City of Berkeley

2024 Local Hazard Mitigation Plan

Final

March 18, 2025

A. Planning Process

Note: Meeting minutes, sign-in sheets, and other supporting documents to described activities are provided for State and federal reviewers in Attachment 1: *Documentation*.

A.1 Plan Development Process

Planning Process Overview

The City of Berkeley's Local Hazard Mitigation Plan was originally adopted by the City Council on June 22, 2004, following a process that built on years of disaster mitigation activities. An update to the Plan was adopted on December 16, 2014 and again on December 20, 2019. To create the 2024 LHMP update, Berkeley followed the same multi-phased, broadly-inclusive process used to update the Plan in 2019.

LHMP Kickoff Meeting and Formation of Core Planning Team

On June 20, 2023 the City of Berkeley kicked off the 2024 LHMP Planning Process by convening a Core Planning Team made up of City Staff representing the many departments and divisions most involved in mitigation efforts. The Core Planning Team met monthly throughout the development process. The Core Planning Team included the following City Staff:

- Jamie Albrecht, Emergency Services Coordinator, Office of Emergency Services
- Galadriel Burr, Community Services Specialist, Building and Safety
- Zoe Covello, Assistant Planner, Land Use Division

- Scott Ferris, Director, Parks, Recreation, and Waterfront
- Dan Green, Assistant Fire Chief, Wildland Urban Interface Division
- Ashley James, Senior Planner, Land Use Division
- Ruth Raisner, Health Services Program Special, Public Health Emergency Preparedness
- Meagan Jones, Health Services Program Specialist, Public Health Emergency Preparedness
- Sarah Lana, Emergency Services Manager, Office of Emergency Services
- Sarah Moore, Community Services Specialist, Office of Energy and Sustainable Development
- Steve Riggs, Fire Marshal, Fire Department

Development of First Draft Plan

Throughout 2023 and in early 2024, the Project Manager collaborated with numerous City staff, hazard experts, and community partners to update the plan's hazard analysis, progress on 2019 actions, and to develop the 2024 mitigation strategy. During this time City leaders provided guidance to the Project Manager through participation in the Core Planning Team. As the Project Team developed the First Draft 2024 LHMP, they engaged key partners and community members to update hazard and risk assessments and mitigation initiatives in the Plan, including the new section in the hazard analysis on mitigating individual and household risk for each hazard. The Core Planning Team worked with key partners to identify opportunities for collaboration on new Actions in the 2024 mitigation strategy.

The list of City Staff and hazard expert representatives as well documentation of their

participation is in the Attachment.

Public Review of First Draft Plan

In May 2024, the City posted the First Draft Plan on the City website for review and comment by the Berkeley community. All of the City's commissions were invited to provide feedback on the Plan. The Project Manager presented the First Draft Plan to the Disaster and Fire Safety Commission and Planning Commission, offering an opportunity for feedback from Commissioners and community members. The City also offered to meet with Council Members one-on-one to discuss the Plan and hear their feedback. In response to this offer, Council Members suggested a presentation to the Safety Committee, which staff gave in July 2024.

To support and encourage community members to provide asynchronous feedback, the City posted created videos introducing Risk Assessment content in an accessible and short format. These videos are accompanied by an email address where community members can share their ideas.

The City also held two First Draft Plan Workshops, offering the public an opportunity to engage in person with staff on the Plan's content. The Workshops included a short presentation introducing the Plan and then an opportunity to comment on poster boards describing each hazard in the First Draft Plan.

This public review process is considered a key step in the City Council's adoption of the 2024 Local Hazard Mitigation Plan. See Element F: *Plan Adoption* for details on the public review process.

A.2 Stakeholder Engagement

In August 2023, the Core Planning Team invited Community Partners to help develop the First Draft 2024 LHMP. Community Partners included local and regional agencies, neighboring communities, representatives from business, academia, and other organizations, as well as local non-profit and community groups. Each Community Partner was asked via email to submit their risk assessment information, mitigation strategy approaches, successes, and ideas for collaboration. The City incorporated this feedback into the Plan.

The Project Manager collaborated with these agencies to include detailed information about partners' hazard and risk assessments and mitigation initiatives in the hazard analysis section of the Plan. Additionally, Community Partners were invited to review and provide comment on proposed actions as part of the process to develop the First Draft 2024 LHMP. The list of Community Partner representatives as well documentation of their invitation to participate is in the Attachment.

Community Partners are also invited to provide feedback on the First Draft Plan as part of the public process.

