decline due to changes in the local economy, migration to suburban communities, and other factors. Since 1990, Oakland has experienced growing interest as a place to live and work. In recent decades, the San Francisco Bay Area has been the focal point of significant economic development and investment in the technology sector. In the early 2000s, this resulted in significant constraints on housing in areas located near Silicon Valley (San Mateo County and San Francisco City and County). The economic slowdown after 2008 saw a bursting of the housing bubble, resulting in a significant increase in foreclosures and a decline in housing demand. Resurgence in the technology sector in recent years has resulted in another period of high housing demand that has spilled over to other regional cities, including Oakland.

[2] City of Oakland, *Preliminary Resilience Assessment* (2016), pg. 8

Table 1. City of Oakland Population Changes 1990-2010

Year	Oakland	Alameda County
1990	372,242	1,338,421
2000	399,484	1,443,741
2010	390,724	1,510,271
2013	397,011	1,510,271
Change 1990-2013	24,769	171,850
Percent Change	4.9%	12.8%

Source: U.S. Census Bureau, 1990, 2000 and 2010; American Community Survey, 2013

Age Characteristics:

Between 2000 and 2010, there were only small changes in Oakland's the age distribution. There was a 4 percent decrease in the percentage of children between the ages of 5 to 19 years, leading to a 3 year increase in the median age from 33 years in 2000 to 36 years in 2010. Additionally, Oakland experienced an increase in the percent of the population in their mid-50s to mid-60s. Even with the slight change in the proportion of some age groups, the age groups from 5 years to 54 years of age experienced decreases in population between 2000 and 2010.

If the population changes over the past decade continue during the next 10 to 20 years, the City may be home to a significantly large number of older adults and retirees who are looking for housing suited to their changing lifestyles and physical needs. Table 2 compares the age composition of Oakland's population in 1990, 2000 and 2010 with that of Alameda County and the State of California.

Table 2. Age Distribution (1990, 2000 and 2010)

Age	Oakland 1990	Oakland 2000	Oakland 2010	Alameda County 2000	Alameda County 2010	California 2000	California 2010
Under 5 years	8%	7%	7%	7%	6%	7%	7%
5 to 19 years	20%	21%	17%	21%	19%	23%	21%
20 to 34 years	26%	25%	24%	24%	22%	22%	22%
35 to 54 years	27%	30%	29%	31%	30%	29%	28%
55 to 64 years	9%	7%	12%	8%	11%	8%	11%
65 and over	10%	11%	11%	10%	11%	11%	11%
Median age	32	33	36	35	37	33	35

Source: U.S. Census Bureau, 1990, 2000 and 2010
Note: Percentages may not add to 100 due to rounding.

Ethnicity:

Oakland's population is very diverse, as evidenced by the 2010 Census: 26 percent non-Hispanic White, 27 percent non-Hispanic Black/African American, 17 percent Asian, and 25 percent Hispanic, as shown in Table 3. Since at least the 1940s, Oakland has had a significantly higher percentage of non-White and Hispanic residents than other cities of similar size. The City's non-Hispanic Black/African American population declined by 24 percent between 2000 and 2010. In comparison, the population who identified themselves as non-Hispanic White increased, as did the non-Hispanic Asian/Pacific Islander, and Hispanic/Latino populations. The non-Hispanic White population increased by 8 percent, non-Hispanic Asian/Pacific Islander population increased by 8 percent, and the Hispanic/Latino population increased by 13 percent.

Table 3. Population by Race, City, County, and State (1990, 2000 and 2010)

Race/ Ethnicity	Oakland 1990		Oakland 2000		Oakland 2010		Alameda County			State		
Race	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**	**1990**	**2000**	**2010**	**1990**	**2000**	**2010**
Non-Hispanic/Latino												
White (Not Hispanic/ Latino)	105,927	28%	93,953	24%	101,308	26%	53%	41%	34%	57%	46%	40%
Black or African American	160,640	43%	140,139	35%	106,637	27%	17%	15%	12%	7%	6%	6%
Native American	1,695	<1%	1,471	<1%	1,214	<1%	<1%	<1%	<1%	<1%	1%	<1%
Asian/Pacific Islander	53,818	14%	62,259	16%	67,208	17%	14%	21%	27%	9%	11%	13%
Other Race	895	<1%	1,229	<1%	1,213	<1%	7%	<1%	<1%	<1%	<1%	<1%
Two or More Races[1]	N/A	N/A	12,966	3%	14,076	4%	N/A	4%	4%	N/A	3%	3%
Hispanic/Latino (any race)												
Hispanic or Latino	49,267	14%	87,467	22%	99,068	25%	14%	19%	23%	26%	32%	38%
Total	372,242	100%	399,484	100%	390,724	100%	--	--	--	--	--	

Source: U.S. Census Bureau, 1990, 2000 and 2010.
[1]This is a 2000 Census category only.
Note: Percentages may not add to 100 due to rounding

Household Composition

In 2010, Census data reported an increase in the number of households throughout the City of Oakland since 2000. The total number of households in 2010 was recorded at 153,791, as shown in the Table below. Of those households, 54 percent were family households (households with related individuals). This percentage was substantially below countywide figures. Even though the number of households has grown, there has been a decline in the average household and family size. The average household size has declined from 2.6 in 2000 to 2.49 in 2010. Similarly, the average family size also decreased, from 3.38 to 3.27. These trends are directly related to the decline in proportion of population groups with larger household sizes and the increase in the proportion of population groups with smaller household sizes. These changes in household size might be a reflection of the nationwide trend away from traditional family structures. The number of family households has scaled down from 86,347 in 2000 to 83,718 in 2010. Similarly, there has been a 10% decline in the number of family households with children between 2000 and 2010.

Oakland has a high percentage of single adults and other non-family households (unrelated individuals living together). Nearly one-third of Oakland households consist of single persons, and about 30 percent consist of two people. More than a third (36 percent) of Oakland households have more than three people (mostly family households). The high percentage of smaller households in Oakland may be due, in part, to the relatively low proportion of housing units with more than two bedrooms compared to the surrounding suburban areas. According to the 2000 Census, nearly 70 percent of Oakland's housing stock has two or fewer bedrooms, compared to 54 percent countywide.

2. Planning Process

2.1 Overview of Hazard Mitigation Planning

Hazard Mitigation Planning is one part of an ongoing effort at the City of Oakland to prepare, respond and build back from known hazards, such as earthquakes, as well as expected future hazards, such as sea-level rise. The 2016-2021 LHMP incorporates many overlapping policies and plans, as described in Section 3.1, below.

Mitigation

The term "mitigation", as described by the State Multi-Hazard Mitigation Plan, means:

> Any sustained action taken to reduce or eliminate the long-term risk to human life and property from natural, human-caused, and technological hazards and their effects. Note that this emphasis on long-term risk distinguishes mitigation from actions geared primarily to emergency preparedness and short-term recovery.
>
> Mitigation is predicated on the principles that many losses are preventable through better community design and that each event should teach us how to reduce losses in the next disaster. Mitigation generally means reducing long-term risk from hazards to acceptable levels through predetermined measures accompanying physical development, such as strengthening structures to withstand earthquakes, prohibiting or limiting development in flood-prone areas, clearing defensible space around residences in wildland-urban interface (WUI) areas, or designing development away from areas of geological instability.
>
> Mitigation is different from emergency preparedness. The latter concentrates on activities that make a person, place, or organization ready to respond to a disaster with emergency equipment, food, emergency shelter, and medicine."[3]

2.2 Preparing the 2016-2021 Update

Preparation of the 2016-2021 LHMP continues the hazard mitigation planning process that has been in place in the City of Oakland since the early 1970s, with the adoption of the City's first Seismic and Safety Elements to the City's General Plan. The City of Oakland is a leader in the regional discussion of hazards, hazards mitigation and disaster recovery. The City was designated one of the first Disaster Resistant Communities in the United States, as well as one of the first "100 Resilient Cities."[4]

This, and prior Hazard Mitigation Plans build upon and refine priorities set in 2004, with the adoption of the *Safety Element* to the Oakland General Plan. The *Safety Element* is a living

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[3] STATE OF CALIFORNIA MULTI-HAZARD MITIGATION PLAN CHAPTER 4 –RISK ASSESSMENT OVERVIEW, Section 4.4 *PAGE 95, accessed at http://www.caloes.ca.gov/HazardMitigationSite/Documents/005-SHMP%202013%20Chapter%204.pdf*

[4] See website, http://www2.oaklandnet.com/Government/o/CityAdministration/d/ResilientOakland/index.htm

document, used by City staff, with a comprehensive discussion of natural and human-caused hazards in Oakland, and measures to mitigate effects from those hazards. The General Plan *Safety Element* is divided into the following hazards:

- **Public Safety:** including violent crime and terrorism;
- **Geologic Hazards:** including earthquake fault displacement, ground shaking, liquefaction, subsidence and settlement, slope instability or landslide hazards, erosion, soils, structural hazards, transportation facilities, and utility systems;
- **Fire Hazards:** including fire-fighting response, water supply, structural fires, wildland fires, roadway standards and emergency routes;
- **Hazardous Materials:** including business plan program, CalARP program, UST program, aboveground storage tank program, hazardous waste tiered permitting program, household hazardous water management, toxic air contaminants, contaminated sites and brownfields, transportation, pipelines, emergency response, and zoning;
- **Flooding Hazards:** including storm-induced flooding, tsunamis, seiches, dam failure, and sea-level rise.

All of the mitigation strategies identified in the 2016-2021 Local Hazard Mitigation Plan will be integrated into those contained in the City's *Safety Element* of the General Plan, as an "implementation annex" to the *Safety Element*. This action requires adoption of a resolution by the City Council, and will be based on a recommendation from the Oakland Planning Commission.

The City's preparation of the 2016-2021 LHMP included a review of all existing programs and strategies, identifying any gaps that may lead to disaster vulnerabilities, assimilation of complimentary efforts, such as the Oakland *Preliminary Resilience Assessment* (see Appendix A), and prioritization of existing and proposed mitigation measures. Three community workshops were also held, prior to publication of a final public review document.

The Port of Oakland has contributed current mitigation planning initiatives that reduce hazards from earthquakes, flooding and sea-level rise.

Participating Oakland senior staff in this Hazard Mitigation Plan update were:

- Christine Daniel, Assistant City Administrator
- Karen Boyd, Communications Director
- Harry Hamilton, Public Information Officer
- Teresa Deloach Reed, Fire Chief

- Miguel Trujillo, Assistant Fire Marshall, Oakland Fire Department
- Cathey Eide, Manager of the Oakland Fire Department's Emergency Management Services Division, with support from her staff;
- Rachel Flynn, Director of the Department of Planning and Building;
- Ed Manasse, Strategic Planning Manager;
- Devan Reiff, Bureau of Planning;
- Dave Harlan, Department of Planning and Building, Buildings Bureau
- Brooke Levin, Director, Oakland Public Works
- Susan Kattchee, Oakland Public Works
- Mike Neary, Oakland Public Works
- Jason Mitchell, Oakland Public Works
- Daniel Hamilton, Sustainable Oakland
- Richard Sinkoff, Port of Oakland; Joshua Polston, Port of Oakland; Tranh Vuong, Port of Oakland
- Victoria Salinas, Chief Resilience Officer (former)

Consulting agencies

Association of Bay Area Governments

- Danielle Meiler, Resilience Program; Dana Brechwald, Michael Germeraad

San Francisco Bay Conservation and Development Commission

- Lindy Lowe; Maggie Wenger, Adapting to Rising Tides

East Bay Municipal Utilities District

- Lilian Leung, Design Division

Also complimenting this Hazard Mitigation Plan update is the regular participation of the City of Oakland's Emergency Management Services Division management and staff, in a wide variety of federal, state, regional and local groups, task forces and workshops on disaster preparation and recovery. See Appendix B for an annual report summarizing this division's activities in the last year.

In addition to the policies and actions outlined in the *Safety Element*, the City routinely implements the hazard mitigation policies from its *Housing Element* and the *Land Use and Transportation Element* of the General Plan. The City also enforces the requirements of the California Environmental Quality Act (CEQA). Since 1988, CEQA requires mitigation for identified natural hazards.

2.2.1 Specific and Area Plans – Hazard Mitigation Measures

In the last few years, the City has adopted a number of Specific Plans which have policies that mitigate hazards, and plan for adaptation to climate change. Below are a few selected examples from recent Specific Plans, and the hazards addressed by the mitigation action.

West Oakland Specific Plan

Extreme Heat:

- **Reforestation 1**: Implement the West Oakland Reforestation Plan, which includes detailed, site specific recommendations for new tree plantings, and analysis of the environmental and economic benefits that would accrue from such additional tree plantings.

  New Sidewalk Trees: Support and pursue implementation of the Reforestation Plan's recommendations for additional plantings of quality trees along each of twelve major streets identified in that Plan. The Reforestation Plan includes a detailed list of locations where additional trees can be planted, estimates of the quantity of trees that can be planted at each location, and recommendations for specific tree species that should be used.[5]

Broadway-Valdez District Specific Plan

Flood and Drought:

- **I 4.2**: Developers shall design projects to optimize runoff capture and treatment by incorporating features such as bioswales, infiltration areas, vegetated filter strips, porous paving, and rain gardens that enhance stormwater infiltration and reduce peak runoff .
- **I 4.5**: Encourage developers to incorporate rainwater harvesting in new buildings and landscapes as a means supplementing their water supply and reducing demand for potable water.[6]

Lake Merritt Station Area Plan

Sea Level Rise, stormwater:

[5] City of Oakland, *West Oakland Specific Plan*, (2014), pg. 9.23.
[6] City of Oakland, *Broadway-Valdez District Specific Plan*, (2014), pg. 85.

- **IU-5:** Stormwater runoff - New development must be designed to limit the amount of storm water runoff into drains or surface water bodies including Lake Merritt, the Lake Merritt Channel, or the Oakland Estuary.[7]

Coliseum Area Specific Plan

<u>Flood and future Sea-level Rise:</u>

- **Public Infrastructure 6.10:** a. Design flood protection against a nearer-term potential 16-inch sea level rise above current Base Flood Elevation for mid-term planning and design (2050); and design gravity storm drain systems for 16 inches of sea level rise;

  b. Provide a mid-term adaptive approach for addressing sea level rise of greater than 18 inches, including incorporation of potential retreat space and setbacks for higher levels of shoreline protection, and design for livable/floodable areas along the shoreline in parks, walkways, and parking lots;

  c. Develop a long-term adaptive management strategy to protect against even greater levels of sea level rise of up to 66 inches, plus future storm surge scenarios and consideration of increased magnitude of precipitation events."

- **Public Infrastructure 6.11:** Include a suite of shoreline protection measures, protective setbacks and other adaptation strategies, to be incorporated into subsequent development projects. These could include:

  a. Build a shoreline protection system within Sub Areas B, C and D to accommodate a mid-term rise in sea level of 16 inches, with development setbacks to allow for further adaptation for higher sea level rise, with space for future storm water lift stations near outfall structures into the Bay and Estuary.

  b. Consider incorporation of a seawall along the rail tracks, east of the new Stadium and/or Ballpark sites.

  c. Consider designing temporary floodways within parking lots, walkways and roadways.

  d. Construct the storm drainage system to be gravity drained for sea level rise up to 16 inches, and pumped thereafter. Pumping should be secondary to protection.

  e. Require that all critical infrastructure sensitive to inundation be located above the 16-inch rise in base flood elevation.

[7] City of Oakland, Lake Merritt Station Area Plan (2014), pg. 9-12

f. Design buildings to withstand periodic inundation, and prohibit below grade habitable space in inundation zones.

g. Where feasible, construct building pads and vital infrastructure at elevations 36 inches higher than the present day 100- year return period water level in the Bay, and add a 6-inch freeboard for finish floor elevations of buildings.

h. Consider construction of a protection system, such as a "living levee", (similar to the design presented in the MTC Climate adaptation Study, 2014), along Damon Slough in Sub-Area A, from its entry into the Plan Area at San Leandro Bay to its upstream confluence at Lion's Creek."[8]

Plan Downtown

At the time of this Hazard Mitigation Plan update (2015-2016), the City is preparing a specific plan for downtown Oakland. The Downtown Plan is expected to have a number of resilience and adaptation strategies. The City will continue to monitor the adoption of the Downtown Plan, and incorporate any hazards related policies and actions by reference into the 2016-2021 LHMP.

2.3 Document the community engagement process

On March 3rd and 16th, and on April 18th and 25th, 2016, the City hosted public workshops on its 2016-2021 update of the Local Hazard Mitigation Plan (LHMP). Notes, photographs and presentations from each workshop are included as Appendix C to this 2016-2021 LHMP. The public was encouraged to take an online survey which identified public priorities for City programs which reduce risk and mitigate hazards (see Appendix D). Staff coordinated with other similar, complimentary efforts by the City, such as 'Resilient Oakland', and the update to the Energy and Climate Action Plan, with public meetings throughout 2016, to bring a Hazard mitigation discussion to each of the public workshops held for those two efforts. Staff from both the Association of Bay Area Governments (ABAG) and the San Francisco Bay Conservation and Development Commission (BCDC) made presentations at the community workshops, to inform participants about the Resilience Program, and Adapting to Rising Tides initiative.

[8] City of Oakland, *Coliseum Area Specific Plan* (2015), pgs. 132-133

3. Capability Assessment

3.1 Relevant plans and programs in place.

The City of Oakland has a long history and ongoing commitment to hazard mitigation planning. Over the last twenty years, the City has addressed the potential natural and human-caused hazards in elements of the Oakland General Plan, in policies and actions of Specific or area plans, and in myriad programs and projects underway by different departments. In addition, the 2010-2015 Oakland Local Hazard Mitigation Plan (2010-2015 LHMP) was adopted in 2012 and is still applicable through March 2016, with over two hundred policy actions and goals. Table 4 below describes some of these Plans and projects, and their management. Appendix E lists each of the detailed policies and actions which are in each Element or Plan, that addresses or responds to hazards.

Table 4. Relevant plans and programs in place

Plan or Program		Description	Department lead
Oakland General Plan			Bureau of Planning
	Safety Element	A policy framework to guide the public decision making process with regard to safety hazards including public safety, geologic hazards, fire, flooding and hazardous materials.	
	Housing Element	An assessment of the need for housing and an inventory of housing; statement of the goals with regard to housing residents; and a program for providing the needed amount of housing throughout the City.	
	Land Use and Transportation Element (LUTE)	Adopted in 1998, the LUTE defines the long range goals and intentions of the community regarding the direction of future development within the City of Oakland. Designates the kinds, location, and intensity of land uses, as well as appropriate zoning controls to achieve development goals.	
Specific and Area Plans			Bureau of Planning
	Downtown Specific Plan (ongoing 2016)	Specific Plan for downtown Oakland, to ensure continued growth and revitalization to benefit both Downtown residents and the larger community. The plan will provide sound policy guidance on development, linking land use, transportation, economic development,	

		housing, public spaces, cultural arts, and social equity.	
	Coliseum Area Specific Plan (2015)	Specific Plan to transform the underutilized land around the Oakland-Alameda County Coliseum and Arena into a world-class sports, entertainment and science & technology district that boasts a dynamic and active urban setting with retail, entertainment, arts, culture, live and work uses.	
	Lake Merritt Station Area Plan (2014)	Specific Plan to consider land use, buildings, BART facilities, the transportation network, parks and public spaces within a half mile of Lake Merritt BART station. It identifies actions the City, other public agencies and community members can take, and establishes regulations for development projects on private property.	
	West Oakland Specific Plan (2014)	Specific Plan to develop comprehensive, multi-faceted strategies for facilitating the development of selected vacant and/or underutilized commercial and industrial properties within the West Oakland community. The Plan is a tool for supporting, attracting and developing commercial and industrial enterprises to provide jobs and services needed by the West Oakland community and the city of Oakland at large.	
Priority Conservation Area designations (2015)		Priority Conservation Areas" (PCAs) are an important tool in Association of Bay Area's "Plan Bay Area", an integrated land use and transportation for the region. Oakland's Priority Conservation Areas (PCAs) include parts of Oakland that are most at risk from earthquakes, floods, and sea level rise (See http://abag.ca.gov/priority/conservation/).	

3.1.1 Ongoing initiatives and collaborations

Oakland is in ongoing collaboration with neighboring jurisdictions, public agencies, special districts, utilities and other stakeholders about climate adaptation, emergency and disaster management, and resiliency. Of note are the following ongoing initiatives, staffed by the Emergency Management Services Division, the Sustainable Oakland team in Oakland Public

Works, and the Office of the City Administrator "Resilient Oakland." Each effort is described more fully, below.

City of Oakland Emergency Management Services Division (EMSD):

EMSD, a division of the Oakland Fire Department, coordinates the activities of all City agencies relating to planning, preparation and implementation of the City's Emergency Operations Plan[9]. EMSD also supports the coordination of the response efforts of Oakland's Police, Fire and other first responders in the City's state-of-the-art Emergency Operations Center (EOC) to ensure maximum results for responders by providing up-to-date public information and ensuring coordinated resource management during a crisis. Additionally, EMSD coordinates with the Alameda County Operational Area and other partner agencies to guarantee the seamless integration of federal, state and private resources into local response and recovery operations.

EMSD accomplishes this mission through partnerships, policy, planning, programs, training, exercise, equipment and outreach efforts that assist Oakland's first responders, City departments, local businesses, non-governmental organizations (NGOs), community-based organizations (CBOs) and residents in their emergency management/preparedness efforts. EMSD also integrates its emergency management and homeland security management practices that incorporate a multi-disciplinary, multi-hazards approach to the Urban Area Security Initiative (UASI), Port Security, Airport Security and Transit Security which includes a strong emphasis on partnerships and regional, state and federal collaboration.

The City of Oakland has made strides in comprehensive emergency management planning through the development of previously adopted federal and state-compliant Local Hazard Mitigation Plans (LHMP), Emergency Operations Plan (EOP) and Regional Catastrophic Preparedness Grant Program (RCPGP) Annexes. The 2010-2015 LHMP assisted in the mitigation of future disasters by identifying risk vulnerabilities and measures to alleviate the impact of hazards. The EOP is an all-hazards emergency preparedness, response and short-term recovery plan designed to: serve as a basis for effective response to any hazard threatening Oakland using capabilities for the protection of citizens from the effects of disasters; facilitate the integration of mitigation in response and recovery activities; and facilitate coordination with cooperating private or volunteer organizations and County, State and Federal government in disaster situations. The RCPGP Annexes are specialized addendums to the EOP which focus on the City's response to the impact of a catastrophic earthquake on mass care and sheltering, mass transportation and evacuation, donations management, volunteer management, mass fatalities, and debris management.

[9] For further detail on these programs, see the January 15, 2016 "Emergency Management and Disaster Preparedness Council Informational Report, 2014-2015" at https://oakland.legistar.com/LegislationDetail.aspx?ID=2557718&GUID=B8CA470C-4311-47BA-81A3-FA7FF49EA39E&Options=ID|Text|&Search=emergency

Each emergency plan follows the principles and processes outline in the National Incident Management System (SEMS), California Standardized Emergency Management System (SEMS), and the Incident Command System (ICS). This provides a consistent, flexible and adjustable framework for the City to work to manage disasters regardless of their cause, size, location or complexity across all phases of emergency management: preparedness, response, recovery and mitigation.

Training and Exercise:

The EMSD Emergency Planning Coordinator responsible for training and exercise planning assists with the identification and coordination of Standard Emergency Management (SEMS), National Incident Management Systems (NIMS) and EOC Incident Command System (ICS) training courses on behalf of City of Oakland employees.

Since August 2014 to the present and in coordination with OFD sworn staff and the UASI Training Program Lead Planner, 20 trainings have been scheduled in which OFD or Oakland EMSD was the planned host. Eighteen of these courses have already been held.

The EMSD has developed and hosted three exercise events designed for the benefit of Oakland personnel. This included the annual Flu vaccination clinic (November, 2014) "No Blue Flu," The Yellow Command Emergency Public Information Officer Exercise (September 2015), and the Oakland Yellow Command EOC Drill (September 2015).

City/Oakland USD Emergency Shelter Facilities Use Committee

The Oakland Unified School District (OUSD) Emergency Shelter Facilities Use Committee has met quarterly since August 2014. The Committee's charge is to fulfill the elements of the Oakland Unified School District Memorandum of Agreement (MOA) in using school district facilities as emergency shelters or staging areas in the event of a catastrophic disaster.

Logistics Planning: Points of Distribution (PODS) and Local Staging Areas (LSA)

EMSD staff continues to conduct outreach to identified PODS and LSA sites to establish partnerships in providing the City of Oakland with paved, open and level space to serve the purpose of a community-based needs PODS and/or LSA.

Mass Notification System

When local emergencies or disasters occur, the City of Oakland uses a mass notification system to communicate concise information and instructions to Oakland employees, residents, visitors and businesses including the type of incident and instructions or actions to take to remain safe.

Internally, the system is used for activations of the Emergency Operations Center (EOC) and for callouts for multi-alarm fires.

Effective January 1, 2016, the City of Oakland will be participating in "EverBridge," the Alameda County Alert System. The EverBridge system is internet-based and can send emergency messaging via telephone, Short Message Service (SMS) text message, email, instant message, fax or TTY/TDD.

Oil Spill Response Planning

The State Office of Spill Prevention and Response (OSPR) has the California Department of Fish and Wildlife's (CDFW) public trustee and custodial responsibilities for protecting, managing and restoring the State's fish, wildlife, and plants. It is one of the few State agencies in the nation that has both major pollution response authority and public trustee authority for wildlife and habitat.

Since July 1995, the Oakland Fire Department's Emergency Management Services Division (EMSD) has been the lead agency for development and implementation of the Alameda County Local Oil Spill Contingency Plan (ACLOSP).

In 2015, the City Council approved a Memorandum of Understanding (MOU)[10] between the City of Oakland Emergency Management Services Division and the Alameda County Operational Area for oil spill planning. The new agreement ensures the City of Oakland will continue to play a prominent role in planning, mitigating, responding to, and training for oil spills.

Emergency Operations Center (EOC)

EMSD staff maintains the Emergency Operations Center (EOC) throughout each week in order to keep it in readiness mode at all times. In late 2012, grant funds were approved for upgrade to the EOC workspace environment for the creation of a Virtual Desktop Infrastructure. Work on this project was completed in 2014, providing enhancement of the EOC capability. In addition to the infrastructure upgrade, the EMSD also received funding and approval for an upgrade of the Emergency Management (EM) software. allowing for a smooth and well integrated web-enabled crisis information management system that provides secure real-time information sharing between the City EOC, the Alameda County Operational Area; and thusly the Regional Operations Center (REOC) and the State Operations Center (SOC).

Emergency Management and Disaster Preparedness Council:

The Emergency Management and Disaster Preparedness Council (EMADPC) is the City of Oakland's Disaster Council and also advisory over the City's CERT Program Communities of

[10] Resolution No. 85531 C.M.S

Oakland Respond to Emergencies (CORE). The EMADPC is an executive-level advisory body established to facilitate the development and implementation of policies, programs and plans that protect persons and property within Oakland during times of emergencies and disasters. The Council membership consists of the Mayor (chair), City Administrator (vice chair), Director of Emergency Services (secretary), city agency, department or division heads and representatives from the general public, businesses, civic and community organizations, local agencies, utilities, and neighboring cities.

The Emergency Management and Disaster Preparedness Council meets quarterly. All EMADPC members are assigned to one of the five standing committees: Preparedness, Mitigation, Response, Recovery and Fiscal/Funding. These standing committees meet periodically to undertake specific projects, in which case members are assigned to work groups with delineated tasks and timeframes. The standing committees and/or working groups are chaired by EMADPC members and staffed by Fire Department, Emergency Management Services Division personnel.

The City of Oakland's Emergency Management and Disaster Preparedness Council (EMADPC) has supported the following efforts for the time period of September 1, 2014 through December 31, 2015:

- Disaster Recovery Planning includes the development of a best practices document and localizing the planning products to coordinate and manage long-term recovery after a catastrophic event. Key objectives:
    - Validation of the health, social, economic, natural and environmental Recovery Support Functions (RSFs).
    - Build resiliency from the local jurisdiction up to the nation.
    - Development of the "Recovery Framework Resources and Tool Kit."

- The Private Non-profit (PNP) Assistance Program (AB903) Committee consisting of members of the NorCal VOAD (Voluntary Organizations Active in Disasters), Oakland EMSD staff with the support of California Office of Emergency Services (Cal OES) continue to work on developing training and outreach for the PNP Assistance Program reimbursement to non-profits requested to provide assistance to local jurisdictions for critical resources post disaster[11]. The group is developing a work plan to assist with educating government, non-profits and faith based organizations on Cal OES's requirements and process. NorCal VOAD has received a grant from the San Francisco Foundation to support this effort.

- NorCal VOAD held a regional forum on January 14, 2016 to provide information about the Disaster Cost Reimbursement (DRC) Project to assist Bay Area Nonprofits and local government to better understand and prepare to utilize the California Disaster Assistance Act Private Nonprofit (PNP) Program for cost reimbursement following a disaster. The

[11] Program authorized by AB 903 legislation.

program was attended by nonprofits, government agencies and faith based organizations from five counties; Alameda, Contra Costa, Marin, San Francisco and San Mateo. The forum included: A program overview, research results from PNP applicant case stories, a step by step overview of the process and forms from Cal OES and a tabletop exercise. Participants were given the opportunity to discuss next steps and action items to continue working together within their individual counties.

Communities of Oakland Responding To Emergencies (CORE):

Communities of Oakland Responding To Emergencies (CORE) is a free emergency preparedness and disaster response training program for individuals, neighborhood groups and community-based organizations in Oakland. CORE teaches self-reliance skills and helps neighborhoods establish response teams to take care of the neighborhood until professional emergency personnel arrive. Since its inception in 1990, more than 18,000 residents have been trained in CORE programs.

Highlights of the CORE program in the past year include:

- The Tenth Annual CORE Citywide Emergency Response Exercise was held Saturday, April 25, 2015. This year's objectives included: Neighborhood Command Post Operations, triage and treatment processes conducted by Light Search and Rescue and Disaster First Aid teams and effective communication at all levels. 47 CORE neighborhoods participated in this year's exercise and over 55 individuals and volunteers participated in the simulation exercise at the OFD training division. Testing communications via Amateur radio operators were made to participating anchor fire stations and GMRS radio capabilities.

- The CORE Program uses the City's GovDelivery notification system to deliver mass emails and notices to CORE members and subscribers, which has been very successful. Our popular Tuesday Tips are now automatically posting to the CORE Facebook page and the City's Twitter account. The program has also used the system to do outreach for special trainings such as workshops, Learn, Lead, Lift and special projects like the City's Soft Story Project.

- Learn, Lead, Lift (LLL) – The LLL Program has transitioned to the CORE Program and will be offering trainings on a regular basis. "Learn, Lead, Lift" is a disaster justice pilot project which strives for the sustainable engagement and integration of all Oakland neighborhoods in emergency planning, preparedness, and mitigation efforts regardless of social, cultural, religious and economic status.

- Oakland Fire EMSD and the CORE Program partnered with FEMA to provide community outreach and education for the movie release of "San Andreas" at the Grand Lake Theatre. Over 1,000 moviegoers participated, in conjunction with Oakland Fire, Oakland Parks and Recreation, Oakland Radio Communications Association (ORCA), FEMA, USGS, CalOES, Bay EMT and the Grand Lake Theatre.

- The CORE Program offered two new workshops in the last quarter: Self-Care & Resiliency and Neighborhood Networking.

- CORE has conducted over twenty private classes in the last quarter and has numerous classes scheduled through the end of the year. CORE classes in Cantonese, Mandarin, ASL and Braille were provided via translators and translated materials with the assistance of the City's Equal Access department, and our ADA program.

- The Great CA ShakeOut Annual Drop, Cover, Hold On drill was held Thursday, October 15, 2015 at 10:15 am. This year in conjunction with the ADA 25th Anniversary Oakland Fire, ADA Program and FEMA hosted a ShakeOut ADA25 Preparedness Fair at Frank Ogawa Plaza from 9:00 am to 2:00 pm with speakers, demonstrations and displays with an interactive Drop, Cover, Hold On drill.

Sustainable Oakland/ Energy and Climate Action Plan

Oakland is consistently recognized as one of the most livable and sustainable cities in the nation, and City staff and elected officials are committed to leading Oakland's progress in becoming a more sustainable city – a community in which all people have the opportunity to pursue safe, happy, healthy and fulfilling lives, now and into the future. Protecting a clean and ecologically healthy environment; growing a strong economy with opportunity for all; and fostering a safe, equitable and vibrant community are all critical components of this vision. The City's award-winning sustainability efforts rely on collaboration both among City departments and between City government and community and business groups. Our sustainability leadership is focused on continuously improving our efforts as new data, technologies, and community resources become available, and constantly pushing the boundaries of what it possible. The Sustainable Oakland Program tracks and reports on progress toward achieving the City's Energy and Climate Action Plan (ECAP) goals, and produces an annual Sustainable Oakland Report.[12]

The City's ECAP was adopted by Council in 2012, and sets forth Priority Actions and additional actions for accomplishing deep Greenhouse Gas emissions, increasing social equity through sustainability efforts, and building community-wide resilience by 2020. Actions are grouped into themes of transportation and land use, building energy use, material consumption and waste, community engagement, and climate adaptation and increasing resilience.

The Sustainable Oakland report for 2014-2015 notes progress on several relevant Priority Actions:

- **PA-29:** The City participates in discussions with the San Francisco Bay Conservation and Development Commission (BCDC), Local Government Sustainable Energy Coalition, and

[12] See City website, http://www2.oaklandnet.com/Government/o/PWA/s/SO/index.htm

Urban Sustainability Directors Network on climate adaptation programs, and administers a Resilience Program through the 100 Resilient Cities grant from the Rockefeller Foundation.

- **PA-31:** Transportation and land use planning are coordinated in the City's General Plan, and specific integration requirements are in place for all major development projects in the City.
- **PA-58:** The City is continuing to seek grants to fund community climate workshops. Community partners, including the Oakland Climate Action Coalition, have been conducting workshops addressing both climate change mitigation and resiliency.
- **PA-59:** BCDC, through the Adapt to Rising Tides program, is completing its Oakland Alameda Resilience Study in 2016, assessing long term climate risks to properties near the Oakland Coliseum and on Bay Farm Island, home to the Oakland International Airport. Additional analysis is being conducted regionally, with the City of Alameda.
- **PA-60:** The City provides ongoing education to the community on climate issues through the Sustainable Oakland site, a Facebook page, and multiple publications, brochures, events, and other materials.
- **PA-61:** The City has hired a Chief Resilience Officer to pursue opportunities to improve resilience in both planning and policy documents.

Resilient Oakland:

In 2013, Oakland was named one of "100 Resilient Cities", an initiative funded by the Rockefeller Foundation, dedicated to helping cities around the world become more resilient to physical, social and economic challenges. Oakland, as a leader in community-based climate resilience planning, is working to foster community partnerships to increase resilience, as well as social and economic equality. Development of a Resilience Strategy allows Oakland to: review and confirm the City's existing level of resilience; identify high-priority areas and initiatives for improving resilience; and strategically implement high impact projects in partnership with 100 Resilient Cities and other organizations and people committed to Oakland thriving. A *Preliminary Resilience Assessment* was released in March 2016, and is included as Appendix A to this update of the Hazard Mitigation Plan.

3.3 Previously implemented mitigation measures.

There are a number of hazard-reduction measures the City has performed in the years 2010-2015, and in prior years, and other measures the seeks funding to continue as ongoing mitigation.

Oakland City Hall base isolation/retrofit

Oakland's City Hall is a historic landmark which opened in 1914 as the first high-rise government building in the nation. The building underwent seismic renovations, including installation of base isolators, following the 1989 Loma Prieta earthquake to improve the safety of the building and its occupants during future earthquakes.

Single family home seismic retrofit program

The City instituted and funded the Seismic Strengthening Incentive Program for Single Family homeowners, starting in 2008. The City set aside $1 million from its real estate transfer tax for a two-year program. Details of the program included a flat rate permit fee ($250) for those who met the City's retrofitting standards (otherwise, applicants would pay 10% of construction fee for the permit); and up to $5,000 reimbursement for those who met the City's seismic retrofitting standards and completed the retrofitting within 18 months. The City also included retrofitting standards—akin to Plan Set A or a custom designed plan by a licensed structural engineer—in the Oakland Building Code.

At the time Oakland began its Seismic Strengthening Incentive Program, the State of California had not adopted such a code, and Oakland was one of the first to do so. The State has since also adopted retrofitting standards.

During the two years the Single Family seismic retrofit program was funded in Oakland, more than 360 people participated. Owners understood that by performing the seismic retrofit, they were protecting a large investment, and adding the typical cost of a $3,000 to $10,000 for retrofitting at the time they were applying for the mortgage was not onerous. Oakland's funding program ended in 2012, with the closing of the Redevelopment Agency, but the operational and administrative functions are still in place within the City's Housing and Rehabilitation Unit.

As of 2016, the City is seeking grant funding for the "Earthquake Safe Home" program, which would assist 600 homeowners for code-compliant seismic retrofits (see Mitigation strategies Section, 6.4.2). .

Un-reinforced masonry ordinance:

City of Oakland staff continue to actively implement existing State law that requires cities and counties to maintain lists of the addresses of unreinforced masonry buildings and inform private property owners that they own this type of hazardous structure.

Soft-story screening program

In 2009, the Oakland City Council passed Ordinance 12966 C.M.S., which added Chapter 15.26 to the Oakland Municipal Code, entitled "Mandatory Seismic Screening of Certain Multiple Story Residential Buildings Permitted for Construction Prior to the Adoption by the State of California on January 1, 1991, of the 1988 Edition of the Uniform Building Code". The ordinance acknowledged that "soft story" residential buildings pose a substantial risk to the building's residents because this type of building is inherently vulnerable to structural damage and even collapse in a moderate or major earthquake. The ordinance required owners of wood-frame multi-family buildings to complete a short level 1 (low-cost) screening assessment to verify the City's inventory of potential soft story buildings. Through this process, 1,379 building owners were contacted, with 65 percent responding. The City of Oakland is currently in the process of developing a new program that will mandate the retrofit of vulnerable multi-family soft-story buildings.

Wildfire Prevention

The City of Oakland has a designated 'High Fire Severity Zone' within the Oakland Hills which is approximately 16.5 square miles. The Wildfire Prevention Assessment District (WPAD) was created in 2004 and assessed a parcel tax of $65 annually per single family residence for a period of 10 years, concluding in 2014. A City Council appointed Citizen Advisory Board provides oversight on the use of the accrued fund balance. This funding is used specifically for abatement measures and public education within the High Fire Severity zone. Fire Department residential and vacant lot compliance inspections, roadside fuels reduction projects, free residential curbside chipping and debris pile removal, goat grazing on City open spaces and parks, fire prevention and education outreach and a matching grant program of up to $5,000 per home to pay for tree thinning, brush cutting and other fuel reduction measures have been possible because of the WPAD parcel tax funding. The City will seek the renewal of the WPAD by voters during the Local Hazard Mitigation Plan period of 2016-2021.

The *Preliminary Resilience Assessment* notes several of the ongoing fire-prevention actions of the City:

> Oakland's Fire Department proactively mitigates fire risk by deploying 3,000 goats across 1,400 acres of the Oakland Hills between May and September to eat the brush that could otherwise be the flash fuel for wildfires; engages community volunteers in removing flammable brush, which in 2014 resulted in the removal of 250 cubic yards of brush like the invasive French Broom; and regularly inspects the 10,590 acre, 16.5-square-mile Wildfire Prevention Assessment District. Firefighters also educate the public on fire code requirements and best practices for creating defensible space zones around

the exterior of homes. These multi-pronged efforts make Oakland's Fire Department among the most proactive in California and have prevented the spread of wildfire during the most recent intense drought and during dry summer months.[13]

Infrastructure improvements

In January 2012, the City sought continuation of an existing contract with an international engineering firm, enabling them to continue their design, bidding and construction support for the seismic upgrades of seven bridges owned by Caltrans in the City of Oakland, under the Seismic Safety Retrofit Program. Completion of bridge seismic retrofit projects will ultimately improve seismic response of City facilities during earthquakes.

Oil Spill Response Planning

As mentioned earlier, the Oakland Fire Department's Emergency Management Services Division (EMSD) has been the lead agency since July 1995 for development and implementation of the Alameda County Local Oil Spill Contingency Plan (ACLOSP).

The Emergency Management Services Division receives grant funding to make revisions and updates to the local plan, participate in the development of a Memorandum of Understanding (MOU) between the CDFW, Alameda County Operational Area, the City of Oakland and participating cities, and conduct and participate in trainings and exercises.

In 2014, Governor Brown expanded the Office of Spill Prevention and Response (OSPR) program to cover all state surface waters at risk of oil spills from any source, including pipelines, production facilities, and the increasing shipments of oil transported by railroads. This expansion provided critical administrative funding for industry preparedness, spill response, and continued coordination with local, state and federal government along with industry and non-governmental organizations.

In 2015, the City Council approved by Resolution (No. 85531 C.M.S.), a Memorandum of Understanding (MOU) between the City of Oakland Emergency Management Services Division and the Alameda County Operational Area for oil spill planning. The new agreement ensures the City of Oakland will continue to play a prominent role in planning, mitigating, responding to and training for oil spills.

Disaster Recovery Planning

[13] City of Oakland, *Preliminary Resilience Assessment*, 2016, pg. 23

Phases one and two of the City of Oakland Emergency Management Services Division's Disaster Recovery Planning project includes development of a best practices document and localizing the planning products to coordinate and manage long-term recovery after a catastrophic event.

Key objectives:

- Validation of the health, social, economic, natural and environmental Recovery Support Functions (RSFs).
- Build resiliency from the local jurisdiction up to the nation.
- Development of the "Recovery Framework Resources and Tool Kit".

4 Community Profile

4.1 Oakland Economy

Oakland's economy is made up of thousands of private businesses, as well as larger organizations and government agencies. A recent count shows there are approximately 220,000 total employees in Oakland, with approximately 95,000 employees located in downtown[14]. Bringing Oakland businesses back to operation following a disaster, to allow employees to return to work, and using businesses for disaster recovery is part of the current planning of the Emergency Management Services Division, as well as the training objective of the CORE program.

The largest employers in Oakland are health care services or government services, as shown in Table 5. Employees of the City of Oakland are Disaster Services Workers during an emergency.

[14] City of Oakland/ Hausrath Economics Group, "Oakland Transportation and Capital Improvements Impact Fee Nexus Analysis", Table A-2: Oakland Employment and Space Sub Area, 2015", pg. A-4.

Table 5: Largest employers in the City of Oakland

Employer	# Employees
Kaiser Permanente	16,500
Alameda County	tbd
Oakland Unified School District	tbd
City of Oakland	4,400
UCSF Benioff Children's Hospital Oakland	2,400
Alameda Health System	2,300
UPS	2,260
Alta Bates Summit Medical Center, Summit Campus	2,000
Caltrans	tbd
Bay Area Rapid Transit	tbd
East Bay Municipal Utility District	tbd

4.2 Assets (Services & Facilities)

The City of Oakland owns and maintains City facilities which totals over 3,000,000 square feet of space. Facilities include Oakland City Hall and administrative office buildings and parking lots in Frank H. Ogawa Plaza, Oakland Museum of California, 25 recreation centers, the Main Library and 16 neighborhood branch libraries, 25 fire stations, five senior centers, and five municipal swimming pools. A list of City-owned facilities maintained by Oakland Public Works is Appendix F to the 2016-2021 Local Hazard Mitigation Plan.

In 2012, the City prepared an *Infrastructure Report Card for the City of Oakland*. That report shows the City's assets and infrastructure as:

- *Local Streets and Roads:* 806 miles of paved streets
- *Sidewalks, Curb Ramps, Stairs, Paths:* 1,126 miles of sidewalk; 17,978 curb ramp locations; 232 sets of stairs and paths
- *Bridges*: 38 bridges
- *Traffic Signals, Signs and Markings:* 677 traffic signal Intersections; 200,000 signs
- *Street Lighting:* 37,000 streetlights
- *Storm Water:* 400 miles of storm drains; 80+ miles of open creek
- *Wastewater Collection:* 919 miles of sewer pipes; 7 pump stations
- *Public Buildings:* 309 public buildings
- *Parks and Landscaping*: 134 parks and public spaces

- *Trees:* 42,642 street trees, plus trees in parks & medians
- *Fleet and Equipment*: 1,489 vehicles and pieces of equipment

The sizes of some City-owned facilities, such as Fire, Police, Library and Parks buildings are detailed in Table 6.

Table 6. Oakland Public Facilities Inventory

Public Facilities Inventory	Inventory	
Fire		
Essential Service	132,405	bldg. sq. ft.
Civic	18,159	bldg. sq. ft.
Utility	9,092	bldg. sq. ft.
Total Buildings	159,656	bldg. sq. ft.
Land	767,466	land sq. ft.
Police		
Essential Service	237,122	bldg. sq. ft.
Civic	7,001	bldg. sq. ft.
Total Buildings	244,123	bldg. sq. ft.
Land	180,000	land sq. ft.
Library		
Civic Buildings	209,046	bldg. sq. ft.
Land	242,810	land sq. ft.
Parks & Recreation (includes Open Space)		
Civic Buildings	489,933	bldg. sq. ft.
Land (for buildings)	2,155,634	land sq. ft.
Improved Parks	26,355,130	land sq. ft.
Open Space	71,585,152	land sq. ft.
Storm Drain		
Storm Drain Pipes	2,108,859	linear ft.

Source: *Oakland Transportation and Capital Improvements Impact Fee Nexus Analysis,* prepared for City of Oakland by Urban Economics and Hausrath Economics Group, March 10, 2016.

Recent Public facilities which have been either built or renovated in the last five years, include:

- Fire Station #18 (2011)
- 81st Avenue Library (2011)
- Golden Gate Recreation Center (2015)

In the 2010-2015 Local Hazard Mitigation Plan (2010-2015 LHMP), the City reported the specific acreage which was threatened by specific hazards. Updated data for the 2016-2021 LHMP can be found in Chapter 5, the Hazards Analysis.

Oakland is the location for many facilities which other governmental agencies, special districts, hospitals and public transportation agencies own and operate from. These agencies include:

- Oakland Unified School District
- Peralta Colleges, including the campuses of Laney College and Merritt College
- University of California, Office of the President
- Alameda County (Courthouses and offices)
- East Bay Regional Parks District (HQ and parks facilities)
- East Bay Municipal Utility District
- The State of California
- United States Federal Government (Courthouses and offices)
- Oakland Housing Authority
- San Francisco Bay Area Rapid Transit District (BART)
- Alameda- Contra-County Transit District (AC Transit)
- Kaiser Hospital and Emergency Room
- Highland Hospital and Emergency Room
- Alta Bates Summit Medical Center

The City will continue to collaborate with each of these agencies and entities on mitigation efforts.

Populations, such as young children, school – age children, the elderly and sick and recovering patients are considered vulnerable, and are all housed in Oakland, in facilities including private day care, private schools, elder care and assisted living, and medical clinics. Because these facilities are privately operated, and some may move without notifying the City, identifying individual buildings for mitigation efforts can be challenging. The City does maintain a listing of current locations as this is critical information for effective disaster response.

5. Hazard Identification, Analysis, Assessment

As described in Oakland's *Preliminary Resilience Assessment*, natural hazards, which could occur in Oakland, are well known. Earthquakes and wildfire have damaged the City in the past so severely that impacts have made international news. The effects of such shocks are exacerbated by long-term social stresses, such as violent crime and financial and educational disparities. Now, climate change threatens the City, with impacts that fall as both discrete shocks (coastal floods, increased wildfire risks) and continual or periodic stress (rising seas and droughts). As the climate warms, droughts, extreme heat days, and large rainstorms, are expected to occur more frequently and intensely. Oakland's poorer residents, the elderly, and children may be disproportionately vulnerable to these increasing threats.[15]

5.1 Hazard Characterization

Acute shocks are the sudden and sharp events that threaten the wellbeing of the City. A variety of shocks can be expected to occur within Oakland over time. The frequency or intensity of a particular shock can trigger additional shocks (such as a powerful earthquake triggering major infrastructure failure and wildfire), and the scale of impacts will vary widely for an event depending on a variety of factors and conditions. This section of the 2016-2021 Local Hazard Mitigation Plan (2016-2021 LHMP) describes those shocks which are considered high likelihood events in Oakland.

In 2010, the LHMP identified earthquakes, fire and flood as the highest priority hazards to mitigate. These three hazards continue to be the high priority in the 2016-2021 LHMP. Because of the close collaboration with BCDC on the *Adapting to Rising Tides* project and the Oakland study area around the Airport, I-880 and the Oakland Coliseum, mitigating the effects of future flooding from sea-level rise is also a high priority in the 2016-2021 LHMP.

Past Occurrences of Disasters (Natural, and human-caused)

The City of Oakland has experienced a number of different disasters over the last 50 years, including numerous earthquakes, floods, droughts, wildfires, energy shortages, civil disturbances, landslides, and severe storms. Two shocks from 25 years ago are still in the forefront of hazard mitigation planning and disaster preparedness: the 1989 Loma Prieta earthquake and the 1991 Oakland-Berkeley Firestorm (the "Oakland-Berkeley Tunnel Fire").

[15] City of Oakland, *Preliminary Resilience Assessment,* (2016) pg. 20-21

The magnitude 6.9 Loma Prieta earthquake collapsed the double-deck Cypress viaduct, part of the Nimitz Freeway, in West Oakland, killing 42 people. The earthquake damaged unreinforced masonry buildings, and rendered 5,000 residents of single occupancy buildings homeless. However, it was also a springboard to improvement: community activists successfully fought for the reunification of West Oakland. The old highway viaduct was torn down and replaced by Mandela Parkway, a grand boulevard with a landscaped median where the viaduct once stood. The earthquake also inspired the formation of Oakland-based CARD (Collaborating Agencies Responding to Disasters) to address the unmet emergency readiness needs of the public, nonprofit and faith sectors. CARD inspired a nationwide increase in emergency preparation. The last major regional reconstruction project resulting from the Loma Prieta quake was the completion of the new East span of the Oakland-San Francisco Bay Bridge in 2013.

The 1991 Oakland firestorm destroyed 2.5 square miles of mostly residential neighborhoods. Spread by gusting winds through heavily vegetated valleys, the fire destroyed 3,469 homes and apartment units, killed 25 people and injured 150. In total, the firestorm cost $3.9 billion in present-day dollars. The economic losses, in combination with injuries and loss of life make this the worst urban firestorm in American history.

The fire storm highlighted the dangers posed by wildland-urban interface fires in major cities, spurred research into improved prevention and firefighting techniques, and validated the efforts of CARD. Oakland city firefighters now carry more extensive wildland firefighting gear and fire shelters. Fire hydrants now have the industry standard outlets throughout the city, water cisterns and a new Hills fire station were added, and radio communications were improved.

Oakland experienced its worst flooding conditions during the storm of October 1962. In the last 20 years, Oakland has experienced the most severe storm events in the winters of 1997/1998 and 2005/2006.

As shown in Table 7 below, Oakland has experienced declared disasters, but the majority of activations of the Emergency Operations Center are for human-caused incidents.

Table 7. Declared Disasters and Activations of the Emergency Operations Center

Date	Action
31 December 2015	New Year's Eve
19 June 2015	Warriors NBA Parade Celebration
16 June 2015	NBA Finals
5 June 2015	First Friday -Call For Action
19 May 2015	Malcolm X Day -Call For Action
2 May 2015	National Day of Action
1 May 2015	May Day
15 January 2015	MLK Weekend
31 December 2014	New Year's Eve
14 November 2014	Ferguson Grand Jury
22 October 2014	National Day to Stop Police Brutality (Occupy Oakland)
5 September 2014	Oakland-Urban Shield Protest
15 March 2014	International Anti-Police Day
31 December 2013	New Year's Eve
25 October 2013	Occupy Oakland Planned Protests (Anniversary Event)
19 July 2013	Operation Verdict (Zimmerman)
2 July 2013	Occupy Oakland Planned Protests
1-2 May 2013	May Day-March for Dignity and Resistance
31 December 2012	New Year's Eve
26-27 October 2012	Occupy Oakland Planned Protests (Anniversary Event)
12 July 2012	Presidential Visit (POTUS)

Date	Action
1-2 May 2012	May Day-March for Dignity and Resistance
10 April 2012	Occupy Oakland Planned Protests (6 mo. Anniversary Event)
28-29 January 2012	Occupy Oakland
7, 14, 21 January 2012	Anti-Police Protests
September, October, November and December 2011	Occupy Oakland
12 June 2011	Mehserle Release Protest March/Rally
11 March 2011	Tsunami Warning Result of 8.9 Earthquake in Hondshu, Japan
June 30-July 1; July 6-July 8; December 3, 2010	Mehserle Trial
27 February 2010	Chile Earthquake/Tsunami (State EOC activated; Alameda County EOC monitored situation
January 2009	Oscar Grant shooting/Mehserle verdict (Civil Disturbance)
January 2008	Winter Storms (City of Oakland declared emergency)
9 November 2007	Cosco Busan Oil Spill; 53,000 gallons of oil spilled into SF Bay
29 April 2007	I-80 Freeway collapse; tanker truck exploded, destroying section of freeway.
2006	Spring Storms (Alameda County); flooding, landslides and mudslides
2005-2006	Winter Storms (Alameda County); flooding, landslides and mudslides

Source: City of Oakland Emergency Management Services Division, 2016

5.1.1 Earthquake

Most, though not all, of the geologic hazards that present the threat of devastation to life and property are the direct or indirect result of ground movement due to earthquakes. The primary, or direct, earthquake hazards are surface-fault rupture and ground shaking. Secondary hazards, associated with ground shaking, include several forms of ground failure and inundation. Ground failure is the permanent deformation of the ground due to its loss of strength or failure of the underlying materials during earthquake shaking, and includes liquefaction, landslides, mudslides, differential settlement and subsidence. The likelihood of occurrence of these secondary earthquake effects (with the exception of inundation) is generally high. The main geologic hazards include:

- **Fault rupture or displacement:** a sudden shifting of the ground along the trace of an earthquake fault; usually, but not always, occurs at the time of an earthquake, and is associated with stronger quakes.

- **Ground shaking:** movement of the ground caused by the passage of seismic waves through the earth's outer crust during an earthquake; it typically is strongest near the earthquake fault. Ground shaking is the most noticeable phenomenon of seismic activity and the one people associate most closely with earthquakes; it also represents the major hazard from an earthquake, in the form of damage to structures. The intensity of ground shaking at a particular site is affected by the characteristics of the earthquake, distance from the fault, and the characteristics of the underlying soil.

- **Liquefaction:** the rapid transformation of sediment from a solid state into a fluid state, which causes the soil to lose cohesiveness and become incapable of carrying significant loads; it causes sediment to behave as quicksand, and results in structures settling, tipping or—in the case of underground tanks, for example—rising buoyantly. Its potential to occur is a function of the intensity of the ground shaking and the underlying geologic conditions. In general, liquefaction is less destructive than ground shaking; however, in certain areas, it has occasionally resulted in substantial damage to property from the failure of structural foundations.

- **Landsliding:** the rapid down-slope movement of soil, rock and rock debris. Most slides are natural occurrences, though they can be triggered by improper construction activities. The main causes of landslides are earthquake-induced ground shaking, heavy rains and poorly engineered grading and drainage projects. (Improper grading may alter natural drainage patterns and allow water to collect and loosen soils). Factors that determine the

extent and severity of a landslide include the steepness of slope, the presence of weak or poorly consolidated soils, the soil's water-content level and the existing grading and drainage patterns.

Earthquakes are the most pervasive safety hazard in Oakland. Unlike fires or floods—the paths of which can, to some extent, be measured, predicted and contained—earthquakes are, at present, impossible to predict or contain. Although it is not possible to eliminate all the risks associated with earthquakes, it is the intent of the safety element to use available tools, such as geotechnical studies, appropriate land-use decisions and adequate building codes, to reduce the risks. Because earthquakes rarely destroy an entire neighborhood or even city block, the prohibition of construction in a particular area—with the exception of earthquake fault zones—is a less-effective mitigation measure than improved building design.

Local seismology. The tectonic plates that make up the earth's crust are in continual movement. This movement causes strain to build at the plate boundaries, or faults. Strain accumulates until the plates can no longer sustain it, at which point there is an energy release. This energy release expresses itself as tectonic creep, fault ruptures, ground shaking and, more generally, earthquakes. Once the release occurs, the process of gradual strain build-up begins anew. Major earthquakes result when collisions of the plates occur at shallow depths or involve larger plates or longer faults, and usually have their epicenters on or near a fault. Earthquakes are common in California because the state's coastline is at the boundary of two tectonic plates. The coastline is part of the Circum-Pacific seismic belt, which extends the length of the western edge of the Western hemisphere, and is where over 80 percent of the world's earthquakes occur.

The *Safety Element* of the Oakland General Plan describes the following risks to Oakland from earthquakes:

> The City of Oakland lies within the San Andreas fault system, the largest one in California and the one with potential for the strongest earthquakes. More specifically, the city straddles the Hayward fault, a "branch" fault of the larger system. The Hayward fault runs along the southwestern base of the East Bay hills and parallels State Highway 13, making it an approximate physical boundary between the low-lying, urbanized portions of Oakland to the west and the less developed, upland areas to the east. The fault's two segments, each approximately 30 miles long, extend from the Warm Springs district of Fremont to Oakland, and from Oakland to Point Pinole. The Hayward fault is believed to accumulate strain at one of the highest rates in the Bay Area, suggesting that it is one of the faults in the region most likely to generate a large earthquake. In fact, the fault is one of the most hazardous in the world because of its high "slip rate;"

> its demonstrated ability to generate large, surface-rupturing earthquakes; and, most importantly, its location through a heavily urbanized area. The last major quake on the Hayward fault occurred in 1868. A far less-active fault, the Calaveras fault, runs down the San Ramon Valley, parallel to and approximately ten miles east of the Oakland hills crest.[16]

In 2016, the City issued its *Preliminary Resilience Assessment*, which looked at the latest data for earthquake hazards in Oakland. The *Assessment* found:

> In Northern California, seven major fault systems are considered capable of rupturing in earthquakes of magnitude 6.7 or larger (see Figure 2). Many of these earthquakes would produce strong ground shaking and damage in Oakland. The Hayward Fault, lies at the base of the hills east of the city, has a 31% chance of producing such an earthquake within the next 30 years. Such an earthquake would cause significant damage; in Oakland, shaking from the Hayward fault could be 3-10 times stronger than the shaking experienced in the 1989 Loma Prieta earthquake. Soft story apartment buildings are particularly at risk, and over 22,000 apartment units are in such buildings in Oakland[17].

Table 8. Earthquake-related declared disasters in the Bay Area since 1950

Disaster	State Proclamation	Federal Declaration	Counties Declared	Damage
M6.0 South Napa earthquake	August 24, 2014	September 11, 2014	Napa and Solano Counties	$362 million - $1 billion in damage
Tsunami resulting from M8.9 Honshu, Japan earthquake	March 11, 1011	April 18, 2011	Del Norte, Monterey, Santa Cruz	$39 million in damage
M5.2 Napa earthquake	September 6, 2000	September 14, 2000	Napa County	$15-70 million in estimated damage
M7.1 Loma Prieta earthquake	October 18, 1989	October 18, 1989	Alameda, Monterey, San Benito, San Mateo, Santa Clara, Santa Cruz, San Francisco, Contra Costa, Marin, Solano	$5.9 billion in damage, 23,408 homes damaged, 3,530 businesses damaged, 1,018 homes destroyed, 366 businesses destroyed

[16] City of Oakland, *Safety Element* of the Oakland General Plan, (2004), pg. #26-27

[17] City of Oakland, *Preliminary Resilience Assessment*, (2016), pg. 21

M6.2 Morgan Hill earthquake		April 25, 1984	Santa Clara County	$7.265 million in damage to public, business, and private sectors
Tsunami warning resulting from Good Friday earthquake in Alaska	September 15, 1964	Not declared	Marin County	No damage

Source: State of California *Multi-Hazard Mitigation Plan*, Appendix M; Governor's Office of Emergency Services

Probability of Future Earthquakes

ABAG's "Bay Area Risk Landscape," discusses the probability of future earthquakes in the Bay Area[18]:

> A powerfully damaging earthquake similar to the 1906 earthquake or 1989 Loma Prieta earthquake is rare but likely to occur in the next 30 years. The United States Geological Survey (USGS) estimates there is a 72% chance of one or more magnitude 6.7 or larger earthquakes in the next 30 years on one of the Bay Area's faults.[19] Smaller magnitude earthquakes are more likely to occur, potentially producing significant local damage, as experienced in the 2014 South Napa earthquake.
>
> Scientists continually study which Bay Area faults are more likely to produce large earthquakes, and how often. In March 2015, the USGS released an update to its 2008 earthquake probabilities for California faults. The Uniform California Earthquake Rupture Forecast 3 (UCERF3) provides detailed assessment on the likelihood of each fault segment producing M6.7, M7.0 and M8.0 and greater earthquakes. These probabilities are based on data such as fault length; how much energy the faults release annually through fault slip; and, known historical return periods for the fault. Table 9 summarizes the probabilities of future earthquakes in California, and each fault is shown on a map in Figure 2.

[18] Association of Bay Area Governments, "Risk Landscapes", 2016, pg. 11.
[19] Field, E.H., et al, (2013)

Table 9. Likelihood of a M6.7 or greater earthquake over the next 30 years.

Earthquake Fault	Probability[1]
San Andreas (Mendocino Coast to San Benito County)	33%
Hayward	28%
Calaveras	24%
Hunting Creek, Berryessa, Green Valley, Concord	24%
Maacama	23%
Rodgers Creek	15%
San Gregorio	5%
Greenville	6%
Mt. Diablo	3%
West Napa	2%

[1]*Source: Uniform Earthquake Rupture Forecast, Version 3 (2014)*

Source: ABAG

Figure 2. Regional Earthquake Faults

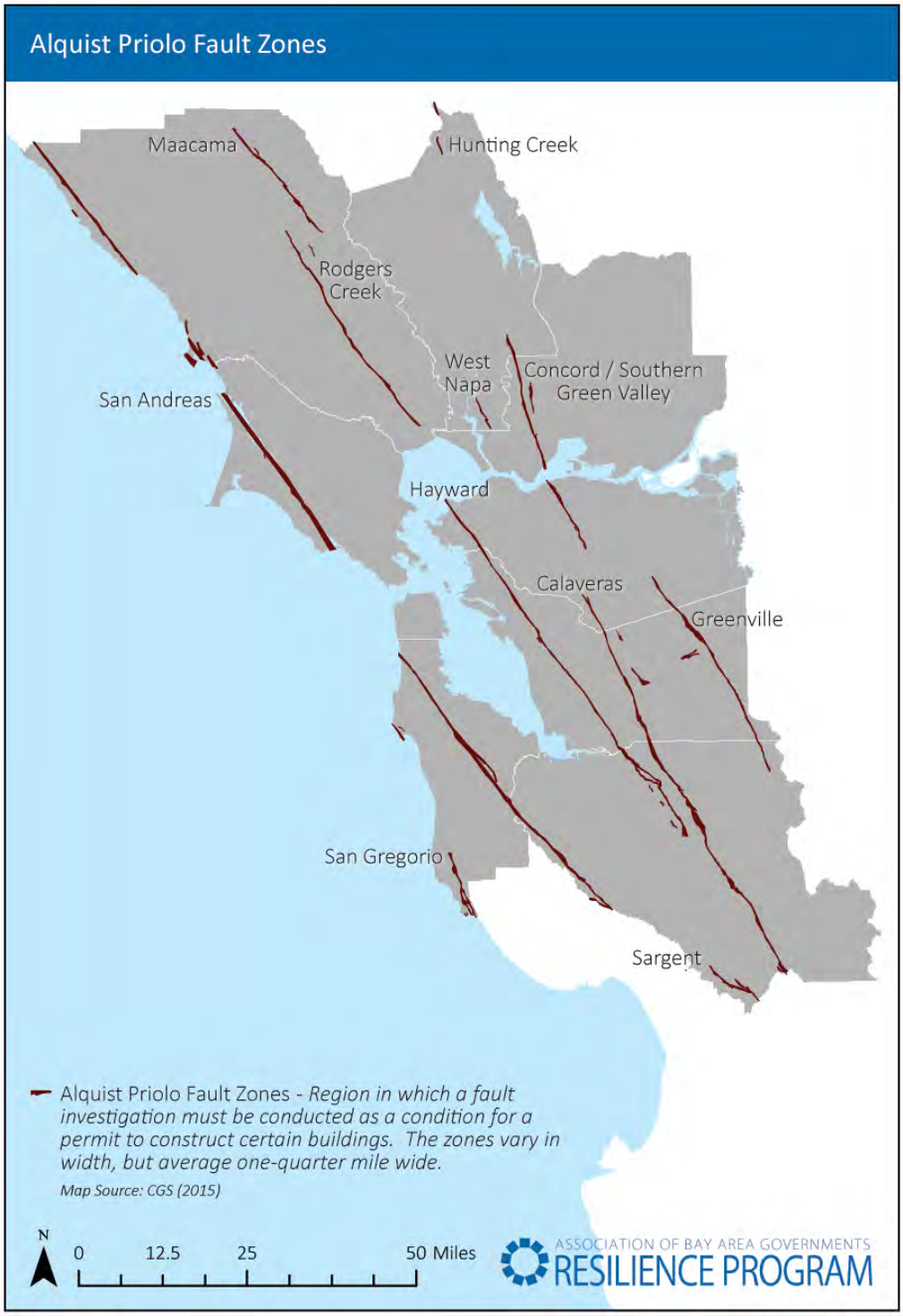


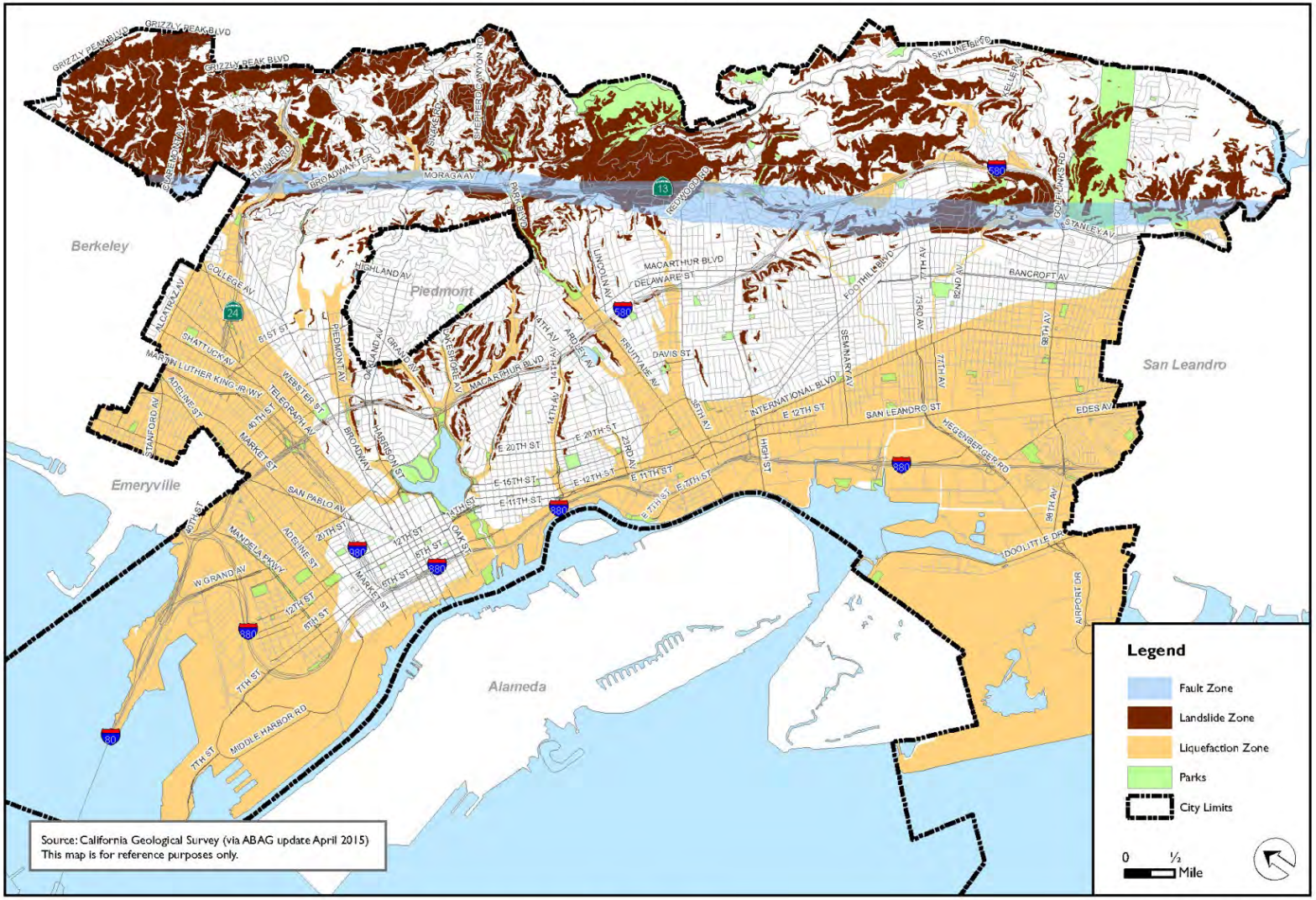
Figure 3 shows several earthquake hazards in Oakland on a single map: the Hayward Fault zone ("Alquist-Priolo" zone), liquefaction and landslide susceptibility in Oakland. 1,850 acres of Oakland are in the Alquist-Priolo Earthquake Fault Study Zone; most of the City's urban acres (34,600) are in the highest two categories of shaking potential, in large part because the Hayward fault runs through to the eastern portion of the City.

Post-seismic slip ("after-slip")

Following an earthquake, sections of the fault can continue to slip, for up to a year after the initial shaking. "Post-seismic slip" or "after-slip" can be difficult to manage, according to ABAG, "as infrastructure may need to be continually re-straightened, complicating restoration of systems that cross the fault."[20] The City could also, under this scenario, issue building permits to reconstruct earthquake-damaged buildings which then are further damaged following additional quakes.

[20] Association of Bay Area Governments, *Cascading Failures: Earthquake Threats to Transportation and Utilities;* (2014); pg. 8

Figure 3. Seismic Hazard Planning Zones



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March 2016

CITY OF OAKLAND

Local Hazard Mitigation Plan 2016

Seismic Hazards Planning Zones

Modified Mercalli Intensity (MMI) scale

The U.S. Geological Survey describes the Modified Mercalli Intensity scale:

> The effect of an earthquake on the Earth's surface is called the intensity. The intensity scale consists of a series of certain key responses such as people awakening, movement of furniture, damage to chimneys, and finally - total destruction. Although numerous intensity scales have been developed over the last several hundred years to evaluate the effects of earthquakes, the one currently used in the United States is the Modified Mercalli (MM) Intensity Scale. This scale is composed of increasing levels of intensity that range from imperceptible shaking to catastrophic destruction. It does not have a mathematical basis; instead it is an arbitrary ranking based on observed effects.
>
> The Modified Mercalli Intensity value assigned to a specific site after an earthquake has a more meaningful measure of severity to the nonscientist than the magnitude because intensity refers to the effects actually experienced at that place.
>
> The lower numbers of the intensity scale generally deal with the manner in which the earthquake is felt by people. The higher numbers of the scale are based on observed structural damage. Structural engineers usually contribute information for assigning intensity values of VIII or above.[21]

At high intensities (MMI ≥ 6), earthquake shaking damages buildings. The severity of the damage depends on the building type, the age of the building, and the quality of the construction. Masonry and non-ductile concrete buildings can be more severely damaged than wood-frame or engineered buildings. Buildings built to older building codes can be more severely damaged than recently constructed buildings using newer codes.[22]

The U.S. Geological Survey modeled the intensity which could come from a magnitude 7.3 earthquake on the Hayward Fault. Figure 4 shows the different levels of intensity anticipated across the Bay Area from such a quake. The map shows that the most intense shaking will be felt along the East Bay, including Oakland, from Pinole in the north, to Milpitas in the south. The Figure 4 shows much of Oakland in the orange area, suggesting that in this scenario of a 7.3 Hayward fault earthquake, Oakland will have violent shaking, associated with MMI Level 9. **Table 10** describes the different effects of the different MMI intensity levels.

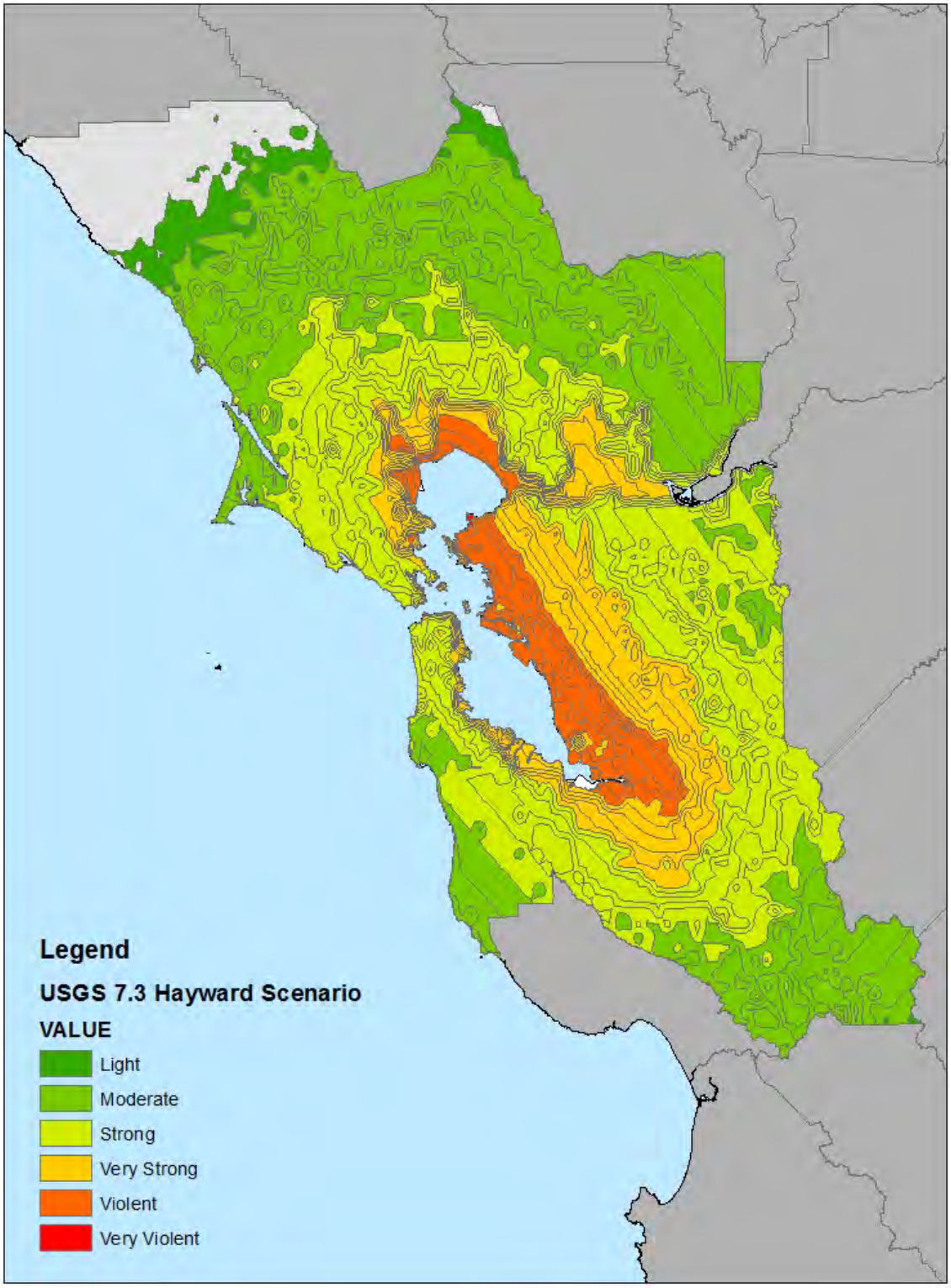
[21] U.S. Geological Survey, http://earthquake.usgs.gov/learn/topics/mercalli.php
[22] See http://resilience.abag.ca.gov/shaking/mmipopup/

Table 10. MMI Intensity Table

Intensity	Building Contents	Masonry Buildings	Multi-Family Wood-Frame Buildings	1&2 Story Wood-Frame Buildings
MMI 8	Nearly everything thrown down from shelves, cabinets, and walls. Furniture overturned.	Poorly constructed buildings suffer partial or full collapse. Some well-constructed buildings are damaged. Unreinforced walls fall.	Soft-story buildings are displaced out of plumb and partially collapse. Loose partition walls are damaged and may fail. Some pipes break.	Houses shift if they are not bolted to the foundation, or are displaced and partially collapse if cripple walls are not braced. Structural elements such as beams, joists, and foundations are damaged. Some pipes break.
MMI 9	Only very-well anchored contents remain in place.	Poorly constructed buildings collapse. Well-constructed buildings are heavily damaged. Retrofitted buildings damaged.	Soft-story buildings partially or completely collapse. Some well-constructed buildings are damaged.	Poorly constructed buildings are heavily damaged, some partially collapse. Some well-constructed buildings are damaged.
MMI 10	Only very well anchored contents remain in place.	Retrofitted buildings are heavily damaged, and some partially collapse.	Many well-constructed buildings are damaged.	Well-constructed buildings are damaged.

Source: ABAG (2013). Modified Mercalli Intensity Scale; http://resilience.abag.ca.gov/shaking/mmipopup/

Figure 4. Modified Mercalli Intensity for Magnitude 7.3 Scenario Earthquake on the Hayward fault



Source: USGS

Table 11 describes some of City-owned and major utility operators in the City of Oakland, which are subject to earthquake vulnerability.

Table 11. Infrastructure and Utilities subject to earthquake vulnerability

Owner/Manager	Infrastructure
City of Oakland	• City Streets • Storm drains • Sanitary sewer collection system connected to EBMUD wastewater treatment system • Creeks, open channels and creek culverts in right-of-way and on City property • Street Lights and traffic signals, and conduits supplied from the PG&E system • Municipal Services Center (Corporation Yard) and other essential City facilities
EBMUD	• Potable and fire suppression water supply system consisting of pipelines, pumping plants, flow/pressure control facilities, and storage tanks and reservoirs owned by the East Bay Municipal Utility District • Sanitary sewer transmission pipeline (EBMUD wastewater interceptor) and pumping station
PG&E	• Electricity distribution system, including substations, mains, laterals and meters, owned by the Pacific Gas and Electric Company • Natural gas distribution system, including main pipelines, lateral pipelines and meters
AT&T, Comcast and other providers	• Telecommunications aerial and underground conduits; fiber optic cabling
Kinder Morgan Corporation	• Fuel Pipelines

<u>Earthquake-induced Fires</u>

Earthquakes can start fires, which causes damage in addition to the shaking and collapsing that comes with a major disaster. Fires can start from damaged gas connections, appliances with pilot lights, or damaged electrical equipment. For example, immediately after Loma Prieta, there were 35 fires in San Francisco; the 1906 earthquake famously ignited fires which burned over 3.5 miles of the City. ABAG recently studied the risks from earthquake-induced fires in the Bay Area and found:

Fire following earthquake is especially challenging because there are often multiple ignitions at once (overwhelming fire crews), typical water supply for fighting fire may be reduced or unavailable, and maneuvering fire crews to the ignition can be difficult if streets are blocked by road damage or by debris that blocks the streets. Fire following earthquake is an issue that could impact any Bay Area community that experiences an earthquake – both urban and rural. The problem is heightened for urban environments, where many simultaneous ignitions can lead to a firestorm, and single fires can more quickly and easily move structure to structure.

A few characteristics can make a specific community more vulnerable to fire following earthquake. If there is a higher likelihood of building damage, there is also a higher likelihood that an ignition occurs. If a building collapses there is a high risk for gas or electrical lines to start "seed" fires that then impact undamaged neighboring structures. Areas of liquefaction are more vulnerable to fire because of the greater potential for underground gas mains to break due to the ground displacements, and because the water lines in the area may also be damaged – preventing the ability to fight a fire with regular water resources. Areas that are largely wood frame or shingle roof may be less prone to earthquake damage, but are a heightened risk for the spread of fires. There is added concern in areas with hazardous materials with the potential for explosion, or with the potential to produce toxic smoke. Industrial facilities and labs are a high concern because of the hazardous and flammable materials they store at their facilities.[23]

[23] Association of Bay Area Governments, *Bay Area Risk Landscape* (draft, 2016), pg. 34

5.1.2 Liquefaction

During an earthquake, some ground can behave like a liquid—sinking or spreading—which can cause pipes and pipelines to break, and damage to building foundations, among other effects.

The *Safety Element* of the Oakland General Plan describes the hazard of earthquake-induced liquefaction as:

> The rapid transformation of sediment from a solid state into a fluid state, which causes the soil to lose cohesiveness and become incapable of carrying significant loads; it causes sediment to behave as quicksand, and results in structures settling, tipping or—in the case of underground tanks, for example—rising buoyantly. Its potential to occur is a function of the intensity of the ground shaking and the underlying geologic conditions. In general, liquefaction is less destructive than ground shaking; however, in certain areas, it has occasionally resulted in substantial damage to property from the failure of structural foundations.[24]

According to ABAG[25], liquefaction only occurs under certain conditions:

Loose Soils	The soils must be loose, such as uncompacted or unconsolidated sand and silt without much clay. This happens most often in the Bay Area along the Bay shoreline, near creeks or other waterways, on dry creek beds, and in areas of man-made fill, such as the Marina District in San Francisco or parts of Alameda.
Soggy Soils	The sand and silt must be soggy and saturated with water due to a high water table.
Ground Shaking	The ground must be shaken long and hard enough by the earthquake to trigger liquefaction.

Liquefaction may not necessarily occur even if all three conditions are present. Additionally, if liquefaction does occur, the ground may not move enough to have significant impact on the built environment. Unless areas of liquefaction susceptibility are subject to significant ground shaking, they are not likely to liquefy. Liquefaction hazard maps express where the ground is both susceptible to liquefaction, and where the ground is likely to be shaken long and intensely in an earthquake.

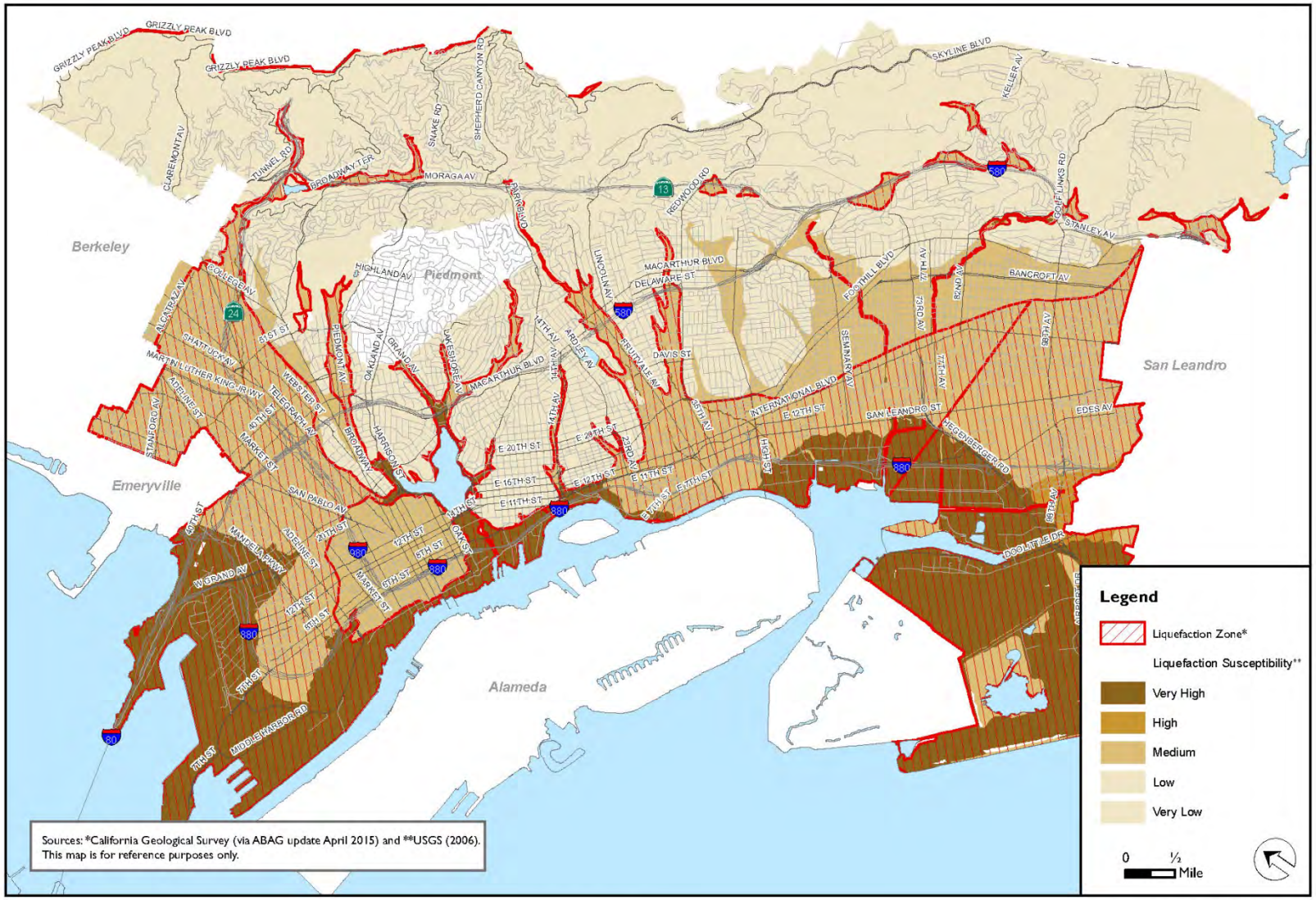
Using ABAG mapping from 2015, which combine liquefaction susceptibility with California Geologic Survey data, to identify areas where there is a significant hazard of liquefaction, Figure

[24] City of Oakland, *Safety Element*, Oakland General Plan, 2004, page 24

[25] Association of Bay Area Governments, *Bay Area Risk Landscape*, (draft 2016), pg. 19.

5 shows the potential for different areas of Oakland to experience liquefaction during a major earthquake. During an earthquake scenario, areas nearest the San Leandro Bay waterfront have a high susceptibility to liquefaction during an earthquake. In Oakland, 17,400 acres are in areas of moderate, high, or very high liquefaction susceptibility mapped by the U.S. Geological Survey; while 14,600 acres are in the California Geological Survey's Seismic Hazard Mapping Zone, as shown in Figure 5.

Figure 5. Liquefaction.



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Local Hazard Mitigation Plan 2016

Liquefaction

5.1.3 Landslides

According to the U.S. Geological Survey:

> Landslides can be a wide range of ground movement, such as rock falls, deep failure of slopes, and shallow debris flows. Although gravity acting on an over-steepened slope is the primary reason for a landslide, there are other contributing factors:
>
> - erosion by rivers, glaciers, or ocean waves create over-steepened slopes
> - rock and soil slopes are weakened through saturation by snowmelt or heavy rains
> - earthquakes create stresses that make weak slopes fail
> - earthquakes of magnitude 4.0 and greater have been known to trigger landslides
> - excess weight from accumulation of rain or snow, stockpiling of rock or ore, from waste piles, or from man-made structures may stress weak slopes to failure and other structures.[26]

Landslides can occur due to earthquakes ("earthquake-triggered landslides") or during heavy rains ("weather induced landslides"). Weather induced landslides are most common in Oakland, as well as from the modification of creek channels, or improper grading and development activity. Over twenty significant landslides have occurred in Oakland during the last seven decades, generally within a mile-wide band along the Hayward Fault. Clusters of slide activity exist in the Eastmont Ridge around King Estates, in Redwood Heights, in Shepherd and Snake canyons, and in Dimond Canyon and further downstream on Sausal Creek. Landslides have cracked foundations, structures and retaining walls, and have damaged roads, sidewalks and trails; also, debris and mud from landslides have blocked roads, clogged drainage channels and dammed streams and creeks.

The Oakland *Safety Element* includes the following description of landslide hazards in Oakland:

> Most sloping land has some landslide potential. The risks tend to be greatest where a number of contributing factors are present, including slopes over 15 percent, weak, unconsolidated or shallow soils, water saturation, a history of landslides, active earthquake faults, extensive grading and vegetation removal (from fires or development activity). The slide itself is usually triggered by an earthquake, heavy rain or misdirected runoff. Landslides are a relatively common hazard in the East Bay hills, especially during and soon after heavy rainstorms, when the ground is saturated. Mudslides—fast, shallow movements of water-saturated earth that flow as muddy slurries, typically following water courses—are the most common type of landslides in Oakland; they are also known as debris flows or soil slumps.

[26] From website, http://landslides.usgs.gov/learn/ls101.php

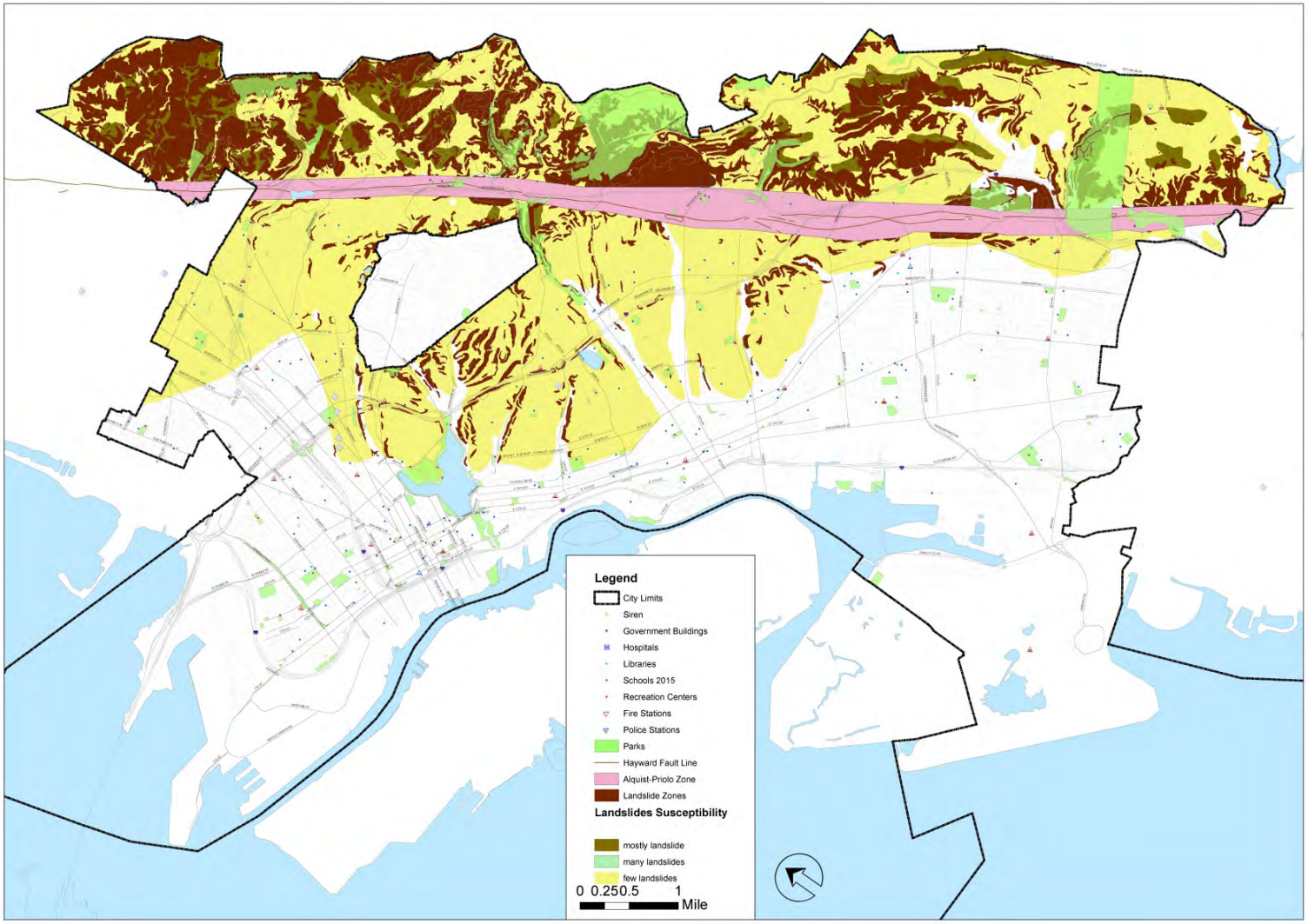
More than half of Oakland's area, including most of its vacant land, consists of gently sloping or hilly land. Moreover, approximately one-quarter of the city, including all of the Oakland Hills, contains slopes greater than 15 percent. Slopes of 15-30 percent are considered developable but are likely to require site modification or special grading or foundation design to reduce the potential for slope instability. Slopes of that degree are found in Oakland throughout the southern Oakland Hills, in the roughly triangular area formed by I-580 and State Highways 13 and 24, in the vicinity of Mills College and Eastmont, and on some of the hills around Lake Merritt. Development on slopes exceeding 30 percent is considered difficult and potentially hazardous. Such slopes are concentrated throughout the Oakland Hills (especially in the northern hills) and within two miles south of Highway 13. In these areas there exist isolated slopes as steep as 75 percent.

The landslide hazard in the Oakland Hills is exacerbated by the fact that the area is crossed by the Hayward fault. During a major earthquake on that fault, landsliding, widespread failure of steep slopes and the collapse of natural stream banks could be expected in the hills in response to strong ground movements anticipated to occur in the area. Landslides could block roads, which would hamper evacuation, firefighting and relief operations within the area. Nevertheless, landslides are not expected to produce a large-scale disaster; rather, they present a persistent risk of damage to buildings and infrastructure in areas of potentially unstable slopes. Landslides would affect only scattered structures located in the direct path, but could result in some loss of life, from the collapse of structures and tumbling earth, rocks and debris.

Although the landslide hazard cannot be completely eliminated, damage can be minimized by following proper development practices or by steering development away from areas of unstable slopes. Sound practices and techniques include drainage provisions to avoid oversaturation of the soil, setbacks between structures and filled slope areas, retaining walls, and the use of detailed soil investigations. While efforts have been taken by the city through the development process to minimize landslide potential, most hillside development predates the imposition of grading and related requirements. For this reason, older hillside homes and subdivisions are the most susceptible to damage from landslides.

Figure 6 shows the susceptibility of areas to earthquake landslides in Oakland, primarily in the Oakland Hills, from a magnitude 7.1 Hayward Fault Earthquake. The map shows City facilities, such as police and fire stations, and shows areas where "mostly landslides" are predicted by the US Geological Survey. There are approximately 2,000 acres in the Oakland Hills where "mostly landslides" are predicted by the data. Separately, the California Geological Survey identifies 4,700 acres of Oakland is in a "Seismic Hazard Mapping Zone. "

Figure 6. Landslides (Landslide Susceptibility Values)



5.1.4 Floods

The *Safety Element* of the Oakland General Plan describes the flood hazards which Oakland faces[27]:

> Flooding is the inundation of normally dry land as a result of a rise in the level of surface waters or the rapid accumulation of storm-water runoff; it becomes a hazard when the flow of water has the potential to damage property and threaten human life or health. Flood risks are greatest, and flood hazards most severe, in winter, when water bodies are usually full and soils saturated. Flooding is primarily a natural process and, therefore, difficult to prevent. However, land-use and development decisions have a significant effect on the frequency and severity of floods; in general, urbanization increases the risk of flooding by increasing stormwater runoff and, to a lesser extent, erosion. Flooding can take many forms—river floods, storm-related flash floods and coastal floods, for example—and be caused by many reasons, including heavy rains, melting snow, inadequate drainage systems, hurricanes, and failed dams and levees.
>
> **Relationship to other hazards:** While flooding is most often caused by excess runoff from heavy rainfall or snowmelt, it can also result from the interaction with other natural hazards:
>
> - Earthquakes can create floods indirectly by generating tsunamis and seiches; damaging flood-control equipment; and causing dams, levees and channel banks to fail.
> - Landslides—themselves often triggered by earthquakes—can block water courses, resulting in upstream flooding. Also, large masses of earth that break loose and slide into a reservoir can cause catastrophic flooding by making the reservoir overflow.
> - Subsidence—tectonic-related or caused by the pumping of groundwater, oil or gas—increases the risk of flooding by lowering ground levels.
> - Fires strip away vegetation, which makes hillsides contribute to flooding by reducing their ability to absorb water.
>
> **Specific flood hazards:** As suggested above, flooding can occur for many reasons. The *Safety Element* of the Oakland General Plan examines flooding hazards resulting from the following five causes (with a brief description of each):

[27] City of Oakland, *Safety Element*, Oakland General Plan (2004), pg. 97-99

- Excessive stormwater runoff from heavy rain. When rainfall exceeds the absorption rate of the soil or the water-storage capacity of the watershed, the excess rainfall flows downstream. This is the flood hazard with the greatest potential to affect Oakland. While it is impossible to prevent excess stormwater runoff, proper engineering and land-use planning can be used to minimize the potential adverse effects on areas subject to flooding and reduce off-site flooding and erosion.

- Tsunamis. Often incorrectly referred to as tidal waves, tsunamis are waves caused by an underwater earthquake, landslide or volcanic eruption. Because San Francisco Bay is a mostly enclosed body of water, severe damage from tsunamis in Oakland is unlikely. However, this hazard needs to be considered not only to meet state mandates but also because of the potential for wave damage along the waterfront.

- Seiches. A poorly understood phenomenon, seiches (pronounced "SIGH-chaise") are waves in an enclosed or semi-enclosed body of water such as a lake, reservoir or harbor. (They are analogous to the sloshing of water in a bucket when shaken.) Seiches are usually caused by unusual tides, winds or currents but could also be triggered by earthquake-induced ground motion. Seiche waves, while rare, can have devastating effects on nearby people and property. The occurrence of devastating seiches in Oakland is highly unlikely but, again, needs to be considered.

- Failure of dams and other water-holding structures. This is an unlikely hazard but needs to be considered due to the potential for large-scale damage. Dam failures are one of the greatest natural threats to life and property because of the large volumes of water, numbers of people and area of land typically involved.

National Flood Insurance Program/ Repetitive Loss Properties

Standard floodplain management analyzes a flood with a one-percent probability of occurring in any given year, known as the 100-year flood (or "base flood."). FEMA prepares 100-year flood maps, called the Flood Insurance Rate Maps (FIRMs), which indicate floodplain boundaries and are the common reference when describing flood hazards. These maps are used to support the National Flood Insurance Program (NFIP), which Oakland has participated in, since 1970[28]. The City's most recent action which continues the City's compliance with the NFIP was in 2009[29]. FIRMs also show floodplain boundaries for the 500-year flood, which is a flood having a .2% chance of occurring in any given year. Oakland's 100 year and 500 year floodplains are shown in Figure 7.

[28] Oakland has been, according to FEMA, a "full status" member in the program, since 1982.
[29] See Ordinance 12960, adopted July 21, 2009.

FEMA defines a "repetitive loss property" as a "property for which two or more National Flood Insurance Program losses of at least $1,000 each have been paid within any ten year period since 1978." As of November, 2011, there are six repetitive loss properties in the City of Oakland, according to FEMA[30]. Of the six properties, one is inside the special flood hazard area, and all properties are residential.[31] By comparison, in 2004, the City had five repetitive loss properties that were outside the flood plain. FEMA reported in 2012 that there were 310 flood insurance policies in Oakland, representing a total coverage of $86 million. There have been 78 paid flood insurance losses in Oakland—for a total of $266,564.

Comparison of Preliminary Flood Insurance Rate Maps to 2009 Flood Maps

FEMA is performing detailed coastal engineering analyses and mapping of the San Francisco Bay shoreline within the nine San Francisco Bay Area counties. The analysis and mapping will revise and update the flood and wave data for the Alameda County Flood Insurance Study report and Flood Insurance Rate Map panels along the San Francisco Bay shoreline. FEMA issued 2015 Preliminary FIRM maps, which the City compared against the existing 100-year flood plain maps. As shown in Figures 7.1 and 7.2, the areas with the most change are the inclusion of the North Field of the Oakland International Airport (Port of Oakland), as well as smaller areas of land around the Lake Merritt Channel. The differences between the two FIRM maps are shown in Table 12 below.

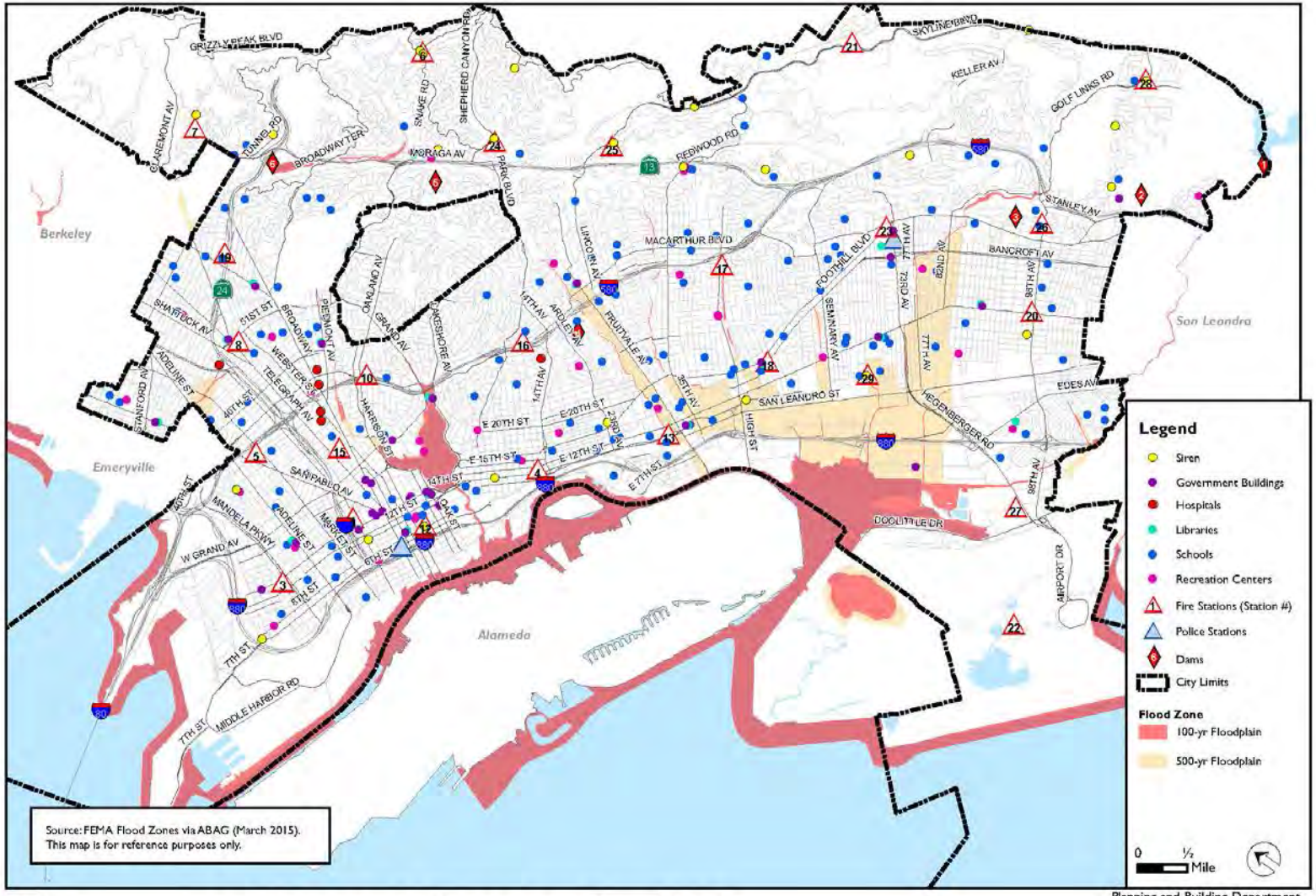
Table 12. Difference in acreage between 2009 and 2015 FIRM maps

Flood Plain	2009 (# acres)	Preliminary 2015 (# acres)
100-year	578	1,322
500-year	1,865	1,840

[30] Phone discussion with Sarah Owen, of the National Flood Insurance Program. .

[31] According FEMA, payments to these six properties from the Flood Insurance Program total $51,000.

Figure 7. 100 and 500 year floodplain with City facilities



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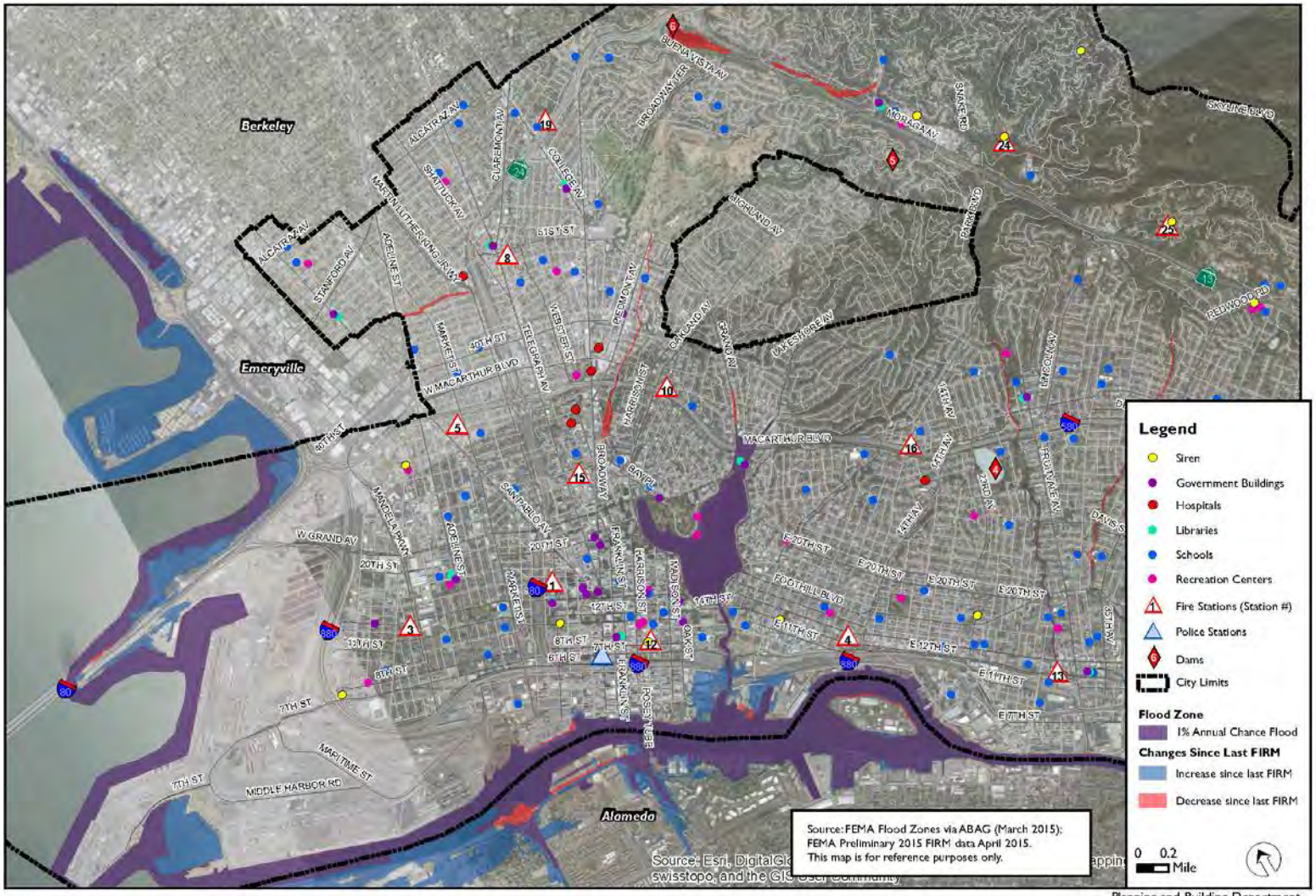
FEMA Flood Zones & Critical Facilities

Figure 7.1 Preliminary changes to 100-year Flood Plain, West Oakland detail



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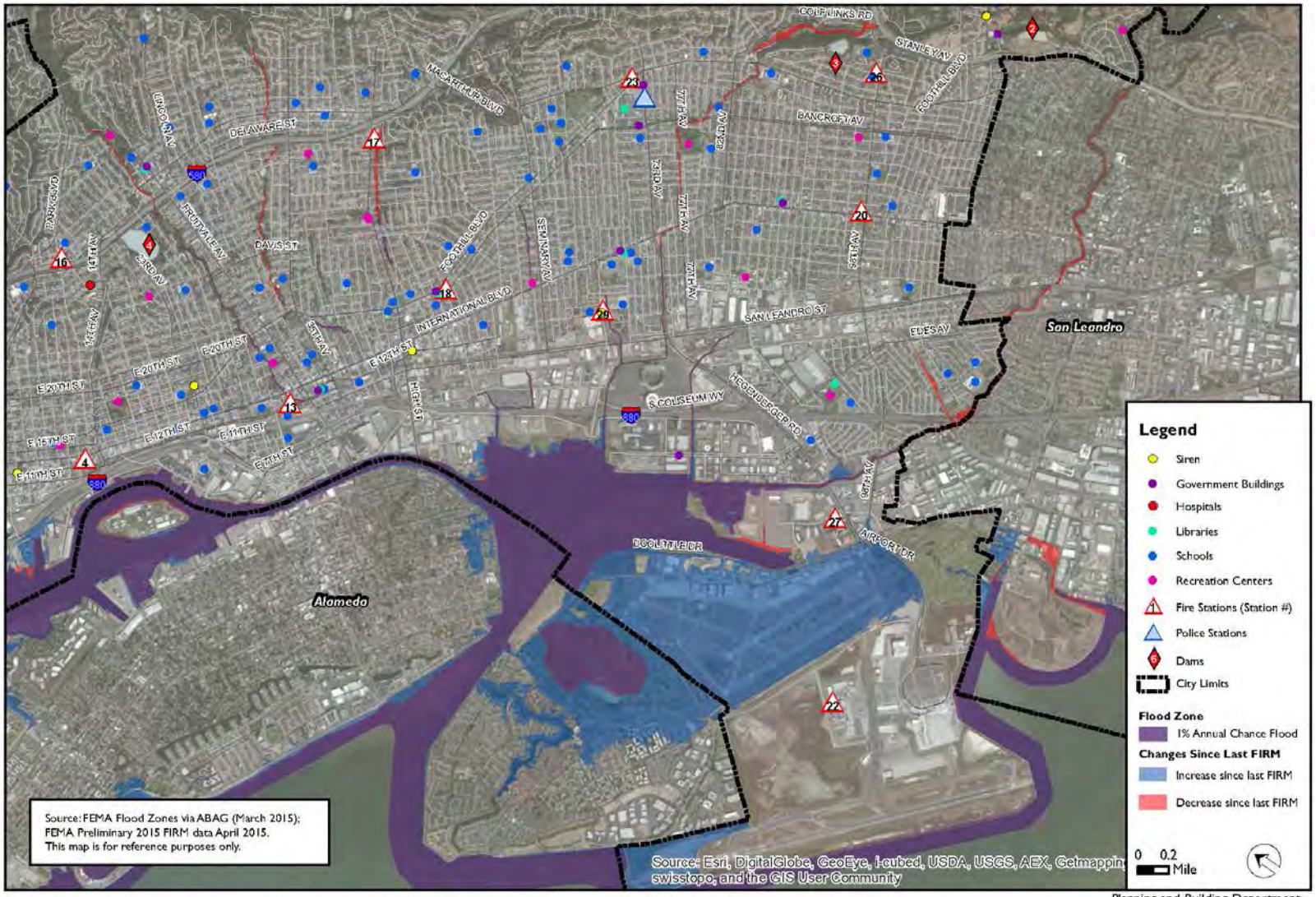
Preliminary Changes 2015 - 100 year Floodplain, West Oakland

Figure 7.2 Preliminary changes to 100-year Flood Plain, East Oakland detail



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Preliminary Changes 2015 - 100 year Floodplain, East Oakland

Dam Failure

The City's *Safety Element* includes the following description of the risk of dam failure in Oakland:

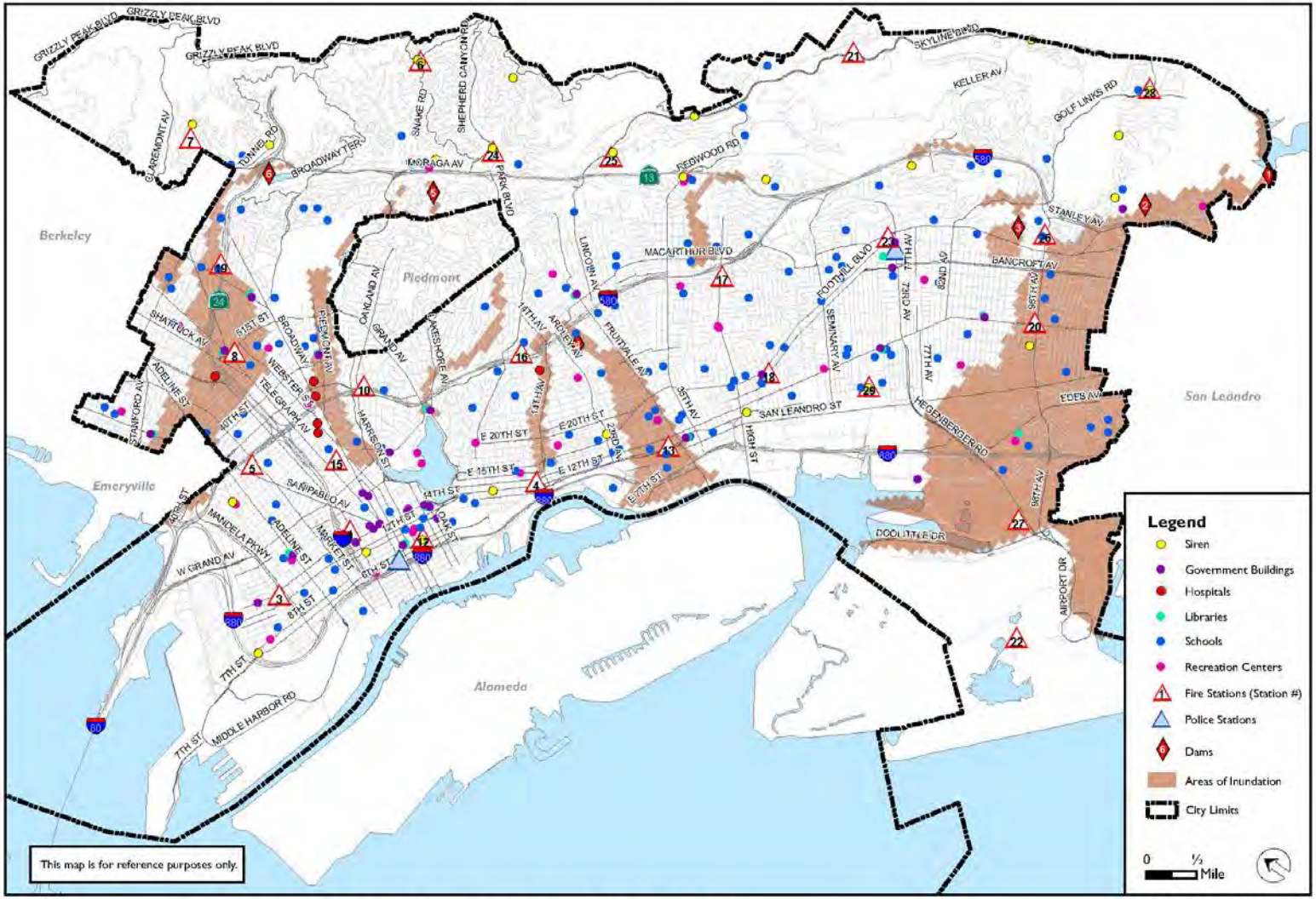
> According to inundation maps developed by dam owners to fulfill requirements of the Dam Safety Act, there are 13 active dams, reservoirs and clearwells that, in case of failure, would cause flooding in Oakland. (Additionally, there are small ponds and water tanks scattered throughout the city, the failure of which could result in the sudden release of a sizable volume of water. Failure of such a facility in the Oakland hills could cause isolated damage to structures downhill). These 13 facilities, listed by owning entity, are:
>
> ● Central, Claremont, Dingee, Dunsmuir, Estates and 39th Avenue reservoirs, the dams at Lake Chabot and at Upper San Leandro reservoir, and the Upper San Leandro filtration plant no. 1 and no. 2 clearwells (owned by the East Bay Municipal Utility District, or EBMUD). As part of its seismic improvement program, EBMUD will have upgraded and strengthened all its reservoirs by 2005. Upgrade measures include the addition of seismic anchors and the installation of pre-stressed wire around tanks. EBMUD has also identified reservoirs at risk due to landslides and incorporated landslide-mitigation improvements at these sites. EBMUD also has a dam safety program, carried out in cooperation with the DSOD, to confirm that its facilities are safe for continued operation.
>
> ● Lake Temescal dam (owned by the East Bay Regional Park District). This dam was last inspected by the state's Division of Safety of Dams in May, 2011. At the time, it presented no issues necessitating corrective action and was "judged satisfactory for continued operation."
>
> ● Lower Edwards and Upper Edwards reservoirs (owned by the Mountain View Cemetery Association). These reservoirs were removed from the jurisdiction of the Division of Safety of Dams in 1983 because their capacity does not reach regulatory thresholds.