A.3 Public Engagement during Drafting Stage

In order to involve the public early in the mitigation planning process, the City of Berkeley's Office of Emergency Services spoke to people about the Plan at community events, like National Night Out. During National Night Out, staff went to neighborhoods across Berkeley where residents were hosting free block parties. The block parties were out on the streets or green space of the neighborhood, blocked off to traffic, making them open and accessible to anyone who was available to join. Questions focused on top hazards of concern and how community members can take mitigation and preparedness actions to reduce risk.

The Office of Emergency Services also hosted three community workshops focused on offering the public mitigation actions that could easily take as well as collecting input into the Plan. These workshops included one on all Berkeley's Hazards in central Berkeley, one on Tsunamis at the waterfront, and a Winter Weather Workshop held in north Berkeley. These workshops were held at different times to accommodate a variety of schedules: one on a weekday evening, one on a Saturday morning, and one on Saturday morning and afternoon. Locations were all public transit accessible.

For individuals that could not attend in person events, there was always an option to email staff at mitigation@berkeleyca.gov. This email address was advertised as part of outreach materials such as newsletters and at community events for people to share.

This public engagement led to the decision to remove climate change as its own standalone hazard and instead integrate it more thoroughly into each hazard of concern. Many community members expressed that it didn't make sense to have it so separate from the other hazards. Climate change is now more of framing discussion throughout each hazard section.

A.4 Update of Technical Information

The Project Manager worked with City staff, hazard experts, and community partners to update information in the Risk Assessment, accounting for new scientific research on hazards that could affect Berkeley, their areas of exposure and their potential impacts.

The Endnotes Section of the Element B: *Risk Assessment* provides a detailed listing of technical information incorporated into the plan.

B. Risk Assessment

To become disaster resilient, a community must first understand the existing hazards and their potential impacts. Berkeley is exposed to a number of hazards that vary in their intensity and impacts on the city. This mitigation plan addresses hazards: earthquake, wildland-urban interface (WUI) fire, flood, rainfall-triggered landslide, tsunami, extreme heat, hazardous materials release, poor air quality, sea level rise, infectious disease, high wind events, and utility interruption. Each of these hazards can occur independently or in combination, and can also trigger secondary hazards.

Describing Likelihood and Impacts

Using a structure outlined by Saunders, Beban and Kilvington (2013 draft), the table below summarizes these hazards, their relative likelihoods, and the relative severities of their potential consequences.

Relative degrees of likelihood are described as:

- *Likely*: The event may occur several times in your lifetime, up to once every 50 years
- *Possible*: The event might occur once in your life time, once every 51 – 100 years
- *Unlikely*: The event does occur somewhere from time to time, once every 101 – 1,000 years
- *Rare*: Possible but not expected to occur except in exceptional circumstances, once every 1,001 to 2,500 years
- *Very rare*: Conceivable but highly unlikely to occur, once every 2,500+ years

Relative severity of hazard impacts is described using the following terms, which are defined by matrix of factors, including Social/Cultural, Buildings, Critical Buildings, Lifelines, Economic and Health and Safety:

- *Catastrophic*
- *Major*
- *Moderate*
- *Minor*
- *Insignificant*

Table 1. *Summary of Hazard Analysis*

Hazard	Likelihood	Severity of Impact
Earthquake	Likely	Catastrophic
Wildland-Urban Interface Fire	Likely	Catastrophic
Extreme Heat	Likely	Moderate to Catastrophic
Poor Air Quality	Likely	Minor
High Wind	Likely	Minor
Rainfall-Triggered Landslide	Likely	Minor to Catastrophic
Tsunami	Possible	Minor to Catastrophic
Sea Level Rise	Likely	Minor to Major
Floods	Likely	Minor

Utility Interruption	Likely	Minor to Major
Hazardous Materials Release	Likely	Minor to Catastrophic
Infectious Disease	Likely	Minor to Catastrophic

B.1.a Description of Hazards

Sections B1-B13 describe hazards and how they occur in Berkley. They also describe how related hazards can trigger or be triggered by the hazard in question.

Natural Hazards

Originally, the natural hazards included in this plan were first identified through a community-based process during the revision of the Disaster Preparedness and Safety Element of the City's General Plan, adopted in 2002. The General Plan is the result of four drafts, approximately 100 hours of public workshops, meetings, and hearings, almost 1,000 pages of policy suggestions submitted by Berkeley citizens, and the hard work and dedication of the Berkeley community and Berkeley Planning Commission[1]. Specialists from the California Geological Survey, US Geological Survey, UC Berkeley, the Earthquake Engineering Research Institute (EERI), the Association of Bay Area Governments (ABAG) and many others worked with the city on programs and research that were incorporated in the Disaster Preparedness and Safety Element.