As shown on Figure 8, most of these facilities are located in North and East Oakland, within a half mile south and west of I-580 and State Highway 13. The map also shows the potential inundation areas for each facility. This information, based on inundation maps prepared by dam owners, represents the best estimate of where water would flow in case of total failure of a dam with a full reservoir; generally, flood waters would follow existing stream beds or drainage courses. Flooding from dam failure, while unlikely, could have catastrophic impacts on portions of North and East Oakland. The dam and reservoir failures resulting in the largest flooded areas

in Oakland would be those of Central reservoir and of Lake Chabot, Lake Temescal and Upper San Leandro reservoir dams. Of particular concerns are the Lake Temescal dam, since it straddles the main trace of the Hayward fault, and the Lake Chabot dam, which is located only one-quarter mile east of the fault. In the event of dam failure, Lake Temescal's waters would follow the Temescal stream course, inundating an area one block wide north of Highway 24 to College Avenue that would then broaden to several blocks wide west of College. Failure of the Lake Chabot dam (and of the Upper San Leandro reservoir dam) would inundate much of the Brookfield Village district and the industrial areas near the airport (as well as a large portion of San Leandro). The risk posed by dam failures is mitigated by the regulatory safeguards in place and should be weighed not only against the extremely rare occurrence of dam failure in the United States but also against the significant benefits provided by water-storage facilities.

In Oakland, 5,200 urban acres are subject to dam failure inundation.

Figure 8. Dam Inundation Zones



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Dam Inundation

5.1.5 Sea Level Rise scenarios

Oakland is projected to experience 36 - 66 inches of sea level rise (SLR) by the year 2100, which, without action, could substantially impact coastal areas: low lying coastal residences, the Port, the former Oakland Army Base, the Coliseum, Oakland International Airport, and I-880 are most at risk.

Predictions are that global climate change will increase the elevation of San Francisco Bay, and that the frequency and extent of short term, temporary coastal floods will increase. Eventually, permanent daily tidal inundation will be reached. Low-lying coastal residential areas, the Port of Oakland, the former Oakland Army Base, and a variety of low-lying areas near the Coliseum, Oakland International Airport, and Interstate-880 are most at risk[32]. Storms are expected to increase in intensity, as well. With Oakland's older stormwater drainage system, processing the water from the predicted higher tides and larger storms could lead to significant increases in both coastal and urban flooding and flood damage. As recently as December 2014, a combination of coastal and urban flooding closed roads, businesses and schools throughout the City; this was without the predicted tidal inundation from sea-level rise.

ABAG has recently reported on the latest science of sea-level rise prediction, in its "Bay Area Risk Landscape" report[33]:

> The potential for new or prolonged flooding as sea level rises will not be confined to the shoreline. Sea level rise will increase the likelihood of major flood events around the Bay Area because higher water levels in tidal creeks and flood control channels will reduce capacity to discharge rainfall runoff. While some creeks already flood when rainstorms coincide with high tides, rising sea levels will cause flooding during smaller, more frequent rainfall events.
>
> Sea level rise inundation maps help to visually assess under what conditions assets may be impacted by sea level rise and storm events and how far-reaching the consequences may be if they are impacted. To understand these factors, it is helpful to evaluate a range of possible future sea level rise scenarios. The "total water level" approach presented below simplifies this process and reduces the number of maps needed. In this

[32] In coordination with the National Oceanic and Atmospheric Administration, the Bay Conservation and Development Commission has conducted mapping exercises documenting the projected impact of sea level rise on the City http://coast.noaa.gov/slr/

[33] Association of Bay Area Governments, *Bay Area Risk Landscape* public review draft; 2016, pg. 43-46

approach, each inundation map represents a number of different unique combinations of sea level rise and extreme tide (storm surge) conditions.[34]

A total water level of 36 inches above Mean Higher High Water (MHHW)[35] can represent a new "daily" high tide with 36 inches of sea level rise. This amount of sea level rise, which is a likely projection for 2100, could result in regular, e.g., permanent, tidal inundation. This total water level can also represent today's 50-year extreme tide level, a one-year extreme tide level with 24 inches of sea level rise, or a five-year extreme tide level with 12 inches of sea level rise, which is a likely 2050 projection. Extreme tide events that are larger than daily high tide levels can result in episodic, short duration, or temporary, flooding.

As an example, the likely mid-century daily high tide is projected to be 12" above today's high tide, or 12"+MHHW. This water level is color coded in green in **Error! Reference source not found.**. This total water level is approximately the level observed during King Tide, which is an astronomical tides that occur approximately twice per year when the Moon and the Sun simultaneously exert their gravitational influence on the Earth.

There are a number of online tools that provide regionally relevant sea level rise inundation maps. The most commonly used is the *NOAA Sea Level Rise and Coastal Flooding Impacts Viewer*[36]*.* This is a national tool that depicts potential impacts to marshes and human communities from a range of sea level rise projections from zero to six feet coupled with Mean Higher High Water (MHHW). It also illustrates changes in flood frequency and includes visual simulations of flooding at local sites.

The City of Oakland is working with the San Francisco Bay Conservation and Development Commission (BCDC) on their regional study, "Adapting to Rising Tides" (ART), which is addressing Sea Level Rise (SLR) risk in the Bay Area, and specifically in East Oakland and Alameda[37]. Within Oakland, the ART study area covers the full coast inland approximately a

[34] Extreme tides are the maximum high tide level that has occurred over a specific return period (recurrence interval) that correlates to a specific occurrence probability. For example a 100-year extreme tide has a return period of 100 years, and therefore a one percent chance of occurring in any given year.
[35] Mean higher high water (MHHW) is calculated as the average of the higher of the two daily high tides over a 19-year tidal epoch.
[36] See coast.noaa.gov/slr/
[37] See www.adaptingtorisingtides.org and BCDC, "Oakland/Alameda Resilience Study Phase 1 Report: Vulnerability and Risk Assessment Findings, November 2015 Draft."

half-mile beyond the area projected to be exposed to storm event flooding with 55 inches of SLR, considered the most likely levels by the year 2100. ART has found that approximately 6,000 Oakland residents would be at risk in a 16-inch SLR scenario, and 15,000 residents would be at risk in a 55-inch SLR scenario. The replacement costs of property in the ART project area in Oakland are estimated at $22 to $38 billion.

BCDC's "Oakland/ Alameda Resilience Study" found significant infrastructure and critical facilities in the East Oakland study area vulnerable to SLR, including[38]:

- Oakland International Airport, a public airport owned and operated by the Port of Oakland, located on Bay Farm Island, serves passenger airlines, cargo services, and general aviation. More than 10 Million passengers travelled through the airport in 2014. North Field is used for general aviation. Facilities include two terminals, leased commercial facilities, fueling tanks, a control tower, Oakland Fire Station #22 and a perimeter dike.
- Ground transportation in the study area includes Interstate-880, City of Oakland surface streets, and transit service provided by BART, Capitol Corridor JPA/Amtrak, AC Transit, the Oakland Airport Connector, and San Francisco Bay Ferry. The Union Pacific Railroad in the project area carries both cargo and Amtrak passenger service, including the Capitol Corridor line serving Bay Area commuters.
- Fire stations owned and operated by the City of Oakland. Fire Station #22 serves the airport and has special equipment for aviation disasters; stations #27 and #29 serve the neighboring communities. The fire stations are vulnerable to future flooding because the buildings are at grade and firefighters rely on vulnerable roads to perform their emergency response function.
- Utilities -- power transmission facilities owned by Pacific Gas and Electric Company (PGE); stormwater facilities owned by the City of Oakland and wastewater facilities owned by East Bay Municipal Utility District (EMBUD). EBMUD's pump station G conveys Oakland International Airport's wastewater to the treatment facility, and has no redundancy. These utilities are critical to the communities in the study area.
- Martin Luther King Jr. Regional Shoreline, a popular 717-acre park located along the shoreline, with bicycle and pedestrian access on the Bay Trail including two pedestrian bridges, and tidal marsh habitat for endangered species. The park, Bay Trail, and marshes are primarily owned and managed by East Bay Regional Park District (EBRPD).
- The Oakland-Alameda County Coliseum Complex provides economic value to the City and the region through sports and entertainment events year round. Stormwater and

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[38] BCDC, "Oakland/Alameda Resilience Study Phase 1 Report: Vulnerability and Risk Assessment Findings, November 2015 Draft", pgs -20-31

wastewater drainage are insufficient and have caused disruptions to Coliseum facilities in the past.

The City used BCDC scenario of a 48-inch projected sea-level rise by the year 2050, to create Figures 9.1 (West Oakland) and 9.2 (East Oakland), showing projected inundation. The West Oakland map shows areas at the Lake Merritt Channel and the northern portion of West Oakland around Wood Street as the most potentially effected. In East Oakland, as confirmed by the BCDC study, the Oakland-Alameda County Coliseum complex, and Oakland International Airport are inundated under this sea-level rise scenario, as well as the transportation infrastructure (I-880, rail). For a table which describes the different City facilities which could be a risk with these sea-level rise scenarios, see Section "Table 17 City Facilities at risk from sea-level rise (SLR)" in Section 5.2, "Risk Assessment."

Figure 9.1 Projected Sea-Level Rise 48-Inch scenario, West Oakland Detail

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Projected Sea Level Rise - 2050 Scenario, West Oakland

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Figure 9.2 Projected Sea-Level Rise 48-Inch scenario, East Oakland Detail

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Projected Sea Level Rise - 2050 Scenario, East Oakland

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5.1.6 Tsunami & Seiches

Tsunami

The Association of Bay Area Governments (ABAG) describes a tsunami as: "a series of waves generated in a body of water by a rapid disturbance that vertically displaces the water. These changes can be caused by an underwater fault rupture (that generates an earthquake) or underwater landslides (typically triggered by earthquakes)."[39]

The Oakland *Safety Element*[40] has a full description of the tsunami hazard in Oakland:

> Tsunamis are not an uncommon occurrence on the California coast. The 2011 Honshu, Japan earthquake caused tsunami damage in Santa Cruz, Crescent City, and Berkeley marinas. In 1964, a tsunami associated with an Alaskan earthquake caused eight deaths and damage at Crescent City. Most often, tsunamis are generated by large offshore earthquakes in the Pacific Ocean, producing waves that reach the California coast many hours after the earthquake. Tsunamis can also be generated by local earthquakes, in which case the first waves could reach shore mere minutes after the ground stops shaking, giving authorities no time to issue a warning. The National Weather Service is responsible for issuing warnings about potential tsunamis along the West Coast of the United States. Warning times vary depending on the distance to the causative earthquake. For most tsunamis approaching the coast, several hours are available to evacuate residents and undertake other emergency preparations.Flooding from tsunamis would affect low-lying areas along San Francisco Bay and the Oakland Estuary, especially filled areas that are only a few feet above sea level.

Figure 10 and 10.1 maps are estimates on areas of Oakland which could experience inundation following a tsunami. They show the Bay Bridge landing, the outer and the outer and middle harbor of the Port of Oakland's seaport, the San Leandro Bay shoreline (including Martin Luther King, Jr. Regional Shoreline), Jack London Square and the Oakland International Airport's shoreline, including the Oakland Coliseum complex and the City of Oakland Corporation yard as potential sites for flooding during a tsunami.

[39] See http://resilience.abag.ca.gov/tsunamis/

[40] City of Oakland, *Safety Element*, Oakland General Plan, 2004: pages 104-6

Figure 10. Oakland Tsunami Inundation Map—West Oakland

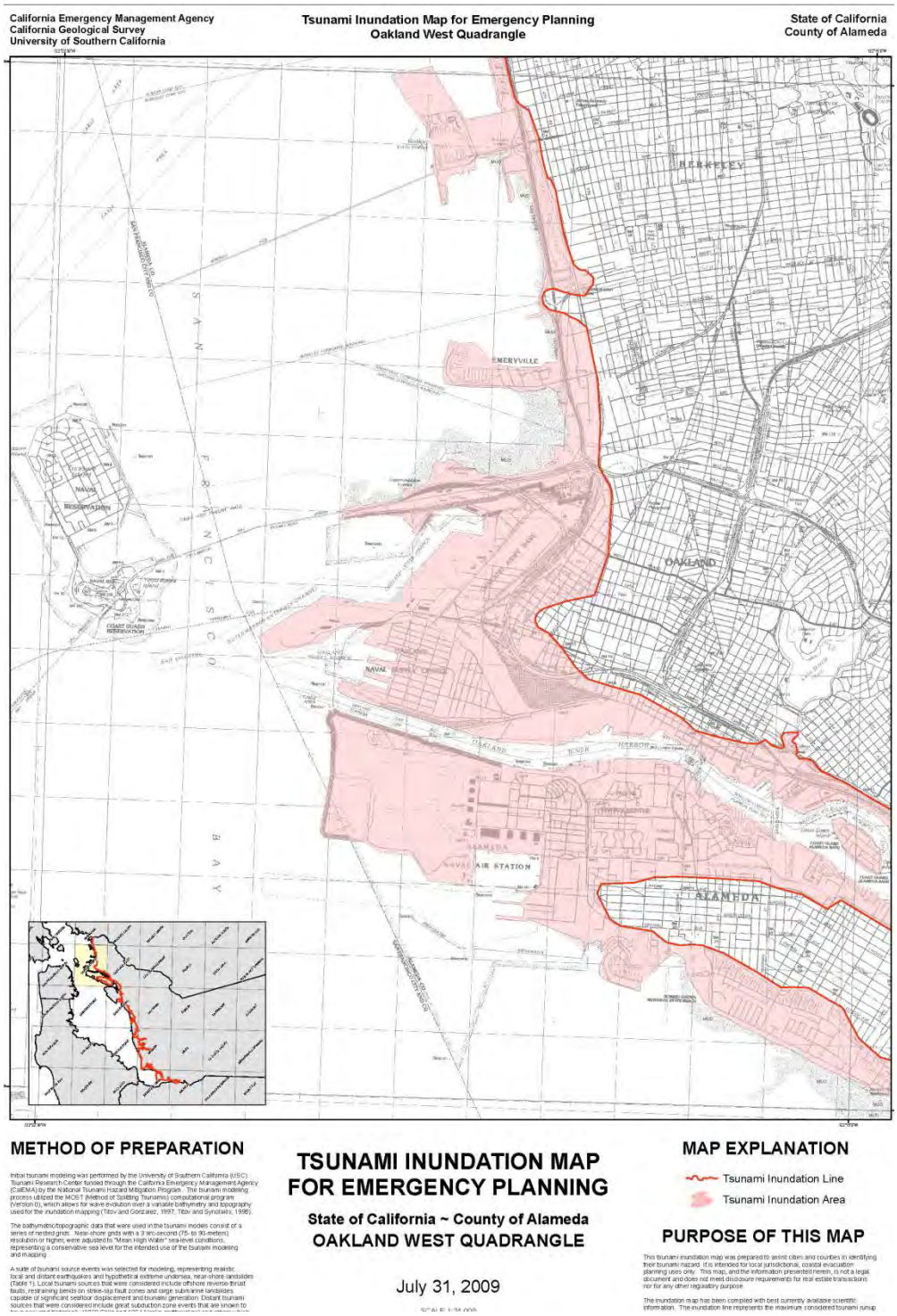
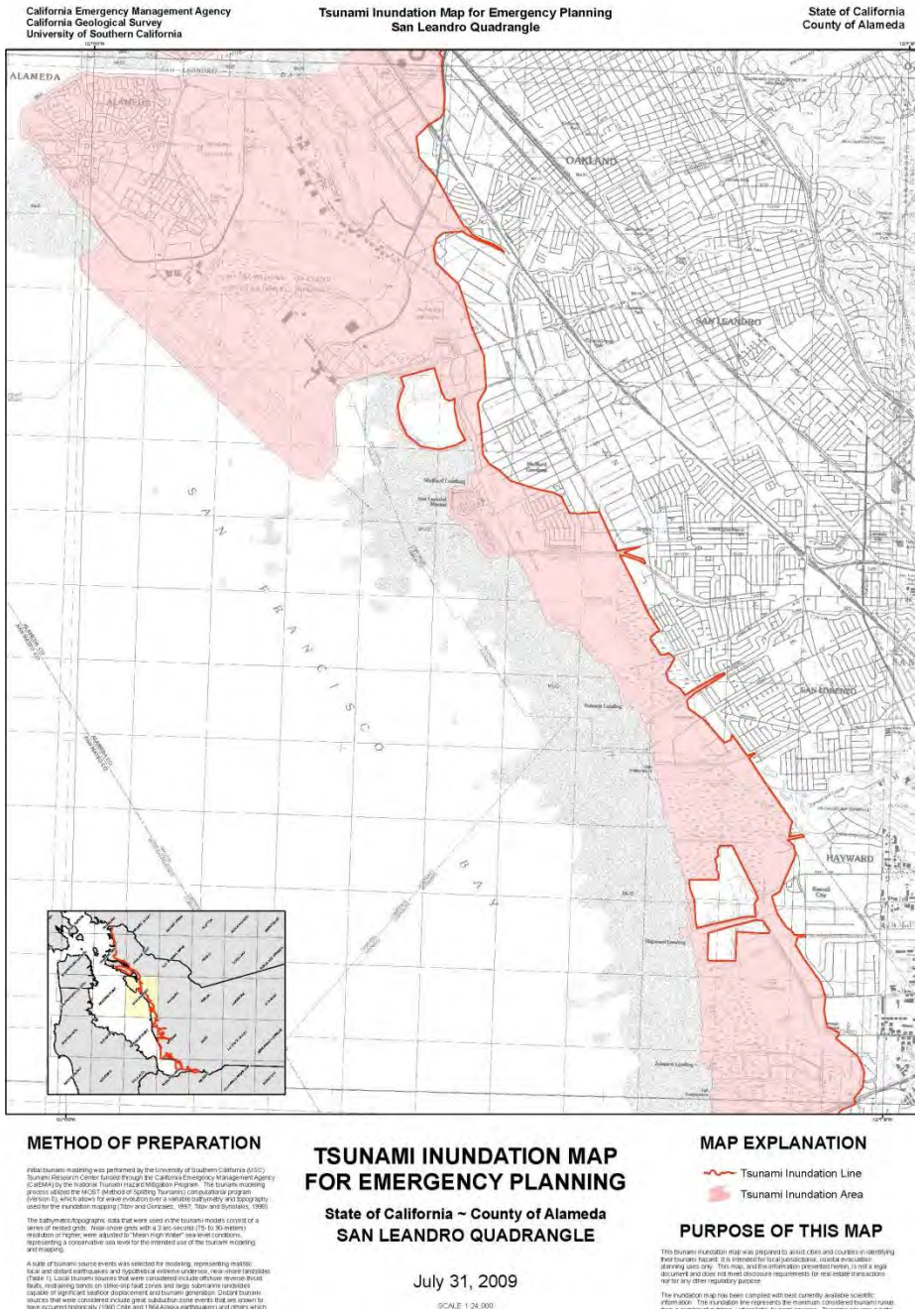


Figure 10.1. Oakland Tsunami Inundation Map—East Oakland



Seiches

A "seiche", according to the US Geological Survey, is the sloshing of a closed body of water from earthquake shaking. Seismic seiches are standing waves set up on rivers, reservoirs, ponds, and lakes when seismic waves from an earthquake pass through the area. They are in direct contrast to tsunamis which are giant sea waves created by the sudden uplift of the sea floor.

The Oakland *Safety Element* includes the following description of seiche hazards:

> There is no data on the local occurrence or impact of seiches, as none has ever been recorded in the Bay Area. Given the absence of local data—and that seiches are, in general, poorly understood—an accurate assessment of the hazard posed by seiches is difficult. Damage from a seiche would depend primarily on the size, depth, elevation, proximity to development and, if human-made, structural condition of the body of water in which the seiche occurs. Outside the Bay Area, earthquake-generated seiches have on occasion damaged dams and water-storage tanks. In addition, isolated damage to adjacent and down-slope structures has been observed from seiches occurring in swimming pools and in small, shallow lakes and ponds.
>
> In Oakland, the only threat of large-scale damage from seiches appears to come from downstream flooding that would be caused by large volumes of water overtopping a dam or reservoir, a hazard that is examined in the following section. (Lake Merritt, with depths greater than two or three feet only near its center, is likely too shallow to be able to generate devastating seiches). The likelihood of large-scale devastation in Oakland resulting from seiches appears to be minuscule.[41]

[41] City of Oakland, *Safety Element,* Oakland General Plan (2004,) pg. 105-6

5.1.7 Fire

There are three main types of fire hazards: wildfires, which affect open space and development on the urban fringe; structural fires, which occur in buildings; and industrial fires, which result from the ignition of hazardous materials. While fires are not entirely preventable, it is possible to create conditions that reduce the chances of fire and that facilitate efficient response in case fire breaks out. When a fire does ignite, quick response from firefighters and an adequate supply of water are essential in minimizing damage.

The Oakland-Berkeley Fire of 1991 was the most destructive fire in State history, resulting in 25 lives lost, 150 injuries, destruction of 3,354 single-family dwellings and 456 apartments, and in $9 billion in losses (2015 dollars). While wildfires may occur at any time of year and in any climate, the risk of fire increases greatly with increased drought and heat. California's future climate of frequent drought and higher heat leaves Oakland at extreme risk for wildfire.

The Oakland *Safety Element* includes the following description of the hazards from fire[42]:

> **Key vulnerability factors.** General factors that affect an area's risk from fire hazards include its location, land uses, distance from fire stations, ease of accessibility by fire-fighting equipment, and adequacy of water supply. More specifically, the extent, severity and damage of fires are determined by several key factors affecting vulnerability. For the three types of fire examined in the *Safety Element*, these vulnerabilities include:
>
> - Wildfires: steep and rugged topography, dense and unmanaged vegetation (especially woods and brush), accessibility to human activities, exposure to wind and sun, drought conditions, and the presence of above-ground utility lines. The wildland-urban interface is an especially hazardous area because it combines a resident population with large areas of combustible material (including structures), and is often characterized by sub-standard water supplies and a distant location from fire stations. The time of the year of high wildfire danger is from May to October, when temperatures are higher and humidity is lower. The closer to the end of this "fire season," the more critical the danger is, as vegetation becomes increasingly dry.
>
> - Structural fires: Especially vulnerable building and land-use types include high-rise buildings, multi-family dwellings, and high-density residential neighborhoods; places of mass assembly, such as schools, stadiums, auditoriums and shopping centers; structures constructed before current fire and building codes; institutions such as hospitals and jails that house people of limited mobility; downtown Oakland, and other high-density commercial districts.

[42] City of Oakland, *Safety Element*, Oakland General Plan, (2004), pages 53-67

- Industrial fires: Especially vulnerable facilities include large industrial complexes, including seaports and airports, and businesses and other "target hazards" with substantial concentrations of highly combustible and toxic materials.

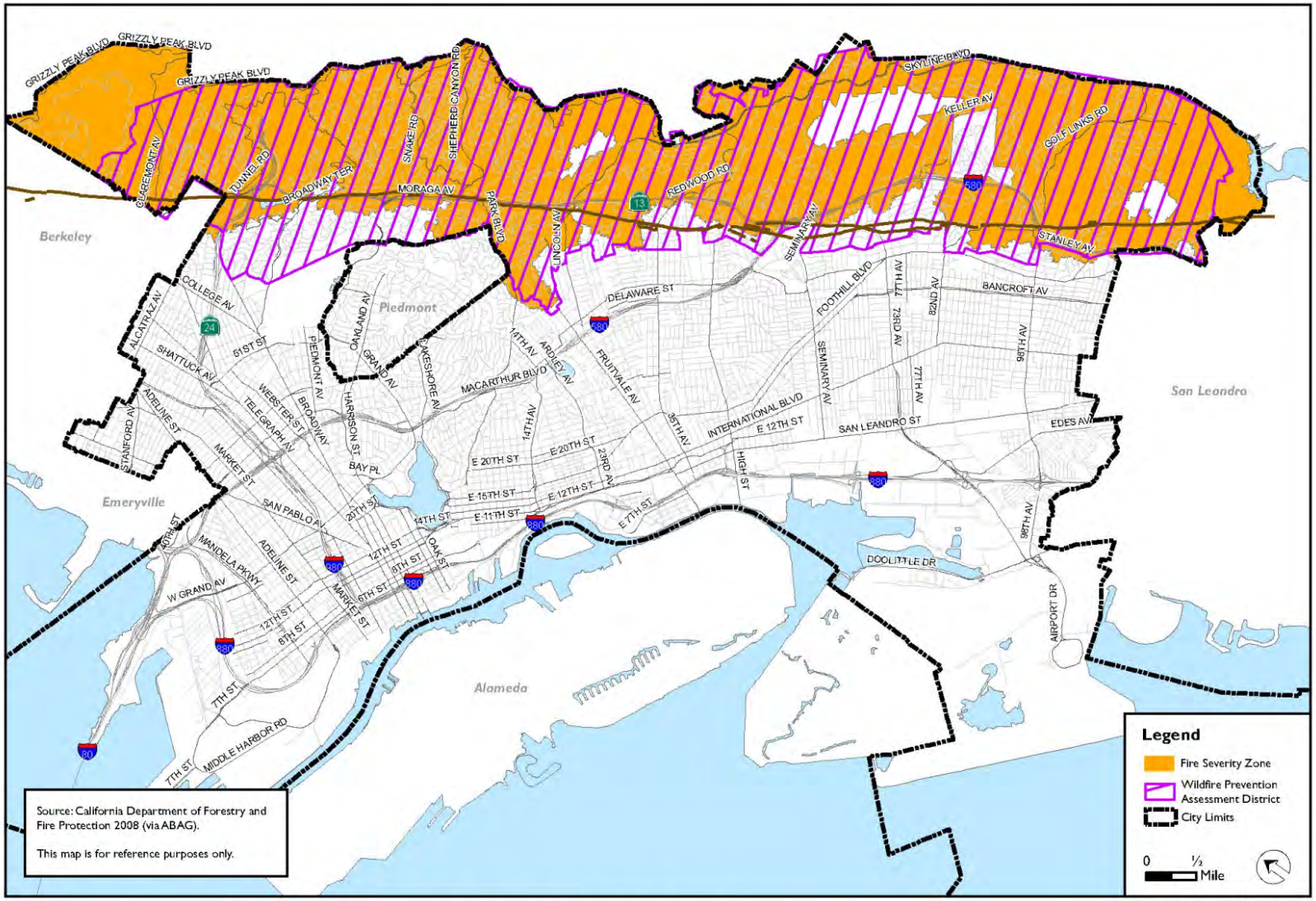
Earthquakes and Fire. While fires usually happen as stand-alone events, the threat of extensive fire damage is greatest following a major earthquake. Strong earthquakes can rupture gas lines and down electric lines, which can, in turn, spark fires. The severity of fires occurring under those circumstances would likely be compounded by the accompanying failure of water mains (which would hamper fire-suppression efforts) and damage to roads and overpasses (which would restrict the evacuation of people and access by emergency vehicles). (See Section 5.1.1, above)

Structural or industrial fires are unlikely to cause widespread damage, so for the purposes of the 2016-2021 LHMP, the risk analysis and mitigation measures will focus on wildfire, or more specifically, the "Wildland-Urban Interface" in the Oakland Hills, defined as the line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels. It describes an area within or adjacent to private and public property where mitigation actions can prevent damage or loss from wildfire.[43]

Figure 11 shows the Fire severity zone for the City of Oakland, the CalFire hazard Zone, and the Wildfire Prevention Abatement District (WPAD) boundary. 10,800 acres of Oakland are subject to very high wildfire threat; and 18,676 acres are in wildland-urban interface threat areas.

[43] See "Glossary" at National Wildfire Coordinating Group, http://www.nwcg.gov/.

Figure 11. Wildfire Risk zones



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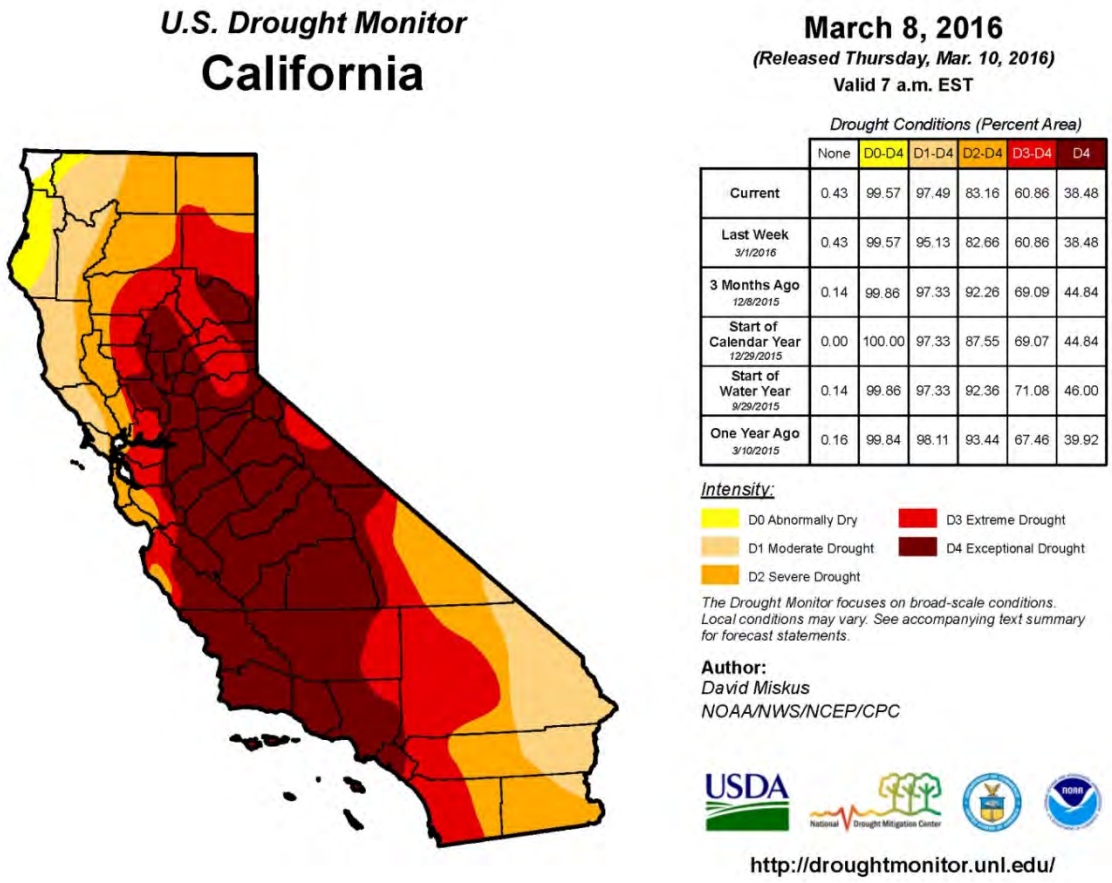
5.1.8 Drought

Starting in 2012, California began experiencing extreme drought conditions, leading to a State of Emergency declaration in 2014, and significant mandatory conservation requirements. The year 2015 surpassed the year 1977 as the driest year on record in California. California has experienced droughts before, but with our changing climate, the expectations are more severe, longer droughts, and more days of extreme heat. During drought, Oakland experiences higher water prices, decreased cooling options during extreme heat days, loss of shade trees and plants and open space values, and higher risk of wildfire. Extreme heat disproportionately affects the health of vulnerable populations, as noted in Section 5.1.7. All 34,600 urban acres in Oakland are subject to drought. Figure X shows the statewide breadth of the drought, Oakland experiencing "extreme drought."

Figure 12. California Drought Monitor, as of March 10, 2016



	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.43	99.57	97.49	83.16	60.86	38.48
Last Week 3/1/2016	0.43	99.57	95.13	82.66	60.86	38.48
3 Months Ago 12/8/2015	0.14	99.86	97.33	92.26	69.09	44.84
Start of Calendar Year 12/29/2015	0.00	100.00	97.33	87.55	69.07	44.84
Start of Water Year 9/29/2015	0.14	99.86	97.33	92.36	71.08	46.00
One Year Ago 3/10/2015	0.16	99.84	98.11	93.44	67.46	39.92

5.1.9 Extreme Heat

The U.S. Environmental Protection Agency (EPA) defines extreme heat events as "periods of summertime weather that are substantially hotter and/or more humid than typical for a given location at that time of year."[44]

The State of California defines an extreme heat day as a day during the months of April through October, where the maximum temperature exceeds 81 degrees Fahrenheit (in Oakland), and defines a heat wave as five or more consecutive extreme heat days.[45] Historically, there have been four extreme heat days in any given year, statewide.

In planning for extreme weather, the City of Oakland has an emergency plan that opens cooling center when there are predictions of: three consecutive days when the daytime high is 105 to 129 degrees Fahrenheit; two consecutive days when nighttime temperature does not go below 90 to 105 degrees Fahrenheit; and any day when the Heat Index high is 130 degrees Fahrenheit.

Projections for the years of this update of the Local Hazard Mitigation Plan, 2016-2021, show the number of extreme heat days for Oakland, with the highest number expected in the year 2017, as shown in Table 13.

Table 13. Days of Extreme Heat

Year	Projected number of extreme heat days
2016	4
2017	28
2018	11
2019	10
2020	10
2021	6

Source: "Number of Extreme Heat Days per year" chart for Oakland; assuming a "high GHG emission scenario", accessed March 7, 2016 at http://cal-adapt.org/temperature/heat/#

Extreme heat can have public health impacts, particularly to the elderly and children under five: premature death; cardiovascular stress and failure; and illnesses such as heat stroke, heat exhaustion and kidney stones.[46]

The Oakland Extreme Weather Plan prepares for extreme heat days by opening cooling stations in public buildings and facilities; locations announced by the City Administrators Office's Public Information Officer through available media sources.

[44] U.S. EPA. 2006. Excessive Heat Events Guidebook. EPA 430-B-06-005. U.S. Environmental Protection Agency, Washington, DC.
[45] This is based on the 98th historical percentile of max temperatures based on daily temperature maximum data between 1961-1990. See Cal Adapt website:http://cal-adapt.org/temperature/heat/#.
[46] California Adaptation Planning Guide, July 2012.

5.1.10 Additional Hazards – Human Caused

Oakland has a high exposure to "man-made hazards," which FEMA describes[47] as terrorism and technological hazards, such as hazardous materials releases. Oakland has the Port of Oakland, regional attractions such as the Oakland Coliseum, the Oakland Zoo, regional transportation such as BART and high profile governmental facilities such as the Post Office in West Oakland, and Alameda County Courthouse and offices in downtown. The City has ongoing Emergency preparedness efforts underway, which protect against hazardous materials release.

Hazardous materials release

The *Oakland Safety Element* (Chapter 5) has a thorough discussion of "Hazardous Materials," a term describing a large number of gaseous, liquid and solid substances which are toxic, flammable, corrosive, reactive, infectious or explosive. These properties of hazardous materials make their potential release into the environment and the negative impact on human health from such a release the subject of governmental regulation and community awareness and activism[48].

Hazardous materials released into the environment become hazardous waste. Hazardous materials and waste disposed or released into the environment can occur in several ways: illegal dumping into the sewer or storm-drain system; into creeks or along roadways; industrial accidents or spills on freeways or railroads; a ruptured gas or petroleum pipeline; leaking underground storage tanks; illegal disposal in; demolition or remodeling of older buildings containing asbestos, lead-based paint or other hazardous building materials; contaminated groundwater plumes; application of pesticides, of herbicides; urban storm water runoff carrying grease, oil and other pollutants. As a dense urban center with long-established industrial areas in West and East Oakland, and extensive freeway and rail networks, Oakland faces the risk of a transportation-related or other hazardous materials incident, such as a fire, explosion, spill or accidental gas release. While hazardous material incidents can happen anywhere, certain areas of the City are particularly vulnerable to these hazards, particularly residents near industrial zones and along interstate highways.[49]

Transportation

Transporting hazardous materials through Oakland is, and has been, a potential significant public safety hazard. Oakland is the Bay Area's transportation hub, which makes the City vulnerable to truck and rail accidents involving hazardous materials. Oakland is crossed by four

[47] See FEMA report, "Integrating Manmade Hazards into Mitigation Planning" (pg 11): http://hazardmitigation.calema.ca.gov/docs/howto7_Integrating_Manmade_Hazards.pdf

[48] See City of Oakland *Safety Element*, pages 11 and following, and 71 and following: http://www2.oaklandnet.com/Government/o/CEDA/o/PlanningZoning/s/GeneralPlan/DOWD009020

[49] City of Oakland, Safety Element, pgs. 72-74.

interstate highways (I-80, I-580, I-880 and I-980) and three transcontinental railroad lines; also, the city is home to the Port of Oakland, one of the nation's top five gateways for ocean-borne cargo and the Bay Area's top destination for truck and trail traffic, and for hazardous material in general. The Oakland International Airport is also a significant national and regional transportation hub for freight, being in the top fifteen airports nationwide for tonnage of cargo[50]. The risk of transportation related accidents is mitigated by the many federal and state safety precautions and regulations, and by the fact that accidents on freeways are likely to be detected and reported quickly. In the event of a spill, or other accidental release, the Oakland Fire Department would be the first responder, while Caltrans would assume responsibility for the subsequent clean-up.[51]

Pipelines

Pipelines which carry hazardous liquids in populated areas are a potential safety threat. For example, an earthquake could damage pipelines, potentially causing fires, explosions and groundwater contamination. Oakland has pipelines for the transportation of liquefied natural gas, crude oil, and refined-petroleum products, which are laid under residential and commercial areas. PG&E has natural gas pipelines under San Leandro and Oakport Streets in East and Central Oakland, under 2nd and 4th Streets in Jack London Square, and under Linden Street in West Oakland, among other locations (PG&E provides a map of these pipelines on its website[52]). Kinder Morgan Corporation has pipelines through Oakland which transport petroleum materials.

Hazardous Materials Sites

The use of hazardous materials before the adoption of current environmental regulations has left a legacy of contaminated sites, especially in older cities such as Oakland. Sites associated with hazardous waste contamination include landfills, rail yards, certain manufacturing operations, and most commonly, sites with leaking underground storage tanks (LUST's). Sites with LUSTs include gasoline stations, corporation yards and other places associated with the use, storage or maintenance of fuels and motor vehicles. The risk of hazardous material release from contaminated sites is serious, but typically not immediately life threatening, and depends on the quantity and toxicity of contaminants, and the available exposure pathways for contaminants to affect human health.

Oakland is home to a large number of businesses and facilities that generate, use, store or dispose of hazardous materials. These sites are throughout the city, though primarily concentrated in the industrial areas of West and East Oakland.

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[50] For 2014; Airport Traffic Reports, Airports Council International --North America; http://www.aci-na.org/content/airport-traffic-reports
[51] City of Oakland, *Safety Element,* page 88.
[52] See PGE website: http://www.pge.com/en/safety/systemworks/gas/transmissionpipelines/index.page

Terrorism

Terrorism is a human-caused hazard, which may involve injury to people or damage to property, and may manifest itself through bombings, hijackings, kidnappings, arson, assassinations, threats only, disruption of "lifeline systems" and other critical infrastructure, and the use of chemical, biological, radiological, nuclear, and explosive weapons. The nature of such weapons makes mitigation, response and recovery issues difficult.

Cyber-terrorism is a concern: a criminal act perpetrated by the use of computers and telecommunications capabilities, resulting in violence, destruction and/or disruption of services to create fear by causing confusion and uncertainty within a given population, with the goal of influencing a government or population.

Despite the significant Federal role in terrorism response, local, county, and state jurisdictions have the primary responsibility for protecting public health and safety. Local law enforcement, emergency medical services (EMS), and fire agencies will be the first units to respond to a terrorist incident. Local health care agencies will be required to provide treatment to victims and, in cases of nuclear, chemical, or biological attacks, rapidly identify the substance used in the attack. Citizens will inevitably look to local and state officials and the media for information regarding what has occurred, the actions are being taken/will be taken to respond to this type of incident.

Estimating the likelihood of Oakland experiencing a terrorist attack is not possible. However, Oakland's Emergency Management Services Division (EMSD) has readiness efforts which identify critical sites, and assesses those sites' vulnerability to attack. EMSD participates in a number different planning and coordinating efforts to combat terrorism.

Oakland is part of the Bay Area Urban Area Security Initiative and has been designated as a Tier I urban area. It is one of only 10 other urban areas with this designation, meaning it faces a higher level of risk than other urban areas for terrorism.

5.2 Risk Assessment

Urban Land Exposure

The City examined the exposure of City urban land to the natural hazards studied. Of the approximately 34,600 urban acres in the City:

- Earthquake faulting – 1,800 acres are in the Alquist-Priolo Earthquake Fault Study Zone.
- Earthquake shaking – most of the urban acres, 34,493, are in the highest two categories of shaking potential, in large part because the Hayward fault runs through to the eastern portion of the City.
- Earthquake-induced landslides – the California Geological Survey has identified 4,900 acres in the Seismic Hazard Mapping Zones; Landslides – 2,000 acres are in areas of existing landslides ("mostly a landslide area").
- Earthquake liquefaction – 17,000 acres are in areas of moderate, high, or very high liquefaction susceptibility mapped by the U.S. Geological Survey; while 14,600 acres are in the California Geological Survey's Seismic Hazard Mapping Zone.
- Flooding –294 acres are in the (2009) 100-year flood plain, while an additional 1,546 acres are in other flood-prone areas.
- Wildfires – 10,300 acres are in the "very high severity zone" of wildfire threat; and 20,646 acres are in wildland-urban interface threat areas.
- Dam inundation – 5,200 acres in Oakland are subject to dam failure inundation.
- Tsunami -- 6,640 acres are within the inundation area
- Drought – all 34,682 urban acres in Oakland are subject to drought.

For the 2016-2021 LHMP, the City reviewed the hazard exposure of Oakland's urban land, based the 2010-2015 LHMP, which used ABAG data[53]. The City then compared the 2010 results with more recent GIS data, if it was available, for each of the hazards. The new, updated acreage information is shown in the "Plan Year 2016" columns of Table 14.

[53] See http://quake.abag.ca.gov/mitigation/landuse

Table 14. Exposure to Hazards (acres of urban land)

Hazard	Plan Year 2010 # acres	Plan Year 2016 # acres
Total Acres of Urban Land (excludes the Bay and EBRPD lands within the City limits).	*34,682*	*34,534*
Earthquake Faulting (within California Geologic Survey (CGS) zone)	1,835	1,801
Earthquake Shaking (within highest two shaking categories)	33,925	34,493
Earthquake-Induced Landslides (within CGS study zone)	4,742	4,932
Liquefaction (within moderate, high, or very high liquefaction susceptibility	17,261	17,044
Landslides (within areas of existing landslides)	2,034	
Flooding[54] (within 100 year floodplain)	578	294
Flooding (within 500 year floodplain)	1,865	1,840
Wildfire (subject to high, very high, or extreme wildfire threat)	2,393	10,303
Wildland-Urban Interface Fire Threat	18,676	20,646
Dam Inundation (within inundation zone)	5,427	5,183
Tsunami (within inundation area)	Not calculated	6,643
Drought[55]	*34,682*	*34,682*

[54] This is a calculation of the acreage shown in the 2009 FIRM map.

[55] The entirety of the City of Oakland is subject to drought.

Infrastructure Exposure

For the 2016-2021 LHMP, the City used ABAG data[56] to review the miles of Oakland-located infrastructure, such as roadways, transit and rail lines exposed to natural hazards from the 2010 LHMP. The City then compared the 2010 results with more recent GIS data, if it was available, for each of the hazards. The new, updated information is shown in the "Plan Year 2016" columns of Table 15.

Table 15. Miles of infrastructure exposed to natural hazards

Hazard	Roadway		Transit		Rail	
	Plan Year 2010[57]	Plan Year 2016	Plan Year 2010	Plan Year 2016	Plan Year 2010	Plan Year 2016
Total Miles of Infrastructure	*1,178*		*30*		*44*	
Earthquake Shaking (within highest two shaking categories)	1,166		30		42	
Liquefaction Susceptibility (within moderate, high, or very high liquefaction susceptibility	642		27		43	
Liquefaction Hazard (within CGS study zone)[58]	496		24		42	
Earthquake-Induced Landslides (within CGS study zone)[59]	66		1		0	
Earthquake Faulting (within CGS zone)	72		0		0	
Flooding (within 100 year floodplain)	8		0		1	
Flooding (within 500 year floodplain)	70		5		7	
Landslides (within areas of existing	46	73	0	0	0	0

[56] See http://quake.abag.ca.gov/mitigation/landuse

[57] "Plan Year 2010" data used the "2005 Existing Land Use with 2009 Mapping" file at ABAG, http://quake.abag.ca.gov/mitigation/landuse

[58] 681 miles of roadway, 6 miles of transit, and 2 miles of rail are outside the area that has been evaluated by CGS for this hazard

[59] 1,112 miles of roadway, 29 miles of transit, and 44 miles of rail are outside the area that has been evaluated by CGS for this hazard

landslides)						
Wildfires (subject to high, very high, or extreme wildfire threat)	54	42	0	0	0	0
Wildland-Urban Interface Fire Threat	560	608	6	9	4	8
Dam Inundation (within inundation zone)	179	203	4	7	6	7
Sea Level Rise	More research needed					
Tsunami	More research needed					
Drought	not applicable					

Exposure of Oakland City-Owned Buildings, Plus Critical Healthcare Facilities and Schools

For the 2016-2021 LHMP, the City used ABAG data[60] to review the hazard exposure of Oakland's City-owned buildings, as well as critical healthcare and school facilities compared to the 2010-2015 LHMP. The City then compared the 2010 results with more recent GIS data, if it was available, for each of the hazards. The new, updated information is shown in the "Plan Year 2016" columns of Table 16. For Sea-level rise hazard exposure, see Table 17, below.

[60] See http://quake.abag.ca.gov/mitigation/landuse

Table 16. Exposure (number of facility types)

Hazard	Hospitals[61]		Schools		City-owned[62] critical facilities		City-owned bridges and interchanges	
	Plan Year 2010	Plan Year 2016	Plan Year 2010	Plan Year 2016	Plan Year 2010	Plan Year 2016	Plan Year 2010	Plan Year 2016
Total Number of Facilities	*8*		*205*		*312*		*155*	
Earthquake Shaking (within highest two shaking categories)	8		204		311		152	
Liquefaction Susceptibility (within moderate, high, or very high liquefaction susceptibility	4		121		176		134	
Liquefaction Hazard (within CGS study zone)	3		72		119		123	
Earthquake-Induced Landslides (within CGS study zone)	0		0		0		0	
Earthquake Faulting (within CGS zone)			5		1		0	
Flooding (within 100 year floodplain)	0		1		0		4	
Flooding (within 500 year floodplain)	0		7		4		31	
Landslides (within areas of existing landslides)	0		0		2		3	
Wildfires (subject to high, very high, or extreme wildfire threat)	0		2		0		3	
Wildland-Urban Interface Fire	2		65		28		60	

[61] ABAG collected data on Hospitals, Long Term Care Facilities, Primary Care or Specialty Clinics, and Home Health Agencies or Hospices. This table only shows the data for Hospitals. Further information available at **http://quake.abag.ca.gov/mitigation/pickcrit2010.html**

[62] ABAG collected data on City-Owned, County-Owned, and Special District-Owned facilities. This table reports only the data for City-owned facilities. Further information available at **http://quake.abag.ca.gov/mitigation/pickcrit2010.html.**

Threat								
Dam Inundation	2	3	20	33	9	31	44	45
Tsunamis (within inundation area)	-		-		-		-	
Drought	-	-	-	-	-	-	-	-

Table 17 describes the number and type of City facilities which could be effected by two different projected sea-level rise scenarios, in years 2050 and 2100.

Table 17. City Facilities at risk from sea-level rise (SLR).

City Facilities	**Total Number**	**Number at Risk from Sea Level Rise (SLR)**	
		16 inches by 2050	*55 inches by 2100*
Emergency Response Facilities			
Fire Stations	8	2	2
Facilities serving at-risk populations			
Health Care facilities	87	5	13
Homeless shelters	12	2	4
Food Banks	14	1	5
Facilities serving vulnerable, less mobile populations			
Senior housing facilities	45	0	3
Childcare centers	146	6	16
Schools	81	3	13

Source: City of Oakland Preliminary Resilience Assessment, March 2016

6. Mitigation & Adaptation Strategy

6.1 Introduction, mission statement

The City of Oakland is committed to reducing the risks to residents and businesses from natural hazards. The Mitigation measures in this Section describe the actions the City will take during the years 2016-2021 to pursue funding for capital projects and program, and for long-range planning efforts and studies.

6.2 Analysis of mitigation measures

City staff reviewed the mitigation measures, policies and actions included in the 2010-2015 Local Hazard Mitigation Plan. Some mitigation measures have been completed, and some have been continued in the 2016-2021 Local Hazard Mitigation Plan, as shown in Section 6.4, below.

6.3 Mitigation Goals

The Oakland Planning Bureau will ensure the Downtown Specific Plan (expected adoption in 2017/18) and all future Specific Plans include recognition of projected sea level rise, and policy and goals statements that encourage future development projects to adapt.

6.4 Mitigation Action Plan

A number of mitigation strategies are already complete in Oakland. Those actions and programs which the City and the Port of Oakland commit to implement, or to seek funding for implementation, during the years 2016-2021, are described in this section, and are more fully detailed, in Table 18, below.

6.4.1 Mitigation actions and measures completed 2010-2015

The City has completed several of the mitigations during the previous LHMP.

1. Buildings and Facilities
    - New City facilities, built to current acceptable seismic standards: East Oakland Sports Center; 81st Avenue Library; Golden Gate Recreation Center; Fire Stations #8 and #18; Sailboat House Shoreline Improvements (flood protection and ADA).
    - Fire prevention: 1,400 acres of brush clearance using goats during May-September; 250 cubic yards of invasive species removal with volunteer assistance;

2. Greenhouse Gas (GHG) Inventory
    - Inventory global warming emissions in local government's operations and in the community, set reduction targets and create an action plan. The Oakland Energy and Climate Acton Plan (ECAP) was adopted in 2012, and will be updated in 2016.

3. Disaster Planning and Communications
    - A Mass Notification system is in place, as of January 1, 2016
      When local emergencies or disasters occur, the City of Oakland uses a mass notification system to communicate concise information and instructions to Oakland employees, residents, visitors and businesses including the type of incident and instructions or actions to take to remain safe.

      Internally, the system is used for activations of the Emergency Operations Center (EOC) and for callouts for multi-alarm fires.

      Effective January 1, 2016 the City of Oakland will be participating in "EverBridge," the Alameda County Alert System. The EverBridge system is internet-based and can send emergency messaging via telephone, Short Message Service (SMS) text message, email, instant message, fax or TTY/TDD.

The database currently includes all public "listed" phone numbers, in addition the new system allow for Oakland residents to "opt-in" at ACAlert.org and add unlisted numbers as well as select from a variety of preferred messaging priorities. The new system will also allow for residents to "opt-in" to receive additional "urgent" messages for:

- City of Oakland Events & Information
- Fire Red Flag Warnings Fire Red Flag Warnings
- Urgent Oakland Business Alerts Urgent Oakland Business Alerts
- Urgent Oakland Resident Alerts

4. Oil Spill response

Since July 1995, the Oakland Fire Department's Emergency Management Services Division (EMSD) has been the lead agency for development and implementation of the Alameda County Local Oil Spill Contingency Plan (ACLOSP).

The Emergency Management Services Division receives grant funding to make revisions and updates to the local plan, participate in the development of a Memorandum of Understanding (MOU) between the CDFW, Alameda County Operational Area, the City of Oakland and participating cities, and conduct and participate in trainings and exercises.

In 2015, the City Council approved by Resolution (No. 85531 C.M.S.) a Memorandum of Understanding (MOU) between the City of Oakland Emergency Management Services Division and the Alameda County Operational Area for oil spill planning. The new agreement ensures the City of Oakland will continue to play a prominent role in planning, mitigating, responding to and training for oil spills.

5. Disaster Recovery Framework

The City of Oakland's Disaster Recovery Framework project includes development of a best practices document and localizing the planning products to coordinate and manage long-term recovery after a catastrophic event.

Key objectives:

o Validation of the health, social, economic, natural and environmental Recovery Support Functions (RSFs).

o Build resiliency from the local jurisdiction up to the nation.

o Development of the "Recovery Framework Resources and Tool Kit".

6.4.2 Mitigation actions to complete, 2016-2021

Each hazard mitigation measure below that the City commits to either implement, or seekfunding for, is explained in greater detail in Table 18 below. Port of Oakland mitigation measures are included in Section V.

I. Building and Facilities

1. Safer Housing for Oakland: Soft Story Apartment Retrofit Program
2. Earthquake Safe Homes Program

II. Infrastructure

3. Green Infrastructure Planning
4. "Detain the Rain" -- Stormwater detention on private property
5. City of Oakland, Stormwater infrastructure improvements
6. Review and Collaborate with BCDC on Adapting to Rising Tides mitigation strategies

III. Fire Prevention

7. Wildfire Prevention Assessment District (WPAD) re-authorization
8. Defensible Space Vegetation Program to reduce Wildfire hazards
9. Amend Oakland Planning Code to adopt a "Fire-safe Combining Zone" for future construction

IV. Emergency Planning and preparations

10. Reliable Water Supply during Fires
11. Continuity of Operations Emergency Planning
12. Emergency Notification Systems
13. Assessment and retrofits of Critical Facilities and Infrastructure

V. Port of Oakland – Airport and Maritime Mitigations

14. Oakland International Airport, Old Earhart Road Floodwall Improvements
15. Oakland International Airport Perimeter Dike
16. Maritime Terminal Study on Liquefaction Potential
17. Middle Harbor Shoreline Park Dike repair
18. Maritime Intelligent Transportation System (ITS)
19. Maritime Area Seismic Monitors
20. Sea Level Rise Vulnerability and Assessment Improvement Plan

Table 18. Mitigation Strategies to be implemented or continued, 2016-2021.

STRATEGY DEVELOPMENT INFORMATION							
Strategy Name	**Green Infrastructure Planning**						
Hazard(s) Addressed	Earthquake Ground Shaking	Earthquake Liquefaction	**Current Flooding**	**Future Flooding**	Wildfire	Landslide	Other Hazards
Strategy Type	Evaluation	Program/ Operation	**Policy Development**	**Coordination**	**Education/ Outreach**		
Process/ Implementation Mechanism	Long-Range Planning	Land Use Planning	**Capital Planning**	Operations	**Emergency & Hazards Planning**	**Project Planning & Design**	**New Initiatives**
Responsible Agency	Oakland Public Works						
Partners							
STRATEGY IMPLEMENTATION INFORMATION							
Priority	High						
Actions/ Activities	Oakland is developing a Green Infrastructure Plan to identify areas of opportunity and standards for inclusion of green infrastructure in public capital projects - such as streetscape renovations, park projects, and parking lot retrofits among others. Green infrastructure is a term for stormwater detention systems - such as rain gardens, tree wells, bioswales, green roofs, living walls, and permeable pavement.						
Staff Lead	Kristin Hathaway, Watershed Program Supervisor						
Cost Estimate							
Benefits (losses avoided)	The purpose of this planning effort is to detain stormwater runoff during storm events to achieve a measurable reduction in downstream flows in order to reduce flooding, erosion, landslides, and sedimentation. In addition to mitigating the risk of the aforementioned hazards, the project will provide co-benefits including groundwater recharge, protection and/or creation of habitat and open space, augmenting green space, neighborhood beautification, and climate change mitigation.						
Potential Funding Sources	Grant funding						
Timeline	2016-2021						

STRATEGY DEVELOPMENT INFORMATION							
Strategy Name	**"Detain the Rain" : Storm water detention on private property**						
Hazard(s) Addressed	Earthquake Ground Shaking	Earthquake Liquefaction	**Current Flooding**	**Future Flooding**	Wildfire	Landslide	Other Hazards
Strategy Type	Evaluation	**Program/ Operation**	Policy Development	Coordination	**Education/ Outreach**		
Process/ Implementation Mechanism	Long-Range Planning	Land Use Planning	**Capital Planning**	Operations	**Emergency & Hazards Planning**	**Project Planning & Design**	**New Initiatives**
Responsible Agency	Oakland Public Works						
Partners							
STRATEGY IMPLEMENTATION INFORMATION							
Priority	High						
Actions/ Activities	The City of Oakland will establish a "Detain the Rain" program that will work with homeowners and residents across the City to install stormwater detention systems on private properties. The City will outreach to residents throughout the City, with a focus on residents in the Oakland hills where landslides and erosions issues are more prevalent, to recruit participants in the project. Residents who elect to participate in the program will be provided with design and installation assistance for establishing a stormwater detention system at their property or residence. The residents will be given a variety of stormwater detention options from which to choose including cisterns, large rain barrels, a rain garden or bioretention area, a flow-through planter, or permeable pavement.						
Staff Lead	Kristin Hathaway, Watershed Program Supervisor						
Cost Estimate							
Benefits (losses avoided)	The purpose of this program is to detain stormwater runoff during storm events to achieve a measurable reduction in downstream flows in order to reduce flooding, erosion, landslides, and sedimentation. In addition to mitigating the risk of the aforementioned hazards, the project will provide co-benefits including groundwater recharge, protection and/or creation of habitat and open space, augmenting green space, neighborhood beautification, and climate change mitigation.						
Potential Funding Sources	Grants						
Timeline	2016-2021						

STRATEGY DEVELOPMENT INFORMATION							
Strategy Name	**City of Oakland – Stormwater infrastructure Improvements**						
Hazard(s) Addressed	Earthquake Ground Shaking	Earthquake Liquefaction	Current Flooding	**Future Flooding**	Wildfire	Landslide	Other Hazards
Strategy Type	**Evaluation**	Program/ Operation	Policy Development	Coordination	Education/ Outreach		
Process/ Implementation Mechanism	**Long-Range Planning**	Land Use Planning	Capital Planning	**Operations**	**Emergency & Hazards Planning**	Project Planning & Design	New Initiatives
Responsible Agency	City of Oakland, Oakland Public Works						
Partners							
STRATEGY IMPLEMENTATION INFORMATION							
Priority	High						
Actions/ Activities	The City of Oakland will pursue funding for design and construction of storm drainage projects to protect vulnerable properties, including property acquisitions, upstream storage such as detention basins, and channel widening (with the associated right of way acquisitions, relocations, and environmental mitigations). The City will also continue to repair and make structural improvements to storm drains, pipelines, and/or channels, to enable them to perform to their design capacity in handling water flows as part of their regular maintenance activities.						
Staff Lead	Brooke Levin, Director, Oakland Public Works						
Cost Estimate							
Benefits (losses avoided)	Reduced flooding. Reduced hazards and litter entering the stormwater system, and ultimately the San Francisco Bay.						
Potential Funding Sources	Grants						
Timeline	2016-2021						

STRATEGY DEVELOPMENT INFORMATION							
Strategy Name	**Review and Collaborate with BCDC on Adapting to Rising Tides mitigation strategies**						
Hazard(s) Addressed	Earthquake Ground Shaking	Earthquake Liquefaction	**Current Flooding**	**Future Flooding**	Wildfire	Landslide	Other Hazards
Strategy Type	**Evaluation**	Program/ Operation	Policy Development	**Coordination**	Education/ Outreach		
Process/ Implementation Mechanism	Long-Range Planning	**Land Use Planning**	Capital Planning	Operations	**Emergency & Hazards Planning**	Project Planning & Design	**New Initiatives**
Responsible Agency	City of Oakland, Bureau of Planning; Oakland Public Works						
Partners	BCDC						
STRATEGY IMPLEMENTATION INFORMATION							
Priority	High						
Actions/ Activities	City staff will continue to work in collaboration with BCDC to evaluate and cost estimate the mitigation measures proposed in the Adapting to Rising Tides initiative, specifically the measures in the "Oakland/Alameda Resilience Study Phase 1 Report: Vulnerability and Risk Assessment Findings."						
Staff Lead							
Cost Estimate	Unknown						
Benefits (losses avoided)	Identify capital projects which will reduce the risk of flooding during future storm events, following sea-level rise changes to SF Bay.						
Potential Funding Sources							
Timeline	2016-2021						

STRATEGY DEVELOPMENT INFORMATION							
Strategy Name	**Safer Housing for Oakland: Soft Story Apartment Retrofit Program**						
Hazard(s) Addressed	**Earthquake Ground Shaking**	**Earthquake Liquefaction**	Current Flooding	Future Flooding	Wildfire	Landslide	Other Hazards
Strategy Type	Evaluation	Program/ Operation	**Policy Development**	Coordination	**Education/ Outreach**		
Process/ Implementation Mechanism	Long-Range Planning	Land Use Planning	Capital Planning	Operations	**Emergency & Hazards Planning**	Project Planning & Design	**New Initiatives**
Responsible Agency	Department of Planning and Building, Building Division						
Partners	City of Oakland Rent Board; ABAG						
STRATEGY IMPLEMENTATION INFORMATION							
Priority	High						
Actions/ Activities	Twenty-two thousand (22,000) rental units in Oakland are in the type of building called "soft story." With large open spaces on the ground floor for parking or shops, these buildings lack adequate strength and stiffness in their first story. Safer housing, which will make Oakland more resilient to earthquakes, requires investing in seismic retrofits. Retrofitting the housing stock can help saves lives and keep people in their homes and out of emergency shelters. Keeping people in their homes after an earthquake ensures that residents can go to work, send their children to school and continue to contribute to the local economy. The City of Oakland seeks to preserve the character of its diverse communities by designing a soft story retrofit program that (1) makes housing safer and saves lives, (2) facilitates emergency response and housing recovery, (3) keeps Oakland residents in Oakland, and (4) softens the economic blow of a major disaster. The City seeks to: (1) establish the retrofit program; (2) provide financial support to building owners to complete retrofits. As of March 2016, such an ordinance had not yet been adopted by Council.						
Staff Lead	Dave Harlan, Department of Planning and Building, Building Division						
Cost Estimate	The cost of retrofitting apartment buildings is on average $10,000 per unit. Since most buildings have between 5 and 25 units, the costs for retrofitting could range from $50,000 to $250,000 per building. Total activity cost: $4 million						
Benefits (losses avoided)	Retrofitting soft story apartment buildings will likely save lives, minimize injuries and help keep people in their homes after a major disaster.						
Potential Funding Sources	City's Federal Community Development Block Grant (CDBG) funds; grants.						
Timeline	2016-2021						

STRATEGY DEVELOPMENT INFORMATION							
Strategy Name	**Earthquake Safe Homes Program**						
Hazard(s) Addressed	**Earthquake Ground Shaking**	**Earthquake Liquefaction**	Current Flooding	Future Flooding	Wildfire	Landslide	Other Hazards
Strategy Type	Evaluation	**Program/ Operation**	Policy Development	Coordination	**Education/ Outreach**		
Process/ Implementation Mechanism	Long-Range Planning	Land Use Planning	Capital Planning	Operations	**Emergency & Hazards Planning**	Project Planning & Design	**New Initiatives**
Responsible Agency	Ms. Michele Byrd Director, Housing and Community Development						
Partners	ABAG						
STRATEGY IMPLEMENTATION INFORMATION							
Priority	High						
Actions/ Activities	Up to 600 single-family homes with a high risk of damage due to foundation shifting and structural failure due to a major earthquake will be seismically retrofitted as part of the City of Oakland's Earthquake-Safe Homes Program. The program will be open to all Single-Family homes within the City of Oakland, with a priority placed on homes located in areas prone to liquefaction based on data provided by CALGS/USGS. The Earthquake-Safe Homes Program will have three primary components: (1) re-establishing a single-family seismic retrofit program previously funded through the City's Redevelopment Agency; (2) leveraging the City's existing community outreach network, current pipeline of homes in need of retrofit, and existing housing rehab intake process to solicit and process applications expeditiously; (3) deploying financial assistance to homeowners to complete code-compliant seismic retrofits. While the project area is citywide, priority will be given to homes located in, or adjacent to, a liquefaction zone. Eligible homes must be light, wood-framed residential structures with a raised foundation that includes cripple or stem walls.						
Staff Lead	Loyd Ware, Manager, Residential Lending Services						
Cost Estimate	The Earthquake-Safe Homes Program will support qualifying seismic retrofits for owner-occupied single-family homes, averaging between $5,000-$10,000, and require a 25% match from the homeowner-occupant. Total project cost of $3 million represents 600 homes, at $5,000 grant for each.						
Benefits (losses avoided)	Significantly reduce injury and loss of life, minimize damage to homes, protect the environment, and promote hazard mitigation as an integrated public policy.						
Potential Funding Sources	Grants						
Timeline	2016-2021						

STRATEGY DEVELOPMENT INFORMATION							
Strategy Name	**Wildfire Prevention Assessment District (WPAD) re-authorization**						
Hazard(s) Addressed	Earthquake Ground Shaking	Earthquake Liquefaction	Current Flooding	Future Flooding	**Wildfire**	Landslide	Other Hazards
Strategy Type	**Evaluation**	**Program/ Operation**	Policy Development	Coordination	Education/ Outreach		
Process/ Implementation Mechanism	Long-Range Planning	Land Use Planning	Capital Planning	**Operations**	**Emergency & Hazards Planning**	Project Planning & Design	New Initiatives
Responsible Agency	Oakland Fire Department						
Partners	Wildfire Prevention Assessment District Citizen Advisory Board						
STRATEGY IMPLEMENTATION INFORMATION							
Priority	High						
Actions/ Activities	Approximately Sixteen square miles of the Oakland Hills are designated as a High Fire Severity Zone. The Wildfire Prevention Assessment District (WPAD) was created in 2004 and assessed a parcel tax of $65 annually per single family residence for a period of 10 years, concluding in 2014. A City Council appointed Citizen Advisory Board provides oversight on the use of the accrued fund balance. This funding is used specifically for abatement measures and public education within the High Fire Severity zone. Fire Department residential and vacant lot compliance inspections, roadside fuels reduction projects, free residential curbside chipping and debris pile removal, goat grazing on City open spaces and parks, fire prevention and education outreach and a matching grant program of up to $5,000 per home to pay for tree thinning, brush cutting and other fuel reduction measures have been possible because of the WPAD parcel tax funding. The City will put the renewal of the WPAD on the ballot for voters, during the Local Hazard Mitigation Plan period of 2016-2021.						
Staff Lead	Fire Marshal Miguel Trujillo						
Cost Estimate							
Benefits (losses avoided)	Reduction of wildfire hazards.						
Potential Funding Sources							
Timeline	2016-2021						

STRATEGY DEVELOPMENT INFORMATION							
Strategy Name	**Reliable Water Supply during Fires**						
Hazard(s) Addressed	Earthquake Ground Shaking	Earthquake Liquefaction	Current Flooding	Future Flooding	**Wildfire**	Landslide	**Other Hazards**
Strategy Type	Evaluation	**Program/ Operation**	Policy Development	Coordination	Education/ Outreach		
Process/ Implementation Mechanism	Long-Range Planning	Land Use Planning	Capital Planning	**Operations**	**Emergency & Hazards Planning**	Project Planning & Design	New Initiatives
Responsible Agency	Oakland Fire Department						
Partners	East Bay Municipal Utility District (EBMUD)						
STRATEGY IMPLEMENTATION INFORMATION							
Priority	Ongoing						
Actions/ Activities	Ensure a reliable source of water for fire suppression (meeting acceptable standards for minimum volume and duration of flow) for existing and new development. Continue to coordinate between fire jurisdictions and EBMUD to identify needed improvements to the water distribution system, initially focusing on areas of highest wildfire hazard (including wildfire threat areas and in wildland-urban-interface areas).						
Staff Lead	Fire Marshal Miguel Trujillo						
Cost Estimate							
Benefits (losses avoided)	Reduction of wildfire and structural fire hazards.						
Potential Funding Sources							
Timeline	2016-2021						

STRATEGY DEVELOPMENT INFORMATION							
Strategy Name	**Defensible Space Vegetation Program to reduce Wildfire hazards; Preparation of a Vegetation Management Plan**						
Hazard(s) Addressed	Earthquake Ground Shaking	Earthquake Liquefaction	Current Flooding	Future Flooding	**Wildfire**	Landslide	Other Hazards
Strategy Type	Evaluation	**Program/ Operation**	Policy Development	Coordination	**Education/ Outreach**		
Process/ Implementation Mechanism	Long-Range Planning	Land Use Planning	Capital Planning	**Operations**	**Emergency & Hazards Planning**	Project Planning & Design	New Initiatives
Responsible Agency	Oakland Fire Department						
Partners	Wildfire Prevention Assessment District, Citizen Advisory Board						
STRATEGY IMPLEMENTATION INFORMATION							
Priority	Ongoing						
Actions/ Activities	Continue the defensible space vegetation program that includes the clearing or thinning of non-fire resistive vegetation within 10 feet of access and evacuation roads and routes to critical facilities, or all non-native species (such as eucalyptus and pine, but not necessarily oaks) within 10 feet of access and evacuation roads and routes to critical facilities. Clearing a 30 foot fuel reduction zone around all buildings/structures. Additional space may be required based on site conditions and/or topography. On properties of a half acre or more, create a 100-foot defensible space/fuel reduction zone from all building and neighboring structures. Prepare the Vegetation Management Plan.						
Staff Lead	Fire Marshal Miguel Trujillo						
Cost Estimate	Unknown						
Benefits (losses avoided)	Reduction of wildfire hazards.						
Potential Funding Sources							
Timeline	2016-2021						

STRATEGY DEVELOPMENT INFORMATION							
Strategy Name	**Amend Oakland Planning Code to adopt a "Fire-safe Combining Zone" for future construction**						
Hazard(s) Addressed	Earthquake Ground Shaking	Earthquake Liquefaction	Current Flooding	Future Flooding	**Wildfire**	Landslide	Other Hazards
Strategy Type	Evaluation	Program/ Operation	**Policy Development**	**Coordination**	Education/ Outreach		
Process/ Implementation Mechanism	Long-Range Planning	**Land Use Planning**	Capital Planning	Operations	Emergency & Hazards Planning	Project Planning & Design	New Initiatives
Responsible Agency	City of Oakland, Bureau of Planning						
Partners	Oakland Fire Department; Wildfire Prevention Assessment District, Citizen Advisory Board						
STRATEGY IMPLEMENTATION INFORMATION							
Priority	Moderate						
Actions/ Activities	The Planning Bureau will draft for public review a new "combining zone" mapped in the Oakland Hills, at the boundaries of the designated High Fire Severity Zone. The proposed "Fire-Safe" combining zone will have design standards for all new and renovated buildings in the Oakland Hills (where mapped) that specify fire-resistant materials and fire-preventative architecture; and landscaping standards that meet with Oakland Fire Department and industry-standard best practices.						
Staff Lead	Bureau of Planning						
Cost Estimate							
Benefits (losses avoided)	Further regulatory authority to require the design of "fire-safe" homes and landscaping in the Oakland Hills, reducing the risk of future damage from wildfire.						
Potential Funding Sources							
Timeline	2016-2021						

STRATEGY DEVELOPMENT INFORMATION							
Strategy Name	**Continuity of Operations Emergency Planning**						
Hazard(s) Addressed	**Earthquake Ground Shaking**	Earthquake Liquefaction	**Current Flooding**	**Future Flooding**	**Wildfire**	Landslide	**Other Hazards**
Strategy Type	**Evaluation**	**Program/ Operation**	Policy Development	**Coordination**	Education/ Outreach		
Process/ Implementation Mechanism	**Long-Range Planning**	Land Use Planning	Capital Planning	Operations	**Emergency & Hazards Planning**	Project Planning & Design	New Initiatives
Responsible Agency	Oakland Fire Department -- Emergency Management Services Division						
Partners	Oakland City Administrator's Office						
STRATEGY IMPLEMENTATION INFORMATION							
Priority	High						
Actions/ Activities	The Oakland Fire Department will continue to develop a continuity of operations plan that includes back-up storage of vital records, such as plans and back-up procedures to pay employees and vendors if normal finance department operations are disrupted, as well as other essential electronic files. Continue to plan for the emergency relocation of government-owned facilities critical to recovery, as well as any facilities with known structural deficiencies or in hazardous areas. Continue to conduct comprehensive programs to identify and mitigate problems with facility contents, architectural components, and equipment that will prevent critical buildings from being functional after major natural disasters. Such contents and equipment includes computers and servers, phones, files, and other tools used by staff to conduct daily business. Maintain the local government's emergency operations center in a fully functional state of readiness. Complete Phase 3 of the Recovery Support Function process, with Council adoption expected in 2017.						
Staff Lead	Cathey Eide, Manager						
Cost Estimate	Unknown						
Benefits (losses avoided)	Resiliency and function of government, following a disaster						
Potential Funding Sources							
Timeline	2016-2021, continual						

STRATEGY DEVELOPMENT INFORMATION							
Strategy Name	**Emergency Notification Systems**						
Hazard(s) Addressed	**Earthquake Ground Shaking**	**Earthquake Liquefaction**	**Current Flooding**	**Future Flooding**	**Wildfire**	**Landslide**	**Other Hazards**
Strategy Type	Evaluation	**Program/ Operation**	Policy Development	Coordination	Education/ Outreach		
Process/ Implementation Mechanism	Long-Range Planning	Land Use Planning	Capital Planning	**Operations**	**Emergency & Hazards Planning**	Project Planning & Design	New Initiatives
Responsible Agency	Oakland Fire Department -- Emergency Management Services Division						
Partners							
STRATEGY IMPLEMENTATION INFORMATION							
Priority	High						
Actions/ Activities	Install alert and warning systems for rapid evacuation, or shelter-in-place. Such systems include outdoor sirens and/or reverse-911 calling systems. The City is in progress with this measure, and is currently updating the siren system citywide. A new Mass Notification system is in place as of January 1, 2016. The City conducts periodic tests of the alerting and warning system.						
Staff Lead	Cathey Eide, Manager						
Cost Estimate							
Benefits (losses avoided)	Communication of disaster-relief information to the public and to emergency responders.						
Potential Funding Sources							
Timeline	2016-2021						

STRATEGY DEVELOPMENT INFORMATION							
Strategy Name	**Assessment and retrofits of Critical Facilities and Infrastructure/ Infrastructure Operators**						
Hazard(s) Addressed	**Earthquake Ground Shaking**	**Earthquake Liquefaction**	**Current Flooding**	**Future Flooding**	**Wildfire**	**Landslide**	**Other Hazards**
Strategy Type	**Evaluation**	Program/ Operation	Policy Development	Coordination	Education/ Outreach		
Process/ Implementation Mechanism	Long-Range Planning	Land Use Planning	Capital Planning	Operations	**Emergency & Hazards Planning**	Project Planning & Design	New Initiatives
Responsible Agency	Oakland Fire Department -- Emergency Management Services Division; Oakland Public Works, Bureau for Facilities and Environment						
Partners							
STRATEGY IMPLEMENTATION INFORMATION							
Priority	High						
Actions/ Activities	Assessment and Retrofit Plans of Critical Facilities and Infrastructure are complete, but funding is needed to retrofit or replace critical lifeline facilities and/or their backup facilities that are shown to be vulnerable to damage in natural disasters. The City is working towards pre-positioning emergency power generation capacity (or have rental/lease agreements for these generators) in critical buildings of cities, counties, and special districts to maintain continuity of government and services, but funding is needed. The City continues to participate in the CalCOP program, and regularly assesses the vulnerability of critical facilities (such as city halls, fire stations, operations and communications headquarters, community service centers, seaports, and airports) to damage in natural disasters and make recommendations for appropriate mitigation. Assess the vulnerability of critical facilities owned by infrastructure operators subject to damage in natural disasters or security threats, including fuel tanks and facilities owned outside of the Bay Area that can impact service delivery within the region.						
Staff Lead	Cathey Eide, EMSD; Susan Kattchee, Oakland Public Works						
Cost Estimate							
Benefits (losses avoided)	Resiliency and use of critical facilities, following a disaster.						
Potential Funding Sources	Grants						
Timeline	2016-2021						

STRATEGY DEVELOPMENT INFORMATION							
Strategy Name	**Port of Oakland – Oakland International Airport, Old Earhart Road Floodwall Improvements**						
Hazard(s) Addressed	Earthquake Ground Shaking	Earthquake Liquefaction	**Current Flooding**	**Future Flooding**	Wildfire	Landslide	Other Hazards
Strategy Type	Evaluation	Program/ Operation	Policy Development	Coordination	Education/ Outreach		
Process/ Implementation Mechanism	Long-Range Planning	Land Use Planning	**Capital Planning**	Operations	**Emergency & Hazards Planning**	Project Planning & Design	**New Initiatives**
Responsible Agency	Port of Oakland—Oakland International Airport						
Partners							
STRATEGY IMPLEMENTATION INFORMATION							
Priority	High						
Actions/ Activities	In 2015, the Oakland International Airport (OAK) finished a significant airfield safety, grading and drainage project called the Runway Safety Area Project. A new capital project, the Old Earhart Road Floodwall Improvement, is a localized project to reduce the risk of flooding to the North Field. Old Earhart Road is aligned between two high areas on the north side of the North Field. Linking these two high areas by raising the road, and linking the raised road with two short flood walls, totaling 530 feet, would greatly reduce the flood risk for the whole North Field.						
Staff Lead	Joshua Polston, Port of Oakland						
Cost Estimate	$800,000.						
Benefits (losses avoided)	Reduced flood risk for North Field runways of Oakland International Airport.						
Potential Funding Sources	Undetermined						
Timeline	2016-2021						

STRATEGY DEVELOPMENT INFORMATION							
Strategy Name	**Port of Oakland – Oakland International Airport Perimeter Dike**						
Hazard(s) Addressed	**Earthquake Ground Shaking**	Earthquake Liquefaction	**Current Flooding**	**Future Flooding**	Wildfire	Landslide	Other Hazards
Strategy Type	Evaluation	Program/ Operation	Policy Development	Coordination	Education/ Outreach		
Process/ Implementation Mechanism	**Long-Range Planning**	Land Use Planning	**Capital Planning**	Operations	**Emergency & Hazards Planning**	Project Planning & Design	New Initiatives
Responsible Agency	Port of Oakland – Oakland International Airport						
Partners	FEMA, State of California						
STRATEGY IMPLEMENTATION INFORMATION							
Priority	High						
Actions/ Activities	The Oakland International Airport (OAK) is seeking funding for new capital projects, which will protect the Airport from flooding and sea-level rise. The existing Airport Perimeter Dike provides flood and shoreline protection to the Airport main passenger and cargo runway, part of which are below sea level. The Dike is approximately 4.5 miles long and is composed primarily of sand, gravel or clay. Some segments of the Dike do not meet current flood control standards of FEMA, while other segments are susceptible to liquefaction in a major earthquake. The Airport Perimeter Dike project, which can be phased, will provide additional flood and shoreline protection to the Airport main passenger terminal and cargo runway.						
Staff Lead	Joshua Polston, Port of Oakland						
Cost Estimate	Total cost is $55 million; remaining funding needed after Phase 1 is $42.5 million.						
Benefits (losses avoided)	• Protects and preserves critical airport infrastructure, including the primary passenger and cargo operations runway. • Improves stability and safety of the Dike, to resist against a major earthquake. • Protects OAK against projected sea-level rise and major storm events • Allows the Airport to meet FEMA's flood zone certification criteria • Increases protection for major utilities and pipelines located within the Dike.						
Potential Funding Sources	Port of Oakland, State of California,						
Timeline	Construction of first phase, estimated at $12 million, starts in early 2016.						

STRATEGY DEVELOPMENT INFORMATION							
Strategy Name	**Port of Oakland – Maritime Terminal Study on Liquefaction Potential**						
Hazard(s) Addressed	Earthquake Ground Shaking	**Earthquake Liquefaction**	Current Flooding	Future Flooding	Wildfire	Landslide	Other Hazards
Strategy Type	**Evaluation**	Program/ Operation	Policy Development	Coordination	Education/ Outreach		
Process/ Implementation Mechanism	Long-Range Planning	Land Use Planning	Capital Planning	Operations	**Emergency & Hazards Planning**	**Project Planning & Design**	**New Initiatives**
Responsible Agency	Port of Oakland						
Partners							
STRATEGY IMPLEMENTATION INFORMATION							
Priority	High						
Actions/ Activities	The Port of Oakland is located in a geographic area highly prone to liquefaction, and as a result, infrastructure damage from seismic activity. The Port has determined that in order to mitigate risk and prepare for imminent seismic events, it is necessary to conduct a liquefaction study at the marine terminals. This study will evaluate the liquefaction potential throughout the marine terminals at Port of Oakland and its effects on Port infrastructure. The study will identify areas and facilities most at risk for liquefaction and outline a plan for mitigation, retrofit, and emergency response.						
Staff Lead	Richard Sinkoff, Port of Oakland, Director of Environmental Programs and Planning						
Cost Estimate	Estimated cost of $1 Million. Scoping for this project has not started and is unfunded.						
Benefits (losses avoided)	Reduced risk to Maritime terminals from liquefaction from an earthquake; continued operations of the Maritime Port following a disaster.						
Potential Funding Sources	Undetermined						
Timeline	The Study is expected to last three to five years.						

STRATEGY DEVELOPMENT INFORMATION							
Strategy Name	**Port of Oakland -- Middle Harbor Shoreline Park Dike repair**						
Hazard(s) Addressed	Earthquake Ground Shaking	Earthquake Liquefaction	**Current Flooding**	**Future Flooding**	Wildfire	Landslide	Other Hazards
Strategy Type	Evaluation	Program/ Operation	Policy Development	**Coordination**	Education/ Outreach		
Process/ Implementation Mechanism	Long-Range Planning	Land Use Planning	**Capital Planning**	**Operations**	**Emergency & Hazards Planning**	Project Planning & Design	**New Initiatives**
Responsible Agency	Port of Oakland						
Partners	East Bay Regional Parks District						
STRATEGY IMPLEMENTATION INFORMATION							
Priority	High						
Actions/ Activities	The Middle Harbor Shoreline park (Park) is owned by the Port of Oakland and maintained by East Bay Regional Parks District. The Park is located adjacent to the southwest corner of the Port of Oakland, next to the Oakland International Container Terminal. Over the past years, the existing dike facing the Oakland Inner Harbor channel at the park is slowly sliding into the channel and now significantly lower than before. Initial site investigation and assumptions indicate that this could be a result of channel dredging undercutting the dike, or seismic activity from the recent earthquake in the Sonoma Valley. Before construction activities can occur to repair the seawall, a geotechnical study will need to be conducted to determine the source of slipping. The study will identify a design option that can be implemented to fix/repair the dike. The Park provides an open space and Bay viewing access for the public.						
Staff Lead	Richard Sinkoff, Port of Oakland, Director of Environmental Programs and Planning						
Cost Estimate	The cost of improvements is expected to be approximately $150,000 for the geotechnical study, and $1,500,000 for construction depending on the results of the Study. This project is currently unfunded.						
Benefits (losses avoided)	Continued use of Middle Harbor Shoreline Park, following flooding						
Potential Funding Sources	Undetermined						
Timeline	2016-2021						

STRATEGY DEVELOPMENT INFORMATION							
Strategy Name	**Port of Oakland – Maritime Intelligent Transportation System (ITS)**						
Hazard(s) Addressed	Earthquake Ground Shaking	Earthquake Liquefaction	Current Flooding	Future Flooding	Wildfire	Landslide	**Other Hazards**
Strategy Type	Evaluation	**Program/ Operation**	Policy Development	Coordination	Education/ Outreach		
Process/ Implementation Mechanism	Long-Range Planning	Land Use Planning	Capital Planning	**Operations**	**Emergency & Hazards Planning**	Project Planning & Design	**New Initiatives**
Responsible Agency	Port of Oakland						
Partners	Alameda County Transportation Commission						
STRATEGY IMPLEMENTATION INFORMATION							
Priority	High						
Actions/ Activities	The Intelligent Transportation System project is meant to improve Port of Oakland operation efficiencies, provide congestion relief, and support hazard mitigation. The project would allow Port staff to view real-time traffic through CCTV video cameras and provide advanced traffic information to travelers to the Port at specific gateways and outside the Port. The project would also establish improved transportation communication with the City of Oakland and Caltrans District 4 as well as collect data for future improvements.						
Staff Lead	Richard Sinkoff, Port of Oakland, Director of Environmental Programs and Planning						
Cost Estimate	The total estimated cost to complete the project is $7.5 million. Funding has not been secured for this project. The Port has requested funding from Alameda County Transportation Commission.						
Benefits (losses avoided)	Reduced truck congestion at maritime Port; re-routing of trucks during emergencies.						
Potential Funding Sources	Alameda County Transportation Commission						
Timeline	2016: Detailed design and Right of Way Engineering are expected to take one year, and construction activities are estimated to take 12 months.						

STRATEGY DEVELOPMENT INFORMATION							
Strategy Name	**Port of Oakland -- Maritime Area Seismic Monitors**						
Hazard(s) Addressed	**Earthquake Ground Shaking**	**Earthquake Liquefaction**	Current Flooding	Future Flooding	Wildfire	Landslide	Other Hazards
Strategy Type	**Evaluation**	Program/ Operation	Policy Development	Coordination	Education/ Outreach		
Process/ Implementation Mechanism	Long-Range Planning	Land Use Planning	Capital Planning	Operations	**Emergency & Hazards Planning**	Project Planning & Design	New Initiatives
Responsible Agency	Port of Oakland						
Partners							
STRATEGY IMPLEMENTATION INFORMATION							
Priority	High						
Actions/ Activities	The Port of Oakland's Seaport terminals are generally constructed of a pile-supported wharf structure with a rip-rap/bulkhead retaining the soil at the back of the terminals. The Port proposes to implement additional Seismic monitoring equipment at Berths 23-26, and Berths 57-58, as well as repair existing equipment at berths 35-37. The limited amount of existing Seismic monitoring equipment makes it difficult for Port personnel to assess potential damage to its terminals after any major earthquake, which is an essential step before a terminal can resume operations. The proposed additional Seismic monitoring equipment installations will fill gaps in the current monitoring system by providing a more complete picture at Inner Harbor, Middle Harbor and Outer Harbor locations. It will allow Port engineers to focus on areas that are most susceptible to damage during inspection and proceed with any needed repair to resume operations in the timeliest manner.						
Staff Lead	Richard Sinkoff, Port of Oakland, Director of Environmental Programs and Planning						
Cost Estimate	The cost of the proposed improvements is estimated at approximately $600,000 for design and construction.						
Benefits (losses avoided)	Rapid renovation and operation of shipping terminals following an earthquake.						
Potential Funding Sources	Undetermined						
Timeline	2016-2021—ten months for CEQA review, design and construction.						

STRATEGY DEVELOPMENT INFORMATION							
Strategy Name	**Port of Oakland -- Sea Level Rise Vulnerability and Assessment Improvement Plan**						
Hazard(s) Addressed	Earthquake Ground Shaking	Earthquake Liquefaction	Current Flooding	**Future Flooding**	Wildfire	Landslide	Other Hazards
Strategy Type	**Evaluation**	Program/ Operation	Policy Development	Coordination	Education/ Outreach		
Process/ Implementation Mechanism	**Long-Range Planning**	Land Use Planning	Capital Planning	**Operations**	**Emergency & Hazards Planning**	Project Planning & Design	**New Initiatives**
Responsible Agency	Port of Oakland -- Maritime						
Partners							
STRATEGY IMPLEMENTATION INFORMATION							
Priority	High						
Actions/ Activities	The Port of Oakland's Sea Level Rise Vulnerability and Assessment Improvement Plan will assess the potential effects of Sea Level Rise on Maritime Facilities. The study will assess facilities Port-wide for sea level rise vulnerability and develop an implementation plan for near-term and long-term strategies to address the potential impacts. The Study will analyze the need for infrastructure such as sea walls, wharf improvements, and changes in port operations. In addition, the Study will help to establish design standards.						
Staff Lead	Richard Sinkoff, Port of Oakland, Director of Environmental Programs and Planning						
Cost Estimate	The estimated cost of the study is $2 million. This project has not been fully scoped at the time of the 2016 Hazard Mitigation Plan preparation, and is not currently funded.						
Benefits (losses avoided)	Protection of maritime facilities from flooding, due to sea level rise.						
Potential Funding Sources	Grants						
Timeline	2016-2021						

7. Plan Maintenance Procedures

The Oakland 2016-2021 Local Hazard Mitigation Plan is scheduled to be reviewed by CalOES, then considered by FEMA. After receiving an "Approval, Pending Adoption" determination from FEMA, the Oakland City Council will consider adoption of the Plan in public hearings. The Plan will be adopted by resolution as an implementation Appendix to the *Safety Element of the Oakland General Plan*.

7.1 Implementation, Monitoring, and Amendment

To ensure that the mitigation strategies in the 2016-2021 LHMP are implemented as envisioned, and to review new hazards data as it becomes available, the City Administrator's office and the Oakland Fire Department Emergency Management Services Division will monitor the mitigation measures, and periodically review the Local Hazard Mitigation Plan (LHMP), in partnership with staff from the Planning and Building Department. If LHMP Amendments are needed, legislation will be prepared, following a public review process, and approval from CalOES and FEMA.

The members of the Emergency Management and Disaster Preparedness Council, staffed by the City of Oakland, who meet quarterly, can also provide oversight, by scheduling City staff to return with periodic updates and reviews of mitigation programs in the 2016-2021 LHMP.

7.2 Continued Public Involvement

The thousands of Oakland residents and businesses who participate in CORE trainings and exercises, who contributed their ideas and comments to the Resilient Oakland initiative, and who attend one of the four community meetings held to consider the 2016-2021 LHMP, form a natural constituency and resource that the City can call upon to consider new ideas for hazard mitigation programs. The preparation, in 2020-2021, of the next Oakland Local Hazard Mitigation Plan is the best opportunity for the public to be involved with the update of the Plan, but the City will continue with education opportunities during the period between 2016 and 2021, to keep citizens informed of the natural and human-caused hazards Oakland faces, and what their City is doing to reduce the risks from those hazards.

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Appendices

Appendix A. Resilient Oakland program, *Oakland Preliminary Resilience Assessment* (2016)

Appendix B. Oakland Emergency Services Management Division Annual Report (2016)

Appendix C. Community workshop notes, photographs and City of Oakland presentation

Appendix D. Survey and summary of results, posted to www.speakupoakland.org

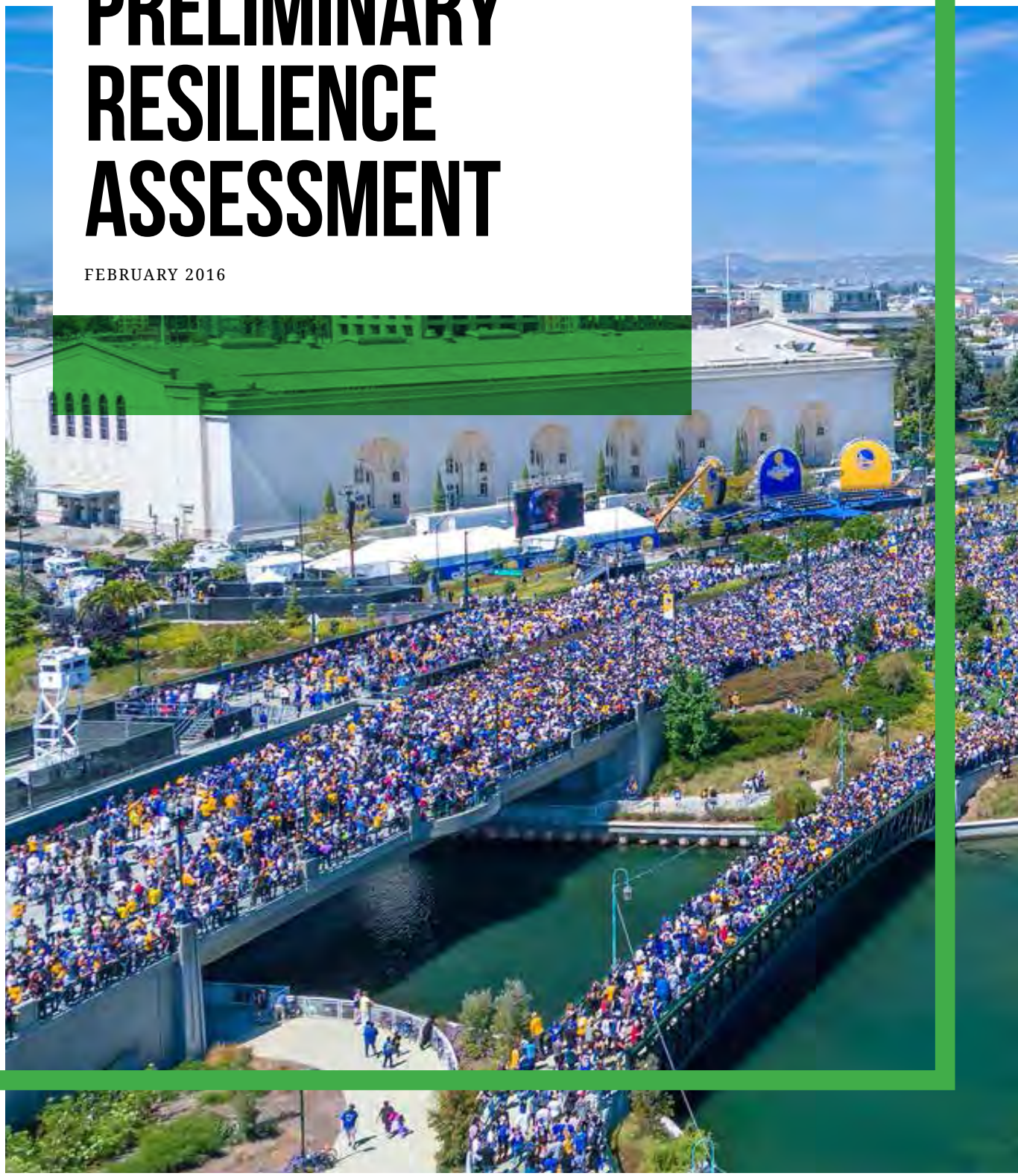
Appendix E. Hazard Mitigation Policies in the Oakland General Plan and in Specific and Area Plans.

Appendix F. Selected list of City-owned facilities

OAKLAND

PRELIMINARY RESILIENCE ASSESSMENT

FEBRUARY 2016



CITY OF OAKLAND

100 RESILIENT CITIES

About 100 Resilient Cities

Pioneered by the Rockefeller Foundation 100 Resilient Cities (100RC) is dedicated to helping cities around the world become more resilient to the physical, social and economic challenges that are a growing part of the 21st century. 100RC supports the adoption and incorporation of a view of resilience that includes not just the shocks – earthquakes, fires, floods, etc. – but also the stresses that weaken the fabric of a city on a day to day or cyclical basis. By addressing both the shocks and the stresses, a city becomes more able to respond to adverse events, and is overall better able to deliver basic functions in both good times and bad, to all populations.

The Fox Theater originally opened its doors in 1928 as an elaborate movie palace, and serves as a symbol of resilience. It shuttered in 1966 and remained closed for 40 years, surviving a fire and an earthquake, and escaping the wrecking ball before being restored to its former splendor, reopening in 2009 as part of the renewal of the Uptown theater and arts district.
Photo: Greg Linhares, City of Oakland

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For Oakland, resilience is about creating a thriving and equitable city.

Purpose of this report:

- Provide a summary of the state of resilience in Oakland today;
- Describe the work that has been done to date to understand Oakland's key threats and opportunities to build resilience; and
- Identify emerging resilience themes and translate them into focus areas to guide the development of a Resilience Strategy for Oakland.

1
Overview

CITY RESILIENCE is the capacity of individuals, communities, institutions, businesses, and systems within a city to survive, adapt, and grow no matter what kinds of chronic stresses and acute shocks they experience. By developing and implementing a Resilience Strategy, Oakland becomes more able to respond to adverse events and better able to deliver basic functions, especially to the poor and vulnerable.

"Shifting Topographies" public art installation at 19th Street BART Station
Photo: Greg Linhares, City of Oakland

RESILIENT OAKLAND

INTRODUCTION

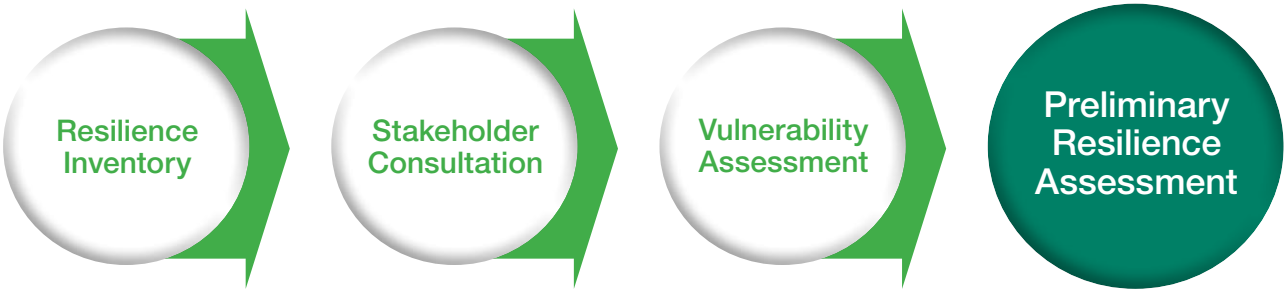
Resilient cities are those in which individuals, communities, institutions, businesses, and city systems have the capacity to survive, adapt, and grow, no matter what kinds of chronic stresses and acute shocks are experienced.

Oakland was competitively selected to join 100 Resilient Cities, pioneered by the Rockefeller Foundation. 100 Resilient Cities is a global initiative in which 100 cities around the world will become more resilient to the physical, social, and economic challenges that are a growing part of the 21st century. Oakland (the City) and its neighboring cities of San Francisco and Berkeley—as well as those farther away like New Orleans, Boston, Rome, Durban, and Rio de Janeiro—are developing comprehensive strategies that seek to build not only the physical resilience of infrastructure and the environment, but also the social resilience that creates opportunities for all residents to thrive.

Resilience requires more than just disaster preparedness or even long-term planning. Resilience requires understanding the connections between stresses, such as the links between poverty and poor health, between educational disparities and high crime, and between aging infrastructure and unemployment. Resilience requires understanding how shocks, such as earthquakes and floods, impact vulnerable residents and City budgets. Resilience requires investigating how improving any of these factors has the potential to improve others. Understanding these connections is important to ensure that future interventions will have critical and meaningful benefits across sectors, ultimately building the resilience of the City. Most of all, resilience requires that City decision-making considers social, economic, environmental, and natural hazard risks, and when hard choices are made, prioritizes solutions that address multiple risks or provide multiple resilience benefits.

Development of a Resilience Strategy allows Oakland to (1) review and confirm the City's existing level of resilience and (2) identify high-priority areas and initiatives for improving resilience and (3) strategically implement high impact projects in partnership with 100 Resilient Cities and other organizations and people committed to Oakland thriving. The Resilience Strategy is developed through a two-phase process. Phase 1 involves an initial assessment, culminating in the selection of high-priority focus areas where further work is needed, as documented in this report—the Preliminary Resilience Assessment. Phase 2 involves strategic planning to identify solutions to Oakland's most critical resilience challenges. Additional analysis and diagnostic work will be conducted around each focus area, and resilience approaches and initiatives will be identified and documented in a Resilience Strategy, which will be released in 2016. As part of the 100 Resilient Cities Network, Oakland also has the opportunity to share lessons and best practices with other cities around the globe that are developing a Resilience Strategy of their own.

Phase I: Initial Assessment



Phase II: Strategic Planning

To build resilience, Oakland will be exploring opportunities in five focus areas:

1. **Prosperous residents and families.** Personal resilience is often affected by financial resources and access to quality jobs and stable employment. Consequently, Resilient Oakland will focus on promoting the prosperity of residents and families through a more coordinated and comprehensive approach to increasing access to good jobs, building wealth, and fostering economic development.

2. **Staying rooted in Oakland.** Oakland's ability to maintain and strengthen community resilience will likely be affected by the extent to which current residents have what they need to continue to call Oakland home, and new residents and businesses become part of the existing community fabric and culture. Consequently, Resilient Oakland will identify what long-term residents of Oakland (especially the most vulnerable) need to be able to stay, and what new residents need to integrate in a way that preserves and reinforces community character.

3. **Living in safe and secure neighborhoods.** Strengthening social stability, security, and justice are critical to reducing Oakland's persistently high crime rates and the exposure of many residents to violence. Consequently, Resilient Oakland will identify innovative approaches for reducing violent crime and building community trust and the legitimacy of law enforcement.

4. **Benefiting from public infrastructure.** The infrastructure residents rely on daily to work, live, and play can also be a resource for increasing Oakland's resilience. Resilient Oakland will identify public infrastructure projects with significant impact on resilience and develop long-term strategies for how such projects should be coordinated, sequenced, and financed.

5. **Recovering from adversity.** Having the ability to quickly recover from major shocks and stresses is essential to keep Oakland residents in Oakland and to minimize displacement. Consequently, Resilient Oakland will identify what Oakland's most vulnerable residents need to build their personal and community resilience.

What builds resilience?

Research has shown that resilient cities demonstrate seven qualities that allow them to withstand, respond to and adapt more readily to shocks and stresses.

Resilient cities are:

Reflective
Using past experience to inform future decisions

Resourceful
Recognizing alternative ways to use resources

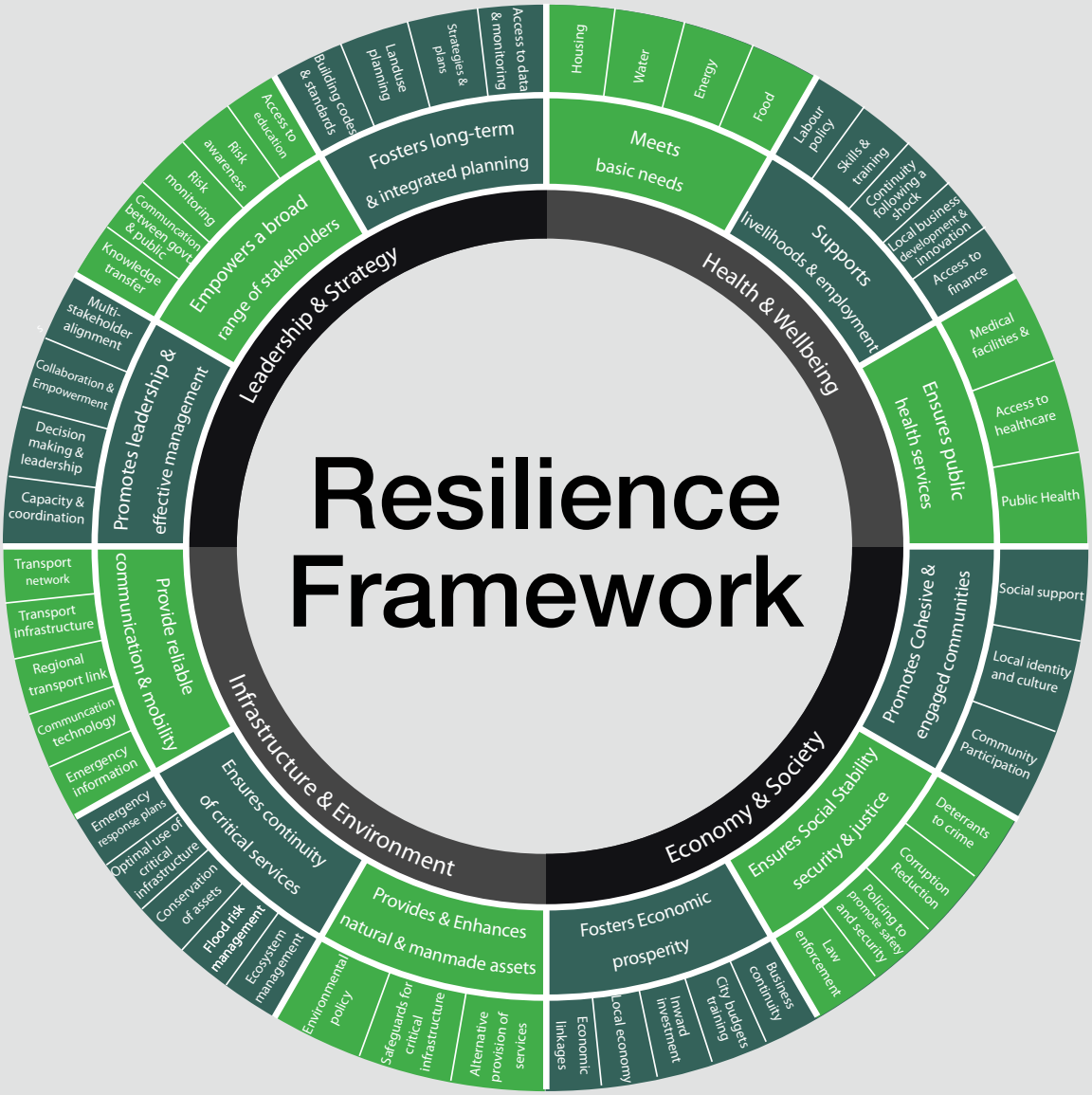
Robust
Well-conceived, constructed and managed systems

Redundant
Spare capacity purposively created to accommodate disruption

Flexible
Willingness and ability to adopt alternative strategies in response to changing circumstances

Inclusive
Prioritize broad consultation to create a sense of shared ownership in decision making

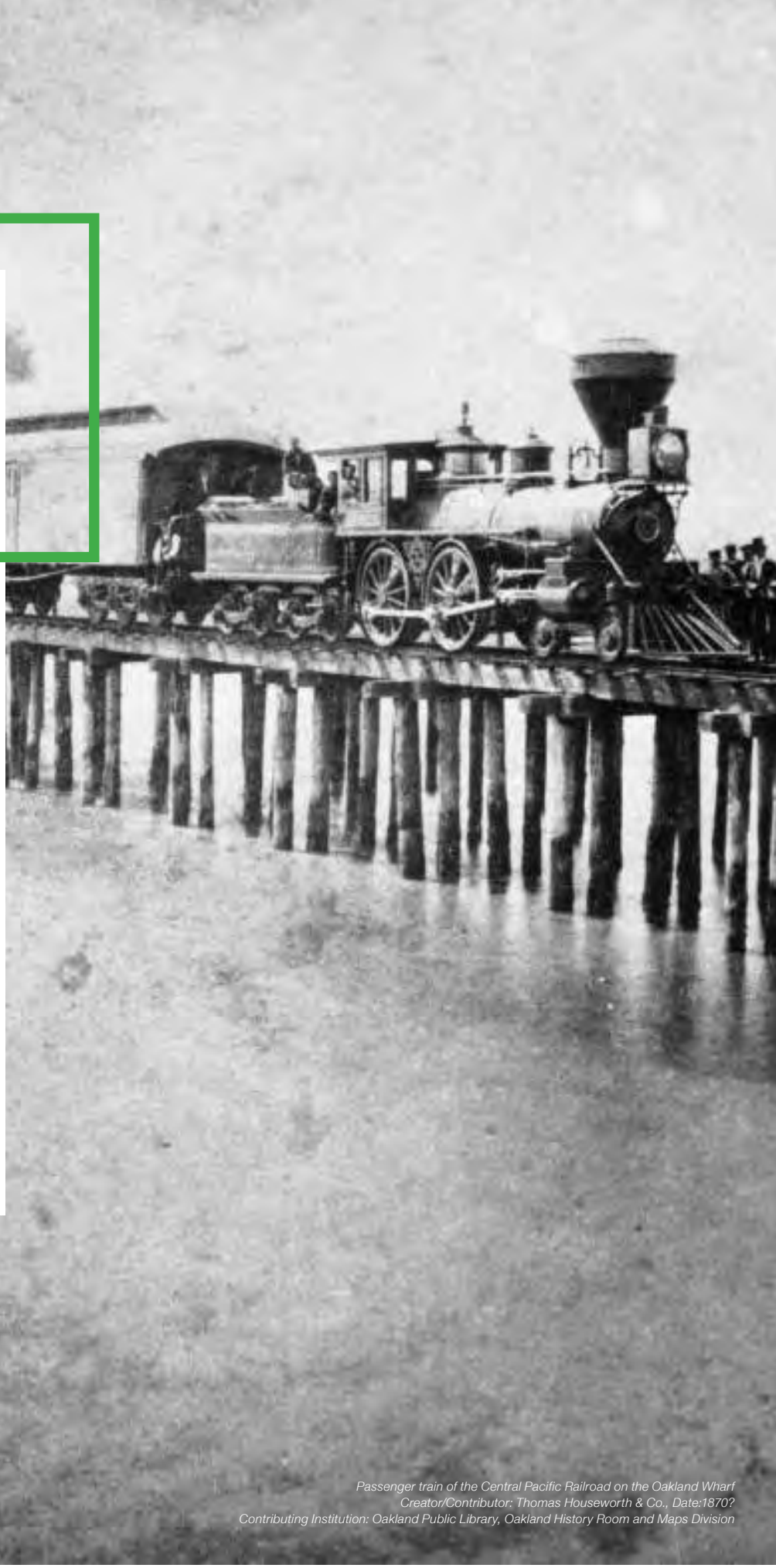
Integrated
bring together a range of distinct systems and institutions



2
History of Resilience

Since Oakland was first incorporated in 1852, it has survived, adapted, and grown amidst major earthquakes, fires, and social and economic stresses.

Today, Oakland is the county seat and largest city in Alameda County with a population of 413,775, making it the eighth largest city in the state, and one that is growing more rapidly than California as a whole.



Passenger train of the Central Pacific Railroad on the Oakland Wharf
Creator/Contributor: Thomas Houseworth & Co., Date:1870?
Contributing Institution: Oakland Public Library, Oakland History Room and Maps Division

Hearst Camp in Oakland. [Refugee tents and belongings. No. 17., Creator/Contributor: Bear Photo, S.F., Date:1906, Contributing Institution: California Historical Society

Mutual aid workers assist with response following collapse of the double-deck Cypress Street Viaduct in the 1989 Loma Prieta earthquake, Photo: Dave Hector

Aftermath of the 1991 Oakland Hills firestorm, which destroyed nearly 3,500 homes and apartments

GROWTH AND ECONOMY

When the massive 1906 earthquake devastated San Francisco, 150,000 people fled to Oakland. The City welcomed the refugees with open arms, providing food, shelter, and assistance for those relocating. Within 4 years, Oakland's population had doubled, transforming a small town into a bustling city. As the population boomed, Oakland annexed surrounding areas, more than doubling in size from 23 to 56 square miles.

The City grew into a major manufacturing hub for metals, shipbuilding, automobiles, and canneries, all of which boomed and expanded after World War I and into World War II. War jobs brought tens of thousands of workers, mostly from southern and southwestern states, to Oakland, greatly increasing the African American and Latino populations.

Following World War II, a decline in shipbuilding and automobile manufacturing industries spread unemployment and resulted in a long economic decline. Construction of the Nimitz Freeway (I-880) further stressed the city, displacing many families from West Oakland, the majority of whom were African American and Latino. However, Oakland's economy began to rebound in the 1990s, with improved Downtown mixed-use development and significant revitalization in Uptown. Oakland still benefits greatly from investments in both its seaport and airport, which have continued to be a source of economic vitality. The Port of Oakland is the fifth busiest container port in the United States, and the San Francisco Bay is among the three principal Pacific Coast gateways for U.S. containerized cargoes.

NATURAL DISASTERS

Oakland's character was shaped by two, back-to-back natural disasters: the 1989 Loma Prieta earthquake and the 1991 Oakland Hills Firestorm. The 6.9 Loma Prieta earthquake collapsed the double-deck Cypress Street Viaduct, of the portion of the Nimitz Freeway, which had divided West Oakland. The collapse killed 42 people, and the earthquake damaged unreinforced masonry buildings and rendered 5,000 residents of single-occupancy buildings homeless. However, it was also a springboard to improvement: community activists successfully fought for the reunification of West Oakland. The viaduct was torn down, and Cypress Street was renamed Mandela Parkway with a landscaped median strip planted where the viaduct once stood, spurring revitalization of West Oakland. Another result of the Loma Prieta earthquake and the outpouring of community support to assist with the rescue efforts when the Cypress Freeway collapsed was the creation of the Communities of Oakland Respond to Emergencies (CORE) Program, which was formed in April 1990. From the earthquake, it was evident that community resilience was all about neighbors helping neighbors, which

Oakland freeway underpass mural of Martin Luther King, Jr., Photo: Greg Linhares, City of Oakland

became the premise of the program. The program was again strengthened following the 1991 Oakland Hills Firestorm.

The 1991 Oakland Hills firestorm destroyed 2.5 square miles of mostly residential neighborhoods. Spread by gusting winds through heavily vegetated valleys, the fire destroyed 3,469 homes and apartment units, killed 25 people, and injured 150. In total, the firestorm cost $3.9 billion in present-day dollars. The economic losses combined with the injuries and loss of life made the Oakland Hills Firestorm the worst urban firestorm in State history.

The firestorm highlighted the dangers posed by wildland-urban interface fires in major cities, spurred research into improved prevention and firefighting techniques, and validated Oakland's efforts to engage the community in responding to disasters. Oakland firefighters now carry more extensive wildland firefighting gear and fire shelters. Fire hydrants now have the industry-standard outlets throughout the city, and water cisterns and a new Oakland Hills fire station were added. Radio communications were also improved.

In 2015, CORE celebrated its 25th anniversary, when more than 2,000 people participated in free training and public education programs for individuals, neighborhood groups, and community-based organizations. The CORE program teaches self-reliance skills and helps neighborhoods establish response teams to take care of their neighborhood until professional first responders arrive. There are more than 150 CORE-organized neighborhoods throughout the City, and for the last 10 years, the City has conducted an annual CORE Citywide Disaster Exercise to provide the opportunity for neighborhoods to practice the skills learned in the program.

HISTORY OF ACTIVISM

Championing the needs of the most vulnerable people is a hallmark characteristic of the Oakland community. The revolutionary socialist Black Panthers started in Oakland, and many Chicano and Asian rights movements drew followers and momentum from the City's residents. This history of activism is evident in everyday life through the many demonstrations in front of City Hall on issues such as living wage and renters' rights and major demonstrations against police brutality and racial profiling. This commitment to social justice and progressive views is also exemplified by the huge network of nongovernmental organizations (NGOs) that call Oakland their home. The goals of these organizations are varied, but most are committed to improving the communities in and around Oakland by empowering vulnerable citizens and directing attention (and resources) toward issues of social justice and environmental sustainability.

Resilient Oakland Initiative launch, March 25, 2015

METHODS

Oakland's resiliency strategy began with four primary exercises designed to answer four key questions. These questions help illustrate the City's baseline resiliency strengths and prioritize resilience needs.

Inventory of Existing Citywide Resilience Activities

Resilience-building activities within the City were inventoried. These activities included both City government actions, plans and projects, and external, public, private, and nonprofit activities. A desktop based approach was combined with stakeholder consultation and surveys and input from subject matter experts. This inventory is not intended to be comprehensive, as such activities continue to evolve throughout the City. Rather, this inventory builds a picture of the breadth and scope of those organizations contributing to Oakland's resiliency and the good work they undertake.

Stakeholder Consultation

Well over 2,000 Oakland residents were consulted in the preparation of this Preliminary Resilience Assessment. Stakeholder input was garnered across the city using workshops, online surveys, and in-person neighborhood surveys to identify residents' top resiliency concerns, perceptions, and actions. A Steering Committee, composed of leaders in diverse resiliency fields, was established and continues to provide invaluable insight and input into Oakland's resiliency process.

High-Level Vulnerability Identification

A Citywide Asset Scan included an infrastructure inventory and condition assessment and a Geographic Information System (GIS)-based exposure analysis. Exposure to an array of shocks was evaluated, including seismic, flood, and wildfire hazards. A Shocks and Stresses Analysis used the results of the Citywide Asset Scan to elucidate the complex relationships between assets, shocks, and stresses. The potential impacts of sudden shocks on long-term stresses such as poverty and violence were examined. These analyses included desktop research, in-person interviews with subject matter experts, and scenario planning workshops, guided by the 100 Resilient Cities Asset and Risk Analysis Tool.

Focus Area Selection

The Resilience Baseline identified 11 resilience challenges. Input on focus area selection was provided by the City's Resilience Working Group, the Resilience Steering Committee, an international panel of Chief Resilience Officers, and the City's Leadership Team.