Since then, the natural hazards in the plan included in the Plan have been updated with each cycle. Updates are based on new science, recent hazard occurrences, and community feedback during the drafting stage.

- In 2014, the LHMP added Climate Change as a hazard of concern.
- In 2019, the LHMP added extreme heat as a specific hazard.
- In 2024, the LHMP added poor air quality, infectious disease, high wind, sea level rise, and utility disruption as specific hazards. The LHMP removed Climate Change as its own hazard and integrated into each specific hazard, inspired by community feedback during the drafting stage.

Hazards Not Considered in the Plan

Other natural hazards that are extremely rare in Berkeley are not included in this plan; these include prolonged low temperatures, hail, and small tornados and waterspouts. This plan does not focus on these hazards because they are not as likely to occur or to create damage that is as serious as the hazards addressed in detail. California is not generally exposed to the large tornado events experienced in the Midwest. Berkeley's geographic location and moderate climate typically shelters it from prolonged cold. Ocean temperatures moderate the power of tropical storms, lessening the effects of low barometric pressure and storm surge. However, these hazards may become more prevalent in Berkeley with the changing climate.

B.1.b Hazard Location

Sections B.1.b – B.13.b maps the locations in Berkeley that are particularly prone to specific hazards.

B.1.c Hazard Extent and Anticipated Intensities

Sections B.1.c – B.13.c describe the range of anticipated intensities of the hazard, usually

shown with a chart or scale.

B.1.d Previous Hazard Events

Sections B.1.d – B.13.d detail the previous hazard events, including state and federal major disaster declarations since the last update, of all hazards addressed in this hazard analysis.

B.1.e Probability of Future Hazard Events

Sections B.1.e – B.13.e detail the probability of future hazard events for all hazards addressed in this hazard analysis.

B.1.f Vulnerabilities

Vulnerability to Current and Future Assets

Sections B.1.f – B.13.f describe risk to assets including people, structures, systems, natural, historic, and cultural resources, and activities of value to the Berkeley community.

Access and Functional Needs

This plan also recognizes that there are many individuals that are still disproportionately impacted during disasters. People with access and functional needs are defined as community members who may have additional needs before, during and after an incident in functional areas, including but not limited to: maintaining independence, communication, transportation, supervision, and medical care. Individuals in need of additional response assistance may include those who have disabilities, live in institutionalized settings, are elderly, are children, are from diverse cultures, have limited English proficiency, or are non-English speaking, or are transportation disadvantaged. An

individual with a disability is defined by the ADA as a person who had a physical or mental impairment that substantially limits one or more major life activities, a person who has a history or record of such an impairment, or a person who is perceived by others as having such an impairment. The ADA does not specifically name all of the impairments that are covered.

Underserved Communities and Marginalized Populations

Disasters also disproportionally impact undeserved communities and marginalized populations. For example, people of color and people with low incomes have been historically denied access to housing and resources, increasing their vulnerability to these shocks. In the 2024 LHMP, actions are considered for how they prioritize underserved communities and marginalized populations. Further, the 2024 LHMP includes a list of mitigation actions for individuals and households that are designed to be approachable and accessible to a variety of circumstances.

B.1.g Risk and Loss Estimates

Sections B.1.g – B.13.g describe the consequences or effects of the hazard on the assets. Impacts are estimated quantitatively, when possible. Economic losses are described when possible.

GFOA Analysis

Some hazard sections Risk and Loss Estimates include analysis from the GFOA. In 2023, the City of Berkeley has been considering the implication that extreme events, like natural disasters, could have on the City government's financial condition, particularly its reserve

levels for the general fund. The City engaged the GFOA to produce a recommendation to help it decide the appropriate reserve level for the general fund, given the risks from extreme events. GFOA is a non-profit association of more than 23,000 state and local government finance professionals and elected officials from across North America. A key part of GFOA's mission is to promote best practices in public finance, including reserve policies. The analysis by GFOA also shed light on the potential broader economic losses to the community from the risks posed by extreme events.

Any "risk" can be thought of as the downside to an uncertain event. The next section describes GFOA's approach to uncertainty.

B.1.h The Approach to Uncertainty

The accomplished forecasting scientist, Spyros Makridakis, suggests a "Triple-A" approach for dealing with highly uncertain phenomena.

Accept. First, we must accept that we are subject to uncertainty. For example, the severity and timing of an earthquake is unpredictable. Berkeley could go years without experiencing a serious earthquake or one could occur next month!

Assess. Next, we must assess the potential impact of the uncertainty, with history providing a useful reference point. The experiences of other local governments are also a good reference point. For example, we used the historical experiences of Berkeley and other relevant municipalities to estimate the potential impact of future extreme events. However, historical experiences are not perfectly predictive of the future.

Augment. The range of uncertainty we face will almost always be greater than what we

initially assess it to be. Therefore, we must augment our understanding of risk beyond what our historical experiences show us. For example, very few people saw the 2008 Great Recession coming or thought it could be as bad as it was. They were unprepared for this historically unprecedented recession. We can augment our understanding of risk using a technique called “Probability Management.”[2] Probability Management is an application of modern information processing technology that allows us to simulate thousands of potential events (e.g., floods, recessions, etc.) so that we can observe the probability of events of various magnitudes coming to pass. The statistical technique that Probability Management is based on is called “Monte Carlo analysis.” This technique was established in the late 1940s, but until very recently required special computers and software to use. Modern information technology has made Monte Carlo analysis accessible to anyone with a personal computer.

In order to use Probability Management, we express any given type of extreme event as a range of possibilities that the City might experience. This range is called a “distribution.” A distribution is a shape that signifies how frequently the City might expect to experience a certain type of event and/or how severe the event might be.

The most common type of distribution is called the “normal distribution,” more popularly known as the “bell curve.” Many phenomena fit a bell curve. To help us understand how to read a distribution, we can start with an example that is related to everyday life: the height of American men.

Exhibit 3.1 shows a bell curve for the height of American men. The horizontal axis of Exhibit 3.1 represents height. The vertical axis represents frequency. The most common

height is 5’9”, so it is shown at the top of the curve. Much taller men, like NBA centers, would be found on the right-hand side of the curve. Very short men would be found on the left.

Exhibit 1. Bell curve for the height of American men.

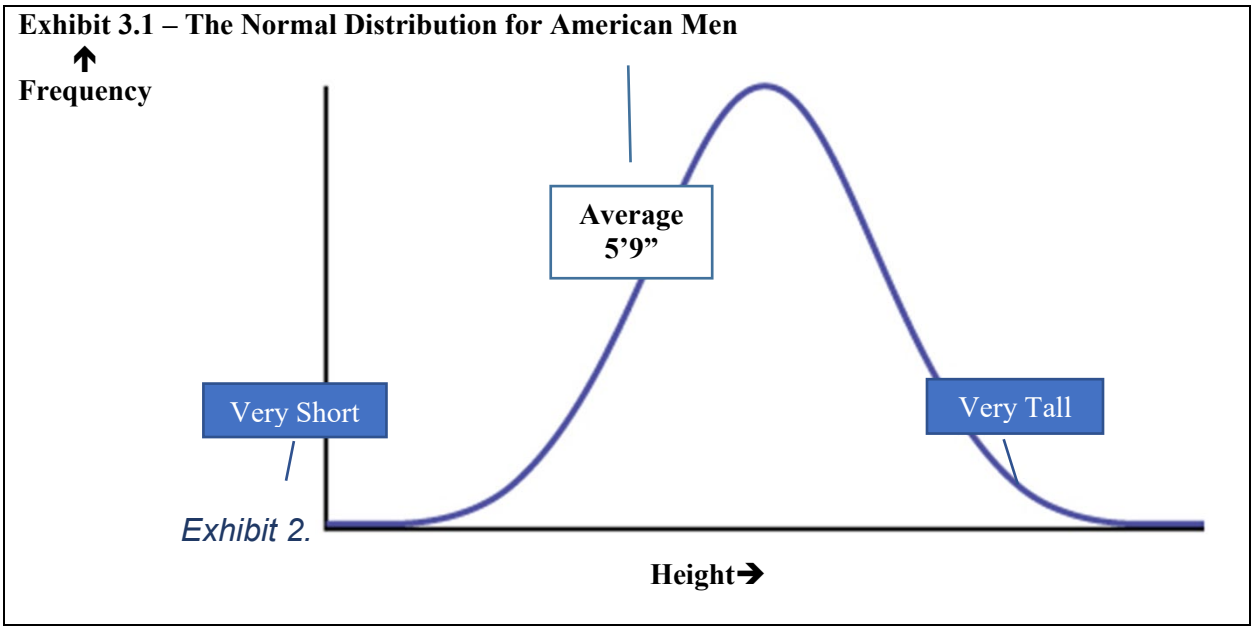
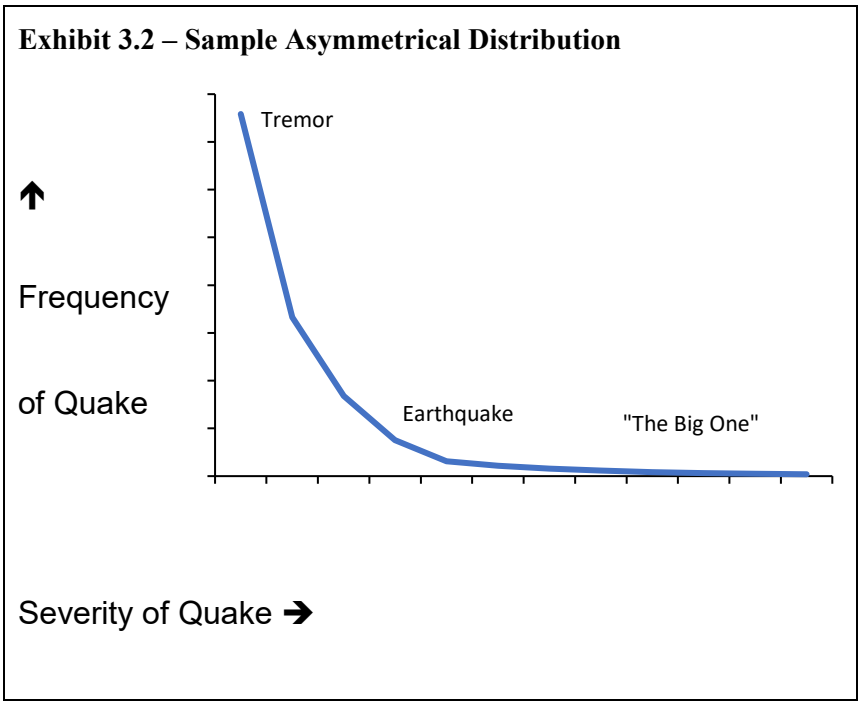