3

Community Resilience Profile

Oakland is one of the most ethnically diverse major cities in the nation, with major representation from Hispanic and Latino, Asian, African-American and Caucasian residents speaking over 125 languages and dialects, as well as one of the country's largest LGBT communities.

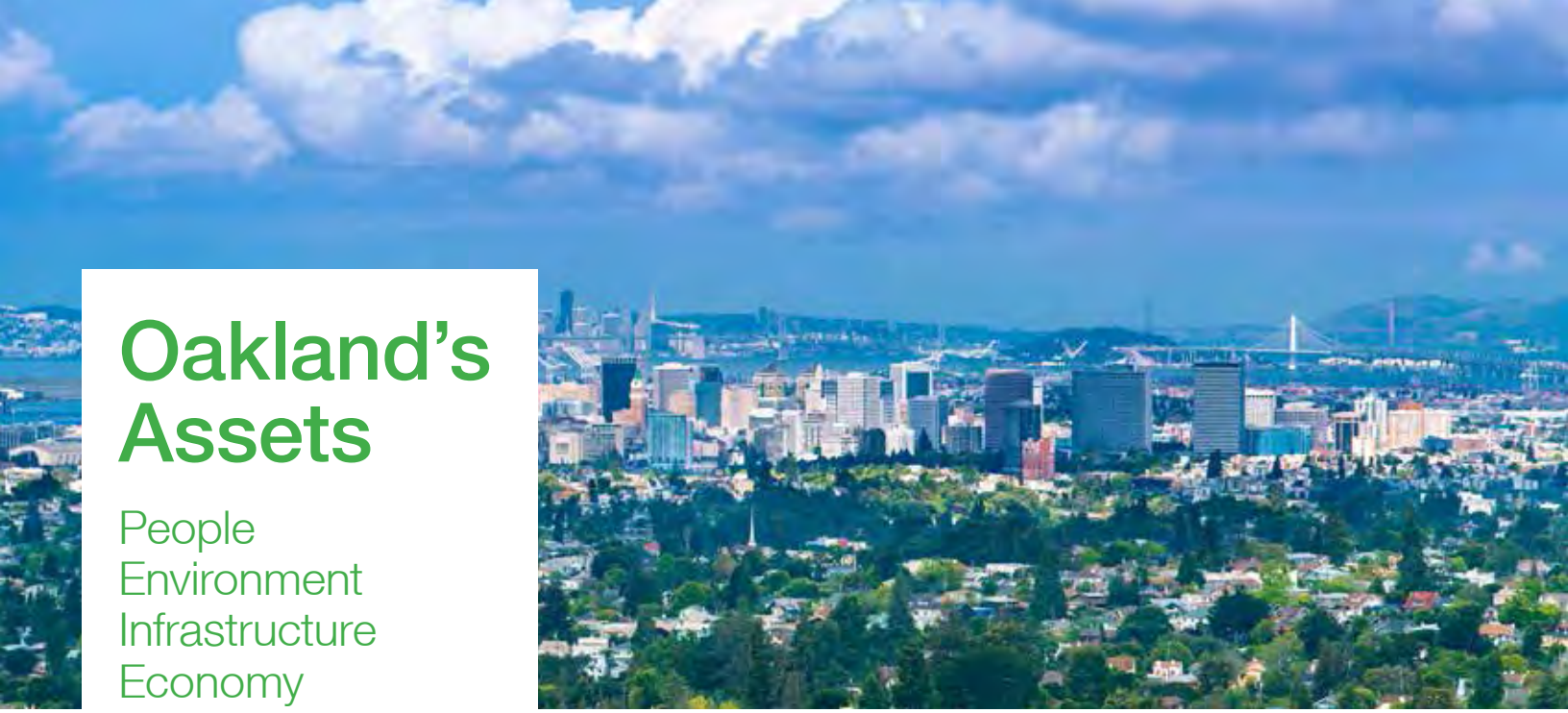
Oakland is nationally recognized as one of the nation's greenest cities, with WalletHub calling Oakland the ninth-greenest city in America[1]. Efforts in energy efficiency and environmental awareness have resulted in Oakland becoming a leading city in the development of an environmentally and economically sustainable planning.

Phase 1 of resiliency planning sought to answer four key questions in order to illustrate the City's baseline resilience and prioritize resilience needs.

- **Stakeholder Identification:** Who is working on resilience? This activity identified key stakeholders and City partners
- **Action Inventory:** What resilience work is happening in Oakland? This activity catalogued the types of resilience work currently conducted both within and external to City government.
- **Perceptions of Resilience:** Do Oaklanders feel resilient? This activity gathered the opinions of a those who live or work in Oakland, utilizing a variety of outreach strategies.
- **Assets, Shocks, and Stresses Characterization:** What are the threats to resilience? This activity summarized the physical state of Oakland's assets (e.g., infrastructure, buildings, storm drain system), and identified how these assets may be vulnerable to long-term stresses (such as deferred maintenance) and potential shocks (such as earthquakes or fires).

The Community Resilience Profile summarizes the findings from this work.

"Eileen" by sculptor Karen Cusolito, Owner of American Steel Studios, 2006
Photo: Greg Linhares, City of Oakland



Oakland's Assets

People
Environment
Infrastructure
Economy

Oakland skyline looking west from hills towards San Francisco, Photo: Greg Linhares, City of Oakland

Situated in the rapidly growing San Francisco Bay Area, Oakland is the county seat and largest city in Alameda County with a population of 413,775, making it the eighth largest city in California. Oakland represents 12% of the population of the San Francisco--Oakland Urban Area. Oakland is growing more rapidly than California as a whole; between 2010 and 2014, Oakland's population grew 5.9%, while the state's population grew 4.2%. Oakland is framed by 19 miles of San Francisco Bay coastline to the west and rolling hills to the east. It has a large footprint of 56 square miles. In between are more than 75 vibrant neighborhoods and commercial corridors, more than 100 parks totaling over 2,500 acres, and Lake Merritt, the largest saltwater lake within a U.S. city. While Oakland is blessed with significant open space, coastline and large industrial areas, it is also quite densely populated, with 7,004 people per square mile.

The City of Oakland is also one of the most ethnically diverse major cities in the nation, with major representation from Hispanic and Latino, Asian, African-American and Caucasian residents speaking over 125 languages and dialects, as well as one of the country's largest LGBT communities.

Oakland is nationally recognized as one of the nation's greenest cities, with WalletHub calling Oakland the ninth-greenest city in America. Efforts in energy efficiency and environmental awareness have resulted in Oakland becoming a leading city in the development of an environmentally and economically sustainable planning.

Oakland's People

Oakland has become known as a city of soul, where more than 100 languages are spoken, people are proud to be natives, and residents stand up for what they believe in. A steady influx of immigrants during the 20th century, along with the thousands of African American war-industry workers who relocated from the Deep South during the 1940s, have made Oakland one of the most ethnically diverse major cities in the country. Today, 27 percent of its population is foreign-born and 40 percent speak a language other than English at home. According to the 2010 census[2], Oakland comprises 27 percent Black or African American, 26 percent White (not Hispanic/Latino), 25 percent Hispanic or Latino, 17 percent Asian/Pacific Islander, and 6 percent other.

Oakland's diversity is a source of pride and identity for many of its residents, who enjoy being exposed to a variety of different cultures through music, food, dance and art. The composition of Oakland does continue changing. From 2000 to 2010, demographic changes included a 16.7 percent drop in its children and youth population, a decline of 24 percent in its African American population, a 6.2 percent increase in senior households, a 13 percent increase in the Latino population, and a 7.8 percent increase in both the White and Asian populations. Oakland's diversity is also a source of economic vitality for many small business owners. Oakland has many cultural festivals celebrating this diversity, including Art + Soul, the Black Cowboys

Parade, Día de los Muertos, Chinatown Streetfest, Oakland Pride Festival, Festival of Greece, Eat Real Festival, and Lunar New Year. This local pride manifests itself in a strong network of thriving local businesses that support each other and enjoy widespread public support from Oakland citizens. The "Shop Oakland Grown" movement allows neighbors to support a thriving local economy while contributing to Oakland's unique cultural landscape.

Although there is a strong sense of shared identity among residents of Oakland, individual well-established neighborhoods also have strong identities. Adams Point, Chinatown, Fruitvale, Jack London, Temescal, Montclair, San Antonio, West Oakland, and more—all of these neighborhoods have distinct demographics, cultures, architecturally significant buildings, land uses and economies, and community organizations dedicated to representing the interests of their residents.

Oakland's communities are a multifaceted and powerful resource within the City. The organizational networks of community organizations and NGOs, representation of diverse stakeholder interests, a tendency toward collaboration, and a proclivity toward progressive, empowering politics are all valuable characteristics that help the city ensure that all the needs and concerns of the diverse citizens that make up Oakland's social fabric are addressed in the process of planning for resilience.

Oakland's Environment

Oakland's mild climate and geography allow residents and visitors to enjoy being outdoors year-round. They can explore a variety of parks; open space; creeks; wooded hills; and the shorelines of two lakes, the Oakland estuary, and San Francisco Bay. These diverse ecosystems—from the marshy estuary to the redwood forests—are home to a wide assortment of flora and fauna.

Oakland maintains 134 parks and public spaces. Many other parks and natural preserves along the ridgeline of the Oakland Hills are maintained by the East Bay Regional Parks District. Oakland has one of the highest percentages of parks and open space per capita in the nation. This waterfront city is haslush green hills, forests, creeks, an estuary, and two lakes.

In the center of the City is Lake Merritt and Lakeside Park. Lake Merritt, a saline lake connected through channels to San Francisco Bay, is the United States' first official wildlife refuge, designated in 1870. Measure DD (passed in 2002) began the process of planning, funding, and implementing a variety of improvements for the lake, including water quality improvements, environmental restoration, landscaping, and the creation of new public gathering places. Lake Merritt is an important urban ecosystem of waterfowl, fish, invertebrates, and other forms of plant and microbiotic life; an essential part of Oakland's flood control system; and a beloved recreational area.

"Off the Grid," Friday Nights at the Oakland Museum of California
Photo: Greg Linhares, City of Oakland

Unicyclist enjoys green space in the Oakland Hills

West Oakland Library Medicine Warrior Dance Troupe, 11/2015
Photo: Doug Oakley, volunteer

Residents and workers from the nearby high-rise office buildings enjoy the pedestrian and bike paths around the lake. This foot traffic supports a variety of small, local businesses in the neighborhoods encircling Lake Merritt.

Oakland's Infrastructure

The built infrastructure of the city consists of traditional structures, systems, and utilities interconnected to serve residents and businesses as well as to provide regional linkages to adjacent communities. These linkages include transportation, energy, water, and communications systems and the homes and businesses that rely on them.

Oakland's Transportation

Oakland's transportation network is one of the most varied and comprehensive in the country. Oakland's central location within the San Francisco Bay Area means many of the region's transportation arteries—from interstates to rail lines—flow through Oakland.

Port of Oakland's Sea and Airport

and handles 99 percent of all containerized cargo that passes under the Golden Gate Bridge. The seaport is connected to a network of freight lines that offers the ability to move goods quickly to any market in the continental United States. The Port of Oakland oversees the Oakland seaport, Oakland International Airport, and 20 miles of waterfront. Together with its business partners, the Port supports more than 73,000 jobs in the region and nearly 827,000 jobs across the United States. The Oakland International Airport is the fourth-largest airport in California and second-largest airport in the San Francisco Bay Area. The airport currently offers air service to 49 destinations on 13 different airline brands. The airport's volume of air cargo ranks among the top three on the West Coast, annually moving more than 510,000 metric tons of cargo, freight, and mail.

Public Transportation

Pleasant temperatures encourage walking and biking, with Walk Score[3] ranking Oakland the ninth-most-walkable U.S. city, and Better Doctor[4] naming Oakland the fourth-most bike-friendly U.S. city. For local travel, the city is well served by an array of transit options. Oakland is the hub for the Bay Area Rapid Transit District (BART), the high-speed, regional rail system with 104-miles of track, including the 3.6-mile Transbay tube. With eight stations in Oakland, it is easy to jump on a train to downtown Oakland and other Bay Area cities. A trip from City Center in Oakland to downtown San Francisco takes 11 minutes. Operated by BART, the $484 million Oakland Airport Connector, which opened in 2014, took more than 1 million riders from the Coliseum BART station to Oakland International Airport in its first year of operation. Oakland is also comprehensively served by the AC Transit bus system, which connects Oakland to communities in Alameda and

Port of Oakland Loading Cranes at Sunset, Photo: Greg Linhares, City of Oakland

Pergola and Necklace of Lights at Lake Merritt, Photo: Greg Linhares, City of Oakland

Contra Costa Counties. The Oakland/Alameda Ferry provides year-round service between Oakland's Jack London Square to San Francisco's Ferry Building and Pier 41.

Rail

For those traveling farther, Amtrak serves Oakland with multiple departures daily on three routes that link to the Pacific Northwest, Southern California, and the Central Valley at stations in Jack London Square and the Coliseum.

Oakland is also at the intersection of a large network of roadways; nine major interstate and California highways pass through Oakland.

Water and Energy

Oakland's water and energy infrastructure are primarily operated and maintained by regional stakeholders. The East Bay Municipal Utility District (EBMUD) provides high-quality drinking water for 1.3 million customers in Alameda and Contra Costa Counties and is a partner with the City on its sewage management system. EBMUD's award-winning wastewater treatment protects San Francisco Bay and serves 650,000 customers.

The Pacific Gas and Electric Company (PG&E) provides natural gas and electricity to nearly 16 million people in Northern and Central California. Oakland is connected by a communications system consisting of telephone, satellite, and internet networks.

Oakland's City Property

Oakland maintains more than 300 public buildings and critical infrastructure, including more than 2,000 lane miles of streets, 38 bridges, and more than 400 miles of storm drains. Oakland's City Hall is a historic treasure that opened in 1914 as the first high-rise government building in the nation. The building underwent seismic renovations, including installation of base isolators, following the 1989 Loma Prieta earthquake to improve the safety of the building and its occupants during future earthquakes.

Oakland's Residential Property

Oakland has more than 170,000[5] housing units, of which 41 percent are single-family homes and 19 percent are large, multifamily units in buildings of five or more units. Of Oakland households, 59 percent are renters. Oakland had a net gain of 13,113 housing units between 2000 and 2013, with most of the increase through the construction of multifamily housing. Nonetheless, nearly 12 percent of the City's households lived in overcrowded conditions in 2010. Of those, one-third of overcrowded households are in owner-occupied units, while two-thirds are renter-occupied.

Homeownership rates are closely related to incomes. In 2011, White households had the highest median income and the highest ownership rates. However, even though Hispanic households had the second-highest median

income, their homeownership rates lagged behind those of Black/African American and Asian/Pacific Islander households.

Historically, Oakland's residential housing stock has been less expensive than that of neighboring cities such as San Francisco and Berkeley. The housing stock ranges from elegantly restored Victorian single-family homes, bungalows, and cottages to downtown loft living, lakeside condos, and upscale hillside estates, with 42% built before World War II during times of significant population influxes (e.g., refugees following the 1906 earthquake and families attracted by war-industry jobs in the early 1940s). Consequently, a substantial portion of Oakland's housing stock needs significant investment or it will deteriorate.

Oakland's Commercial Property

Just as Oakland's residential property values have increased, so too have the City's commercial property values. In the last 3 years, Cushman & Wakefield[6] notes that 22 major properties totaling 3 million square feet have been sold. Recent notable transactions include Uber's purchase of Uptown Station for $123.5 million, the University of California's $215.1 million purchase of 1111 Broadway, and UBS AG's purchase of 1221 Broadway for $182 million. These prices represent between a 35.5 percent and a 394 percent increase in value over the sellers' purchase prices. Oakland's Central Business District and Jack London Square contain nearly 19 million square feet of office space, including 8.7 million square feet of Class A space. Also, more than 2 million square feet of office space can be found in the Hegenberger/Airport subarea.

In the retail subsector, Oakland is seeing a surge in investment. At Foothill Square, 200,000 square feet of space is nearly 100 percent leased after a major renovation/expansion of the center. The former Rockridge Shopping Center is being transformed into a 300,000-square-foot outdoor shopping and dining center with completion expected in late 2017. Infill projects are bringing much needed neighborhood-serving retail to underserved areas of Oakland.

Oakland's healthcare sector has also seen massive investment in commercial buildings as the city's four main hospitals have completed or are undergoing $2 billion in new construction or seismic upgrades.

Although many of Oakland's industrial buildings are decades old, new investment has occurred over the last few years. The new 375,000-square-foot Goodman Logistics Center on Pardee Drive provides convenient access to freeways, the Oakland International Airport, and the Port of Oakland. The Oakland Global Trade & Logistics Center will transform the former Oakland Army Base into a 1.5 million-square-foot logistics center at the foot of the Bay Bridge and adjacent to the Port of Oakland.

Oakland Chinatown Crosswalk, Photo: Greg Linhares, City of Oakland

Fruitvale Transit Village, Photo: Unity Council

Finally, the Oakland–Alameda County Coliseum, jointly owned by the City of Oakland and Alameda County, is home to the World Champion Golden State Warriors, the National Football League's Oakland Raiders, and Major League Baseball's Oakland Athletics. The 120-acre sports and entertainment complex, adjacent to the I-880 and BART's Coliseum/Airport station, includes the 19,000-seat Oracle Arena and O.com Coliseum with seating for up to 63,000 patrons, plus two clubs and 147 luxury suites. These facilities are served by an approximately 10,000-space parking lot.

Oakland's Economy

Oakland's economy is booming, with businesses discovering the convenience and ease of doing business there. More than two dozen companies have relocated—or are planning to relocate—to Oakland from neighboring cities to take advantage of lower rents, easier commutes for their workforce, and Downtown's hip, transit-rich urban setting. Neighborhoods such as Temescal, Lake Merritt, Jack London, and Uptown have all seen a rise in foot traffic, with more residents engaging with (and spending their money in) local shops, restaurants, and clubs in their communities.

Oakland has become widely recognized for its high quality of life, vibrant dining and entertainment scenes, and diversified economy. The City has garnered international attention as a travel destination, with Lonely Planet[7] ranking Oakland as the eighth-best U.S. travel destination in 2015, Jetsetter[8] ranking Oakland as the tenth-best new food city in the world in 2015, and the New York Times[9] ranking Oakland as no. 5 on its list of top places to visit in the world in 2012.

As the national economy has shifted toward service industries, Oakland has been able to adapt by investing in urban redevelopment, along with expansions to its port and airport, in an effort to attract new businesses. The city is successfully attracting business in industries like manufacturing, green tech, trade, health care, construction, finance, business services, education, and leisure.

This economic diversity has helped Oakland remain an attractive and affordable home for people with a wide range of skills and potential for employment. WalletHub[10] ranked Oakland as the third-best California city in which to start a career, and Popular Mechanics[11] ranks Oakland the third-best start-up city in America and in the top 10 cities in the U.S. with the most tech-sector investments. The National Venture Capital Association[12] noted the amount of tech investment has propelled Oakland to the ninth spot among U.S. cities. In November 2014, a voter-initiated ballot measure to raise Oakland's minimum wage passed with an 82 percent majority, demonstrating the strong desire of residents to ensure that all workers in Oakland have the ability to support and care for themselves and their families by increasing the minimum wage and making provisions for paid sick leave.

Oakland Supply Company, Jack London Square
Photo: Greg Linhares, City of Oakland

Shocks and Stresses

Shocks

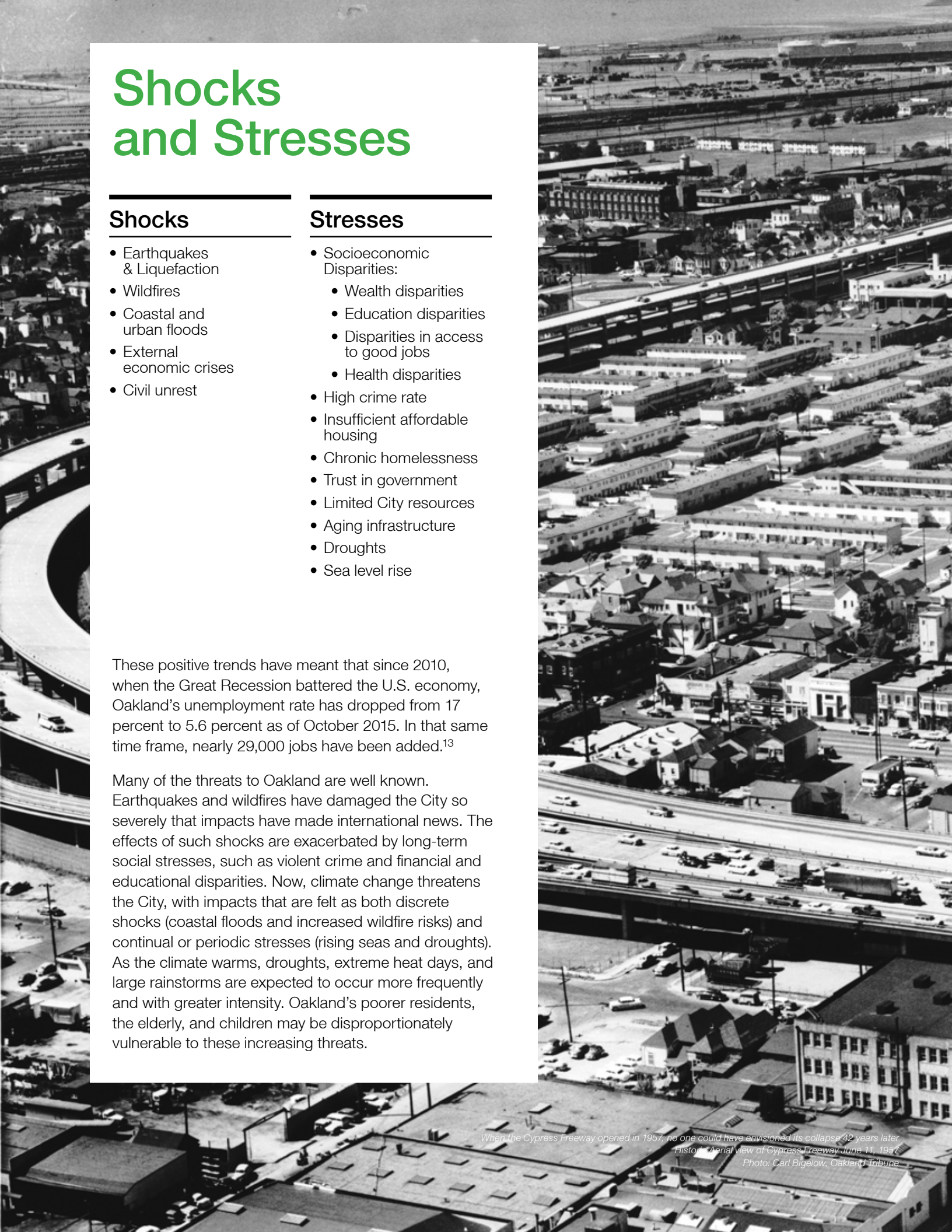
- Earthquakes & Liquefaction
- Wildfires
- Coastal and urban floods
- External economic crises
- Civil unrest

Stresses

- Socioeconomic Disparities:
  - Wealth disparities
  - Education disparities
  - Disparities in access to good jobs
  - Health disparities
- High crime rate
- Insufficient affordable housing
- Chronic homelessness
- Trust in government
- Limited City resources
- Aging infrastructure
- Droughts
- Sea level rise

These positive trends have meant that since 2010, when the Great Recession battered the U.S. economy, Oakland's unemployment rate has dropped from 17 percent to 5.6 percent as of October 2015. In that same time frame, nearly 29,000 jobs have been added.[13]

Many of the threats to Oakland are well known. Earthquakes and wildfires have damaged the City so severely that impacts have made international news. The effects of such shocks are exacerbated by long-term social stresses, such as violent crime and financial and educational disparities. Now, climate change threatens the City, with impacts that are felt as both discrete shocks (coastal floods and increased wildfire risks) and continual or periodic stresses (rising seas and droughts). As the climate warms, droughts, extreme heat days, and large rainstorms are expected to occur more frequently and with greater intensity. Oakland's poorer residents, the elderly, and children may be disproportionately vulnerable to these increasing threats.



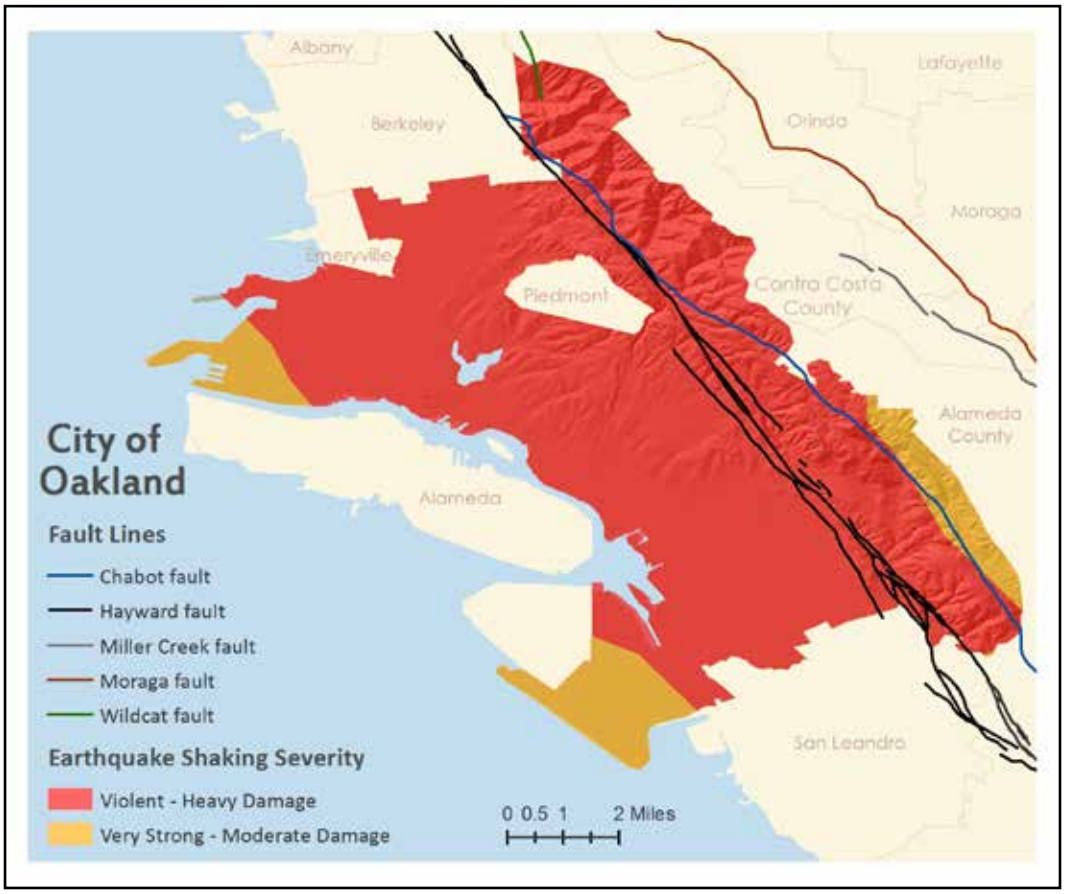
When the Cypress Freeway opened in 1957, no one could have envisioned its collapse 42 years later.
History: Aerial view of Cypress Freeway June 11, 1957.
Photo: Carl Bigelow, Oakland Tribune

SHOCKS

Acute shocks are sudden, sharp events that threaten the well-being of the City. A variety of shocks are expected to occur within Oakland over time. The frequency and intensity of a particular shock can trigger additional shocks (such as a powerful earthquake triggering major infrastructure failures and wildfires), and the scale of the impacts will vary widely for an event depending on a variety of factors and conditions. The following are considered high-likelihood shocks in Oakland.

Earthquakes & Liquefaction

In Northern California, seven major fault systems are considered capable of rupturing in earthquakes of magnitude 6.7 or larger.[14] Many of these earthquakes would produce strong ground shaking and damage in Oakland. The Hayward Fault, located at the base of the hills on the eastern edge of the City, has a 31 percent chance of producing such an earthquake within the next 30 years. An earthquake of this magnitude would cause significant damage in Oakland; shaking from the Hayward fault could be 3 to 10 times stronger than the shaking experienced in the 1989 Loma Prieta earthquake. Soft-story apartment buildings are particularly at risk; there are more than 17,000 apartment units in soft-story buildings in Oakland. Earthquakes also cause liquefaction, a phenomenon in which soil loses its strength, stiffness, and ability to support buildings. The United States Geological Survey has mapped the likelihood of liquefaction of soils in Oakland in the event of a major earthquake along the Hayward Fault.[15] The flat-land areas of Oakland are at the highest risk, and these areas overlap with the locations of much of the critical transportation infrastructure and emergency operations facilities for the City. These areas are also home to many low-income and vulnerable residents.



RESILIENCE ACTIONS

Citizens of Oakland Respond to Emergencies (CORE)

CORE is a free training program for individuals, neighborhood groups, and community-based organizations in Oakland. CORE teaches self-reliance skills and helps neighborhoods establish response teams to take care of the neighborhood until professional emergency personnel arrive.

Seismic Safety

The City of Oakland is developing a seismic retrofit program to make 1,400 wood-framed “soft- story” apartment buildings safer and reduce displacement for residents after an earthquake.

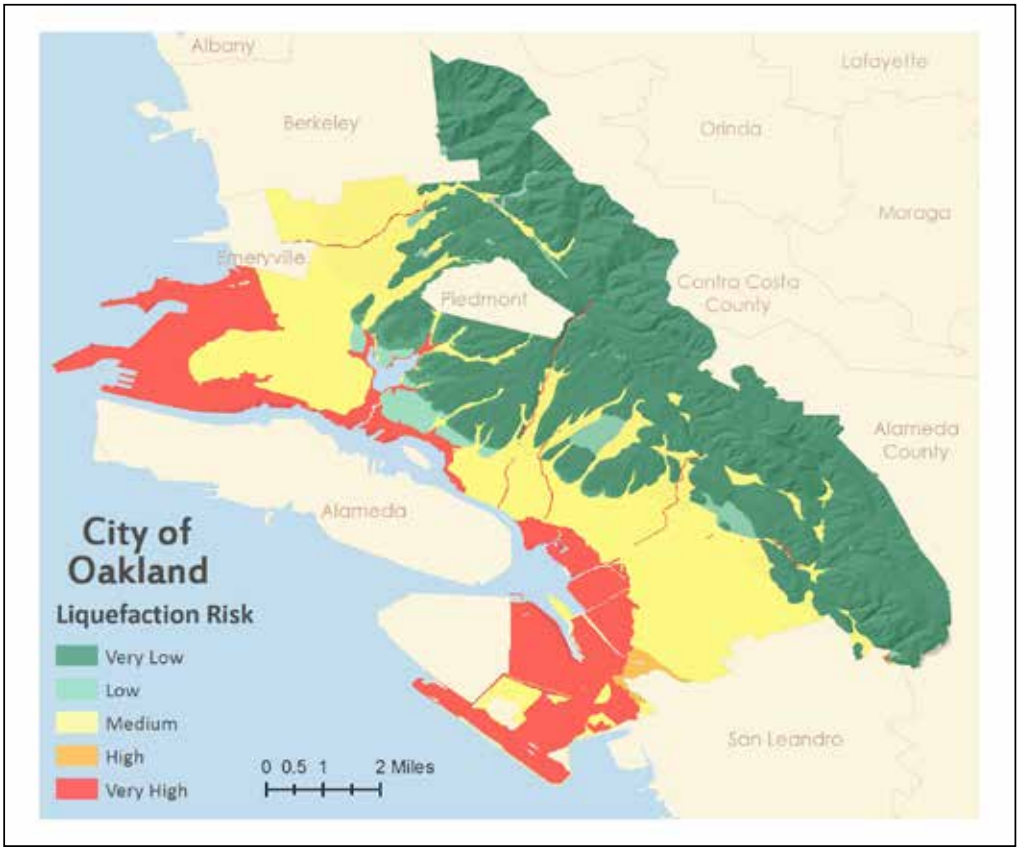
RESILIENCE ACTIONS

Migrating flood risk through green infrastructure

Many opportunity sites exist in Oakland for green infrastructure like bioretention areas, rain gardens, green roofs, swales, permeable pavements, tree planting and storm water detention tree wells. The City and partners like Adapt Oakland/Urban Biofilter, Urban Releaf, the San Francisco Estuary Partnership, the San Francisco Estuary Institute, the West Oakland Greening Initiative, and the Sierra Club, among others, are working together to identify viable projects.

Oakland residents restoring watersheds

In 2015, the City completed the Lake Merritt Sailboat House Shoreline Project; the project was funded by a $198 million voter-approved bond measure to enhance water quality, wildlife habitat, and pedestrian and cycling access that have transformed Lake Merritt in recent years. Also, the Sausal Creek Restoration Project is also underway, which will daylight buried segments of the creek, create habitat and passage for native rainbow trout, and restore nearly 10,000 square feet of riparian habitat with native trees and plants. These types of creek and waterway restoration, land acquisition, and storm water protection projects improve water quality, provide flood control, protect habitat, and enhance natural landscapes.



Coastal (Bay) and Urban Floods

The intensity and frequency of precipitation events are expected to increase.[16] The combination of higher tides and larger storms with Oakland's aging stormwater drainage systems may lead to significant increases in both coastal and urban flooding and flood damage. In December 2014, a combination of coastal and urban flooding closed roads, businesses, and schools throughout the City, impacting public safety, education, and Oakland's economy.

The densely populated Oakland Hills are subject to both significant floods and wildfires, both of which increase the risk of landslides as a secondary shock. Although Oakland has not yet suffered from significant landslides, they are frequent in similar geographies in Southern California and have the potential to cause loss of life and extreme property loss.

Severe 1997-98 El Niño storms damaged homes and streets
Photo: Used with permission of The Oakland Tribune Copyright ©2015. All rights reserved.

Wildfires

The Oakland Hills Firestorm of 1991 was the most destructive fire in state history, resulting in 25 lives lost, 150 injuries, destruction of 3,469 single-family dwellings and apartments and $3.9 billion in losses (in 2015 dollars).[17] Although wildfires may occur at any time of year and in any climate, the risk of fire increases greatly with increased drought and heat. California's future climate of frequent drought and higher heat leaves Oakland at extreme risk for wildfires.

Firefighters, Councilmember Brooks, and community members join together for the dedication of a new fire danger sign in Oakland Wildfire Prevention Assessment District. Photo courtesy of Sue Piper, February 1, 2016.

External Economic Crises

The City of Oakland is part of the San Francisco Bay Area regional economy, which, like most local economies in the U.S., is prone to occasional recessions and contractions. The regional economy is particularly dependent on the technology and real estate sectors, which are prone to particularly dramatic boom-bust cycles. Given large income disparities and the City's revenue structure, these economic crises have a tendency to impact the most vulnerable residents while simultaneously reducing City resources to serve those residents. The City and region are also vulnerable to shocks related to international trade, travel, tourism, logistics, and manufacturing. Analysis from the National Bureau of Economic Research[18] suggests that national economic contractions recur on approximately 7-year cycles. During the prior economic recession, the City's discretionary revenues were reduced by nearly 12 percent, and demands for City services dramatically increased.

RESILIENCE ACTIONS

Preventing fires during extreme droughts

Oakland's Fire Department proactively mitigates fire risk by deploying 3,000 goats across 1,400 acres of the Oakland Hills between May and September to eat the brush that could otherwise be the flash fuel for wildfires; engages community volunteers in removing flammable brush, which in 2014 resulted in the removal of 250 cubic yards of brush like the invasive French Broom; and regularly inspects the 10,590 acre, 16.5-square-mile Wildfire Prevention Assessment District. Firefighters also educate the public on fire code requirements and best practices for creating defensible space zones around the exterior of homes. These multi-pronged efforts make Oakland's Fire Department among the most proactive in California and have prevented the spread of wildfire during the most recent intense drought and during dry summer months.

Preparing for global economic downturns

Following the Great Recession, the City of Oakland developed and implemented a Rainy Day Policy. Oakland's policy dictates that that windfall revenues from the City's most volatile revenue stream (Real Estate Transfer Taxes) be used solely for one-time investments rather than to support or expand ongoing services. Further, the policy requires that 25% of these windfall revenues be used to reduce City long-term debts and liabilities and another 25% be reserved in a special fund for times of economic hardship. Oakland's Rainy Day Policy mirrors, in concept, a recently enacted policy of the State of California.

Civil Unrest

In the past 5 years, Oakland has experienced repeated incidents of civil unrest and public confrontations between police and citizens. In 2014–15, Oakland spent more than $5 million in officer overtime pay to address demonstrations in response to events in Ferguson and New York.

Oakland's history as an epicenter for nationally recognized social change movements—from civil rights to labor rights to economic justice—is a point of pride for the community. Black Lives Matter demonstrations have vocalized important issues that are part of a national conversation about racial inequity, criminal justice, and disparate treatment of people of color by the police. However, protests in Oakland have often resulted in damage to local businesses and public infrastructure, requiring the City to expend limited public funds on emergency response when protest activities have become violent.

Mural on Oakland freeway underpass, Photo: Greg Linhares, City of Oakland

Black Lives Matter rally, steps of Oakland City Hall, 2015, Photo: Victoria Salinas

STRESSES

In addition to acute shocks, cities also face ongoing, long-term stresses, either natural or human caused, and these challenges tend to be tightly interwoven. The following were rated Oakland's highest-impact stresses.

Socioeconomic Disparities

Oakland is in a unique economic moment—the economy is booming and inequality is also increasing. Oakland is recovering and growing following a major nationwide economic recession, but the economic growth has been unequal across the City. Tech workers are finding Oakland an increasingly attractive place in which to live and do business, but this influx of wealth is placing stress on many existing residents and less-educated workers at a time when the manufacturing industry that was once a mainstay of the Oakland economy is shrinking. The burgeoning economy is bringing new optimism to the City while focusing new attention on issues such as inequality and displacement. Consequently, Oakland's current story is a tale of two cities: the global Oakland, where Citywide statistics are looking better each year; and the City as seen by vulnerable residents who are black, brown, poor, young, and old.

Wealth Disparities

Oakland was recently ranked as having the seventh-highest income inequality among cities in the nation.[19] Oakland also has some of the highest regional poverty levels, with 19.6 percent of residents and 30 percent of children living in households with incomes below the federal poverty level. Nearly 35 percent of children live in households that receive public assistance. The median income for African American, Latino, and Asian households in Oakland has declined since 2000. Citywide, White households have nearly double the median household income of any other racial or ethnic group.[20]

Educational Disparities

Educational disparities in Oakland are striking. Oakland exceeds national levels both for the number of adults with college and post-graduate degrees and for the number of adults who did not complete high school. In the past decade, Oakland's public schools have made important gains in student achievement. Today, the Oakland Unified School District stands as California's most improved urban school district.[21] However, only a minority of Oakland's children are meeting key educational milestones. On most metrics, the achievement gap persists when comparing African American and Latino students to White and Asian students. A majority of Oakland's public schools struggle to serve students, particularly students of color and those from socioeconomically disadvantaged or language minority backgrounds. Although Oakland's graduation rate has improved in recent years to 63 percent, it still lags behind the average graduation rate of 80 percent for Alameda County and California. Too many Oakland students are not gaining the skills needed for successful employment.

RESILIENCE ACTIONS

Oakland Funds New Department of Race and Equity

Launched in late 2015, the City of Oakland established a new department charged with integrating the principal of "fair and just" in the delivery of city services.

Cradle-to-Career education initiative

The City and OUSD have joined forces on the Oakland Promise, an initiative to create a college-going/college-bound culture and expectation for all students in the OUSD. The district, through the Offices of Post-Secondary Education and Linked Learning, is developing and improving existing academies at the high schools and partnering with businesses in the City to give its students hands-on work experience through summer jobs and internships.

City of Oakland lowering barriers to start businesses

Making it easy to open businesses online is among the measures the City is taking to help start-ups thrive in Oakland.

RESILIENCE ACTIONS

New City of Oakland economic development strategy slated to encourage sustainable economic growth

Encouraging existing Oakland companies to expand and re-invest property revenues in catalytic neighborhood development projects is among the priorities of the economic development plan to be released in 2016.

Procedural Justice Training Program cultivates community relationships

Developed as part of the Ceasefire Crime Reduction Strategy, the Procedural Justice Training Program teaches Oakland Police officers the principles of giving people a voice, fair treatment and respect and providing a trustworthy process. In addition to building better relationships with community members, these principles promote support for an officer's efforts to improve safety. The Oakland Police Department completed Phase one in June 2015, having conducted 50 classes and trained over 850 sworn staff. Phase two, the practical application of Procedural Justice, is currently being developed with community partners. Oakland is the only city presenting the training where sworn staff and community members partner in its development and delivery.

Disparities in Access to Good Jobs

Unemployment is decreasing Citywide, with a drop from 9 percent to 5.7 percent from 2014 to 2015. Between March 2013 and March 2014, 17,000 new jobs were added in the East Bay, with 143,000 more forecasted by 2020. However, individual Oakland census tracts still have unemployment rates above 10 percent. Among African American males between the ages 16 to 64, the unemployment rate is 14 percent. These statistics fail to capture people who are disconnected from the local economy and who have stopped searching for jobs. The Oakland economy produces a diverse range of jobs in multiple sectors, but needs stronger pathways to connect to alienated workers and encourage them to participate. These pathways include the need for a living wage, support for entrepreneurs, and career ladders for entry-level employment.

West Oakland Summer Reading Kickoff, 2014
Photo: Celia Jackson, Oakland Public Library

African American and Latino students to White and Asian students. A majority of Oakland's public schools struggle to serve students, particularly students of color and those from socioeconomically disadvantaged or language minority backgrounds. Although Oakland's graduation rate has improved in recent years to 63 percent, it still lags behind the average graduation rate of 80 percent for Alameda County and California. Too many Oakland students are not gaining the skills needed for successful employment.

Health Disparities

Health disparities are closely tied to many additional Oakland stressors: wealth and educational disparities, limited government resources, and violent crime all contribute to increased health risks for already vulnerable populations.

- The number of seniors living in Alameda County is expected to grow by 117 percent by 2030 to more than 94,000 residents. Ensuring these older adults have the housing, transportation, and social services they need to meet their changing needs will be a new challenge for Oakland.
- More than half (55 percent) of Alameda County residents and a third (35 percent) of school-aged children were overweight or obese in 2014.[22]
- Diet-related diseases (heart disease and diabetes) are among the 10 leading causes of death in Alameda County in 2010.
- Diabetes and metabolic/nutritional disorders were among the 10 most common reasons for hospitalization of children in Alameda County between 2007 and 2011.

High Crime Rate

The years 2013 and 2014 had the lowest homicide numbers that Oakland has seen in more than a decade. Although more of the shootings that occurred in 2015 were fatal, 2015 marks the third consecutive year of double-digit reductions in shootings in Oakland. To put this 3-year trend into perspective, nearly 250 fewer Oakland residents were injured or killed by gun violence in 2015 than in 2012, and over 1,100 fewer people were victims of violent crime in 2015 than in 2012.

Despite progress, Oakland exceeds statewide and national trends for violent crime. Gun violence is of particular concern, with 411 reported shootings in Oakland in 2014.[23] Table 1 shows crime statistics for three types of violent crime from 2010–14.[24]

Serious violence is most concentrated among individuals (mostly young men) 18 to 34 years old, and the highest percentage of victims and suspects are men between the ages of 18 and 24, followed by men between the ages of 25 to 34. Violence is disproportionately concentrated in specific parts of the City, particularly in East and West Oakland. According to law enforcement data, the individuals engaged in a majority of the robberies throughout the city are the same as those engaged in violent crime in East and West Oakland.[25] This distribution of higher rates of violence in particular parts of the City correlates closely with the concentration of stressors that can increase the risk of violence.[26] The data is based on rates of arrest, crime incidence, food stamp participation rates, youth incarceration and probation rates, rates of violent suspensions, and chronic absence among Oakland Unified School.

Crime Statistics in Oakland by Year 2010–14

Type:	2010	2011	2012	2013	2014
Murders	90	103	126	90	80
Robberies	3,200	3,326	4,173	4,838	3,349
Assaults	2,824	2,641	2,858	2,715	3,016

Oakland's 2014 Youth Poet Laureate Sophie Elkin, Courtesy of Oakland Public Library

I can no longer sit in the back and watch my generation crumble

like the apartments in West Oakland that are being torn down.

like my neighborhoods monthly gentrification.

My peers take intelligence for granted and ignorance is a wide spreading "epidemic" more potent than any drug I've ever known.

I sit on A/C transit day after day observing my people.

Drowning in this concrete amusement park, a woman dusted in track marks sits beside me with arms all too familiar, from vein to sweaty creases.

She hits me too close to home.

Sophie Elkin
Oakland's 2014 Youth Poet Laureate

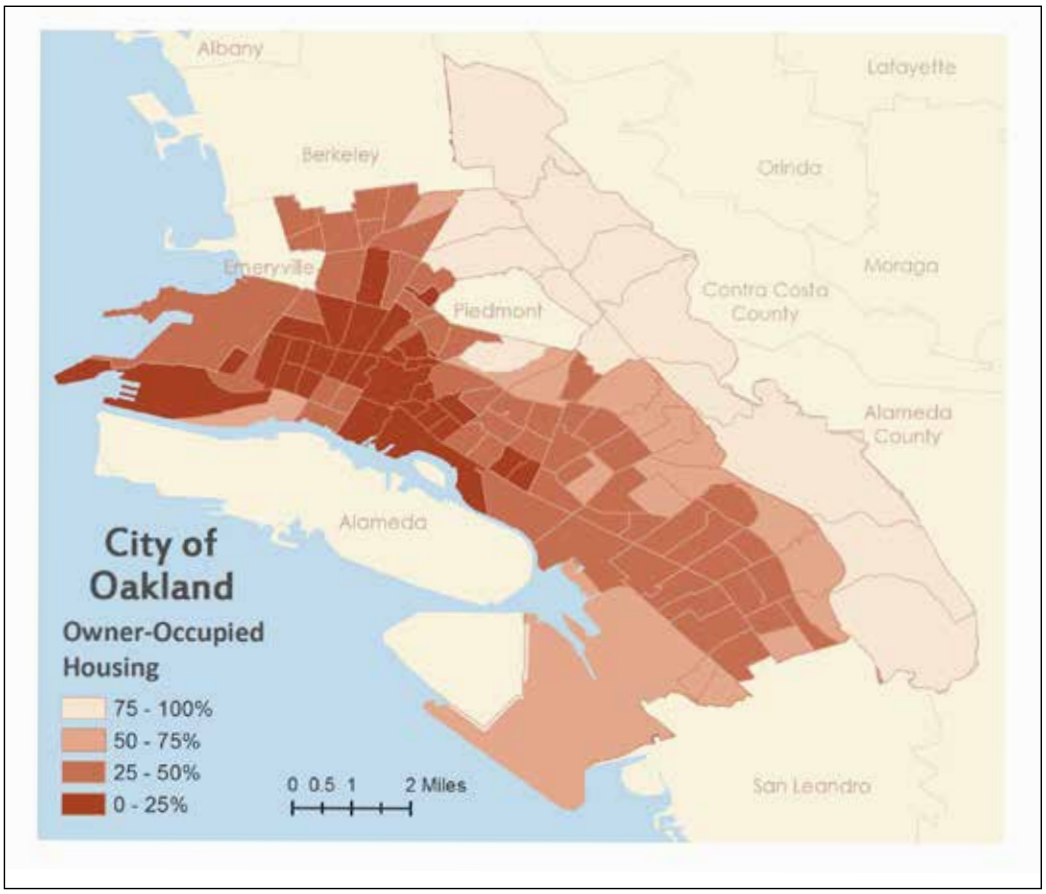
Insufficient Affordable Housing

Oakland is currently in the midst of a housing affordability crisis. In the past decade, housing costs have outpaced income growth for the majority of Oakland residents. From November 2013 to November 2014, the home sale prices in the city rose 13.4 percent, while rents of new vacant listings in the city also rose 13.4 percent. The City's Housing Element states that 50 percent of renter households pay more than 30 percent of their income for housing. The Urban Strategies Council's analysis of 15 neighborhoods with different income levels shows that the vast majority of renters and owners in those neighborhoods would be unable to afford the median-priced rents or homes in their neighborhoods.

According to the City's 2015 Rental Study of Craigslist data[27], median rental prices have risen between 2 percent and 40 percent in the last year (2015 rents are between $1,475 for a studio apartment to $2,975 for a three-bedroom apartment). Housing costs are outpacing income levels of many Oakland residents. When current residents cannot afford increasing housing costs, they are priced out of the market and relocate to cities with less-expensive housing costs. Renters constitute 59 percent of Oakland households, with homeowners at 41 percent. Only 56 percent of Oakland's rental housing stock is subject to rent stabilization requirements. Oakland's housing patterns continue to be segregated by race, ethnicity, and income.

Chronic Homelessness

Chronic homelessness is an ongoing issue in Oakland. The January 2015 "Every One Home" Homeless count[28] indicated that on any given night, there are 2,191 total homeless and 1,384 unsheltered homeless people in Oakland. Of the unsheltered, 56.5% are African American, 24% are White, 12% are Latino, and 18% are under the age of 25. Oakland



RESILIENCE ACTIONS

Generating new affordable housing funds through impact fees

Oakland is completing a study that will enable a Citywide approach to collecting fees and creating new development. Impact fees are a common mechanism cities use to address critical needs for transportation, infrastructure improvements, and affordable housing that can be attributed to new development.

RESILIENCE ACTIONS

Residents rally to adopt-a-drain

Oakland residents are volunteering to take proactive measures to prevent flooding and protect water quality by adopting nearly 1,000 drains throughout the City. Through the Adopt-a-Drain program, volunteers commit to keeping inlets clean and clear.

provides resources for rapid re-housing, including rent subsidies, case management and services to address root causes of homelessness. However, the supply and access to affordable housing is severely limited. The City collaborates closely with housing and service providers as well as mainstream agencies in Alameda County and the Oakland the Housing Authority on issues related to chronic homelessness including winter relief shelter efforts and housing subsidy programs for interim and permanent supportive housing. In order to provide adequate shelter for all residents, both appropriate locations and funding for additional winter shelter beds for the more difficult, colder months of the year are needed.

Trust in Government

Residents at public meetings, the press, and a few public institutions have identified weak public trust and the need for enhanced ethical conduct by City staff and officials as an important issue. Complaints have focused on government transparency, including City compliance with open meeting policies or public records laws. In 2013, the Alameda County Grand Jury[29] identified instances in which City Councilmembers interfered with the administrative functions of the City. In November 2014, the residents of Oakland voted to amend the City Charter in favor of increasing the Public Ethics Commission's strength, independence, and staffing. The City Council also approved the Government Ethics Act in December 2014 to provide a clear, comprehensive, and enforceable framework of ethics rules in Oakland.

Limited City Resources

Despite prudent and conservative fiscal policies established since the last economic downturn, robust economic growth, and a steady and solid credit rating, over the long term without intervention the City's expenditures are projected to grow faster than City revenues. The growth rate in revenues from taxes and fees is slower than the growth rate of personnel, utility, fuel, and other costs. Simultaneously, the City will require significant new investments in capital and services to maintain current infrastructure and quality of life. These trends, when coupled with limitations on the ability of local governments in California to generate new sources of revenue, create continual pressure to reduce government services or continue deferring capital investments. In times of economic downturn, these limitations can lead to dramatic reductions in government services at precisely the times those services are most needed by residents.

Aging Infrastructure

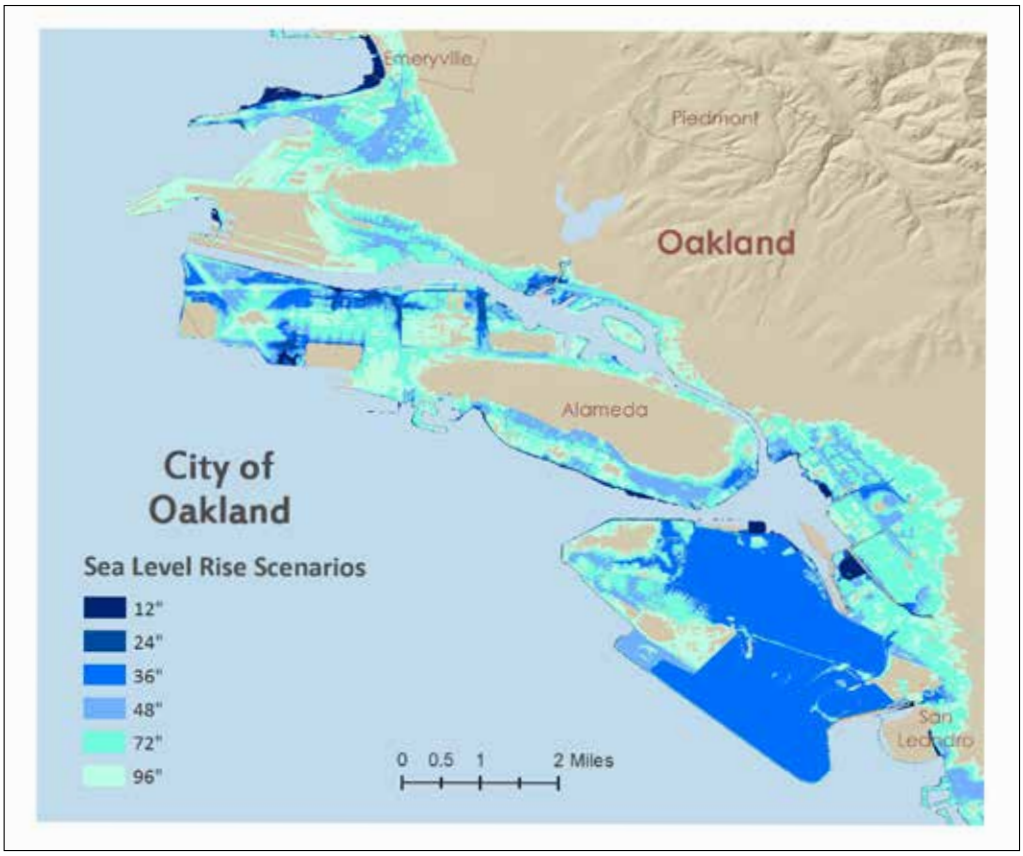
Oakland's infrastructure systems, including roads, sewers, bridges, and pipelines, are increasingly failing and ill-prepared to meet future demands due to years of inadequate funding and deferred maintenance. A 2012 infrastructure report card issued by the American Public Works Associations[30] identifies more than $95 million per year for the five year planning period in budget shortfall for maintenance, in addition to the more than $800 million in unfunded deferred maintenance across the City's infrastructure. This report card also rated Oakland's infrastructure "D+" due to inadequate maintenance. In addition, several key areas of infrastructure do not have dedicated funding sources to address either deferred maintenance or new needs.

Droughts

California has historically experienced cyclical periods of extreme drought, the most recent of which has lasted 3 years and is ongoing, leading to significant mandatory conservation requirements. Our changing climate is expected to bring deeper, longer droughts and more days of extreme heat. During drought, Oakland experiences higher water prices, decreased cooling options during extreme heat days, loss of shade trees and plants and open space values, and higher risk of wildfires. Extreme heat disproportionately affects the health of vulnerable populations.

Sea Level Rise

As the elevation of San Francisco Bay rises in response to warming oceans and melting ice sheets, short-term, temporary coastal floods will increase in frequency and extent until permanent daily tidal inundation is reached.[31] Low-lying coastal residential areas, the Port of Oakland, the former Oakland Army Base, and a variety of low-lying areas near the Coliseum, Oakland International Airport, and I-880 are most at risk. According to the Bay Conservation and Development Commission, Oakland is expected to experience 12-24 inches of sea level rise by 2050 and 3- to 5-foot rise in sea level (36 to 66 inches of sea level rise by the year 2100, which, without action, will substantially impact coastal areas.



RESILIENCE ACTIONS

Oakland schools combatting drought through water conservation.

The Oakland Unified School District is investing nearly $1.2 million for projects that reduce stormwater pollution and conserve water through a grant from the California State Water Resources Control Board. This project, undertaken in partnership with Piedmont Unified School District and StopWaste.org, will engage students involved in the Sustainable Urban Design Academy and Science, Technology, Engineering, and Math curriculum.

RESILIENCE ACTIONS

Groundbreaking sea level rise studies make adaption measures possible

Adapting to Rising Tides is a regional study led by the Bay Conservation and Development Commission that models sea level rise risk in the Bay Area. Other partners include Alameda County, Port of Oakland, AC Transit, ABAG, BART, Bay Area Air Quality Management District, Caltrans, EBMUD, East Bay Regional Park District, FEMA, SPUR, and the Regional Water Quality Control Board.

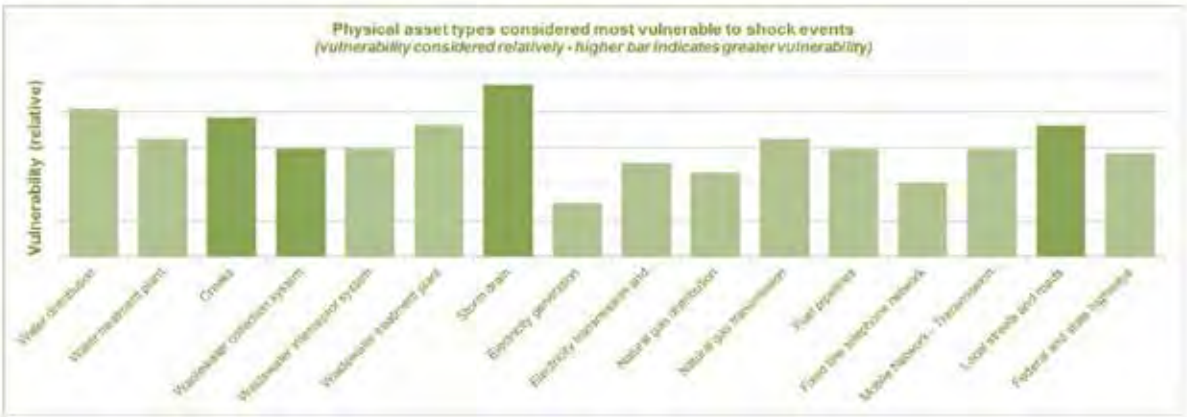
Adapting to Rising Tides is a regional study addressing sea level rise risk in the Bay Area. Within Oakland, the Adapting to Rising Tides study area covers the full coast inland approximately 0.5 mile beyond the area projected to be exposed to storm event flooding with 55 inches of sea level rise. Approximately 6,000 of Oakland's residents would be at risk from 16 inches of sea level rise, with 15,000 at risk from 55 inches of related flooding. The replacement cost of property is estimated to be $22 to $38 billion.