Exhibit 3. Sample Asymmetrical Distribution



The normal distribution can help analyze risk. To illustrate, the severity of an economic downturn is roughly normally distributed. A few downturns are slight, few are severe, but most are closer to average.

Another type of distribution we use in our analysis is an asymmetrical distribution, shown in Exhibit 3.2. Earthquakes fit an asymmetrical distribution. Exhibit 3.2 shows that tremors are the most common. Full-fledged earthquakes are relatively rare. The distribution is "asymmetrical" because the frequency with which we will experience these events are not evenly distributed around the middle of the distribution. Put another way, there are far more tremors that are smaller than the "average" earthquake. Yet, there are far fewer earthquakes ("the big one") that are larger than the average earthquake.

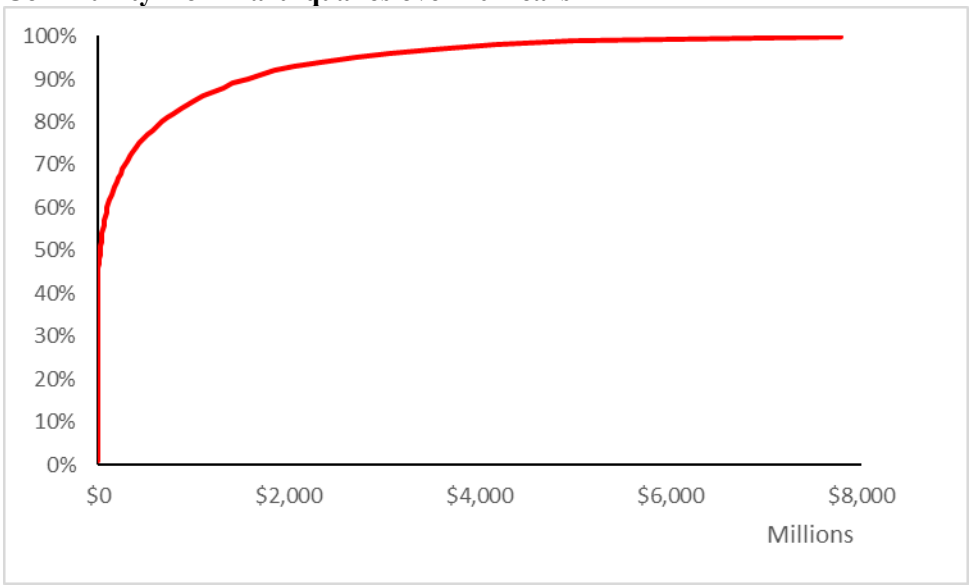
Expressing Berkeley's vulnerability as distributions allows us to calculate the probability that an event of a given magnitude will come to pass. When we associate a dollar amount with that event, we can estimate the probability or chance that Berkeley will need to have a given amount of money on-hand to respond.

Exhibit 3.3 is not a distribution but is a type of graphic we use in our work. It is called a

“cumulative probability chart.” The example in Exhibit 3.3 shows the economic losses to the entire Berkeley community from earthquakes over the course of 10 years. Earthquakes are rare events, so over a ten-year period there is a chance that there are no earthquakes at all. Hence, the red line intersects the vertical axis at about 50% (there is about a 50% chance of no earthquake). We then see the red line go up and to the right from the vertical axis. This means that the chance of larger and larger losses become increasingly remote. To illustrate, the red line intersects 70% at about $300 million. This means there is a 70% chance that total economic losses are $300 million or less (or a 30% chance that losses will be more). The red line insects 80% at $670 million, which means there is an 80% chance that losses will be less than that (or a 20% chance that losses will be more).

Exhibit 4.– Cumulative Chance of Economic Losses to Berkeley Community from Earthquakes over 10 Years

Exhibit 3.3 – Cumulative Chance of Economic Losses to Berkeley Community from Earthquakes over 10 Years



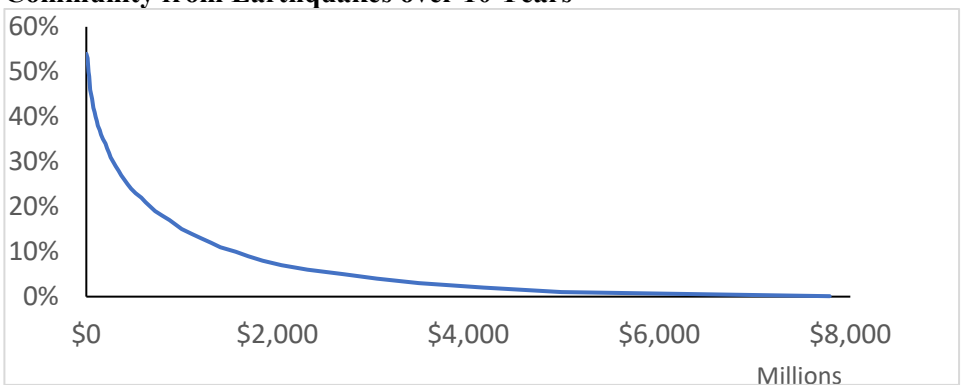
	Chance that Economic Losses will be EQUAL TO OR LOWER THAN that the indicated percentage			
Time Horizon	95%	90%	50%	10%
10-Year	$2,700M	$1,600M	$24M	0*

*Consult the graph for the precise chance that losses are equal to or lower than zero

Another of chart and one we will use to show community-wide losses in this report is a loss exceedance curve. A loss exceedance curve is another way of looking at the same concept as we saw in Exhibit 3.3. Exhibit 3.4 shows the loss exceedance curve for the same earthquake data. It just presents it in an inverse way. So, the 20% point on the vertical axis is $670 million because there is a 20% chance that damages will be more than that. Exhibit 3.4 showed there was an 80% of damages being less.

Exhibit 5. Loss Exceedance Curve for of Economic Losses to Berkeley Community from Earthquakes over 10 Years

Exhibit 3.4 Loss Exceedance Curve for of Economic Losses to Berkeley Community from Earthquakes over 10 Years



	Chance that Economic Losses Will Exceed Dollar Amounts (Millions) Indicated Below*			
Time Horizon	5%	10%	50%	90%
10-Year	$2,700M	$1,600M	$24M	NA

*Not Applicable (NA) means that the loss exceedance curve intersects zero before this point. See the graph to see where the curve meets the vertical axis for the chance of losses exceeding zero.

Both cumulative probability charts and loss exceedance curves are commonly used when quantifying risk. In our work with the City we will use loss exceedance curves to show economic losses to the entire Berkeley community and cumulative probability charts to show losses to just City government. In this particular report, we will be focusing on economic losses to the entire community, so we will show loss exceedance curves. GFOA is working with the City of Berkley on a separate report about financial losses to City government. Our intent is to make it easier to distinguish between charts that depict community versus city government losses by giving each type of loss a distinctive chart (and a different color line), for those readers that will use both reports.