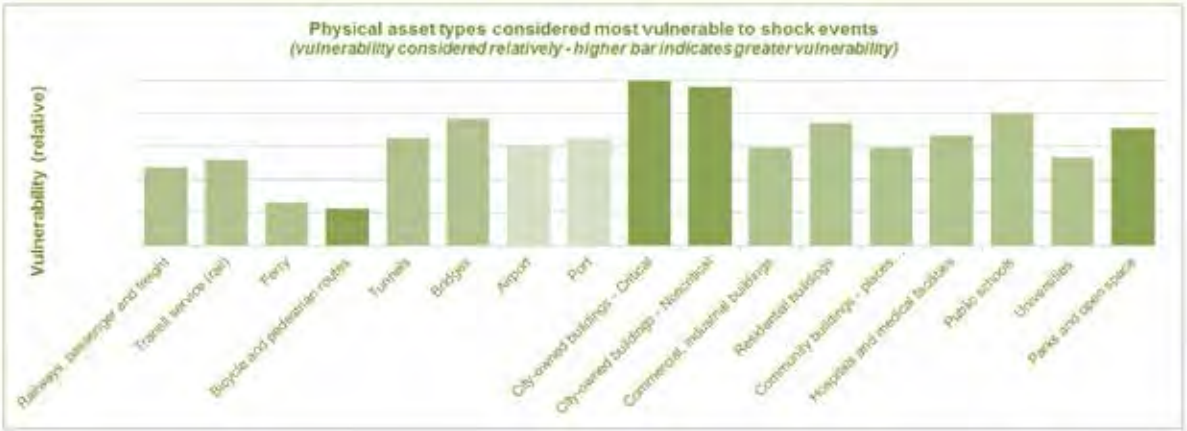
City Facilities	Total Number	Number at Risk from Sea Level Rise	
		16 inches by 2050	55 inches by 2100
Emergency Response Facilities			
Fire Stations	8	2	2
Facilities serving at-risk populations			
Health Care facilities	87	5	13
Homeless shelters	12	2	4
Food Banks	14	1	5
Facilities serving vulnerable, less mobile populations			
Senior housing facility	45	0	3
Childcare center	146	6	16
Schools	81	3	13

ASSETS, SHOCKS AND STRESSES:
WHAT ARE THE THREATS TO RESILIENCE?

An assessment of the current condition of City assets and potential interactions between shocks, stresses, and assets indicated strong feedback links between all three. Both the continued decline of City infrastructure and potential shocks are expected to exacerbate existing long-term City stresses, such as public health and safety issues. Increasing City resiliency around any of the assets, shocks, or stresses would therefore be expected to provide cross-sector benefits. Potential City actions can be considered through a resilience lens to maximize these co-benefits.

Potential for Improvement of Key Oakland Assets





City-owned asset
Quasi-city owned asset
Non-city asset

4

Focus for Resilience

For Oakland, resilience is about having a thriving and equitable city. This means that Oakland has prosperous residents and families; people can stay rooted in the city they love; residents live in safe and secure neighborhoods; public infrastructure is a catalyst for improving people's lives; and when disasters strike, the whole community recovers quickly.

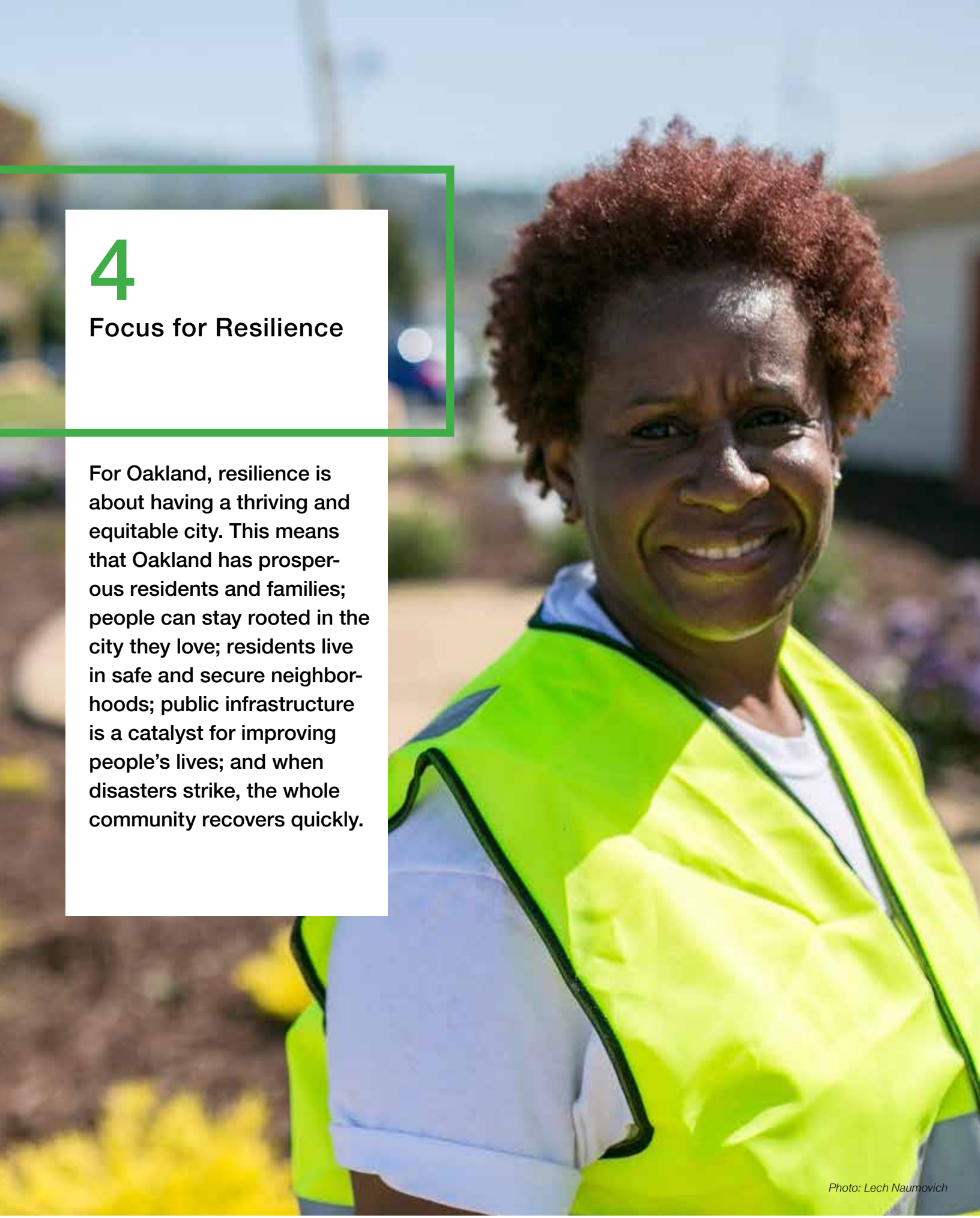


Photo: Lech Naumovich

5 focus areas

Prosperous Residents and Families

Staying Rooted in Oakland

Living in Safe and Secure Neighborhoods

Benefiting from Public Infrastructure

Recovering Quickly from Adversity

The passion and can-do spirit of Oakland residents is a catalyst for resilience.

Clockwise from the top: ***(1)*** *Brown Girl Surf volunteers kayak the Oakland Estuary for the Creek to Bay Day cleanup September 19, 2015, Photo: Lech Naumovich.* ***(2)*** *Beto Brancho of Courtland Creek at Thompson St., Photo: Lech Naumovich.* ***(3)*** *Chris Cook, volunteer coordinator of Leona Canyon Park, and a volunteer show off the strength of the weed wrench, Photo: Lech Naumovich* ***(4)*** *Photo: Lech Naumovich* ***(5)*** *Oakland Parks and Rec Foundation Annual Volunteer Workday Event, Photo: Susan Montauk.* ***(6)*** *Cleanup in Jingletown, Photo: Eric Saltmarsh.* ***(7)*** *The Three Musketeers of Courtland Creek at Thompson St., Photo: Lech Naumovich.* ***(8)*** *Chuck Butler of Courtland Creek Park does away with debris, Photo: Lech Naumovich.*

Photo: Greg Linhares, City of Oakland

A consistent message has emerged from the various surveys, community engagement efforts, and workshops that underpin this Preliminary Resilience Assessment: for Oakland, resilience is about having a thriving and equitable city. This means that Oakland has prosperous residents and families; people can stay rooted in the city they love; residents live in safe and secure neighborhoods; public infrastructure is a catalyst for improving people's lives; and when disasters strike, the whole community recovers quickly. Building Oakland's resilience will also require Oakland's residents to look inward to how the City's culture can be harnessed to address new challenges. Oakland will need to coordinate regionally with other cities and institutions to tackle shared risks and seize new opportunities. New thinking will also be needed on how to leverage assets and financial tools to achieve Oakland's goal of a thriving and equitable resilient city.

A Resilience Strategy will be developed in 2016 to unify existing initiatives and activities and identify additional actions needed to realize the City's resilience goals. As part of this process, the questions and challenges that emerged from the Preliminary Resilience Assessment will be explored in the development of the resilience strategy. As shown in the charts below, it is difficult to prioritize among development issues in Oakland, and so the city is taking a comprehensive approach to building resilience in a way that complements the Mayor's city-wide priorities. To provide a framework for cross-sector collaboration and problem solving during the development of the Resilience Strategy, five focus areas have been identified to help address the questions and challenges that have arisen around building resilience in Oakland.

These focus areas are:

1. **Prosperous Residents and Families**
2. **Staying Rooted in Oakland**
3. **Living in Safe and Secure Neighborhoods**
4. **Benefiting from Public Infrastructure**
5. **Recovering Quickly from Adversity**

Each of these focus areas serves as a path of inquiry for further research and as a framework for the development of resilience-building actions. This research is intended to support the exploration of approaches and initiatives that tackle multiple shocks and stresses and create cross-cutting benefits. Thus, each path of inquiry, each opportunity, each intervention must work to accomplish multiple goals and serve to achieve complementary benefits.

BEST thing about living in Oakland

Oakland values the diversity above all other characteristics.

WORST thing about living in Oakland

Nearly half of voters say crime is the worst part of living in Oakland.

Source: Pulse of Oakland Voter Poll October 2015, Oakland Metropolitan Chamber of Commerce

What is the highest need for public services in the City?

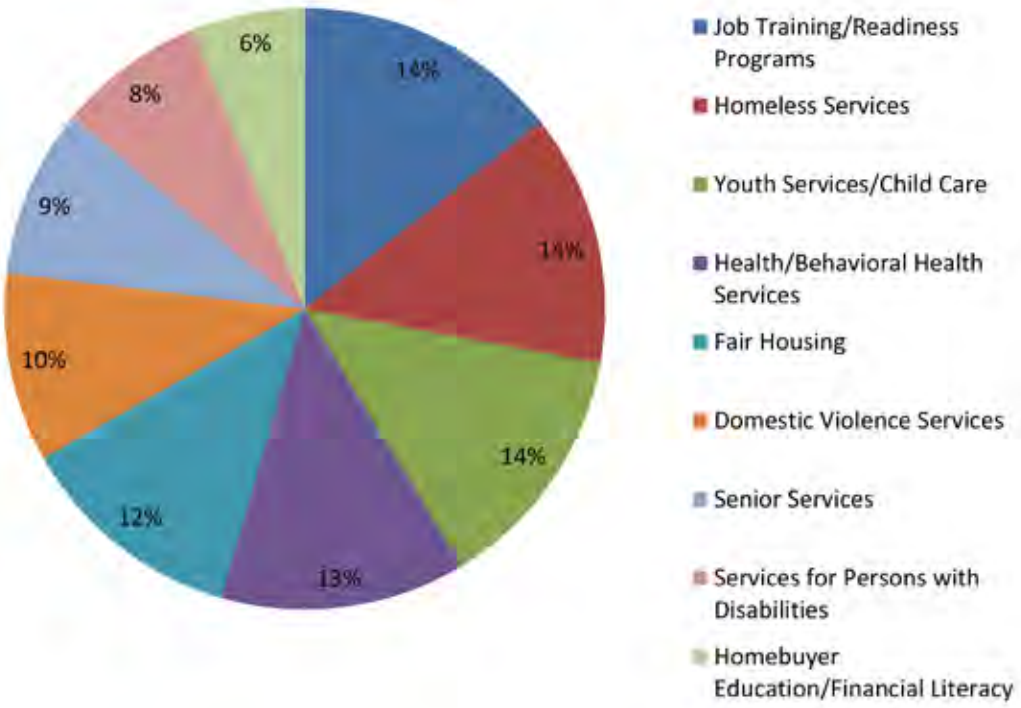


Photo courtesy of Peralta Community College District

RESILIENCE FOCUS AREAS

Focus Area #1

Promote the prosperity of residents and families through a more coordinated and comprehensive approach to increasing access to good jobs, building wealth, and fostering economic development.

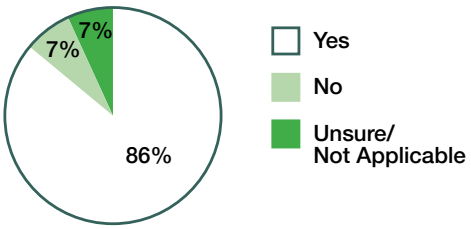
Personal resilience is often affected by financial resources and access to quality jobs and stable employment. How and where people make money is rapidly changing due to technology, Oakland's expanding economic sectors, and sources of public and private financing for workforce development. Oakland residents, especially those who are low income, underemployed, or find it difficult to get hired, will be more financially resilient—today and after major shocks—if there is greater access to good jobs and wealth-building opportunities. This resilience in turn will have positive impacts on people's ability to live where they want, lead healthy lives, and improve overall personal and family well-being.

This focus area will support the Oakland Promise, a cradle to college initiative aimed at ensuring every child in Oakland graduates high school with the expectations, resources, and skills to complete college and be successful in the career of his or her choice.

Priority Questions

- How can innovative wealth building approaches for low-income community members be scaled?
- Who is disconnected from Oakland's economy? What systemic factors lead to disengagement and how can people be connected in more targeted ways?
- How can low-income residents most effectively be supported in starting new businesses and enterprises?

Is economic development/ job creation a critical issue?



Golden State Warriors Championship parade and rally, June 19, 2015, Photo: Greg Linhares, City of Oakland

Priority Questions

- What unique aspects and characteristics of Oakland's neighborhoods do people want to preserve for generations to come?
- How will shocks and stresses affect the availability and ability to have safe and secure housing for the most vulnerable residents of Oakland?
- What is the current level of social cohesion and community ties within neighborhoods and across neighborhoods in the city? How can social cohesion be leveraged to increase community resilience?

Focus Area #2

Identify what long-term residents of Oakland (especially the most vulnerable) need to be able to stay and what new residents need to be able to integrate in a way that preserves and reinforces commtunity character.

Oakland's ability to maintain and strengthen community resilience will likely be affected by the extent to which current residents have what they need to continue to call Oakland home and new residents and businesses become part of the existing community fabric and culture. Residents will be able to stay rooted in Oakland, regardless of shocks and stresses, if housing is safer and more affordable, equity gaps are closed, neighborhoods are vibrant, and communities remain cohesive.

This focus area complements the work being undertaken by the City of Oakland, along with many local and regional organizations, through the Housing Equity Roadmap, which is aimed at alleviating the affordable housing crisis, and Mayor Schaaf's high-level Housing Cabinet, which is providing further recommendations for tackling this challenge.

Focus Area #3

Identify innovative approaches for reducing violent crime and building community trust in law enforcement and justice.

Strengthening drivers of resilience—such as social stability, security, and justice—is critical to reducing Oakland's persistent high crime rates and the exposure of many residents to violence. The interplay of chronic stresses, especially those related to the equity gap, affect incidents of crime and violence in the City. Major shocks often cause new stresses for families and individuals and reinforce existing trends. Tackling this resilience challenge requires addressing the complex root causes of crime and violence as well as the long and complicated history of distrust in law enforcement.

Many organizations have partnered in recent years to better understand and address these challenges. This focus area complements the mayor's Holistic Community Safety Plan, a new strategic plan for the Police Department and the White House's My Brother's Keeper initiative.

Priority Questions

- How is community trust measured?
- How can innovative urban design help reduce crime and violence?
- What types of activities generate improvements in public health, community cohesion, and crime reduction and how is their impact measured?

Do you feel safe in your immediate neighborhood?

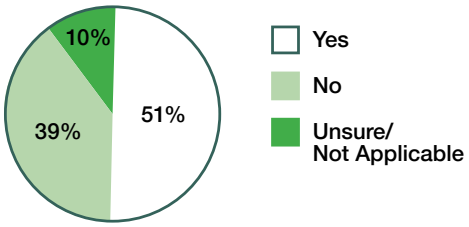
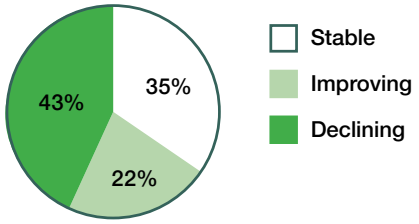


Photo courtesy of the Oakland Police Department

Priority Questions

- What are existing opportunities for maximizing the co-benefits of infrastructure, parks, and public spaces for the most vulnerable residents?
- How should investments in infrastructure be sequenced and financed to maximize the impact on resilience?
- What improvements are needed in the coordination between adjacent jurisdictions and entities like Alameda Flood Control, Port of Oakland, PG&E, EBMUD improve their collective impact on infrastructure investments, hazard mitigation, and reduce social and economic vulnerability?

Is the condition of the public spaces in your neighborhood:



Focus Area #4

Identify which public infrastructure projects will have the most impact on resilience and determine how they should be coordinated, sequenced, and financed.

The infrastructure that residents rely on daily to work, live, and play can also be a resource for increasing Oakland's resilience. If the City of Oakland, as owners and operators of the City's public infrastructure, together with residents, can identify the multiple benefits that can be generated by existing parks, thoroughfares, public spaces, facilities, and physical assets, then taxpayer dollars going into the built and natural environment can also help ameliorate social, economic, environmental, and hazard-related challenges.

This focus area assists with identifying new opportunities for increasing the public benefit and resilience dividend of existing and proposed infrastructure investments.

Photo: Greg Linhares, City of Oakland

Focus Area #5

Identify what Oakland's most vulnerable residents need to build their personal and community resilience.

The ability to quickly recover from major shocks and stresses is essential to keep Oakland residents in Oakland and remain in the city they love. By 2050, it is highly likely that sea level rise will have changed the coastline, drought will have increased fire risk, and a major earthquake will have occurred. How we prepare for, adapt to, and mitigate the potential impacts of these hazards will determine the extent to which these events lead to more frequent flooding, earthquakes that destroy buildings, and homes and fires (including those caused by earthquake damage) burning neighborhoods across the City. Addressing these challenges requires policy changes, new ordinances, infrastructure investments, and tapping into and bolstering the resilience inherent in our communities.

The City of Oakland, along with the State of California, has begun developing a disaster recovery framework to aid the long-term recovery from a major disaster. In addition, the City of Oakland is embarking on the update to its Hazard Mitigation Plan. This focus area contributes to these existing efforts and deepens the understanding of climate adaptation measures needed in Oakland.

Priority Questions

- What are the key actions needed to prepare for, mitigate, and recover from the potential impacts of natural disasters and climate change?
- Which services and critical assets should be prioritize for seismic safety and resilience to sea level rise and flood risk, particularly in neighborhoods furthest from opportunity?
- What policies, regulations, and data analysis systems can support decision-making around how land use, building, and zoning can advance Oakland's long-term sustainability, climate resiliency, housing and job growth?

2015 CORE Citywide Exercise, Photos courtesy of Dena Gunning and Victoria Salinas

CROSS-CUTTING QUESTIONS

Under each focus area, the following cross-cutting issues will be explored:

Financing

How do we use existing and new finance tools and approaches to address the challenges and opportunities of the 21st Century?

Any innovative project or initiative will require new thinking around how to leverage assets and financial tools to make it sustainable.

Regional Coordination

How do we coordinate efforts regionally to address shared risks and opportunities?

The many shocks and stresses that threaten Oakland do not map neatly to political and jurisdictional boundaries. Regional coordination and planning are crucial for the implementation of resilience-building measures to ensure the mutual survival and prosperity of each jurisdiction.

Harnessing Culture

How do we use our culture to address the challenges and opportunities of the 21st Century?

Oakland's unique culture and diversity are residents' most cherished assets. Oakland residents often cite the City's strong social networks as a key element of its long history of resilience. Any future comprehensive resilience-building efforts must take the City's local culture into account to harness its creative and economic momentum to help address risk and generate opportunities.

NEXT STEPS: CRAFTING OAKLAND'S RESILIENCE STRATEGY

Between March and August 2016, Resilient Oakland will engage residents; local and international experts; and a range of organizations, companies, and institutions to explore the critical questions identified under each focus area for resilience. The information, analysis, and community input will shape Oakland's Resilience Strategy.

For example:

- One of the primary avenues for addressing Focus Area 3, Living in Safe and Secure Neighborhoods, will be through a local and international competition for solutions that can contribute to achieving the dual goal of identifying ways for law enforcement to use data to both deter crime and enhance community trust. Through 100 Resilient Cities, Oakland will be collaborating with Citymart and local organizations to launch the challenge for innovative solutions to this intractable problem.
- The exploration of questions under Focus Area 5, Recovering Quickly from Adversity, will be instrumental in assisting Oakland to complete the update to its Local Hazard Mitigation Plan and act on the recommendations of the City's Energy and Climate Action Plan.

2015 march for Real Climate Leadership - Oakland, CA, Courtesy of Fresno Peopel's Media

The overarching goal of Oakland's Resilience Strategy is to contribute to tangible improvements in people's lives—especially Oakland's most vulnerable residents—by conducting a people-centered planning process that effectively empowers the participation of Oaklanders and organizations and businesses committed to a resilient, thriving, equitable city.

This participation will be achieved by proactively engaging and elevating the voices of historically underrepresented people and neighborhoods (especially at-risk youth and people most affected by Oakland's resilience challenge) in crafting the resilience strategy. Resilient Oakland will seek opportunities to conduct outreach and engagement by leveraging existing/planned events, workshops, outreach channels, and working groups. This initiative will also seek to integrate sector-specific conversations and problem-solving efforts into a holistic Resilience Strategy.

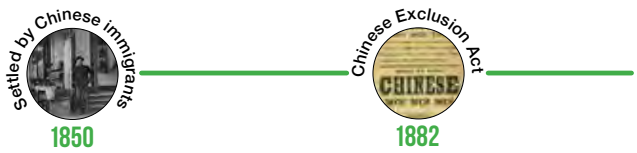
Celebrating Oakland Pride: Oakland is home to one of the country's largest LGBT communities
Photo: Greg Linhares, City of Oakland

CHINATOWN

REVEALING RESILIENCE IN OAKLAND

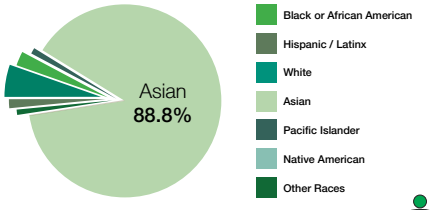
The variety of small, unique businesses is what keeps the fabric of the community together, and they are in need of economic support at a neighborhood and city scale. The area also has a critical need for housing in order to support current residents and create economic growth.

Photo: Greg Linhares, City of Oakland

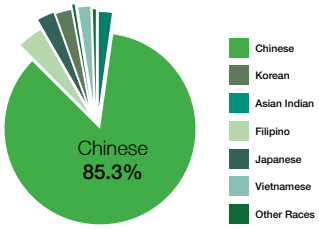


Who Lives Here?

Race



Asian Population

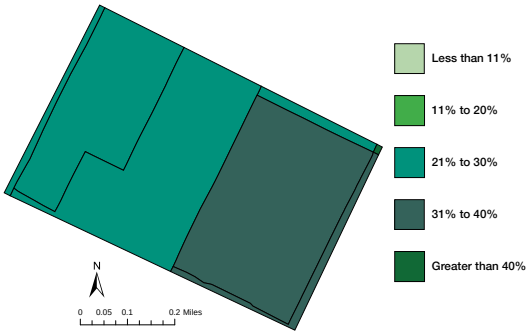


Median Age

55.7 Male

56.4 Female

Economy



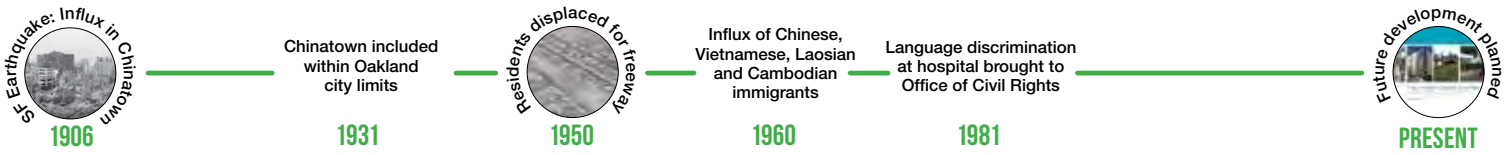
17.3% Households under poverty line

18.7% Owner-occupied properties

Health Concerns

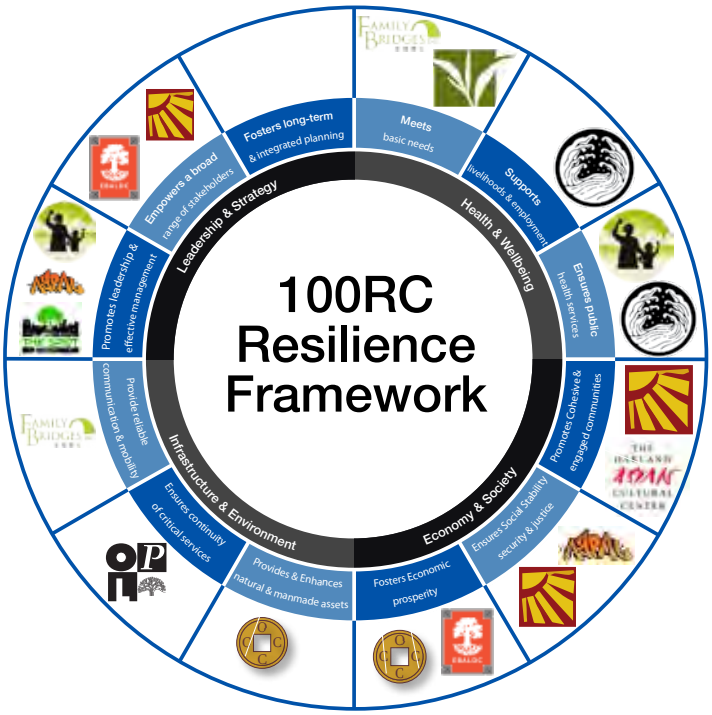
Air Quality

Traffic Density 72nd percentile ⟷ Asthma 100th percentile



Building Resilience

- East Bay Asian Local Development Corporation
- Oakland Chinatown Chamber of Commerce
- AYPAL
- Asian Pacific Environmental Network
- The Spot
- Family Bridges
- East Bay Asian Youth Center
- Oakland Public Library (Asian Branch)



Community Top Priorities

Public Health — Asian Health Services required to work at capacity to cater to Asian/Pacific Islander community

Pedestrian Safety — One of the only areas of Oakland with a sidewalk "scramble," yet it is still unsafe for pedestrians

Perceived areas for improvement

- Range of stakeholders
- Leadership
- Social stability

Perceived areas of strength

- Public space
- Cohesive community

FRUITVALE & SAN ANTONIO

REVEALING RESILIENCE IN OAKLAND

Fruitvale is located at a convergence of environmental threats, however vulnerability is often focused on language barriers, police relations, and economic hardship. The transit-oriented Fruitvale Village was designed to combat this vulnerability, and is still working toward its potential.

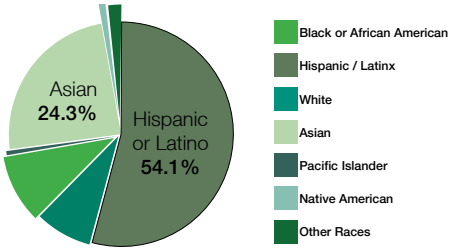
Courtesy of Oakland Public Library

1880

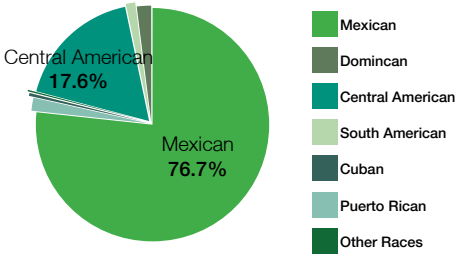
1906

Who Lives Here?

Race



Hispanic or Latino Population



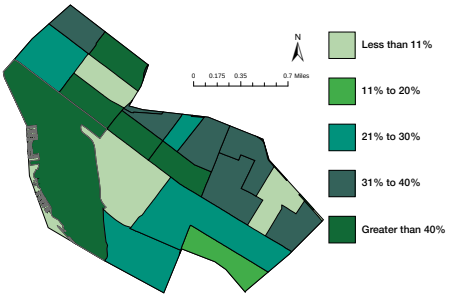
Median Age

31.3 Male

31.8 Female

Economy

Fruitvale Rent as a Percentage of Income

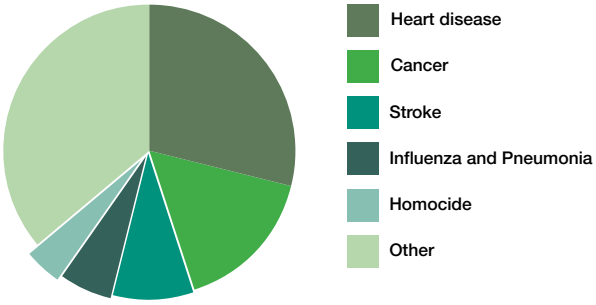


38.7% Households under poverty line

30.7% Owner-occupied properties

Health Concerns

Leading Causes of Death



Community predominantly Hispanic or Latino — 1955

Nimitz Freeway constructed — 1959

Creation of Unity Council — 1968

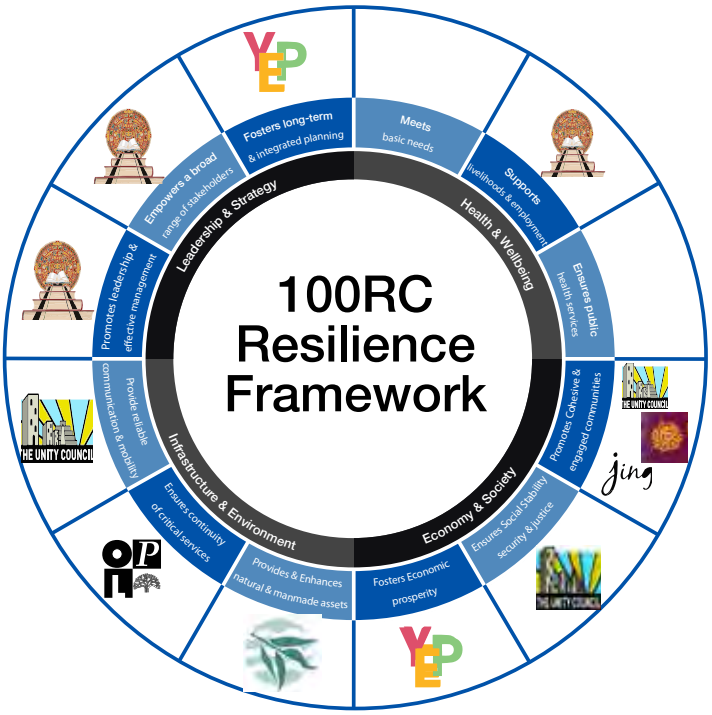
Student walkouts protesting war — 1970

Montgomery Ward (employment anchor) closes its warehouse — 1982

Social unrest and riots due to police brutality — PRESENT

Building Resilience

- Jingletown Arts & Business Community
- Spanish Speaking Citizens Foundation
- Eastside Arts Alliance
- Youth Employment Program
- The Unity Council
- East Bay Asian Youth Center
- Oakland Public Library (César E. Chávez Branch)



Community Top Priorities

Violence — 2009 shooting of Oscar Grant III by a Bay Area Rapid Transit police officer

Education — ARISE School and library acts as a hub for community

Oakland Public Library & ARISE

Perceived areas for improvement

- Range of stakeholders
- Leadership
- Social stability

Perceived areas of strength

- Cohesive community
- Fosters economic growth

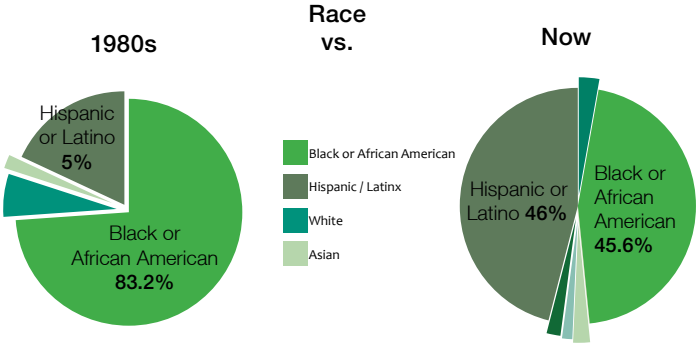
EASTMONT & CASTLEMONT

REVEALING RESILIENCE IN OAKLAND

Eastmont and Castlemont have gone through a tough history of economic decline, disinvestment, poverty, and political exclusion. This has ongoing implications for this community, specifically the large youth population, clear in the high violence and low education rates. Future resilience work must focus on this deomographic.

Historic Picardy neighborhood in East Oakland

Who Lives Here?



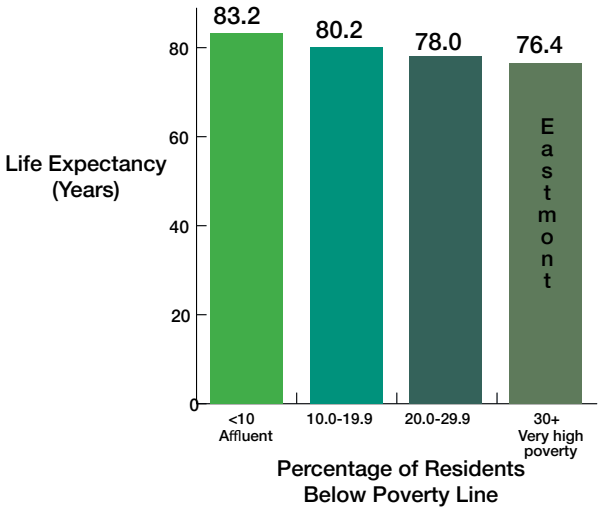
Median Age

29.7 Male

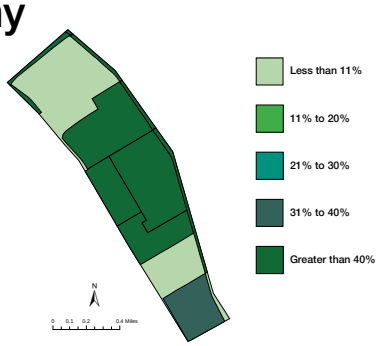
33.2 Female

Health Concerns

Life expectancy for someone living in East Oakland is **10 years shorter** when compared to someone living just 1.3 miles away in the Oakland Hills



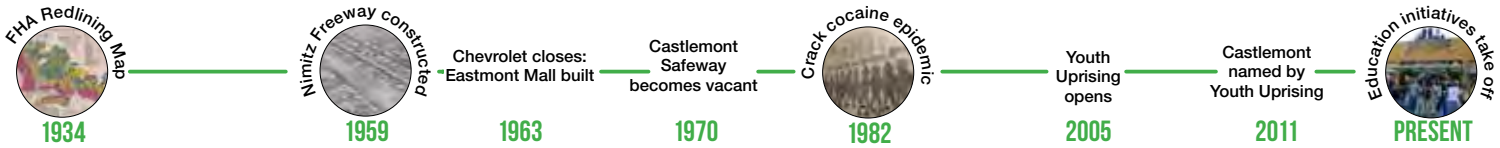
Economy



26% Households under poverty line

27.9% Unemployment

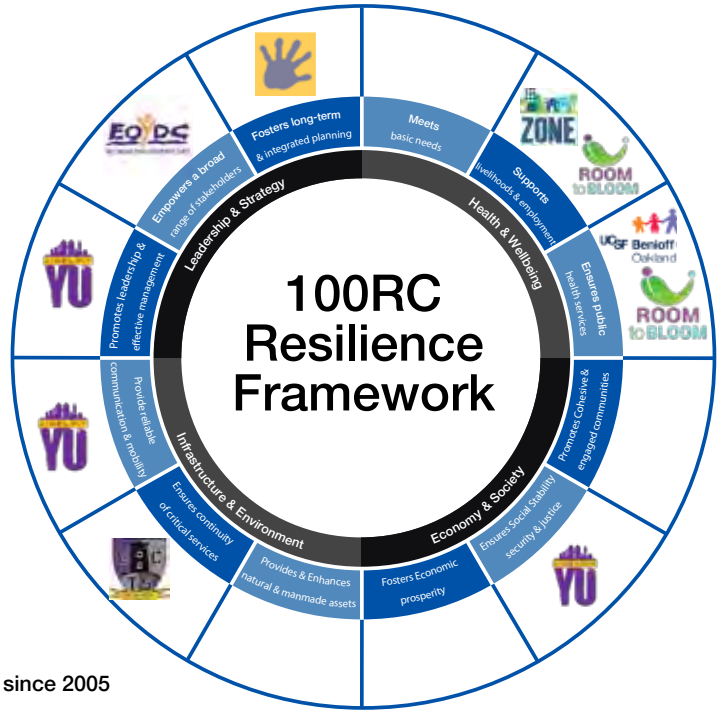
30% Owner-occupied properties



Building Resilience

- East Oakland Youth Development Center
- Children's Hospital Oakland
- Castlemont Community Transformation Schools
- Room to Bloom
- First 5 Alameda County
- Best Babies Zone
- Youth Uprising

Served more than 14,000 unduplicated people since 2005



Black or African American
Hispanic / Latinx
White
Asian
Pacific Islander
Native American
Other Races

Community Top Priorities

Violence

86% of the youth in the area have had contact with the criminal justice system

Education

32% high school graduation rate in 2005

Castlemont High School

Perceived areas for improvement

Employment

Social stability

Inequality

Perceived areas of strength

Public Space

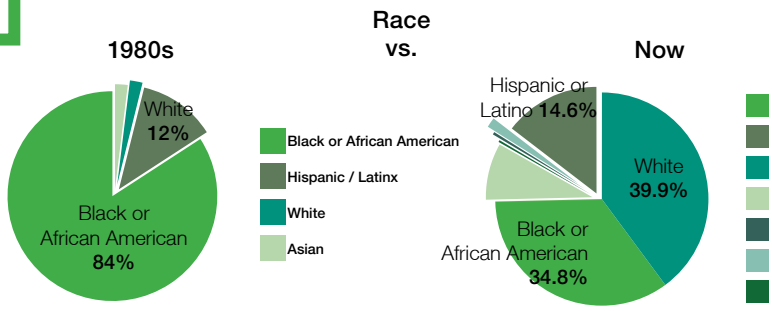
Critical Services

GOLDEN GATE

REVEALING RESILIENCE IN OAKLAND

A neighborhood chartacterized by transitionis currently following that pattern by moving towards a younger, wealthier demographic. The area has the potential for economic development, however the current state of neglect is hindering developer interest.

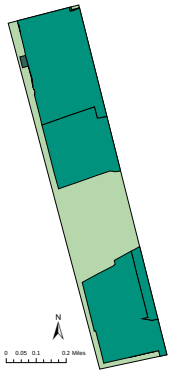
Who Lives Here?



Median Age
1990s vs. Now

47.6	Male	→	35.9	Male
55.6	Female		40.5	Female

Economy



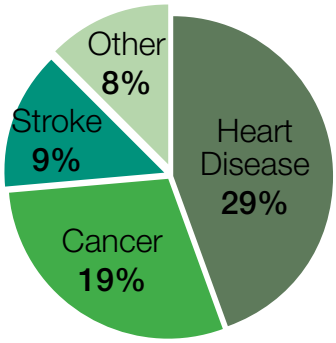
- Less than 11%
- 11% to 20%
- 21% to 30%
- 31% to 40%
- Greater than 40%

17.3% Households under poverty line

18.7% Owner-occupied properties

Health Concerns

Leading Causes of Death



Established African American community
1930

Original Trader Vic's opens
1934

Nimitz Freeway constructed
1959

Trader Vic's closes
1972

Loma Prierta Earthquake
1989

Rec Center opens
PRESENT

Building Resilience

Black or African American

Hispanic / Latinx

White

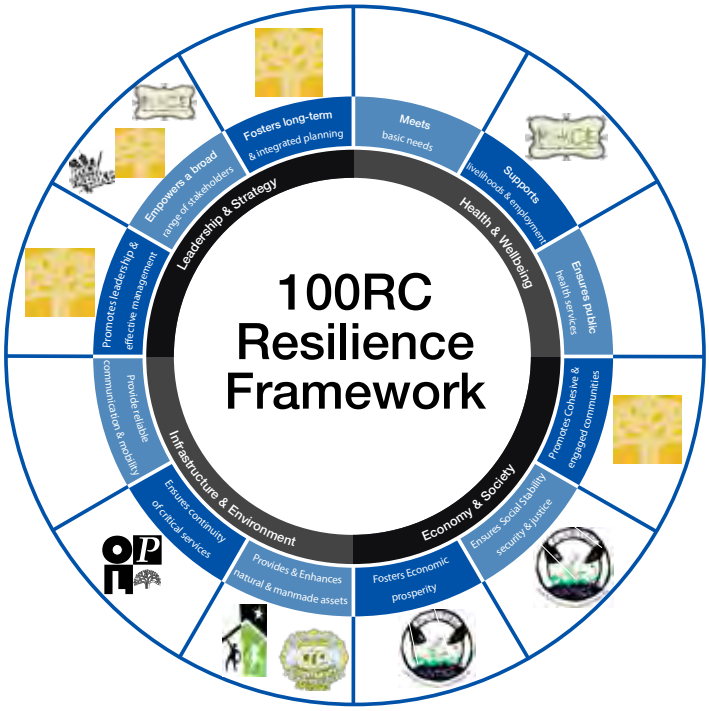
Asian

Pacific Islander

Native American

Other Races

- Golden Gate Community Assoc. (formerly SPAGGIA)
- Rebuilding Together Oakland
- Planting Justice
- People Linking Art, Community, and Ecology
- Rock the Bike
- Community Rejuvination Project
- Oakland Public Library (Golden Gate Branch)



Community Top Priorities

Crime

Many residents express strong concern about burglary and theft in the area.

Affordable Housing

Resident says house value change from $60,000 to $600,000 in 30 years

Value increases with new housing along San Pablo Avenue

Perceived areas for improvement

- Employment
- Public Space
- Critical Services

Perceived areas of strength

- Leadership
- Social stability

Annex 1.

Phase 1 Results Summary

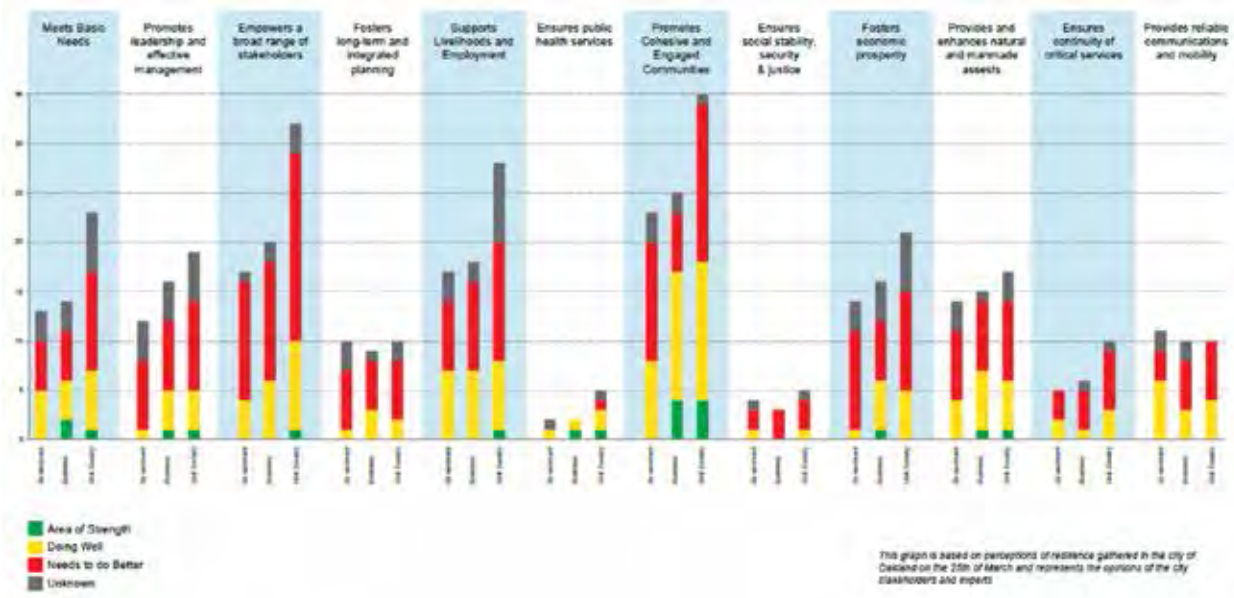
PERCEPTIONS: DO OAKLANDERS FEEL RESILIENT?

Oakland residdents' perceptions of resilience within the City have been gathered in multiple ways, including in-person workshops, online surveys, in-person surveys, and conversations with community representatives.

The three key messages communicated by workshop participants were that the City should:

- Empower stakeholders and promote cohesive communities
- Support local economic development
- Make City leadership more effective and connected to the community

Perceptions of City Resilience from Public Workshop (150 participants)



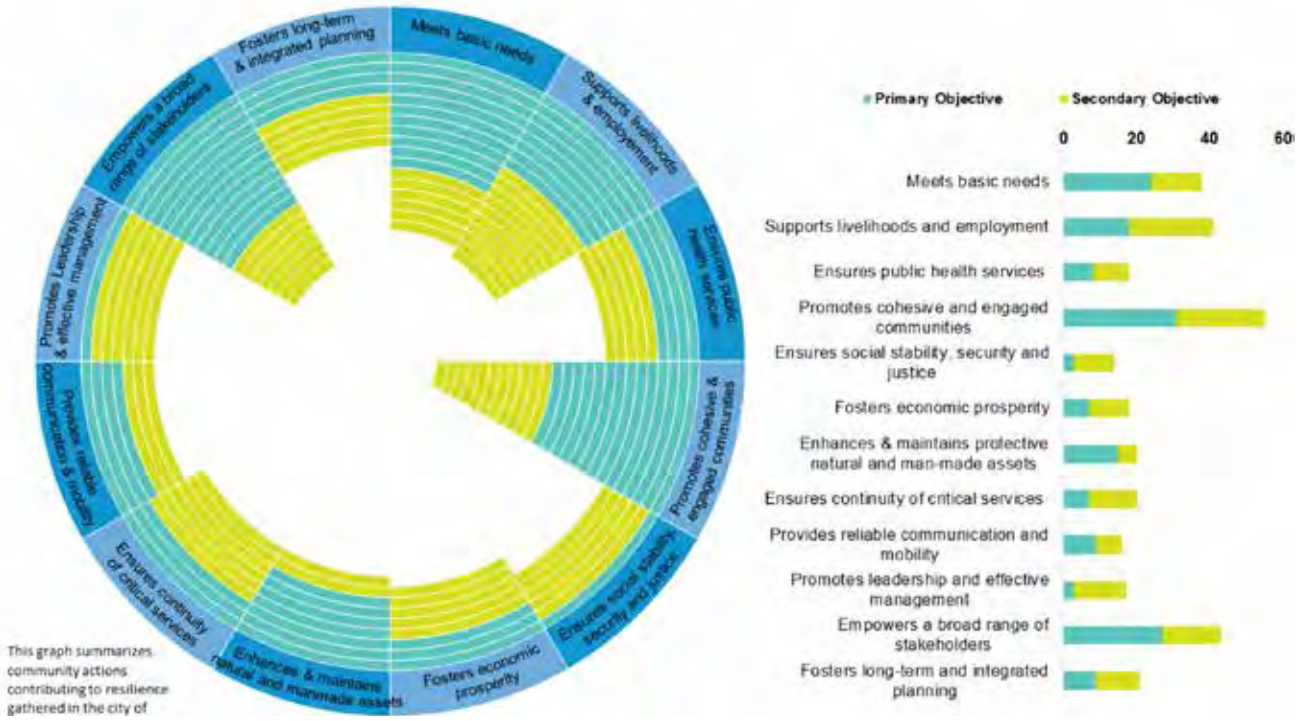
STAKEHOLDERS: WHO IS WORKING ON RESILIENCE?

Oakland's history is steeped in political, social, and environmental activism. In a recent survey, 322 organizations, agencies and businesses self-identified as contributing to three or more drivers of resilience in Oakland. From feeding the hungry and housing the homeless, to restoring green space and natural habitats, to helping vulnerable youth expand their horizons, Oakland is a community of people working for the common good.

ACTION INVENTORY: WHAT RESILIENCE WORK IS ONGOING?

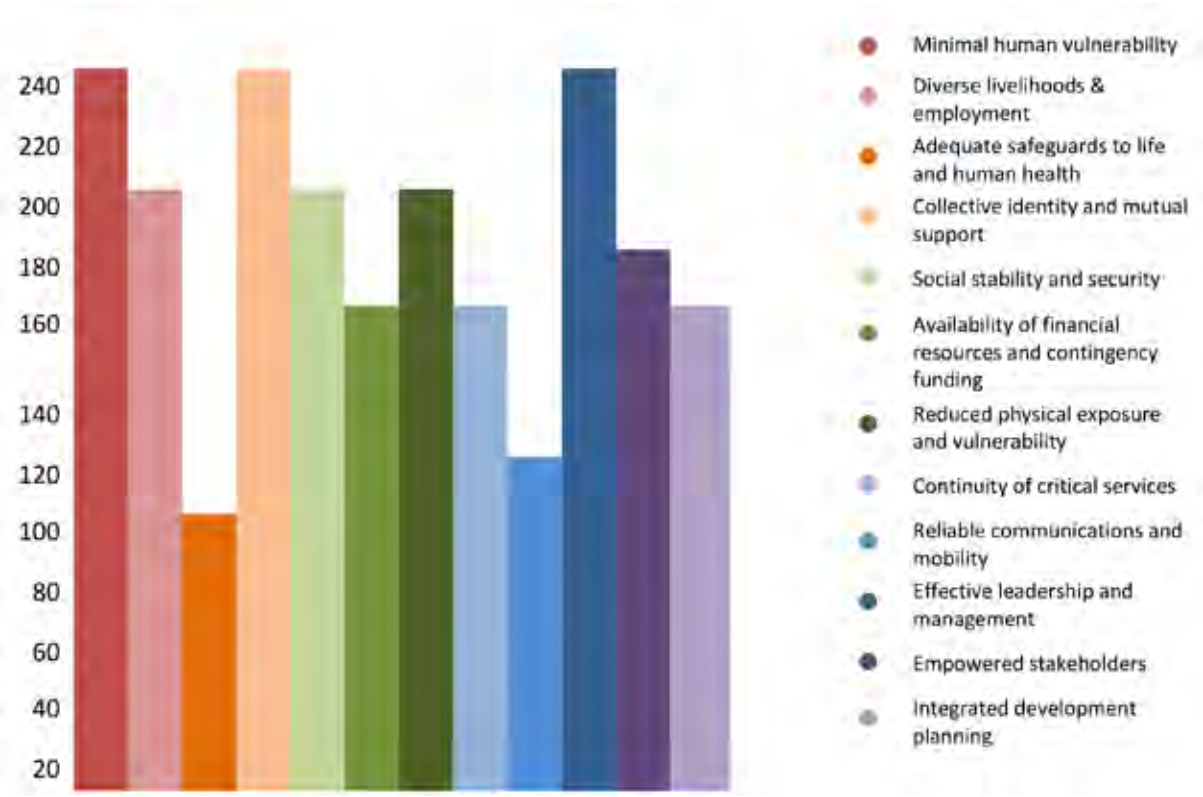
The City of Oakland is supported in resilience work by hundreds of local organizations, working across all aspects of resilience, as demonstrated by survey responses.

Community Activities Contributing to Oakland's Resilience



This graph summarizes community actions contributing to resilience gathered in the city of

Count of Respondents Contributing to Oakland Resilience by Driver



Organizations conducting resilience work in Oakland focus on resilience from many angles, from housing solutions to education to environmental protection. A few examples of organizations conducting this work include:

- **Allen Temple Arms Affordable Housing**, working to increase affordable senior housing in East Oakland.
- **Abode Services**, which secures permanent homes for individuals and families experiencing homelessness, by applying the innovative Housing First approach to go beyond the temporary solutions that shelters and transitional housing programs offer.
- **Eastside Arts Alliance**, providing free neighborhood festivals, block parties, and public murals with a community resilience message.
- **The Watershed Project**, focusing on urban Greening strategies, storm and flood water management, and green infrastructure.
- **Bay Localize**, which hosts the Local Clean Energy Alliance and work toward a single vision: let's stop wasting energy, clean up our air, and put people to work.
- **Oakland Heritage Alliance**, advocating for the protection, preservation, and revitalization of Oakland's architectural, historic, cultural and natural resources through publications, education, and direct action.
- **The Oakland Firesafe Council** is a grassroots community-based organization dedicated to mobilizing the people of Oakland to reduce the risks of wildfire danger to people and property through outreach, programs, and projects.
- **EarthMojo** runs educational workshops that provide residents or businesses/employees with information, and practical skills to make changes to be more sustainable, self-sufficient and resilient in their day to day lives. These workshops empower individuals to make personal change, and move towards engaging with community resilience issues .
- **Friends of the Oakland Public School Libraries** advocates for strong school libraries in every school for every child with the goal that students, teachers, parents and the broader school community will have access to a highly qualified professional teacher librarian, who can build a culture of reading in the school, teach information literacy, and maintain quality print and digital resources.
- **Bike East Bay** promotes healthy, sustainable communities by making bicycling safe, fun and accessible.
- **Acta Non Verba** is a community program targetting community-based farming in Oakland to provide fresh and affordable produce to an underserved population, and in doing so raise seed money for college funds for participating children and teens.

Steering Committee

Ana-Marie Jones, Emergency Preparedness Activist

Asian Pacific Environmental Network (APEN)
Vivian Huang, Campaign and Organizing Director

Arnold Perkins, Human Rights Activist

Bay Area Rapid Transit (BART)
Marla Blagg, Emergency Manager

Bay Conservation & Development Commission
Larry Goldzband, Executive Director
Lindy Lowe, Project Manager, Adapting to Rising Tides

Children's Hospital and Research Center Oakland
Bert Lubin, President/CEO
Dayna Long, Director of Social Determinants of Health Initiatives

City of Oakland
Tomiquia Moss, Chief of Staff to Mayor Libby Schaaf

East Bay Community Foundation
James Head, President/CEO
David Pontecorvo, Interim Director, Community Investment and Partnerships

East Bay Housing Organization
Gloria Bruce, Executive Director

East Bay Municipal Utility District (EBMUD)
Richard Harris, Manager of Water Conservation

Heart of the Town Productions
Samee Roberts, Owner Executive Director

Oakland Climate Action Coalition
Corinne VanHook, representing OCAC Steering Committee

Oakland Community Organizations (OCO)
Amy Fitzgerald, Executive Director

Oakland Metropolitan Chamber of Commerce
Barbara Leslie, President/CEO
Alex Boyd, Director of Economic Development

Oakland Unified School District

SPUR
Laura Tam, Sustainable Development Policy Director

The Unity Council
Chris Iglesias, CEO

Urban Economy Group
Ahmad Mansur, Partner

US Department of Housing and Urban Development
Ophelia Basgal, Regional Administrator
Joshua Geyer, Program Analyst, Office of Economic Resilience
Dwayne Marsh, Senior Advisor, Office of Economic Resilience

West Oakland Environmental Indicators Program
Ms. Margaret Gordon, Co-founder/Co-Director

City of Oakland Team

Victoria Salinas, Chief Resilience Officer
Karen Boyd, Communications Director
Christine Daniel, Assistant City Administrator

Tim Birch
Joe DeVries
Greg Elliott
Aliza Gallo
Mai-Ling Garcia
Mark Hall
Daniel Hamilton
Harry Hamilton
Kristin Hathaway
Bradley Johnson
Heather Klein
Steve Lautze
Scott Means
Danielle Mieler
Genevieve Pastor-Cohen
Dana Perez-St. Denis
Marisa Raya
Maryann Sargent
Jamie Turbak

Resilience Interns
Allan Kapoor, Semaj Blackwood, Jack Lundquist, Zoe Siegel, Chelsea Wurms

In-City team, Resilience Snapshots
B. Max Arnell, Veronica Fink, Varand Onany, Caytie Campbell-Orrock

100 Resilient Cities

Relationship Manager
Corinne LeTourneau

Strategy Partner, AECOM
Rebecca Verity, Claire Bonham-Carter, Kris May, Amruta Sudhalkar, Julie Guyenet, Lisa Jackson

Platform Partner
Ian Mitroff, UC Berkeley Center for Catastrophic Risk Management

End Notes

1. Wallethub, From: https://wallethub.com/edu/most-diverse-cities/12690/
2. Census, from: http://www.bayareacensus.ca.gov/cities/Oakland.htm
3. Walkscore, from: http://blog.walkscore.com/2013/11/2014-ranking-of-most-walkable-cities-and-neighborhoods/#.VrOey032Zes
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Cover image: Golden State Warriors Championship parade and rally, June 19, 2015, Photo: Greg Linhares, City of Oakland
Back cover image: "Off the Grid," Friday Nights at the Oakland Museum of California, Photo: Greg Linhares, City of Oakland

Fun Run at Lake Merritt
Photo: Greg Linhares, City of Oakland

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CITY OF OAKLAND

FILED
OFFICE OF THE CITY CLERK
OAKLAND

2016 JAN 29 AM 9: 11

AGENDA REPORT

TO: Sabrina B. Landreth
City Administrator

FROM: Teresa Deloach Reed
Fire Chief

SUBJECT: Emergency Management And Disaster Preparedness Council (EMADPC) Informational Report (2014-2015)

DATE: January 15, 2016

City Administrator Approval

Date: 1/28/16

RECOMMENDATION

Staff Recommends That The City Council Receive This Informational Report On Emergency Preparedness And Disaster Planning.