B.1.i NFIP-Insured Structures

The City of Berkeley does not have NFIP-insured structures that have been repetitively damaged by floods.

B.2 Earthquakes

B.2.a Description of Earthquakes and Related Hazards

An earthquake is the ground shaking caused by a sudden slip on a fault. Stresses in the earth's outer layer push the sides of the fault together. Stress builds up and the rocks slip suddenly, releasing energy in waves that travel through the earth's crust and cause the shaking that we feel during an earthquake.

Shaking and Ground Failure

The most significant physical characteristic of a major earthquake is the ground shaking. During an earthquake, the ground can shake for a few seconds or up to a minute or more. The strength and duration of ground shaking is affected by many factors, including the types of soils underneath, and the distance, size, depth, and direction of the fault rupture that caused the quake.

The strongest shaking is typically close to the fault where the earthquake occurs. Horizontal shaking in particular causes most earthquake damage, because structures often have inadequate resistance to this type of motion.

Earthquakes can cause the ground to fail in several ways, resulting in additional hazards: surface fault rupture, liquefaction, and seismically-triggered landslides.

Surface fault rupture: Surface fault rupture occurs when movement on a fault deep within the earth breaks through to the surface. This can severely damage structures that cross the fault, including buildings, roads, pipelines, and train tracks.

Liquefaction: Liquefaction is a phenomenon that occurs in wet, sandy, or silty soils. When shaken, the soil grains consolidate, pushing water towards the surface and causing a loss of strength in the soil. The ground surface may sink or spread laterally.

Seismically-Triggered Landslides: Ground shaking from an earthquake can trigger landslides. This landslide movement can range from a few inches to tens of feet. Ground surface displacements as small as a few inches are enough to break typical foundations.

Fire Following Earthquake[3]

Fires break out following all major earthquakes. Fire following earthquake presents a significant problem in dense urban environments, where many simultaneous ignitions lead to a firestorm. In these cases, fire damage is even more severe than damage from earthquake shaking.

Earthquake shaking can start fires in numerous ways, such as:

- Tipping over appliances with pilot lights
- Damaging electrical equipment leading to sparks
- Exposing materials to open flames from stoves, candles, fireplaces and grills

Post-earthquake fires can also spread quickly when flammable chemicals spill.

Ground failure due to liquefaction, surface fault rupture and landslide can rupture gas lines (both underground and at the private gas meter). These ruptures can start and fuel fires, which also spread more quickly after major earthquakes because earthquakes damage the infrastructure needed to mitigate or respond to fires:

- Within a building, earthquake shaking and ground failure can damage a building's active fire protection systems (e.g., fire alarms and sprinkler systems), as well as its passive fire protection systems (construction features designed to slow/stop fire, e.g. fire walls, fire-rated floor-ceiling assemblies, and fire doors).

- Within a community, fires also spread more quickly after major earthquakes because earthquakes damage the infrastructure needed to fight them. Earthquake shaking and ground failure due to liquefaction, surface fault rupture and landslide can simultaneously break water mains, damage electrical systems necessary to provide energy to pump water, damage communication infrastructure, impede emergency transportation routes with debris or landslides, and jam firehouse doors, preventing apparatus from responding. Fires can occur in the days or months following an earthquake due to the to electrical systems, fire protection systems, and gas lines.

Connection to sea level rise

The United States Geological Survey predicts that sea level rise will lead to rising water tables. Higher water tables in turn increases the risk of liquefaction during earthquakes, as more soils become wet, sandy, or silty. This means as climate change continues and sea level rise increases, liquefaction will be a concern for more areas in Berkeley.

Connection to utility disruption

All utilities are vulnerable to disruption from earthquake shaking and ground failure. See the Vulnerabilities and Risk and Loss sections of this Earthquake section for more details.