Staff Also Recommends That The Oakland City Council Continue To Fully Support Through Fiscal And Policy Decisions Emergency Preparedness Efforts For The City Of Oakland By Emergency Management Services Division (EMSD).

EXECUTIVE SUMMARY

City Council acceptance of the Emergency Management Services Division (EMSD) and Emergency Management and Disaster Preparedness Council (EMADPC) report will provide relevant emergency preparedness and disaster planning information to the City Council, residents of Oakland, and other interested stakeholders, and City of Oakland business partners. The purpose of this report is to provide City Council with information regarding the emergency preparedness, response, recovery and mitigation activities as reported to the City's EMADPC by the EMSD, a division of the Oakland Fire Department (OFD). This report covers July 1, 2014 through December 31, 2015 and is divided into the following major topics:

- Emergency Management
- Emergency Operations Center (EOC)
- Emergency Management And Disaster Preparedness Council (EMADPC)
- Communities Of Oakland Responding To Emergencies (CORE) Program

BACKGROUND / LEGISLATIVE HISTORY

The Public Safety Committee has requested an annual report regarding the emergency preparedness, response, recovery and mitigation activities as reported to the City's

Item: _____
Public Safety Committee
February 9, 2016

Emergency Management and Disaster Preparedness Council (EMADPC) by the Emergency Management Services Division (EMSD), a division of the Oakland Fire Department (OFD). Semi-annual reports began in 1995 and continue as requested and submitted. Status reports of EMSD activities have been reported quarterly to the EMADPC which by ordinance is the City's Disaster Council, as well as its Citizens Corps Council.

Since September 11, 2001 the nature of emergency management has changed significantly. As a result of September 11th, there is a need for greater flexibility to appoint participating members, as required, who are qualified to address specific and technical emergency preparedness, response, recovery, and mitigation issues as they arise. The purposes and objectives of the EMADPC are to (a) facilitate the development and implementation of programs and plans that protect persons and property within Oakland on a day-to-day basis as well as during times of emergencies or disasters; (b) establish and define the powers, structure and processes of Oakland's Emergency Management and Disaster Preparedness Council, including the city's overall emergency organization; and (c) encourage coordination of emergency functions of Oakland with other public agencies, governments, corporations and organizations.

ANALYSIS AND POLICY ALTERNATIVES

The EMSD/EMADPC report provides information on the major projects, activities, and services the EMSD is responsible for, including the Emergency Management and Disaster Preparedness Council (EMADPC). This report includes activities and related projects from July 2014 through December 2015.

Emergency Management

EMSD coordinates the activities of all City agencies relating to planning, preparation and implementation of the City's Emergency Operations Plan. EMSD also supports the coordination of the response efforts of Oakland's Police, Fire and other first responders in the City's state-of-the-art Emergency Operations Center (EOC) to ensure maximum results for responders by providing up-to-date public information and ensuring coordinated resource management during a crisis. Additionally, EMSD coordinates with the Alameda County Operational Area and other partner agencies to guarantee the seamless integration of federal, state and private resources into local response and recovery operations.

EMSD accomplishes this mission through partnerships, policy, planning, programs, training, exercise, equipment and outreach efforts that assist Oakland's first responders, City departments, local businesses, non-governmental organizations (NGOs), community based organizations (CBOs) and residents in their emergency management/preparedness efforts. EMSD also integrates its emergency management and homeland security management practices that incorporate a multi-disciplinary, multi-hazards approach to the Urban Area Security Initiative (UASI), Port Security, Airport Security and Transit Security which includes a strong emphasis on partnerships and regional, state and federal collaboration.

Training and Exercise

The EMSD Emergency Planning Coordinator (EPC) responsible for training and exercise planning assists with the identification and coordination of Standard Emergency Management (SEMS), National Incident Management Systems (NIMS) and EOC Incident Command System (ICS) training courses on behalf of City of Oakland employees.

Since August 2014 to the present and in coordination with OFD sworn staff and the UASI Training Program Lead Planner, 20 trainings have been scheduled in which OFD or Oakland EMSD was the planned host. Eighteen of these courses have already been held.

The EMSD has developed and hosted three exercise events designed for the benefit of Oakland personnel. This included the annual Flu vaccination clinic (November, 2014) "No Blue Flu," The Yellow Command Emergency Public Information Officer Exercise (September 2015), and the Oakland Yellow Command EOC Drill (September 2015). Participating department and agencies: Oakland Police Department (OPD), Oakland Fire Department (OFD), Public Works Department, Parks and Recreation Department, Civil Air Patrol, Human Resources and Management Department, the Office of the Mayor, OFD, Medical Services Division, OFD Dispatch, Oakland Department of Information Technology (DIT), UCSF Benioff/Oakland Children's Hospital, OFD Training Division, and Berkeley Emergency Management Office.

City/Oakland USD Emergency Shelter Facilities Use Committee

The City/Oakland Unified School District (USD) Emergency Shelter Facilities Use Committee has met quarterly since August 2014. The Committee's charge is to fulfill the elements of the City/Oakland USD Memorandum of Agreement (MOA) in using school district facilities as emergency shelters or staging areas in the event of a catastrophic disaster.

Logistics Planning: Points of Distribution (PODS), Local Staging Areas (LSA) MOU

EMSD staff continues to conduct outreach to identified PODS and LSA sites to establish partnerships in providing the City of Oakland with paved, open and level space to serve the purpose of a community-based needs PODS and/or LSA.

Mass Notification System

When local emergencies or disasters occur, the City of Oakland uses a mass notification system to communicate concise information and instructions to Oakland employees, residents, visitors and businesses including the type of incident and instructions or actions to take to remain safe.

Internally, the system is used for activations of the Emergency Operations Center (EOC) and for callouts for multi-alarm fires.

Effective January 1, 2016 the City of Oakland will be participating in "EverBridge," the Alameda County Alert System. The EverBridge system is internet-based and can send

emergency messaging via telephone, Short Message Service (SMS) text message, email, instant message, fax or TTY/TDD.

For Internal Communications: All city employees will eventually be added to the system, receiving notifications based on the notification protocols in the Emergency Operations Plan or as directed by the Incident Commander. Employees will be able to provide additional "opt-in" features such as providing home or cell phone information. An Administrative Instruction is being developed accordingly. Oakland residents and employees can "opt-in" to the "public side" at ACAlert.org.

Oil Spill Response Planning

The Office of Spill Prevention and Response (OSPR) has the California Department of Fish and Wildlife's (CDFW) public trustee and custodial responsibilities for protecting, managing and restoring the State's fish, wildlife, and plants. It is one of the few State agencies in the nation that has both major pollution response authority and public trustee authority for wildlife and habitat.

Since July 1995, the Oakland Fire Department's Emergency Management Services Division (EMSD) has been the lead agency for development and implementation of the Alameda County Local Oil Spill Contingency Plan (ACLOSP).

The Emergency Management Services Division receives grant funding to make revisions and updates to the local plan, participate in the development of a Memorandum of Understanding (MOU) between the CDFW, Alameda County Operational Area, the City of Oakland and participating cities, and conduct and participate in trainings and exercises.

In 2014, Governor Brown expanded the OSPR program to cover all state surface waters at risk of oil spills from any source, including pipelines, production facilities, and the increasing shipments of oil transported by railroads. This expansion provided critical administrative funding for industry preparedness, spill response, and continued coordination with local, state and federal government along with industry and non-governmental organizations.

In 2015, by Resolution No. 85531 C.M.S., the City Council approved the Memorandum of Understanding (MOU) with the City of Oakland Emergency Management Services Division and the Alameda County Operational Area for oil spill planning. The new agreement ensures the City of Oakland will continue to play a prominent role in planning, mitigating, responding to and training for oil spills.

Homeland Security Grants

The purpose of all Homeland Security grants is to provide funding to assist in the implementation of programs and equipment to help strengthen the nation against risks associated with potential terrorist attacks. The Homeland Security Unit (HSU) encompasses the following grant:

Urban Area Security Initiative (UASI): The FY 2013-14 grant is $1,000,000. The FY 2013-14 grant program closed December 1, 2014. The grant funded 4.25 FTE planner positions. The planners are responsible for the development/coordination of the following deliverables:

- Conduct a minimum of three Critical Infrastructure inspections and Buffer Zone Protection Plans
- Establish Memorandums of Understanding with key partners
- Update Alternate EOC policies
- Update and maintain all of the City of Oakland Emergency Operations Plans, Annexes and Emergency Support Functions
- Emergency Operations Center (EOC) Virtual Desktop Infrastructure (VDI)

Equipment/Activities Deliverables are as follows:

- Water Rescue Protective Equipment
- Point of Wounding Kits
- OFD Confined Space and Rescue Equipment
- OFD Tactical Medical Response Equipment
- Website for Whole Communities Preparedness

Emergency Operations Center (EOC)

EMSD staff maintains the EOC throughout each week in order to keep it in readiness mode at all times. In late 2012 grant funds were approved for upgrade to the EOC workspace environment for the creation of a Virtual Desktop Infrastructure. Work on this project was completed in 2014 providing enhancement of the EOC capability as well as streamlining the process for maintenance and control for over 56 EOC workstations. In addition to the infrastructure upgrade, the EMSD also received funding and approval for an upgrade of the Emergency Management (EM) software. The new application is called WebEOC; Oakland's selection of this EM application follows the state of California's decision to move to the application allowing for a smooth and well integrated web-enabled crisis information management system that provides secure real-time information sharing between the City EOC, the Alameda County Operational Area; and thusly the Regional Operations Center (REOC) and the State Operations Center (SOC).

Emergency Management And Disaster Preparedness Council (EMADPC)

This section covers meeting highlights and participation of management and staff activities as EMADPC members. The EMADPC strategic goals are directed towards preventing loss of life, maintaining health and life safety, and efforts to stimulate more community involvement.

The City of Oakland's Emergency Management and Disaster Preparedness Council (EMADPC) has supported the following efforts for the time period of September 1, 2014 through December 31, 2015:

- Access and Functional Needs (AFN) Subcommittee's goal is to actively engage persons within the access and functional needs (AFN) community before a disaster. Key topics include:
  - Emergency preparedness informational content
  - Delivery platforms and methods to disseminate such content such as Neighborhood Crime Prevention Council and CORE (Communities of Oakland Responding to Emergencies), and 211
  - Reviewing and providing input for updating the City of Oakland's Mass Care and Shelter-Functional Needs Annex

- Disaster Recovery Planning includes the development of a best practices document and localizing the planning products to coordinate and manage long-term recovery after a catastrophic event. Key objectives:
  - Validation of the health, social, economic, natural and environmental Recovery Support Functions (RSFs).
  - Build resiliency from the local jurisdiction up to the nation.
  - Development of the "Recovery Framework Resources and Tool Kit".

- The Private Non-profit (PNP) Assistance Program (AB903) Committee consisting of members of the NorCal VOAD (Voluntary Organizations Active in Disasters), Oakland EMSD staff with the support of California Office of Emergency Services (Cal OES) continue to work on developing training and outreach for the PNP Assistance Program (AB903 legislation) reimbursement to non-profits requested to provide assistance to local jurisdictions for critical resources post disaster. The group is developing a work plan to assist with educating government, non-profits and faith based organizations on Cal OES's requirements and process. NorCal VOAD has received a grant from the San Francisco Foundation to support this effort. A regional forum was scheduled for January 14, 2016.

Communities Of Oakland Responding To Emergencies (CORE) Program

This section provides a background and overview of the CORE Program. Since 1989, The City of Oakland Fire Department has offered Community Emergency Response Team (CERT) training known as CORE. CORE stands for Communities of Oakland Responding to Emergencies.

CORE Program Updates

- ShakeOut 2014 was held Thursday, October 16, 2014 at 10:16 am. City departments, libraries and recreation centers participated in the annual Drop, Cover and Hold Drill. There was an estimated 4,500 participants throughout the city that joined in to practice.

- Loma Prieta 25th Anniversary Event was held Friday, October 17, 2014 from 11:00 am to 2:00 pm at the Cypress Memorial Park. Preparedness

demonstrations and a commemorative ceremony were well attended by City staff, the public and local school children.

- The Tenth Annual CORE Citywide Emergency Response Exercise was held Saturday, April 25, 2015, 9:00 am – 12:00 pm. This year's objectives included: Neighborhood Command Post Operations, triage and treatment processes conducted by Light Search and Rescue and Disaster First Aid teams and effective communication at all levels. Forty-seven (47) CORE neighborhoods participated in this year's exercise and over fifty-five (55) individuals and volunteers participated in the simulation exercise at the OFD training division. Highlights include:
    - Testing communications via Amateur radio operators at participating anchor fire stations and GMRS radio capabilities within the neighborhoods passing over 20 messages to the Emergency Operations Center.
    - Celebrating the 25th Anniversary of the CORE Program following the simulated exercise at the OFD Training Division with CORE neighborhood group leaders, CORE staff and elected officials Mayor Libby Schaaf and Council President Lynette Gibson McElhaney. Mayor Schaaf presented a proclamation declaring April 25th CORE Day to two of the program's originators, Oakland Fire Department's Deputy Chief Mark Hoffmann and retired Assistant Chief Don Parker.
    - The full exercise plan and after action report (AAR) are available on the CORE website.

- The CORE Program's utilization of the city's Govdelivery notification system to deliver mass emails and notices to CORE members and subscribers has been very successful. Our popular Tuesday Tips are now automatically posting to the CORE Facebook page and the City's Twitter account. The program has also used the system to do outreach for special trainings such as workshops, Learn, Lead, Lift and special projects like the City's Soft Story Project.

- Learn, Lead, Lift (LLL) – The LLL Program has transitioned to the CORE Program and will be offering trainings on a regular basis.

- Oakland Fire EMSD and the CORE Program partnered with FEMA to provide community outreach and education for the movie release of "San Andreas" at the Grand Lake Theatre. Over 1,000 moviegoers came out to Splash Pad Park after the movie and received preparedness information, a gift bag and viewed Oakland Fire's Heavy Rescue Truck, and communications vehicle and FEMA's communications vehicle. Participating agencies included: Oakland Fire, CORE Program, Oakland Parks and Recreation, Oakland Radio Communications Association (ORCA), FEMA, USGS, CalOES, Bay EMT and the Grand Lake Theatre.

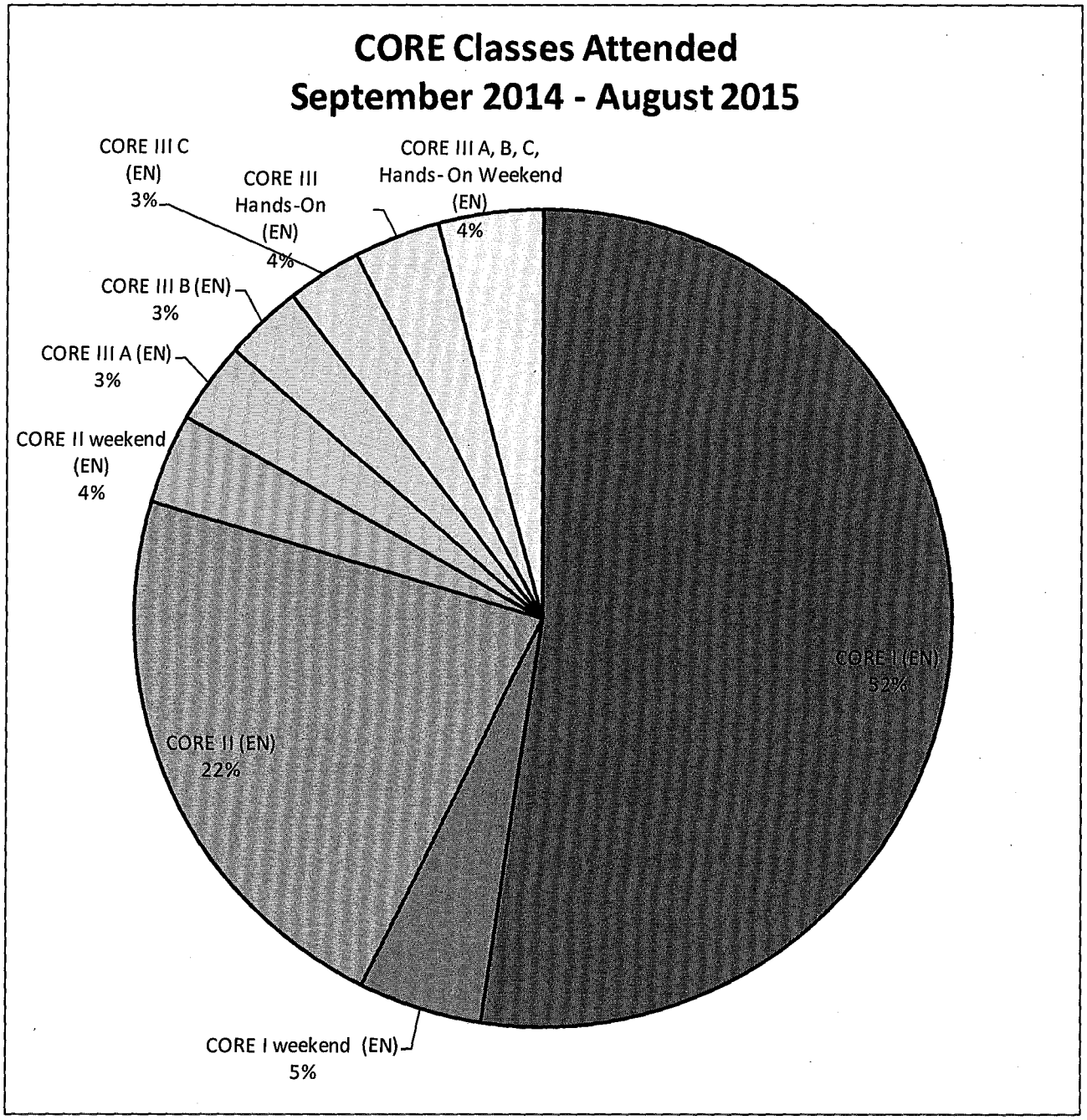
- The CORE Program offered two new workshops in the last quarter: Self-Care & Resiliency and Neighborhood Networking.

- CORE has conducted over twenty private classes in the last quarter and has numerous classes scheduled through the end of the year. CORE classes in Cantonese, Mandarin, ASL and Braille were provided via translators and translated materials with the assistance of the City's Equal Access department, and our ADA program.

- The Great CA ShakeOut Annual Drop, Cover, Hold On drill was held Thursday, October 15, 2015 at 10:15 am. This year in conjunction with the ADA 25th Anniversary Oakland Fire, ADA Program and FEMA hosted a ShakeOut ADA25 Preparedness Fair at Frank Ogawa Plaza from 9:00 am to 2:00 pm with speakers, demonstrations and displays with an interactive Drop, Cover, Hold On drill.

The next chart represents CORE Program training by program and Council District; the pie chart that follows shows percentage of attendance by class type.

CORE Program Training By Program And Council District									
	CD 1	CD 2	CD 3	CD 4	CD 5	CD 6	CD 7	Other/ Unknown	Total
Basic Training									
CORE I (EN)	228	127	210	142	29	72	34	112	**954**
CORE I weekend (EN)	15	21	25	0	10	5	7	6	**89**
CORE II (EN)	114	58	64	72	19	12	12	56	**407**
CORE II weekend (EN)	7	13	15	1	10	4	13	2	**65**
CORE III A (EN)	13	12	6	11	4	6	2	4	**58**
CORE III B (EN)	13	11	5	12	3	6	2	4	**56**
CORE III C (EN)	12	10	6	13	3	5	2	3	**54**
CORE III Hands-On (EN)	13	11	7	16	6	3	3	3	**62**
CORE III A, B, C, Hands- On Weekend (EN)	8	24	12	13	10	2	6	1	**76**
TOTAL CORE (EN)	**423**	**287**	**350**	**280**	**94**	**115**	**81**	**191**	**1821**
CORE I (SP)									
CORE II (SP)									
CORE III (SP)									
TOTAL CORE (SP)									
CORE I (CH)									
CORE II (CH)									
CORE III (CH)									
TOTAL CORE (CH)									
Advanced Training									
Workshops (EN)									
Road to Preparedness	3	2	1	0	0	1	0	2	**9**
Command Post Operations	3	4	1	5	0	4	0	3	**20**
Disaster Triage	1	4	0	2	0	0	0	0	**7**
CORE Instructor training	1	3	1	2	0	2	0	3	**12**
Neighborhood Communications	4	3	1	4	0	2	0	1	**15**
Citywide Exercise Individuals OFD Training Division	13	8	6	5	2	2	2	6	**44**
Learn, Lead, Lift (EN)	2	3	2	1	1	1	0	6	**16**
Learn, Lead, Lift (SP)	0	0	0	0	9	0	0	1	**10**
Learn, Lead, Lift TTT	0	0	1	1	1	1	0	2	**6**
Neighborhood Networking	8	0	1	1	0	0	0	1	**11**
Self-Care & Resiliency	6	3	5	4	1	0	0	2	**21**
TOTAL WORKSHOPS (EN)	**41**	**30**	**19**	**25**	**14**	**13**	**2**	**27**	**171**
GRAND TOTAL:	**464**	**317**	**369**	**305**	**108**	**128**	**83**	**218**	**1992**


CORE Classes Attended
September 2014 - August 2015
CORE III C (EN) 3%
CORE III Hands-On (EN) 4%
CORE III A, B, C, Hands-On Weekend (EN) 4%
CORE III B (EN) 3%
CORE III A (EN) 3%
CORE II weekend (EN) 4%
CORE I (EN) 52%
CORE II (EN) 22%
CORE I weekend (EN) 5%

FISCAL IMPACT

This is an informational report only; there is no fiscal impact.

PUBLIC OUTREACH / INTEREST

This is an informational report only and did not require any additional outreach.

COORDINATION

This report and activities presented in this report have been prepared in coordination with EMSD Staff, members of the EMADPC, and Oakland Fire Department. EMSD Staff represent the City of Oakland serving on a variety of councils, committees, working groups not limited to but including: Private Non-profit (PNP) Assistance Program (AB903) Committee, NorCal Voluntary Organizations Active in Disasters (VOAD),The Bay Area UASI Management Team-Approval Authority and working groups, The Association of Bay Area Health Officers (ABAHO), The Bay Area Mass Prophylaxis Working Group (BAMPWG), Region 2 Medical Health Operational Area Coordinators (MHOAC), Alameda County Emergency Managers Association, United States Coast Guard/California Department of Fish and Wildlife San Francisco Bay Area Contingency Planning Committee, and the Northern California Area Maritime Security Committee.

This report along with all EMSD and EMADPC activities are coordinated with local, state regional and federal constituents assuring the City of Oakland meets or exceeds all levels of compliance for emergency preparedness and disaster response.

SUSTAINABLE OPPORTUNITIES

Economic:

The economic conditions for the City of Oakland are enhanced by EMSD success in applying for and receiving Federal grant dollars. First responder readiness has been supported by purchasing equipment for OFD, OPD, Port and Airport security enhancements, pharmaceutical cache supplies in the event of pandemic flu, upgrading HazMat equipment and sustaining satellite telephone equipment.

The combination of the program and equipment purchases improves the City of Oakland's and first responder's readiness and capability to respond quickly and effectively to protect life and property, thus limiting damages within the city. Interoperability improvements assist in public safety communications within Oakland and within the Mutual Aid region for larger incidents.

In addition to the response efforts, increased readiness contributes to the long term recovery efforts for personal and business return to a more normalized community as soon as possible after a major disaster.

Environmental:

The environmental quality of life for the Oakland community is protected and mitigated by the EMSD planning activities. By planning for coordinated response, the city is able to identify situations for immediate mitigation efforts. Environmental damages can be minimized and cleanup efforts maximized by effective plans and coordinated response.

Social Equity:

The CORE program continues its outreach to include a focused recruitment of persons with functional needs, Cantonese speaking, and Spanish speaking residents.

EMSD remains committed to its responsibility to address the needs of persons with functional needs and senior citizens in its emergency management programs through both our CORE and Learn-Lead-Lift programs.

Brochures and meeting minutes for EMSD programs continue to be published in Braille, on audiotape, and in large print format. Sign language interpreters are utilized, as needed.

The CORE program training contains sections on preparedness for people with functional needs.

EMSD staff continues to attend meetings and present progress reports to the Mayor's Commission on Aging and Mayor's Commission on Persons with Disabilities.

All of the City of Oakland Emergency Operations Plans, Annexes and Emergency Support Functions have been reviewed for applicability and reflect appropriate guidelines for Persons with Functional Needs when indicated.

ACTION REQUESTED OF THE CITY COUNCIL

Staff recommends that the City Council receive this informational report on emergency preparedness and disaster planning. Staff also recommends that the City Council continue to fully support emergency preparedness efforts for the city of Oakland by the Emergency Management Services Division.

For questions regarding this report, please contact Cathey Eide, Acting Emergency Management Services Division Manager, at 510-238-6069.

Respectfully submitted,

TERESA DELOACH REED
Fire Chief

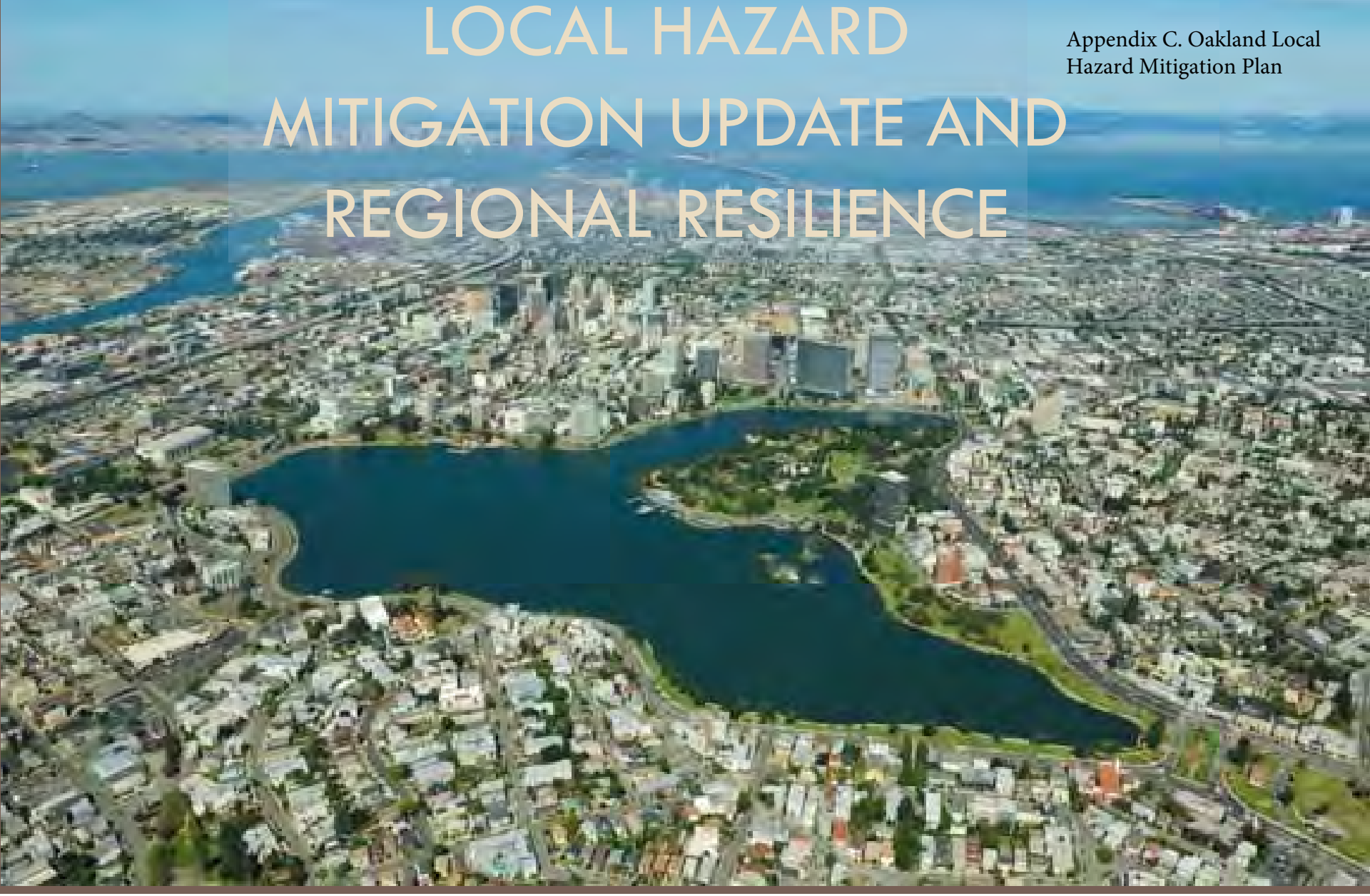
Reviewed by: Rebecca Kozak
Executive Assistant

Prepared by:
Cathey Eide, Acting Emergency Manager
Oakland Fire Department
Emergency Management Services Division

Item: _____
Public Safety Committee
February 9, 2016

Appendix C. Oakland Local Hazard Mitigation Plan

LOCAL HAZARD MITIGATION UPDATE AND REGIONAL RESILIENCE



CITY OF OAKLAND

March 16, 2016

Welcome

City of Oakland- Bureau of Planning	SF Bay Conservation and Development Commission	Association of Bay Area Governments
Devan Reiff	Maggie Wenger	Dana Brechwald

Agenda:

- Welcome and introduction: Devan Reiff, City of Oakland
- ABAG Resilience program – The regional perspective:
  - Dana Brechwald
- BCDC "Adapting to Rising Tides":
  - Maggie Wenger
- Oakland's 2016 Hazard Mitigation Plan
  - Devan Reiff, City of Oakland Bureau of Planning
- Mapping exercise and group discussion
- Q&A and closing remarks

Local hazard mitigation planning

- Hazard Mitigation is "any sustained action taken to reduce or eliminate long-term risk to human life and property from hazards. A hazard mitigation plan identifies the hazards a community faces, assesses their vulnerability to the hazards, and identifies specific actions that can be taken to reduce the risk from the hazards."

Local hazard mitigation planning

- Jurisdictions plan for 2016-2021; previous Plan was from 2010-2016
- Describes the risks to City-owned property, and the top priorities for each hazard: work being done now, and work expected to be done in the next five years

Hazards being addressed:

- Earthquake
- Landslides
- Floods and Sea-level rise
- Fire
- Tsunami
- Drought
- Extreme Heat
- Human-caused hazards (materials release or terrorism)

Local hazard mitigation planning

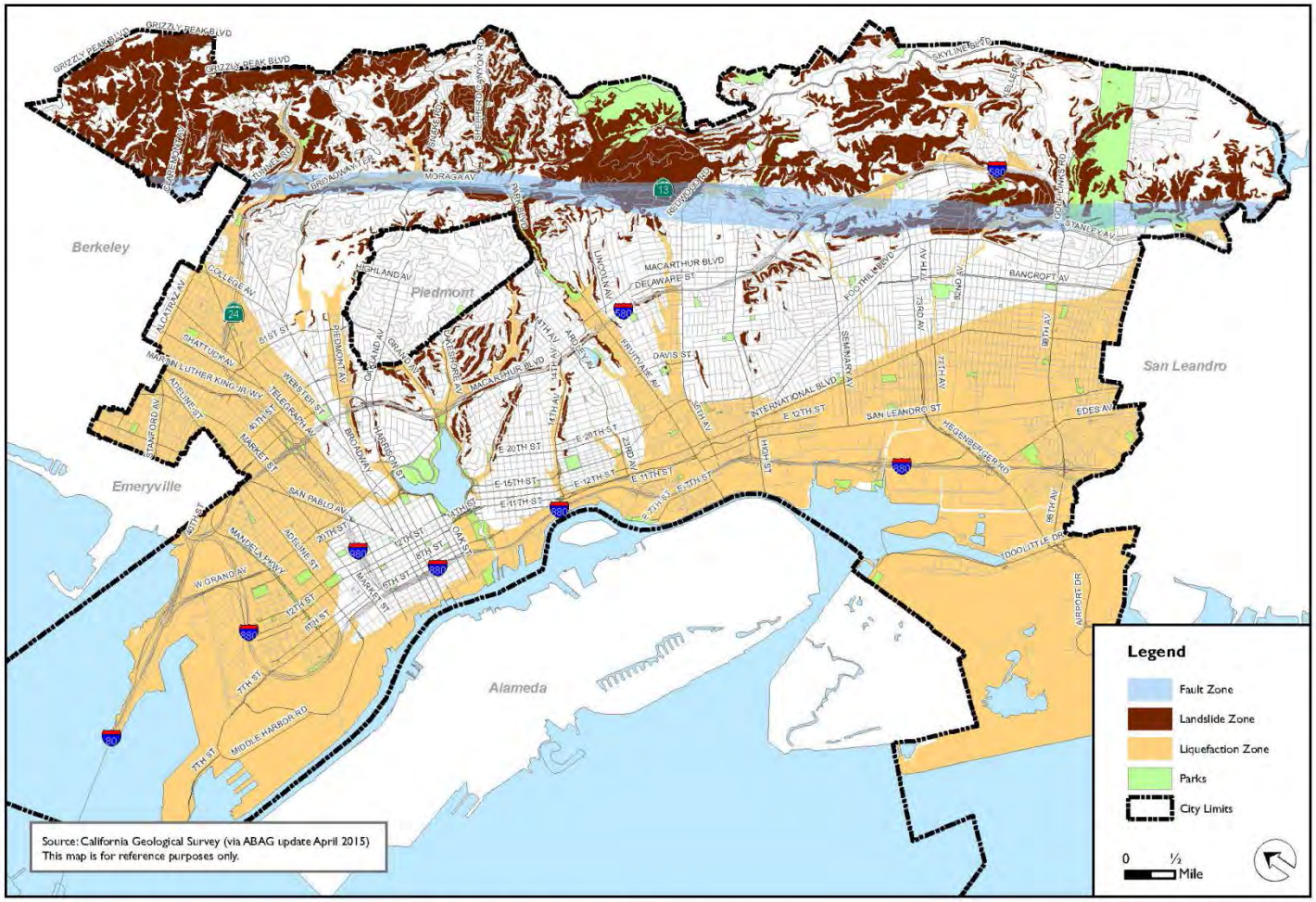
Local governments who adopt a hazard mitigation plan may be eligible for the following benefits:

- A more disaster-resistant and resilient community
- Hazard mitigation assistance programs, including FEMA grants
- Points under the National Flood Insurance Program's Community Rating System (CRS)
- Waiver of the local match for Public Assistance funds, following a disaster.

Current Oakland and Regional Efforts

- Resilient Oakland
- Energy & Climate Action Plan (2016 revision)
- Disaster Recovery Framework
- CORE program
- Emergency Management and Disaster Preparedness Council
- BCDC Adapting to Rising Tides
- ABAG Resilience Program

Earthquake



Planning and Building Department
March 2016

CITY OF OAKLAND

Local Hazard Mitigation Plan 2016

Seismic Hazards Planning Zones

Earthquake

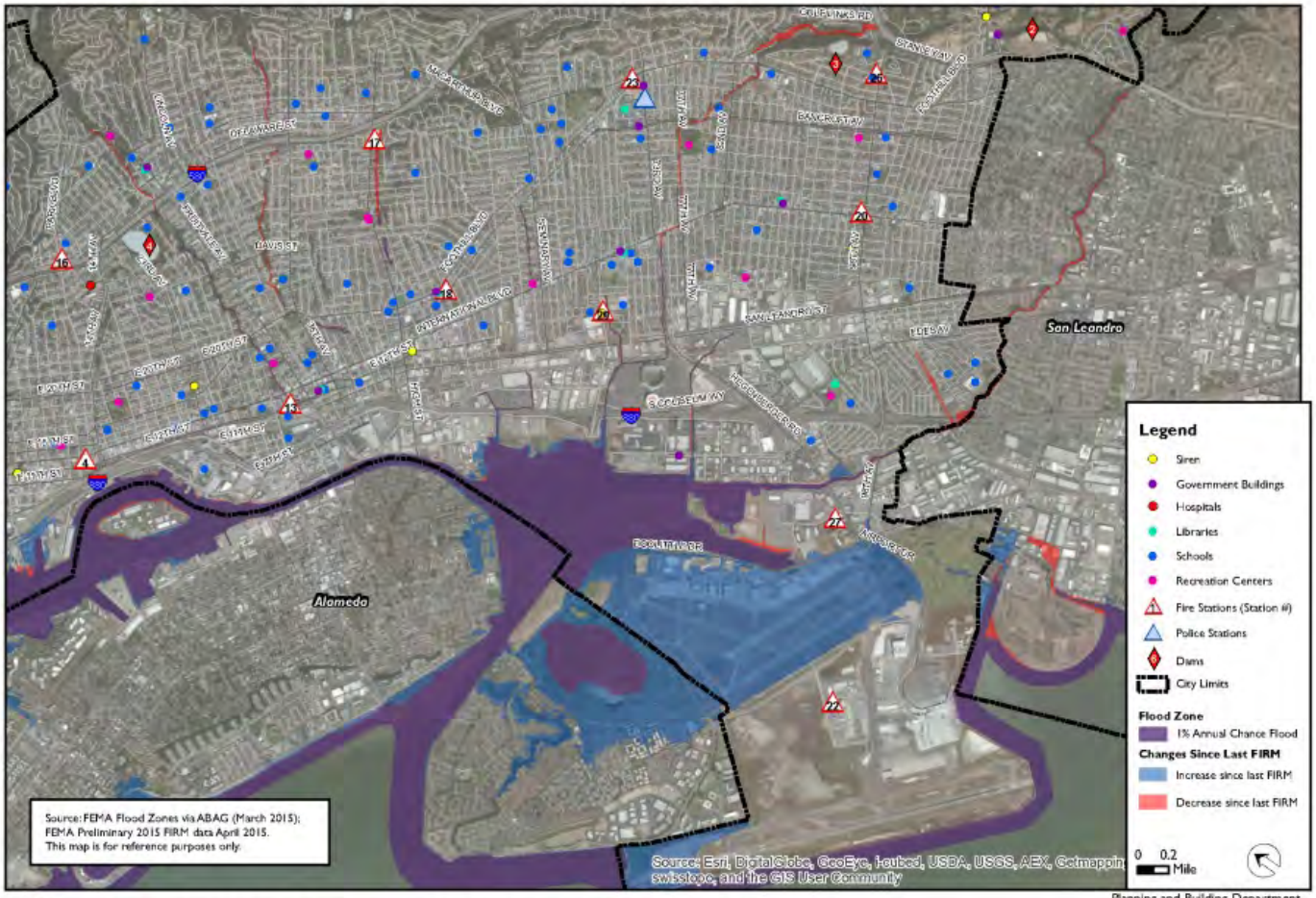
Priorities include:

- Adopt a multi-family soft story ordinance: mandatory seismic upgrades for 22,000 rental units
- Fund the "Earthquake Homes" grant program for 600 single-family homeowners to assist with seismic upgrades

USGS

Loma Prieta Earthquake, 1989

Flooding – 100 year floodplain



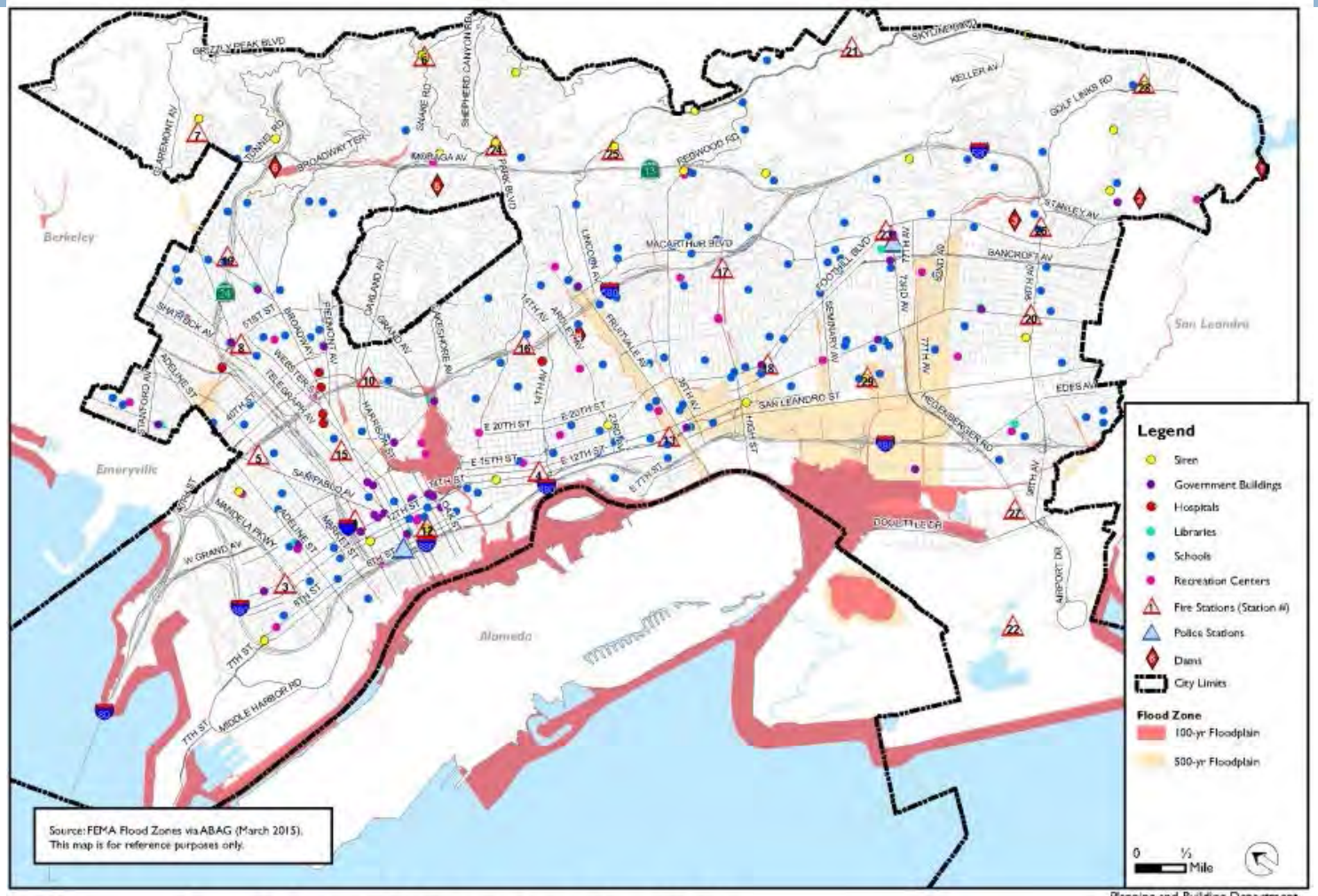
Planning and Building Department
March 2016

CITY OF OAKLAND

Local Hazard Mitigation Plan 2016

Preliminary Changes 2015 - 100 year Floodplain, West Oakland

Flooding – 500 year floodplain



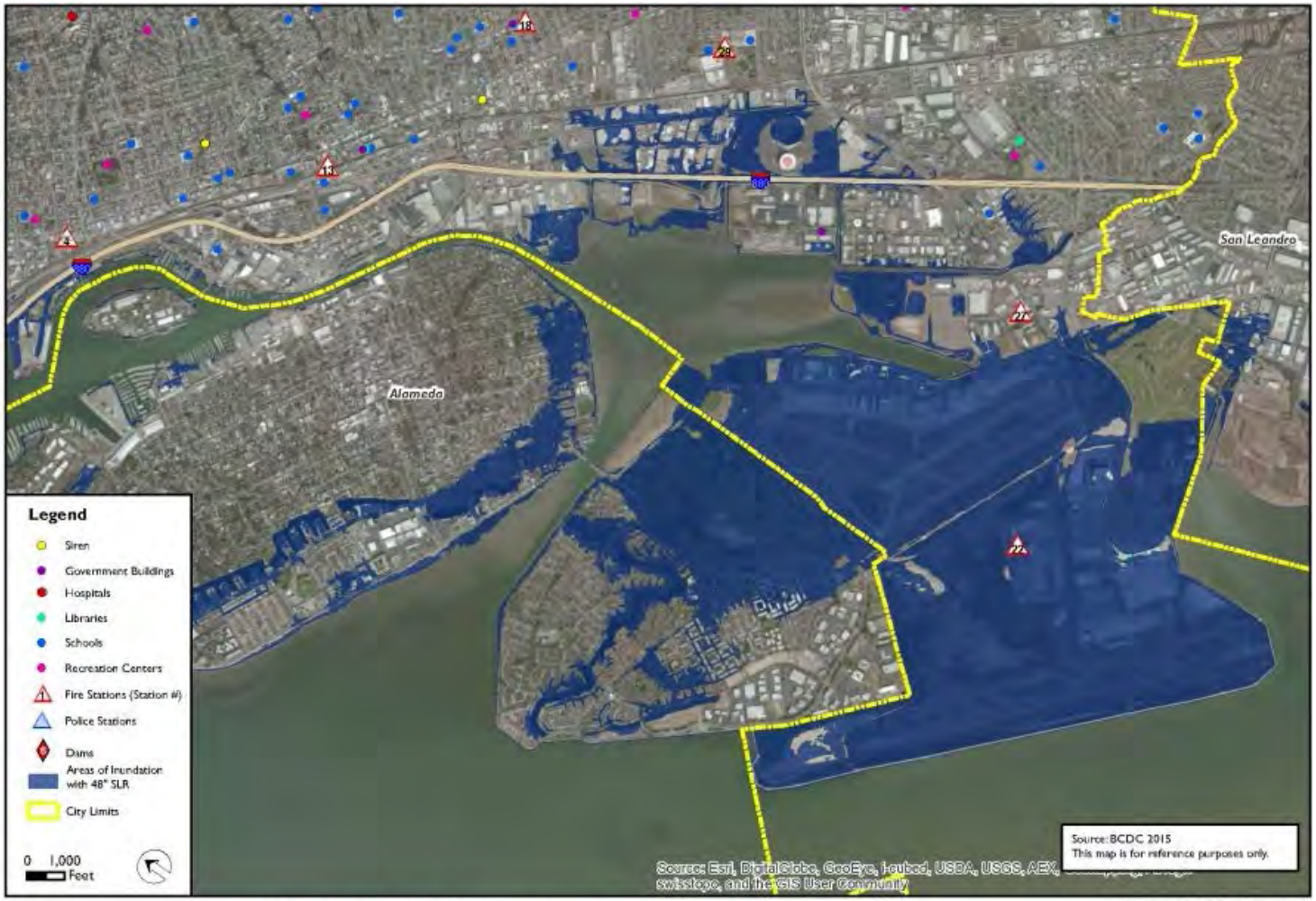
Planning and Building Department
March 2016

CITY OF OAKLAND

Local Hazard Mitigation Plan 2016

FEMA Flood Zones & Critical Facilities

Sea Level Rise scenario -- 2050



CITY OF OAKLAND

Local Hazard Mitigation Plan 2016

Projected Sea Level Rise - 2050 Scenario, East Oakland

Planning and Building Department
March 2016

Flood and Sea Level Rise

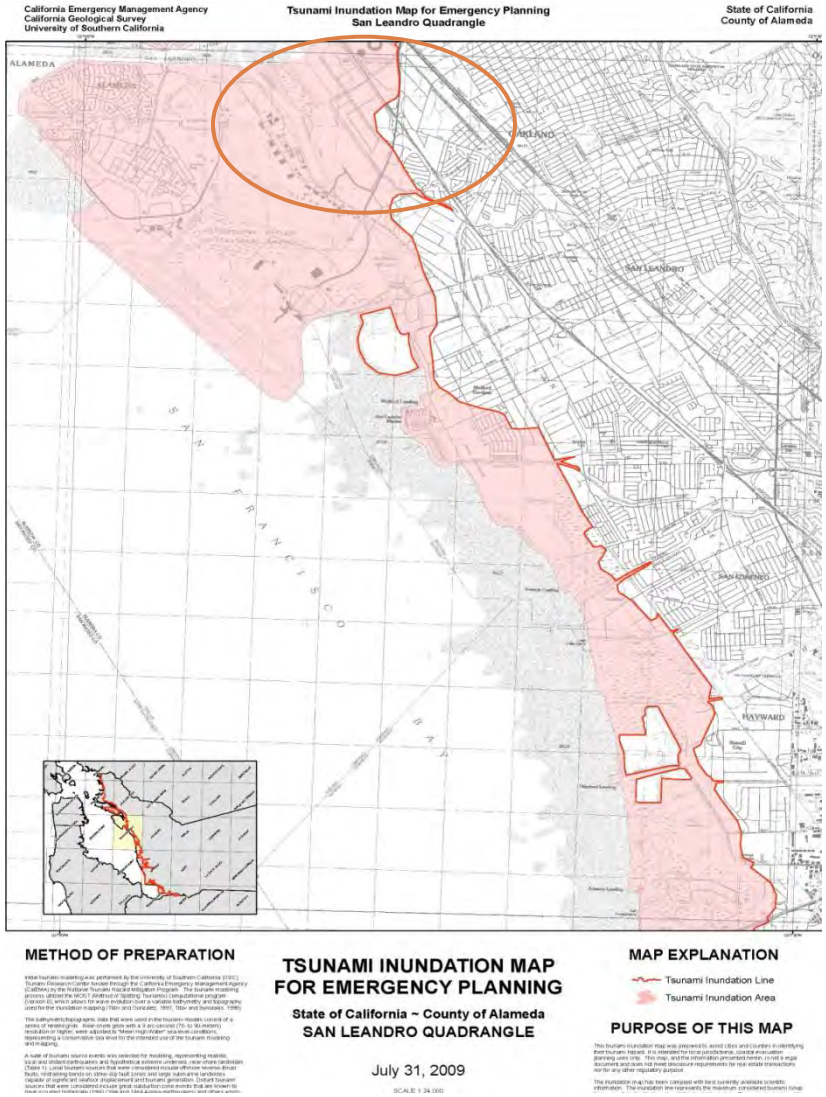
Priorities include:

- Establish "Detain the Rain," a program that will work with homeowners and residents across the City to install stormwater detention systems on private properties, to detain 500,000 gallons.
- Green Infrastructure Plan (prioritize flood-prone areas for capital improvements)
- Continue to participate in BCDC's Adapting to Rising Tides program

ABC News

Oakland, CA-2014

Tsunami

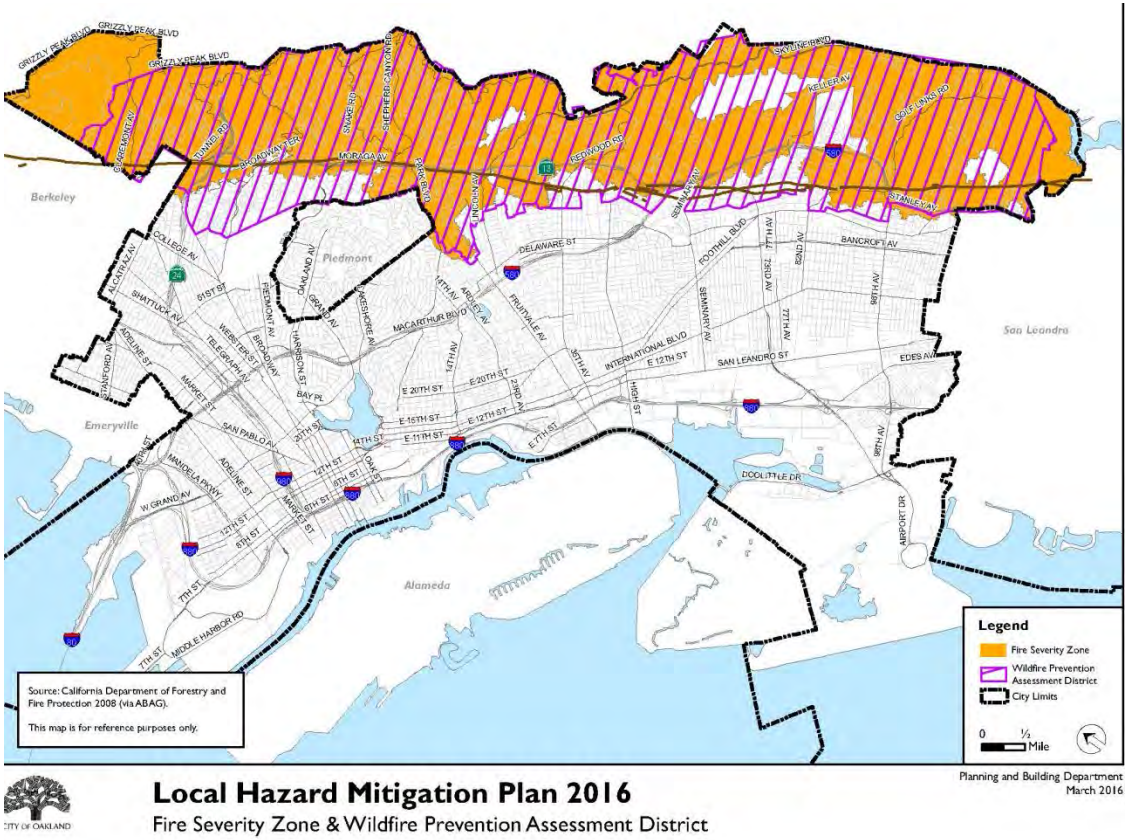


Berkleyside

Emeryville, CA-2011

WILDFIRE

Through a re-authorized Wildfire Prevention Assessment District, reduce hazards in wildland-urban-interface fire-threatened communities through improving engineering design and vegetation management for mitigation, appropriate code enforcement, and public education on defensible space mitigation strategies.



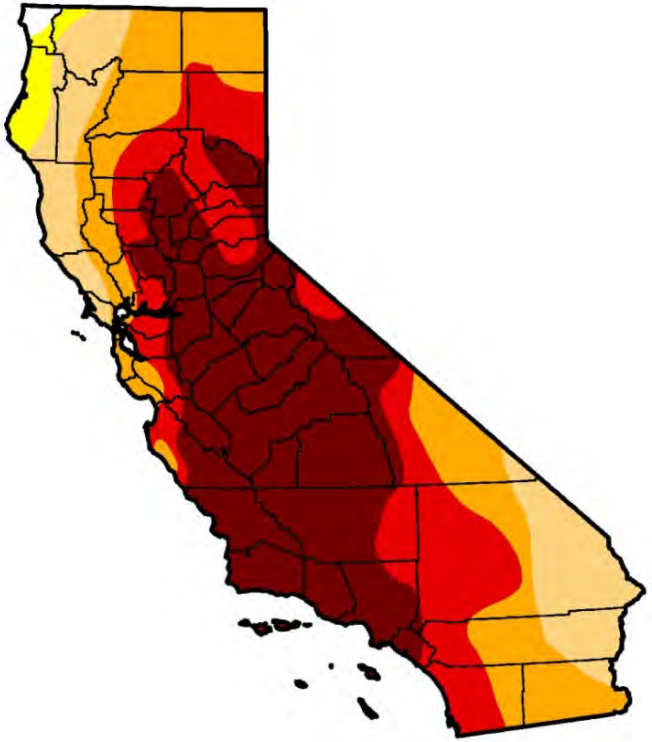
Contra Costa Times

Oakland Hills Fire, 1991

Drought

U.S. Drought Monitor

California



March 8, 2016

(Released Thursday, Mar. 10, 2016)

Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.43	99.57	97.49	83.16	60.86	38.48
Last Week *3/1/2016*	0.43	99.57	95.13	82.66	60.86	38.48
3 Months Ago *12/8/2015*	0.14	99.86	97.33	92.26	69.09	44.84
Start of Calendar Year *12/29/2015*	0.00	100.00	97.33	87.55	69.07	44.84
Start of Water Year *9/29/2015*	0.14	99.86	97.33	92.36	71.08	46.00
One Year Ago *3/10/2015*	0.16	99.84	98.11	93.44	67.46	39.92

Intensity:

- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Author:
David Miskus
NOAA/NWS/NCEP/CPC

http://droughtmonitor.unl.edu/

Reuters

San Jose, CA -2015

Mapping and Group Discussion

West Oakland- 2011

Adoption Process

- April 18 – North Oakland Community Meeting, Faith Presbyterian Church, 430 49th Street
- April 25 – West Oakland Community Meeting, West Oakland Senior Center, 1721 Adeline Street
- May 4 – Planning Commission public hearing
- May 24 – Public Safety Committee public hearing
- June 7 – anticipated City Council adoption hearing

The public is invited to each of these meetings and hearings

Resources

- Local Hazard Mitigation Plan: www.oaklandnet.com/lhmp
- Devan Reiff, Strategic Planning: dreiff@oaklandnet.com / 510-238-3550
- Resilient Oakland: www2.oaklandnet.com/Government/o/CityAdministration/d/ResilientOakland/index.htm
- CORE: www2.oaklandnet.com/Government/o/OFD/s/CORE/index.htm
- El Nino resources: www2.oaklandnet.com/ElNino/index.htm
- BCDC Adapting to Rising Tides:

www. adaptingtorisingtides.org

- ABAG Resilience Program: http://resilience.abag.ca.gov

LOCAL HAZARD MITIGATION UPDATE AND REGIONAL RESILIENCE

Thank you for your participation tonight

CITY OF OAKLAND

March 3, 2016

CITY OF OAKLAND

Oakland Local Hazard Mitigation Plan and Regional Resilience

March 3, 2016

East Bay Regional Parks District– Trudeau Center, 11500 Skyline Blvd

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AGENDA

1. Welcome and Introduction *Christine Daniel, Assistant City Administrator*

2. Presentation

   The Regional Perspective *Dana Brechwald, ABAG Resilience Program*

   Adapting to Rising Tides *Lindy Lowe, BCDC*

   Oakland Hazard Mitigation Plan 2016-2021 Update *Devan Reiff, City of Oakland Bureau of Planning*

3. Mapping exercise and group discussion

4. Q & A

5. Closing Remarks

RESOURCES

- Local Hazard Mitigation Plan update: www.oaklandnet.com/lhmp
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- ABAG Resilience Program: http://resilience.abag.ca.gov

March 3 2016 Discussion Notes

Community Assets to Protect and/or Use

- The Oakland Zoo is a regional attraction.
- The Dunsmuir water retention pond is not maintained properly, and leaks.
- Oakland's villages (and village schools) are what gives the city its character (Rockridge, Lakeshore, Fruitvale, etc.).
- Houses of worship and fraternal buildings are community assets, and should be involved in planning and recovery.
- Elementary schools are natural centers for emergency response; the community needs OUSD to be flexible and cooperate with interagency planning efforts.
    - OES staff noted that the City does have an MOU with OUSD for high school and middle school sites, but not for elementary schools. Their primary goal is to protect their students.
- Churches are important locations and community centers; the City could have an MOU with the archdiocese.
- Grocery stores should have plans both to recover from a disaster and to distribute perishables to residents in an emergency when power fails.
- The hospitality industry needs to think about how to assist visitors in case of an emergency.

Planning Considerations

- Off-ramps are backed up and therefore a problem in case of evacuation. These off-ramps include Golf Links, Keller and 98th
- Earthquake exercises need to incorporate large assembly places such as the Zoo and Fairyland
    - OES Staff noted that this is coming soon; Oakland has a great Animal Services department, which includes large animals, and it has emergency animal supplies and volunteers.
- Oakland contains some very large employers who should be involved in hazard mitigation and disaster planning
    - BCDC staff noted that PG&E and EBMUD participate in the Adapting to Rising Tides program
- Large employers (including government organizations around Frank H. Ogawa Plaza) need to coordinate their evacuation plans.
- The community needs to integrate policies at the regional and national levels – the global economy impacts the Port of Oakland, and thus what hazards come in by way of the port.
- The City should consider other federal policies, such as the FAA changing their flight patterns.

Education

- We need to discuss the linkages between hazards (such as the connection between drought and wildfire).
- We need to educate about the scale of problems that seem localized but are actually communitywide in damage and/or solutions (such as downstream flooding caused by not retaining or slowing water further upstream).
- We need to educate the community about the scale of multi-year hazards and events.
- Residents are not always aware of which agencies are responsible for which areas or policies when it comes to mitigation.
- The Hazard Mitigation Plan should include a robust communication plan that includes multiple ways of communicating in an emergency.

<u>Notes from Mapping exercise</u>

City Facilities and areas important to residents for disaster resilience:

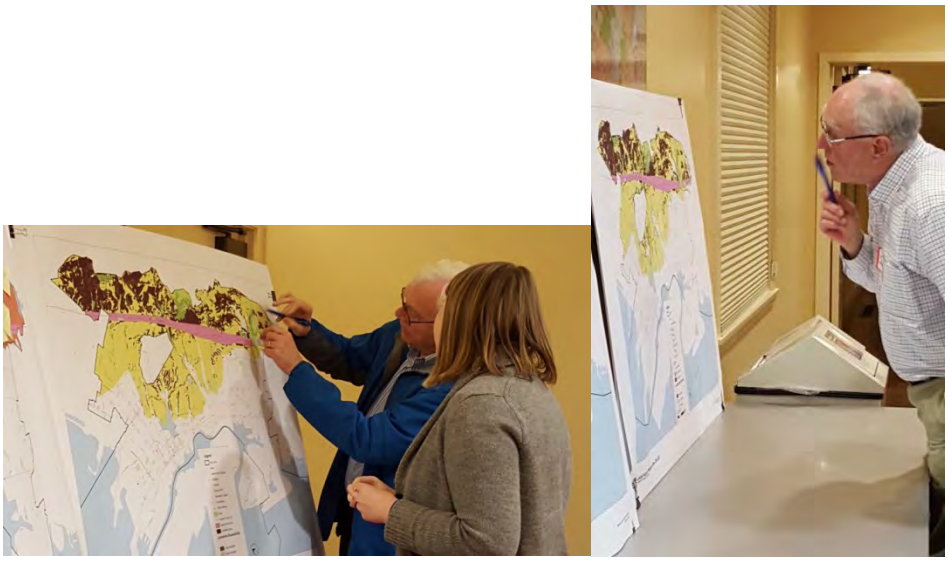
- City Hall
- Emergency Operations Center
- Oakland Zoo
- Montclair Village
- 23rd Avenue Reservoir (EBMUD)
- Chabot Golf Course
- Dunsmuir House and Gardens
- Sibley Park and Lake Temescal (East Bay Regional Parks District)
- Head Royce School
- Chabot Space and Science Center
- Oakland Animal Shelter
- Oak Knoll Development project (former Naval Hospital developed into residential subdivision)

Topics of importance and concern to residents:

- Caring for Oakland Zoo animals, following disaster
- Tight off-ramps and on-ramps at 103rd Avenue (and elsewhere in the Hills) are not capable of handling the traffic flow of a mass evacuation following a disaster
- 23rd Avenue Reservoir could burst, and create a flood impact
- Food deserts of East and West Oakland
- Liquefaction risk at City's corporation yard (Edgewater Drive)
- Sea-level rise causing flooding of BART tunnels and tubes
- Use Dunsmuir pond for more rainwater catchment and ease stormwater runoff

- Flooding of rail-yards releasing hazardous materials
- Fly-fishing ponds= Sulphur Creek
- Flooding of I-980
- Educating the public that landslides could happen –not just in the Hills
- Grand Avenue/Lakeshore commercial district flooding
- Oakland Parks and Rec swimming pools: potential damage after an earthquake?

<u>Photos from meeting</u>



CITY OF OAKLAND

Oakland Local Hazard Mitigation Plan and Regional Resilience

March 16, 2016

Oakland Public Library, 81st Avenue Branch

AGENDA

6. Welcome and Introduction *Devan Reiff, City of Oakland*

7. Presentations –(10 minutes each)

   The Regional Perspective *Dana Brechwald, ABAG Resilience Program*

   Adapting to Rising Tides *Maggie Wegner, BCDC*

   Oakland Hazard Mitigation Plan 2016-2021 Update *Devan Reiff, City of Oakland Bureau of Planning*

8. Mapping exercise and group discussion

9. Q & A

10. Closing Remarks

RESOURCES

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Local Hazard Mitigation Plan Meeting – 3/16/16 Meeting Notes

Community comments.

General approach

- Need a holistic approach, both in the sense that multiple hazards act together (like earthquake-caused fires) and in the sense that hazards and their cases, impacts and solutions are not limited to one area – can unify Oakland in a holistic approach
- Communication is critical
- Evidence-based, scientific decision-making (for example, with climate change – instead of telling other countries what to do, how do we do our part in the global response to climate change)
- Need out of the box thinking, including public/private partnerships – voters aren't renewing the Wildfire Prevention Abatement District (parcel tax assessment) that was used in the past – need to revise the City Charter, deal with union issues, management of Parks and Recreation (to employ people for vegetation management).
- Community organizations that live in/across from hazard areas (such as fire and flood) can help design the mitigation

Wildfire

- Need regional coordination – the City and State didn't do an adequate job rebuilding after the firestorm; this is a problem beyond the Oakland Hills
- Funding for vegetation management needs to be regional, not just targeted to the disadvantaged 30% of the City. The counterpoint being that disadvantaged communities are in more need because they haven't had the funding in the past.
- Link schools and job training to hazard mitigation; can link funding from multiple sources addressing multiple hazards – employ students and youth and train them in vegetation management.
- The City needs to prioritize a 5-10 year urban forest and vegetation management plan
- Plan for 20 years out to transform the Hills; plant the trees now we want
- Need strategies for maintenance and removal of aging and diseased trees
- Both public and private buildings should have 100-foot clearance
- Need to take a scientific, not aesthetic approach to landscaping and replacing trees
- How do we use our water supply?
- Have a goal of the number of residents who are trained and empowered to put out small fires on their own in their neighborhoods (City's CORE program is doing these more technical trainings)
- Need more holistic hazard-preventing landscaping than just tree removal

Flooding

- Instead of hardscape, put in naturalistic shorelines around the Sloughs
- OWLS (Oak Wildland Stewards) is an organization of "friends of…" creek groups
- Focus on key actions along the entire watershed (particularly the several creeks that drain into the Bay near the Coliseum complex)
- What happens to brownfield sites with toxic waste (particularly sites that aren't registered as toxic sites) during a flood? Brownfields have a more significant impact overall than the EPA sites.
- The Department of Toxic Substances Control (DTSC) needs to map future flood areas, not just current ones
- We need long-term thinking as well as short-term thinking, particularly from developers who don't think about long-term risks like sea-level rise and just sell the building, saying "it's not our problem."
- Retain stormwater in parks with catch basins under playgrounds, use the water for landscaping to save money; see Los Angeles, which is coordinating with utilities and school districts.

Wildlife

- Wildlife populations (such as deer) wander out of their habitat during or after a disaster, and sometimes become aggressive
- Wildlife populations could be separated during disasters; build wildlife bridges (like the hedgehog bridges in Europe) to keep them together and safe and away from humans – Bay Farm Island Road is a possible bridge location.

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Survey

How should Oakland reduce risk and build resilience?

2016

Please answer ten questions to help City of Oakland staff prioritize strategies for reducing risk to hazards and building the city's resilience. Answers will inform the Local Hazard Mitigation Plan and Resilience Strategy.

Part 1 – Building City Wide Resilience

1. **How concerned are you by the possibility of your neighborhood being impacted by a natural disaster?** (mark level of concern)

1 – very likely	2 – somewhat likely	3 – unsure	4- not likely	5 – not at all

2. **Please rank the list of hazards below in order of highest concern to you. For example, put "earthquake" at #1 if you are most concerned about an earthquake happening in Oakland.**

__Drought
__Earthquake
__Flood
__Freeze
__Extreme Heat (Heat Wave)
__Landslide
__Wildfire
__Sea Level Rise
__Severe Storms
__Tsunami
__ Other

3. **Please rank the list of human-caused hazards below in order of highest concern to you. For example, put "energy shortage/outage" at #1 if you are most concerned about blackouts and brownouts.**

__ Civil Unrest
__ Dam Failure
__ Energy Shortage/outage
__ Epidemic or Pandemic
__ Gas Explosion (from pipeline or truck)
__ Hazardous Materials Release
__ Infrastructure or utility failure
__ Terrorism
__ Telecommunications failure
__ Train derailment/explosions

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4. **There are a number of strategies Oakland can use to decrease the damage caused by natural disasters. Most of these strategies fit in to the categories described below. Please rank them in order of your preference, where #1 is the one you prefer the most, and #7 is the one you prefer the least.**

__ **Prevention:** regulate what kinds of buildings are built and where to limit the damage caused by a natural disaster. Example: requiring new buildings along the shoreline to take sea level rise and have earthquake safe construction; Preventing new development in hazardous areas

__**Property Protection:** modify existing buildings to protect them from a disaster or remove them from a hazard area. Example: earthquake retrofits; Protecting cultural and historic landmarks; Protecting essential facilities (e.g. highways, hospitals, fire stations)

__ **Natural Resource Protection:** lower the risk of a natural disaster by protecting open space and natural habitats. Example: planting along the hillside to prevent landslide; enhancing natural systems (e.g. creeks, wetlands)

__ **Structural Projects:** lessen the impact of the disaster by interrupting the natural progression of the disaster. Example: building retaining walls to prevent landslide; Protecting and reducing damage to utilities

__ **Public Education & Awareness:** inform residents and community members about disasters and what they can do to protect their families, their homes, and themselves. Example: providing preparedness training for residents and businesses; Disaster preparedness at local schools; Disclosing natural hazard risks during real estate transactions

__ **Disaster recovery**: increase the ability of public agencies, residents, non-profits and businesses to recovery quickly following a major disaster. Example: housing recovery plan; debris removal plan; promoting cooperation between public agencies, citizens, non-profits and businesses

__**Emergency Services:** protect people and property immediately after a disaster happens. Example: training city employees and residents to respond to emergencies; Strengthening emergency services (e.g. police, fire, ambulance)

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Part 2 - Building Neighborhood-level and Personal Resilience

5. **My connection to Oakland** (Check all that apply)

☐ I work in Oakland
☐ I go to school in Oakland
☐ I live in Oakland
Neighborhood_____

Nearest cross street to your home_____

Number of years in neighborhood_____
☐ I own property, or a business in Oakland
☐ None of these (please specify)

6. **What are your three favorite places to go in your neighborhood?**

1. _____

2. _____

3. _____

7. **My connection with neighbors**
Do you generally know the neighbors closest to you?
YES_____ NO_____

Do you feel comfortable reaching out to your neighbors if you need something they could provide?

YES_____ NO_____

8. **In the event of a natural disaster, where do you expect to go for help?**

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9. **To reduce risk and build resilience, can you think of any specific places in downtown where you'd like to see improvements?** If yes, describe where, using streets, corners or landmarks (for example "parking lot across the street from Fox theatre) and describe the strategies, actions, or projects you would like to see happen .

10. **Is there anything else you think the City of Oakland should consider when deciding how to prepare for natural disasters?**

Thank you for your time and interest in helping Oakland prepare in advance for anticipated natural and man-made disasters. If you would like further information about Oakland's 2016 Hazard Mitigation Plan, please sign up for the email announcements by clicking the button "subscribe for updates" at: www.oaklandnet.com/lhmp or email Devan Reiff at dreiff@oaklandnet.com

Appendix E to Oakland Local Hazard Mitigation Plan --Hazard mitigation policies and actions in adopted City of Oakland General Plan Elements and Specific Plans.

This Appendix lists all adopted hazard mitigation policies and actions in Elements of the Oakland General Plan, and in recently-adopted Specific and Area Plans.

Safety Element

POLICY GE-1: Develop and continue to enforce and carry out regulations and programs to reduce seismic hazards and hazards from seismically triggered phenomena.

- ACTION GE-1.1: Continue to enforce the geologic reports ordinance by requiring site-specific geologic reports for development proposals in the Hayward fault Special Studies Zone, and restricting the placement of structures for human occupancy within fifty feet of the trace.
- ACTION GE-1.2: Enact regulations requiring the preparation of site-specific geologic or geotechnical reports for development proposals in areas subject to earthquake-induced liquefaction, settlement or severe ground shaking, and conditioning project approval on the incorporation of necessary mitigation measures.
- ACTION GE-1.3: Continue to update the city's geologic-hazard mapping system based on new information from state and federal agencies and site-specific investigations.

POLICY GE-2: Continue to enforce ordinances and implement programs that seek specifically to reduce the landslide and erosion hazards.

- ACTION GE-2.1: Continue to enforce provisions under the subdivision ordinance requiring that, under certain conditions, geotechnical reports be filed and soil-hazards investigations be made to prevent grading from creating unstable slopes, and that any necessary corrective actions be taken.
- ACTION GE-2.2: Continue to enforce the grading, erosion and sedimentation ordinance by requiring, under certain conditions, grading permits and plans to control erosion and sedimentation.
- ACTION GE-2.3: Continue to enforce provisions under the creek protection, storm water management and discharge control ordinance designed to control erosion and sedimentation.
- ACTION GE-2.4: Consider establishing area-specific interdepartmental task forces, with public participation, to recommend changes to the zoning ordinance to better address hillside development constraints, especially steeply sloping sites and infrastructure availability.
- ACTION GE-2.5: Enact regulations requiring new development projects to employ site-design and source-control techniques to manage peak storm-water runoff flows and impacts from increased runoff volumes.
- ACTION GE-2.6: Design fire-preventive vegetation-management techniques and practices for creek-sides and high-slope areas that do not contribute to the landslide and erosion hazard.

POLICY GE-3: Continue, enhance or develop regulations and programs designed to minimize seismically related structural hazards from new and existing buildings.

- ACTION GE-3.1: Adopt and amend as needed updated versions of the California building code so that optimal earthquake-protection standards are used in construction and renovation projects.
- ACTION GE-3.2: Continue to enforce the unreinforced masonry ordinance to require that potentially hazardous unreinforced masonry buildings be retrofitted or be otherwise made to reduce the risk of death and injury from their collapse during an earthquake.
- ACTION GE-3.3: Continue to enforce the earthquake-damaged structures ordinance to ensure that buildings damaged by earthquakes are repaired to the extent practicable.
- ACTION GE-3.4: Consider developing a program to encourage, assist or provide incentives to owners of single-family homes or small apartment buildings in retrofitting their buildings for seismic safety.

POLICY GE-4: Work to reduce potential damage from earthquakes to "lifeline" utility and transportation systems.

- ACTION GE-4.1: Encourage Caltrans to expedite the retrofit of city- and county-owned highway overpasses in Oakland identified as candidates for seismic strengthening for which Caltrans is the lead agency.
- ACTION GE-4.2: As knowledge about the mitigation of geologic hazards increases, encourage public and private utility providers to develop additional measures to further strengthen utility systems against damage from earthquakes, and review and comment on proposed mitigation measures.
- ACTION GE-4.3: Encourage BART to prioritize its program for retrofitting the system's aerial structures, stations and Transbay Tube for seismic safety over expansion of the system.
- ACTION GE-4.4: Continue to designate underground utility districts for the purpose of replacing aboveground electric and phone wires and other structures with underground facilities, and use the planning-approval process to ensure that all new utility lines will be installed underground from the start.

POLICY FI-1: Maintain and enhance the city's capacity for emergency response, fire prevention and fire-fighting.

- ACTION FI-1.1: Periodically assess the need for new or relocated fire stations and other facilities, changes in staffing levels, and additional or updated supplies, equipment, technologies and in-service training classes.
- ACTION FI-1.2: Strive to meet a goal of responding to fires and other emergencies within seven minutes of notification 90 percent of the time.
- ACTION FI-1.3: Continue to offer fire-prevention and fire-safety presentations and training to the public.
- ACTION FI-1.4: Continue to sponsor the formation and training of CORE teams.
- ACTION FI-1.5: Continue to participate not only in general mutual-aid agreements but also in agreements with adjoining jurisdictions for cooperative response to fires.

- ACTION FI-1.6: Continue to conduct monthly tests of the alerting and warning system's outdoor sirens, coordinating them to the extent possible with those of neighboring jurisdictions.
- ACTION FI-1.7: Along with the East Bay Municipal Utility District, review the extent to which recommendations from the district's 1994 infrastructure policy study on needed improvements to the water distribution system were implemented.

POLICY FI-2: Continue, enhance or implement programs that seek to reduce the risk of structural fires.

- ACTION FI-2.1: Adopt and amend as needed updated versions of the California building and fire codes so that optimal fire-protection standards are used in construction and renovation projects.
- ACTION FI-2.2: Continue to enforce provisions under the local housing code requiring the use of fire-resistant construction and the provision of smoke detectors and fire-extinguishing systems.
- ACTION FI-2.3: Continue to review development proposals to ensure that they incorporate required and appropriate fire-mitigation measures, including adequate provisions for occupant evacuation and access by fire-fighting personnel and equipment.
- ACTION FI-2.4: Compile a list of high-rise and high-occupancy buildings which are deemed due to their age or construction materials to be particularly susceptible to fire hazards, and determine an expeditious timeline for the fire-safety inspection of all such structures.
- ACTION FI-2.5: Continue to conduct periodic fire-safety inspections of commercial, multi-family and institutional buildings.
- ACTION FI-2.6: Enforce the chapter of the municipal code regulating the location and design of street-address numbers on buildings.

POLICY FI-3: Prioritize the reduction of the wildfire hazard, with an emphasis on prevention.

- ACTION FI-3.1: Implement and administer the 2004 wildfire-prevention assessment district for the Oakland Hills, and carry out the programs funded by the district, including fire-safety inspections of private properties, vegetation management practices, roving firefighter patrols on high fire-hazard days, and public eduction efforts.
- ACTION FI-3.2: Consistent with the city's pedestrian master plan, develop unused pedestrian rights-of-way in the Oakland Hills as walkways to serve as additional evacuation routes, and provide and maintain lighting facilities for new and existing walkways.
- ACTION FI-3.3: Continue to participate in multi-jurisdictional programs and task forces, such as the Hills Emergency Forum and Diablo FireSafe Council, that work to reduce the threat of wildfires.
- ACTION FI-3.4: Along with EBMUD, review the extent to which recommendations from the utility's district's 1993 study on its preparation and response to the 1991 firestorm were implemented.

POLICY HM-1 Minimize the potential risks to human and environmental health and safety associated with the past and present use, handling, storage and disposal of hazardous materials.

- ACTION HM-1.1: Continue to exercise unified-program responsibilities, including the issuance of permits for and inspection of certain industrial facilities, monitoring the filing of disclosure forms and risk-management plans, hazardous-materials assessment reports and remediation plans, and closure plans by such facilities.
- ACTION HM-1.2: Continue to enforce provisions under the zoning ordinance regulating the location of facilities which use or store hazardous materials.
- ACTION HM-1.3: Consider adopting a health and safety protection overlay zone or set of procedures to ensure that new activities which use or store hazardous materials on a regular basis near residential zones do not endanger public health or the environment.
- ACTION HM-1.4: Continue to participate in the Alameda County Waste Management Authority and, as a participant, continue to implement policies under the county's hazardous-waste management plan to minimize the generation of hazardous wastes.
- ACTION HM-1.5: Continue to implement the city's household hazardous-waste element (including educating residents about waste-disposal options and the consequences of illegal disposal) in order to reduce the generation of household hazardous waste and the amount of such waste that is disposed inappropriately.
- ACTION HM-1.6: Through the Urban Land Redevelopment program, and along with other participating agencies, continue to assist developers in the environmental clean-up of contaminated properties.
- ACTION HM-1.7: Create and maintain a database with detailed site information on all brownfields and contaminated sites in the city.

POLICY HM-2 Reduce the public's exposure to toxic air contaminants through appropriate land use and transportation strategies.

- ACTION HM-2.1: Continue to enforce performance standards controlling the emission of air contaminants, particulate matter, smoke and unpleasant odors.
- ACTION HM-2.2: Continue to discourage the development of sensitive receptors adjacent to significant sources of air contaminants and encourage industry to adopt best-available control technologies to reduce air contaminants.
- ACTION HM-2.3: Continue to support the efforts of the Bay Area Air Quality Management District's air-toxics program, including the review and permitting of stationary sources, identification of emitting facilities, promulgation of categorical control measures, and monitoring and inventory of emissions.
- ACTION HM-2.4: Ensure implementation of policies and actions in the land use and transportation element designed to integrate land use and transportation planning and to promote alternative transportation options (see Appendix B); and policies in the open space, conservation and recreation element designed to encourage transportation alternatives and land use patterns that reduce automobile dependence (see Appendix A).
- ACTION HM-2.5: Review and comment on regional and state air-quality plans and also on environmental impact reports for development projects in neighboring jurisdictions; and for the latter, request mitigation measures for any significant negative impacts on the city's air quality.

POLICY HM-3 Seek to prevent industrial and transportation accidents involving hazardous materials, and enhance the city's capacity to respond to such incidents.

- ACTION HM-3.1: Continue to enforce regulations limiting truck travel through certain areas of the city to designated routes, and consider establishing time-based restrictions on truck travel on certain routes to reduce the risk and potential impact of accidents during peak traffic hours.
- ACTION HM-3.2: Continue to support the prohibition of trucks on I-580 through Oakland.
- ACTION HM-3.3: Support state and federal legislative efforts that seek to increase the safety of transporting hazardous materials.
- ACTION HM-3.4: Continue to rely on, and update, the city's hazardous materials area plan to respond to emergencies related to hazardous materials.
- ACTION HM-3.5: Continue to offer basic emergency-response education and training to local businesses.

POLICY FL-1 Enforce and update local ordinances, and comply with regional orders, that would reduce the risk of storm-induced flooding.

- ACTION FL-1.1: Amend, as necessary, the city's regulations concerning new construction and major improvements to existing structures within flood zones in order to maintain compliance with federal requirements and, thus, remain a participant in the National Federal Insurance Program.
- ACTION FL-1.2: Continue to require that subdivisions be designed to minimize flood damage by, among other things, having lots and rights-of-way be laid out for the provision of approved sewer and drainage facilities, providing on-site detention facilities whenever practicable and having utility facilities be constructed in ways that reduce or eliminate flood damage.
- ACTION FL-1.3: Comply with all applicable performance standards pursuant to the 2003 Alameda countywide National Pollutant Discharge Elimination System municipal stormwater permit that seek to manage increases in stormwater run-off flows from new-development and redevelopment construction projects.
- ACTION FL-1.4: Continue to enforce the grading, erosion and sedimentation ordinance by prohibiting the discharge of concentrated stormwater flows by other than approved methods.
- ACTION FL-1.5: Continue to enforce provisions under the creek protection, storm water management and discharge control ordinance designed to keep watercourses free of obstructions and protect drainage facilities.

POLICY FL-2 Continue or strengthen city programs that seek to minimize the storm-induced flooding hazard.

- ACTION FL-2.1: Continue to repair and make structural improvements to storm drains to enable them to perform to their design capacity in handling water flows.
- ACTION FL-2.2: Continue maintenance efforts to keep storm drains and creeks free of obstructions—while retaining vegetation in the channel, as appropriate— to allow for the free flow of water.

- ACTION FL-2.3: Continue the "Maintain-a-Drain Campaign," which encourages residents and businesses to keep storm drains in their neighborhood free of debris.
- ACTION FL-2.4: Continue to provide sandbags and plastic sheeting to residents and businesses in anticipation of rainstorms, and to deliver those materials to the disabled and elderly upon request.

POLICY FL-3 Seek the cooperation and assistance of other government agencies in managing the risk of storm-induced flooding.

- ACTION FL-3.1: Upon completion of new flood-control projects, request that FEMA revise its flood-insurance rate map of the city to reflect flood risks accurately.
- ACTION FL-3.2: To reduce the cost of flood insurance to property owners, work to qualify for the highest-feasible rating under the Community Rating System of the National Federal Insurance Program.
- ACTION FL-3.3: Meet annually with the Alameda County Flood Control and Water Conservation District to establish jointly the district's capital improvement program for most effectively reducing the remaining threat of storm-induced flooding.
- ACTION FL-3.4: Encourage the ACFCWCD to continue maintaining adequately those watercourses, storm drains and other flood-control facilities for which it has legal responsibility.
- ACTION FL-3.5: Refer development proposals adjacent to floodways and floodplains to the ACFCWCD for its review and comment.

POLICY FL-4 Minimize further the relatively low risks from non-storm-related forms of flooding.

- ACTION FL-4.1: Request from the state Division of Safety of Dams a timeline for the maintenance inspection of all operating dams in the city.
- ACTION FL-4.2: Review for adequacy, and update if necessary, procedures adopted by the city pursuant to the Dam Safety Act for the emergency evacuation of areas located below major water-storage facilities.
- ACTION FL-4.3: Inform shoreline-property owners of the possible long-term economic threat posed by rising sea levels.
- ACTION FL-4.4: Stay informed of emerging scientific information on the subject of rising sea levels, especially on actions that local jurisdictions can take to prevent or mitigate this hazard.

Lake Merritt Station Area Plan

2. **Drought:** Promote water conservation and efficiency in new and existing buildings and infrastructure, by encouraging installation of water efficient fixtures and plumbing, along with rainwater and gray-water systems where appropriate (pg.9.12).

3. **Drought:** Encourage site designs that optimize runoff capture and treatment via landscape features, including permeable surfaces that allow on site infiltration and green roofs (pg.9.12).

4. **Drought:** New development must be designed to limit the amount of storm water runoff into drains or surface water bodies including Lake Merritt, the Lake Merritt Channel, or the Oakland Estuary (pg. 9.12).

5. **Drought:** Design bulb-outs, sidewalk widening, and other streetscape improvements to adequately handle projected storm water runoff (pg. 9.12).

6. **Drought:** Plant native and drought-resistant landscape when and where appropriate in order to reduce water demand and the City's utility costs (pg. 9.12).

West Oakland Specific Plan

1. **Flood and Drought:** Low impact development storm-water management approaches (pg.237).
2. **Fire:** Support EBMUD's ongoing program to upgrade their older, smaller distribution lines to 6-inches, and to 8-inches where necessary to comply with current California Fire Code where laterals for fire hydrants are located (pg.270).
3. **Drought:** Encourage EBMUD to continue its effective incentive program to use recycled water rather than mandating its use (pg.271).
4. **Drought:** Consider re-use of existing pipelines, reservoirs, and other facilities which are no longer needed by other utilities for distributing recycled water to customers (pg.271).
5. **Drought:** "Include installation of new recycled water distribution mains when roads are being reconstructed, even if it is to place an empty conduit for future connection." (pg.271).
6. **Drought:** Focus the use of recycled water within the Mandela/Grand Opportunity Area, as the primary recycled water transmission main is found traversing west from 7th Street then north on Mandela Parkway into Emeryville. Smaller distribution pipelines are also located in 16th Street and Willow Street (pg.271).
7. **Pollution:** Within the Mandela/West Grand Opportunity Area, there are several blocks between West Grand, 18th Street, Wood Street and Peralta Street that contain very large parcels. Public sewer lines were not installed under Campbell Street, 20th Street or Willow Street in this area. New development within these blocks will require new sewers in this small area (see detailed descriptions in the West Oakland Infrastructure Report) (pg.274).
8. **Pollution:** The City's Right-of-Way Management Division implements a City-wide I & I Improvement Program to reduce infiltration and inflow into the sewer system by replacing conduits and structures with new facilities that are less susceptible to leakage. The City of Oakland should assess the relative priority of implementing I & I improvements within the West Oakland Opportunity Areas as a means of increasing sewer capacity such that all envisioned new development can be accommodated within the City's system (pg.274).
9. Pollution: New development and/or reuse projects should replace existing sewer laterals with new laterals and verify that there are no cross-connections from building downspouts to the sewer. This would result in much lower I/I flow into the main lines (pg.274).
10. **Drought and Pollution:** As the West Oakland area improves, storm drain lines and structures should be added and or replaced to serve the Industrial Zones (pg.276).

11. **Drought and Pollution:** New development that impacts an established minimum area (the current standard is greater than 2,500 square feet) is subject to provision C.3 of the City's National Pollutant Discharge Elimination System (NPDES) permit with the State of California. Pursuant to these regulations, such new development would be required to implement storm-water treatment measures to clean and filter storm-water prior to its entering the storm drain system. These improvements will serve to improve water quality and lower the overall volume of run-off (pg.276).
12. **Drought:** As the West Oakland area improves, underground storm drain lines should be added to several street sections (see detailed descriptions in the West Oakland Infrastructure Report) (pg.276).
13. **Drought and Extreme Heat:** Plant new street trees, using CPTED principles, with high tree canopies and lighting below to allow street lighting to reach the street and sidewalks. Spacing should be provided so that street trees do not interfere with street lighting of the area. The new street trees should be low-maintenance and drought resistant (pg.296).
14. **Pollution:** Continue brownfield cleanup efforts through to completion, securing the necessary funds through to remediation and reuse (pg.307).
15. **Pollution:** Coordinate with the US EPA to ensure that remediation plans for this site anticipate and allow for adaptive redevelopment that can occur in as reasonable a time frame as possible. The former AMCO property is located on a block that is planned as a transition zone between the West Oakland BART Station TOD and the core residential area of the South Prescott neighborhood. Adaptive redevelopment should weigh costs and time frames for the variety of mitigation alternatives against the variety and desirability of future land use options (pg.308
16. **Pollution:** Rely on the EIR prepared for the West Oakland Specific Plan to the greatest extent legally appropriate for the CEQA review of hazardous materials sites within West Oakland (pg.309).
17. **Pollution:** Retain commercial and/ or industrial land use designations on those sites which have been remediated, but only to commercial/industrial standards, and limit the exposure of sensitive land uses by restricting or limiting new residential development at those sites known to have been previously environmentally contaminated (pg.309-310).
18. **Pollution:** Continue to implement those regulatory mechanisms which seek to minimize the potential for spills and contamination of soils and groundwater. Under such regulations, any new use which handles or generates hazardous materials must submit a Hazardous Materials Business Plan for review and approval by the Fire Department, Hazardous Materials Unit. The purpose of the Hazardous Materials Business Plan is to ensure that employees are adequately trained to handle the materials, provides information to the Fire Department should emergency response be required, and includes an emergency response plan including employee training information (pg.310).
19. **Extreme Heat:** New Sidewalk Trees: Support and pursue implementation of the Reforestation Plan's recommendations for additional plantings of quality trees along each of twelve major streets identified in that Plan and listed below. The Reforestation Plan includes a detailed list of locations where additional trees can be planted, estimates of the quantity of trees that can be

planted at each location, and recommendations for specific tree species that should be used, briefly summarized below (pg.394).

Broadway-Valdez Specific Plan

1. **Drought and Pollution:** Support the implementation of "green" storm-water management improvements such as rain gardens and permeable paving along 29th and 30th Streets to capture and treat storm-water runoff before it flows into the City's storm drain system and Lake Merritt (pg.79).
2. **Pollution:** All sewer system improvements shall be designed in conformance with applicable City of Oakland Sanitary Sewer Design Standards (pg.84).
3. **Pollution:** The City shall coordinate with EBMUD to ensure that the proposed developments and development projections within the Plan Area are incorporated into EBMUD's long-range plans for sewage transport and treatment (PG.84).
4. **Pollution:** New development within the Plan Area will be assessed a Sewer Mitigation Fee that contributes to Inflow and Infiltration (I&I) rehabilitation and replacing pipes to increase system capacity (pg.84).
5. **Pollution:** The existing 24-inch sewer pipe will be upgraded to a 36-inch pipe along Harrison Street to support sewage capacity within the Plan Area (pg.84).
6. **Fire:** Design water system improvements in conformance with applicable standards of the Oakland Fire Department and EBMUD (pg.84).
7. **Drought:** Ensure that water conservation is a key design consideration for all new development in the Plan Area (pg.84).
8. **Drought:** Encourage developers to incorporate the re-use of grey-water to help conserve potable water resources within the Plan Area (pg.84).
9. **Drought:** Project sponsors must strive to achieve compliance with water conservation regulations including the City of Oakland's Green Building Ordinance, the state's Model Water Efficient Landscaping Ordinance, CALGreen, and water conservation measures in the state building code (pg.85).
10. **Drought:** Coordinate with EBMUD to secure a future supply of recycled water use for use within Plan Area as a means of reducing demand for potable water (pg.85).
11. **Drought:** Encourage developers to incorporate dual plumbing within buildings and irrigation systems constructed for recycled water standards for future connections (pg.85).
12. **Drought:** Storm drain system improvements shall be designed in conformance with applicable City of Oakland Storm Drainage Design Standards (pg. 85).
13. **Drought:** Developers shall design projects to optimize runoff capture and treatment by incorporating features such as bioswales, infiltration areas, vegetated filter strips, porous paving, and rain gardens that enhance storm-water infiltration and reduce peak runoff (pg. 85).
14. **Pollution:** The City shall explore the potential to implement a 'green' streets program in the Plan Area that incorporates storm-water management features in the design of the public streetscape in order to improve the quality of storm-water runoff that enters Lake Merritt (pg.85).

15. **Drought:** Encourage developers to incorporate rainwater harvesting in new buildings and landscapes as a means supplementing their water supply and reducing demand for potable water (pg.85).
16. **Pollution:** Construction operations, businesses, and residents within the Plan Area shall participate in the City's recycling programs in order to minimize the amount of solid waste that is sent to landfills. Specifically, projects within the Plan Area must comply with Oakland's Construction and Demolition Debris Recycling Ordinance, Oakland's Recycling Space Allocation Ordinance, Alameda County Mandatory Recycling Ordinance, as well as the State of California's mandatory recycling statues, which support the City's adopted Zero Waste goal (pg.85).

Coliseum Area Specific Plan

1. **Flood:** The shoreline of Sub-Area B should be planned and designed comprehensively, to integrate the San Francisco Bay Trail (Bay Trail) and active park spaces with habitat protection and wetlands enhancement (pg.61).
2. **Flood and Drought:** The development of projects within the Plan Area should incorporate sustainable practices in planning and design of sites, buildings, landscapes, energy and water systems, and infrastructure, as required by current regulations for Green building in Oakland (pg.61).
3. **Extreme Heat:** Tree planting should be designed to indicate the hierarchy of the roadway system, establish visual quality, and create shaded areas, especially in public areas such as sidewalks, parking lots, roadways, courtyards, plazas and parks (pg.87).
4. **Pollution:** If the Coliseum and/or Arena are demolished, their physical structures should be crushed and used for fill or aggregate onsite if feasible. If the crushing or filling operation does not take place onsite, the project may need to provide mitigation for air quality and GHG emissions impacts caused by additional material trucking to and from the Plan Area (pg.96).
5. **Pollution:** "New development in Sub-Area A should reduce energy use; explore the viability of reducing building energy demand, a district heating and cooling system, and on-site energy generation." (pg.102).
6. **Drought:** "New development projects should reduce the amount of site runoff by 25% from the existing pre-project condition. This can either be done onsite through increased pervious areas, reuse or infiltration, or it can be achieved regionally as part of a master plan for storm water management." (pg.126).
7. **Drought:** "Existing public storm drain infrastructure should be replaced or improved to current standards for streetscape projects (replacing or significantly improving existing roadways) or projects that are constructing new public roadway" (pg.126).
8. **Drought:** "All projects should comply with current MRP C.3 guidelines for constructing permanent storm water treatment measures" (pg.126).
9. **Drought:** "Incorporate water conservation measures into all public and private improvements and development, as required by California building code, CalGreen and City of Oakland Green Building Ordinance" (pg. 128).

10. **Drought:** "Explore potential with EBMUD to provide recycled water to the plan area, particularly for landscaping" (pg.128).
11. **Pollution:** "New development projects should replace or remove all existing sanitary sewer lateral lines serving the site, to reduce infiltration/inflow that enters the system through cracks and misconnections in both public and private sewer lines."
12. **Flood:** "Design flood protection against a nearer-term potential 16-inch sea level rise above current Base Flood Elevation for mid-term planning and design (2050); and design gravity storm drain systems for 16 inches of sea level rise; b. Provide a mid-term adaptive approach for addressing sea level rise of greater than 18 inches, including incorporation of potential retreat space and setbacks for higher levels of shoreline protection, and design for livable/floodable areas along the shoreline in parks, walkways, and parking lots; Develop a long-term adaptive management strategy to protect against even greater levels of sea level rise of up to 66 inches, plus future storm surge scenarios and consideration of increased magnitude of precipitation events" (pg.132).
13. **Flood:** "Include a suite of shoreline protection measures, protective setbacks and other adaptation strategies, to be incorporated into subsequent development projects. These couldinclude:
    a. Build a shoreline protection system within Sub-Areas B, C and D to accommodate a mid-term rise in sea level of 16 inches, with development setbacks to allow for further adaptation for higher sea level rise, with space for future storm-water lift stations near outfall structures into the Bay and Estuary.
    b. Consider incorporation of a seawall along the rail tracks, east of the new Stadiumand/or Ballpark sites.
    c. Consider designing temporary floodways within parking lots, walkways and roadways.
    d. Construct the storm drainage system to be gravity drained for sea level rise up to 16 inches, and pumped thereafter. Pumping should be secondary to protection.
    e. Require that all critical infrastructures sensitive to inundation be located above the 16-inch rise in base flood elevation.
    f. Design buildings to withstand periodic inundation, and prohibit below grade habitable space in inundation zones.
    g. Where feasible, construct building pads and vital infrastructure at elevations 36inches higher than the present day 100-year return period water level in the Bay, and add a 6inch freeboard for finish floor elevations of buildings.
    h. Consider construction of a protection system, such as a “living levee”, (similar to the design presented in the MTC Climate adaptation Study, 2014), along Damon Slough in Sub-Area A, from its entry into the Plan Area at San Leandro Bay to its upstream confluence at Lion’s Creek" (pg. 132).
14. **Flood:** "Re-evaluate both Bay flooding and watershed flooding potential at key milestones in the Project’s design, to manage for changing sea level rise projections” (pg.133).
15. **Flood (Sea-level rise):** "A sea level rise strategy for the Plan Area should be prepared as part of the City’s updates to the Energy and Climate Action Plan" (pg.133).

16. **Flood (Sea-level rise):** "The City should carefully consider the long-term implications of new traditional development in waterfront areas, including the impacts to other Bay cities of additional levees, etc., which may be needed to protect waterfront development" (pg.133).
17. **Flood (Sea-level rise):** "Throughout the City, new development should seek to provide retreat space around new waterfront development." 133
18. **Flood (Sea-level rise):** "The City's overall adaptive management strategies should be based on the latest sea level rise projections, with recommendations for regular re-analysis as climate science evolves; and done in coordination with BCDC's Adapting to Rising Tides program" (pg.133)
19. **Pollution:** "Construction operations, businesses, and residents within the Plan Area will participate in the City's recycling programs, in order to minimize the amount of solid waste that is sent to landfills. Specifically, projects within the Plan Area must comply with Oakland's ordinances: Construction and Demolition Debris Recycling, Recycling Space Allocation; Alameda County Mandatory Recycling, as well as the State of California mandatory recycling statutes, which support the City's Zero Waste goal" (pg.135).
20. **Fire (Existing):"**The Oakland Fire Department (OFD) provides fire protection (prevention and suppression), and local emergency response (rescue, hazardous materials response, and first responder emergency medical) services to the Plan Area and vicinity. Battalion 4 serves East Oakland. The OFD operates 25 fire stations. Fire Station 27 is located within the Plan Area at 8501 Pardee Drive at Hegenberger Road. Station 27 is staffed daily by eight firefighters, two of which are paramedics and the remaining emergency response technicians (EMT). Station 27 has an engine for fire suppression. In addition, several other stations are in near proximity to the Plan Area:
    a. Station 29 is located at 1061 66th Avenue, just north of Sub-Area A and a half-mile from the Coliseum BART station;
    b. Station 20 is located 1401 98th Avenue, around two miles southeast of Coliseum BART station; and
    c. Station 22 is located at the Oakland Airport at 751 Air Cargo Road, about two miles from Sub-Area D. The Aircraft Rescue and Firefighting (ARFF) Crash Unit operates out of this station" (pg.134).
21. **Pollution:** "Future development should adhere to the principles of sustainability and resource consideration, in order to further City's goals to reduce solid waste" (pg.135).

Appendix F.

FY 2015-16 City of Oakland Facilities Asset List

DRAFT

FACILITY NAME	ADDRESS	SQUARE Footage
81st Avenue Branch Library	1021 81st Ave	21,000
African-American Museum & Library at Oakland	659 – 14th St 94612	17,947
Allendale Rec Center	3711 Suter St 94619	3,206
Animal Shelter	1101 – 29th Ave	27,409
Arroyo Viejo Head Start Center	7701 Krause Ave	1,481
Arroyo Viejo Kiln House (Utility Building)	7701 Krause Ave	406
Arroyo Viejo Magnet Inclusion Annex Rec Center	7701 Krause Ave 94605	1,280
Arroyo Viejo Rec Center	7701 Krause Ave 94605	11,569
Arroyo Viejo Storage Building	7701 Krause Ave	364
Arroyo Viejo/McConnell Field House Restroom	7921 Olive St	1,102
Asian Branch Library	388 – 9th St, Suite 190 94607	7,556
Bella Vista Restroom	1025 East 28th St	196
Brookdale Rec Center	2535 High Street 94601	2,800
Brookfield Branch Library	9255 Edes Ave 94603	3,022
Brookfield Head Start Center	9600 Edes Ave	4,176
Broussard Hall of Justice-County Offices & Courts	600 Washington St	63,053
Burckhalter Park Restroom	4062 Edwards Ave	307
Bushrod Rec Center	560 – 59th St 94609	8,698
Carmen Flores [aka Sanborn] Rec Center	1637 Fruitvale Ave 94601	4,200
Central Resevoir Restroom	2506 E. 29th St @ Sheffield	342
Cesar Chavez Restroom	Foothill Blvd	196
Cesar E. Chavez Branch Library (leased)	3301 East 12th St 94601	15,119
City Hall	1 City Hall Plaza	167,826
City Stables (house)	13560 Skyline	1,500
City Stables (old stables, hay barn, restroom)	13560 Skyline	12,000
Coolidge House (Peralta Hacienda)	Peralta Hacienda Historical Par	2,000
Corp Yard Bldg #1	5921 Shepherd Canyon Rd	2,500
Corp Yard Bldg #2	5921 Shepherd Canyon Rd	315
Corp Yard Bldg #3	5921 Shepherd Canyon Rd	285
Corp Yard Bldg #4	5921 Shepherd Canyon Rd	1,150
Cryer Building	1899 Denison St	8,600
Curt Flood Sports Field Restroom	5885 Oakport St	371
Dalziel Building	250 Frank Ogawa Plaza	234,316
Dalziel Garage	250 Frank Ogawa Plaza	79,524
Davie Tennis Stadium Club House	198 Oak Rd	2,674
Davie Tennis Stadium Field House & Restroom	198 Oak Rd	147
DeFremery (Landmark) Rec Center	1651 Adeline St 94607	8,261
DeFremery Field House Restroom	1651 Adeline St	875
DeFremery Pool and Building	1269 – 18th St 94607	4,363
Dimond Branch Library	3565 Fruitvale Ave 94602	10,544
Dimond Rec Center	3860 Hanly Rd 94602	4,448
Dimond Restroom	3860 Hanly Rd	682
Dimond Scout Shack	3860 Hanly Rd	526
Discovery Center (Rec Center)	2521 High St 94601	804
Dunsmuir House (Landmark)	2960 Peralta Oaks Ct	21,600

FY 2015-16 City Facilities Asset List DRAFT

FACILITY NAME	ADDRESS	SQUARE Footage
Dunsmuir House Grotto and Archway	2960 Peralta Oaks Ct	512
Dunsmuir House- Next to Carriage House	2960 Peralta Oaks Ct	760
Dunsmuir House Pool House	2960 Peralta Oaks Ct	1,125
Dunsmuir House Stables	2960 Peralta Oaks Ct	336
Dunsmuir House-Carriage House	2960 Peralta Oaks Ct	3,794
Dunsmuir House-Chicken Coop	2960 Peralta Oaks Ct	1,109
Dunsmuir House-Dinkelspiel House	2960 Peralta Oaks Ct	3,375
Dunsmuir House-Dinkelspiel House Shed	2960 Peralta Oaks Ct	600
Dunsmuir House-Dinkelspiel House Storage	2960 Peralta Oaks Ct	920
Dunsmuir House-Milk House	2960 Peralta Oaks Ct	720
Dunsmuir House-Next to Milk House	2960 Peralta Oaks Ct	180
Dunsmuir House-Pavilion	2960 Peralta Oaks Ct	6,758
Dunsmuir House-Restroom	2960 Peralta Oaks Ct	720
Dunsmuir House-Ticket Booth At Carriage House	2960 Peralta Oaks Ct	32
East Oakland Multipurpose Senior Center	9255 Edes Ave	12,461
East Oakland Sports Center	9175 Edes	25,000
Eastmont Branch Library (leased)	7200 Bancroft Ave, Suite 211 9	9,976
Eastmont Police Station	2701 – 73rd Ave	64,000
Eastshore/Lakeview Park Restroom	550 El Embarcadero	384
Elmhurst Branch Library	1427 – 88th Ave 94621	3,155
Emergency Operations Ctr/ OES/ Fire Dispatch	1605 MLK, Jr Way	15,811
Ernest A. Robinson II (Manzanita) Rec Center	2701 – 22nd Ave 94606	5,946
Estuary Park Restroom	202 Embarcadero Rd	168
Fire Alarm Building	1310 Oak St	11,720
Fire Station #01	1605 MLK, Jr Way	16,689
Fire Station #02	29 Jack London Sq	2,534
Fire Station #03	1445 – 14th St	10,295
Fire Station #04	1235 East 14th St	6,686
Fire Station #05	934 – 34th St	4,264
Fire Station #06	7080 Colton Blvd	3,717
Fire Station #07	1006 Amito Dr	3,958
Fire Station #08	463 – 51st St	4,293
Fire Station #10	172 Santa Clara Ave	3,630
Fire Station #10 Garage	172 Santa Clara Ave	255
Fire Station #12	822 Alice St	3,787
Fire Station #13	1225 Derby St	4,615
Fire Station #14	3459 Champion St	2,875
Fire Station #15	455 – 27th St	7,670
Fire Station #16	3600 – 13th Ave	3,951
Fire Station #17	3344 High St	4,639
Fire Station #18	1700 – 50th Ave	10,803
Fire Station #19	5776 Miles Ave	3,755
Fire Station #20	1401 – 98th Ave	13,969
Fire Station #21	13150 Skyline Blvd	4,184
Fire Station #22	1 Airport Dr 94621	Port Property

FY 2015-16 City Facilities Asset List DRAFT

FACILITY NAME	ADDRESS	SQUARE Footage
Fire Station #23	7100 Foothill Blvd	3,035
Fire Station #24	5900 Shepherd Canyon Rd	9,512
Fire Station #24-Old Gingerbread (Landmark)	6226 Moraga Ave	3,800
Fire Station #25	2795 Butters Dr	4,588
Fire Station #25 Exercise Building	2795 Butters Dr	308
Fire Station #26	2611 – 98th Ave	6,707
Fire Station #27	8501 Pardee Dr	4,950
Fire Station #28	4615 Grass Valley Rd	4,130
Fire Station #29	1016 – 66th Ave	3,863
Fire Station #29 Garage	1016 – 66th Ave	702
FM Smith Rec Center	1969 Park Blvd 94606	3,608
Franklin Head Start Center	1010 E. 15th St	691
Franklin Rec Center	1010 East 15th St 94606	4,046
Fremont Pool and Building	4550 Foothill Blvd 94601	4,982
Frog Park Restroom (Frog Park)	Hudson St @ Claremont St	48
Golden Gate Branch Library	5606 San Pablo Ave 94608	7,604
Golden Gate Rec Center	1075 – 62nd St 94608	13,423
Greenman Field House	1390 – 66th Ave	704
Greenman Restroom #2 (69th Ave side)	1390 – 66th Ave	196
Grove Shafter Park Field House Restroom	550 – 34th St	459
H. J. Kaiser Convention Center (Landmark)	10 Tenth St	212,507
Hall of Justice-(Former Jail)	611 Broadway	26,164
Hall of Justice-Police Administration Bldg	455 – 7th St	147,905
Hall of Justice-Police Transport Bldg	611 Broadway	5,717
Head Start Kitchen (Vet's Memorial Bldg.)	200 Grand Ave	1,118
Head Start Storage	1270 93rd Ave	3,306
Head Start Storage	1270 93rd Ave	4,700
Ira Jinkins (Brookfield) Rec Center	9175 Edes Ave 94603	14,990
Jack London Aquatics Center	115 Embarcadero	17,658
Jay M. Ver Lee (Montclair) Rec Center	6300 Moraga Ave 94611	4,499
Joaquin Miller Community Center	3594 Sanborn Dr	7,426
Joaquin Miller Maintenance Shop	3590 Sanborn Dr	1,949
Joaquin Miller Park-Fire Circle Restroom	3540 Joaquin Miller Rd	323
Joaquin Miller Park-Meadow Restroom	3540 Joaquin Miller Rd	237
Joaquin Miller Park-PAL Camp Main Bldg	10900 Skyline Blvd	973
Joaquin Miller Park-PAL Camp Officer's Quarter	10900 Skyline Blvd	148
Joaquin Miller Park-Redwood Glen Restroom	3540 Joaquin Miller Rd	162
Joaquin Miller Park-Rotary Day Camp Nature Hut	3540 Joaquin Miller Rd	113
Joaquin Miller Park-Rotary Day Camp Restroom	3540 Joaquin Miller Rd	148
Joaquin Miller Park-Sanctuary to Memory	3540 Joaquin Miller Rd	100
Joaquin Miller Park-Sequoia Horse Arena Restroom	3540 Joaquin Miller Rd	227
Joaquin Miller Park-The Abbey (Landmark)	3082 Joaquin Miller Rd	736
Junior Center of Art and Science	558 Bellevue Ave	3,614
Lafayette Square Restroom	11th St and Martin Luther King (	1,250
Lakeside Bowling Club House (Landmark)	Bellevue Ave	3,469

FY 2015-16 City Facilities Asset List DRAFT

FACILITY NAME	ADDRESS	SQUARE Footage
Lakeside Nursery	Bellevue Ave	3,265
Lakeside Nursery Greenhouse	Bellevue Ave	2,550
Lakeside Nursery Office	Bellevue Ave	325
Lakeside Park Band Stand Restroom	Bellevue Ave	792
Lakeside Park Garden Center	666 Bellevue	16,970
Lakeside Park Restroom	12th Street	168
Lakeside Park-Bandstand	Bellevue Ave	1,936
Lakeside Park-Gardener's Shed	Bellevue Ave (Grand Ave)	72
Lakeside Park-Nursery Restroom/Office	Bellevue Ave	1,200
Lakeside Park-Pergola	El Embarcadero	3,063
Lakeside Park-Snack Bar	Bellevue Ave	286
Lakeside Park-Storage Building	Bellevue Ave	361
Lakeside Park-Ticket Booth	Bellevue Ave	39
Lakeside Park-Turkey Knoll Restroom	Bellevue Ave behind Fairyland	677
Lakeview Branch Library	550 El Embarcadero 94612	5,645
Leona Lodge	4444 Mountain Blvd	4,031
Lincoln (Family Bridges) Rec Dept.	261 – 11th St	1,768
Lincoln Square Rec Center	250 – 10th St 94607	6,910
Lionel J. Wilson Building	150 Frank Ogawa Plaza	191,442
Lions Pool and Building	3860 Hanly Rd 94602	2,740
Live Oak Pool and Building	1550 MacArthur Blvd 94610	5,487
Lowell Park Restroom	1000 Block of 12th St	332
Main Library	125 – 14th St 94612	78,056
Malonga Casquelourd Center [aka Alice Arts]	1428 Alice St	73,338
Manzanita Head Start Center	2701 – 22nd Ave	1,144
Martin Luther King Branch Library	6833 International Blvd 94621	4,307
Maxwell House (Rec Dept.)	4618 Allendale Ave	3,676
Maxwell Park Restroom	4618 Allendale Ave	291
McCrea Residence and Restroom	4460 Shepherd St	768
Melrose Branch Library	4805 Foothill Blvd 94601	10,196
Miller Avenue Branch Library	1449 Miller Ave	8,660
Montclair Branch Library	1687 Mountain Blvd 94611	4,098
Montclair Park Restroom	6300 Moraga Ave	187
Moss House (Landmark -used for storage)	Mosswood Park	4,550
Mosswood (Horseshoe) Teen Center	3612 Webster St	840
Mosswood Gardener's Shed	3612 Webster St	145
Mosswood Park Restroom	3612 Webster St	90
Mosswood Rec Center	3612 Webster St 94609	7,557
Mosswood Theater Arts Building	3612 Webster Street	1,493
MSC Bldg #2	7101 Edgewater Dr	10,493
MSC Bldg #3	7101 Edgewater Dr	36,536
MSC Bldg #4	7101 Edgewater Dr	22,351
MSC Bldg #5	7101 Edgewater Dr	55,518
MSC Bldg #6	7101 Edgewater Dr	11,930
MSC Bldg #8	7101 Edgewater Dr	7,001

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FACILITY NAME	ADDRESS	SQUARE Footage
Multipurpose Sr. Ctr. (Vet.'s Memorial Hall)	200 Grand Ave	30,196
North Oakland Senior Center	5714 MLK, Jr. Way	11,482
North Oakland Sports Center Restroom	6900 Broadway	600
OFD Training Center Annex	250 Victory Ct	363
OFD Training Center Drill Tower	250 Victory Ct	2,140
OFD Training Center Trailer #1	250 Victory Ct	1,272
OFD Training Center Trailer #2	250 Victory Ct	1,440
OFD Training Center Trailer #3	250 Victory Ct	384
OFD Training Center-Main Building	250 Victory Ct	5,700
OPW Heavy Equipment Maintenance	5050 Coliseum Way	39,699
OPW Maintenance Services	750-50th Ave	5,622
Peralta Community Building	2488 Coolidge Ave	765
Peralta Hacienda Fieldhouse Restrooms	3300 Davis St	352
Peralta House (Rec Dept.)	2465 – 34th Ave	2,239
Piedmont Avenue Branch Library (leased)	4314 Piedmont Ave 94611	1,600
Pine Knoll Restroom	1840 Lakeshore Ave	384
Police Stables	500 Bellevue Ave	1,400
Raimondi Restroom	1700 – 18th St	1,632
Rainbow Rec Center	5800 International Blvd 94621	10,500
Rainbow Teen Center	5818 International Blvd	3,344
Rancho Peralta Shed	Tenth St	46
Ranger Station	3590 Sanborn Dr	2,180
Redwood Annex (Rec Center)	3731 Redwood Rd 94619	1,805
Redwood Heights Rec Center	3883 Aliso Ave 94619	6,795
Rockridge Branch Library	5366 College Ave 94618	14,261
Rose Garden Pergola	700 Jean St	756
Rose Garden Restroom	700 Jean St	832
Rose Garden Storage Building	700 Jean St	209
Rotary Nature Center	552 Bellevue Ave	2,752
Sailboat House	568 Bellevue Ave	7,492
Sailboat House – Dock Shed	568 Bellevue Ave	84
Sailboat Storage/Repair Shop, Classroom	568 Bellevue Ave	4,907
San Antonio CDC Head Start Center	2228 E. 15th St	2,107
San Antonio Park Head Start Center	1701 East 19th St	1,740
San Antonio Rec Center	1701 East 19th St 94606	1,764
San Antonio Restroom	1701 E. 19th St	360
Sequoia Lodge	2666 Mountain Blvd	3,304
Sheffield Village Rec Center	247 Marlow Dr 94605	938
Shepherd Canyon Park Restroom	6000 Shepherd Canyon Rd	316
Snow Park Restroom	1930 Harrison St.	361
Sobrante Park Restroom	470 El Paseo Dr	238
Spunkmeyer Field Restroom	Harbor Bay Pkwy & Doolittle Dr	298
Studio One Art Center	365 – 45th St	17,932
Tassafargona Rec Center	975 – 85th Ave 94621	13,574
Tassafaronga Head Start Center	975 – 85th Ave	1,429

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FACILITY NAME	ADDRESS	SQUARE Footage
Temescal Branch Library	5205 Telegraph Ave 94609	6,800
Temescal Pool and Building	371 – 45th St 94609	4,870
Union Point Restroom	2311 Embarcadero	600
Urban Search and Rescue	5050 Coliseum Way	2,200
Verdese Carter (Police Activity League)	9600 Sunnyside St 94603	2,292
West Oakland Branch Library	1801 Adeline St 94608	20,620
West Oakland Senior Center	1724 Adeline St	10,872
West Oakland Youth Center	3233 Market Street	12,087
Willie Keyes (Poplar) Rec Center	3131 Union St 94608	11,179
Willie Wilkins Park Restroom	97th Ave & C St	303
Willow Park Restroom	1368 Willow St	160
Woodminster Theater	3300 Joaquin Miller Rd	13,452
Woodminster Theater Concession Stand	3300 Joaquin Miller Rd	273
Woodminster Theater Projection Booth	3300 Joaquin Miller Rd	260
Woodminster Theater Restroom	3300 Joaquin Miller Rd	1,796