B.2.b Locations of Earthquakes and Related Hazards

Map 1 shows the City of Berkeley and its proximity to known active geologic faults in the San Francisco Bay Region. This map shows most the San Francisco Bay Area, with the City of Berkeley shaded in dark gray. Many green lines move across the map in a northwest to southeast direction:

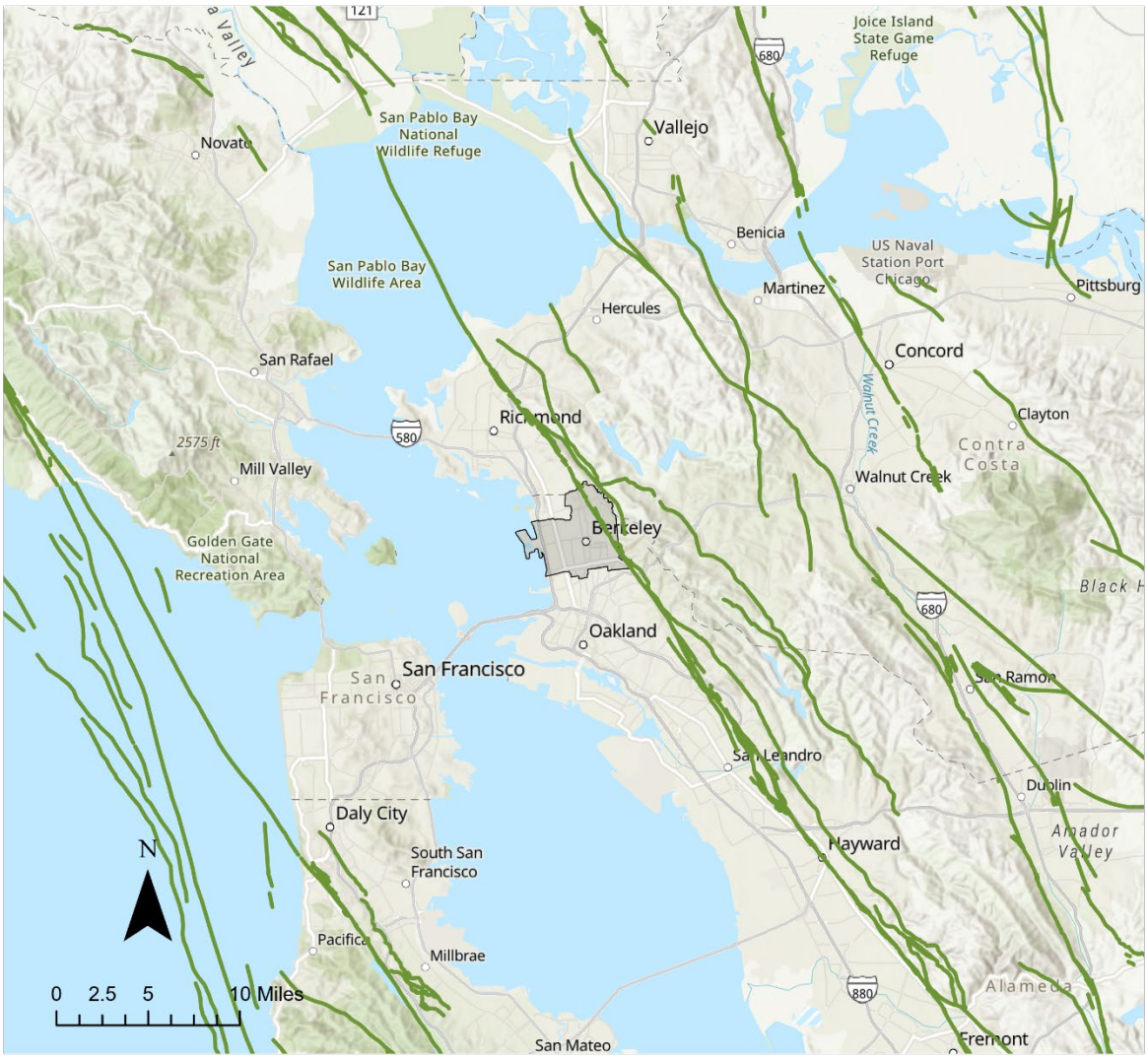
- On the western side of the picture, in the Pacific Ocean, multiple green lines move

along the coast, starting and stopping. One of these lines begins in Marin, stretches through the ocean, and then continues through Daly City and down the peninsula, off the picture. This is the San Andreas Fault.

- On the right side of the frame, another set of green lines starts and stops, showing earthquake faults in the East Bay. One of these lines stretches from the middle of San Pablo Bay, crosses directly through the eastern section of Berkeley, and continues down the East Bay past Union City. This is the Hayward fault, which stretches to Milpitas, and is of particular concern in Berkeley.

A large earthquake on any of the illustrated faults could impact Berkeley. For example, the 1989 M 6.9 Loma Prieta earthquake was a rupture of the San Andreas fault, and the 2014 M 6.0 South Napa earthquakes occurred along the West Napa fault.

Map 1. ***Regional faults and their locations with respect to Berkeley, 2024***



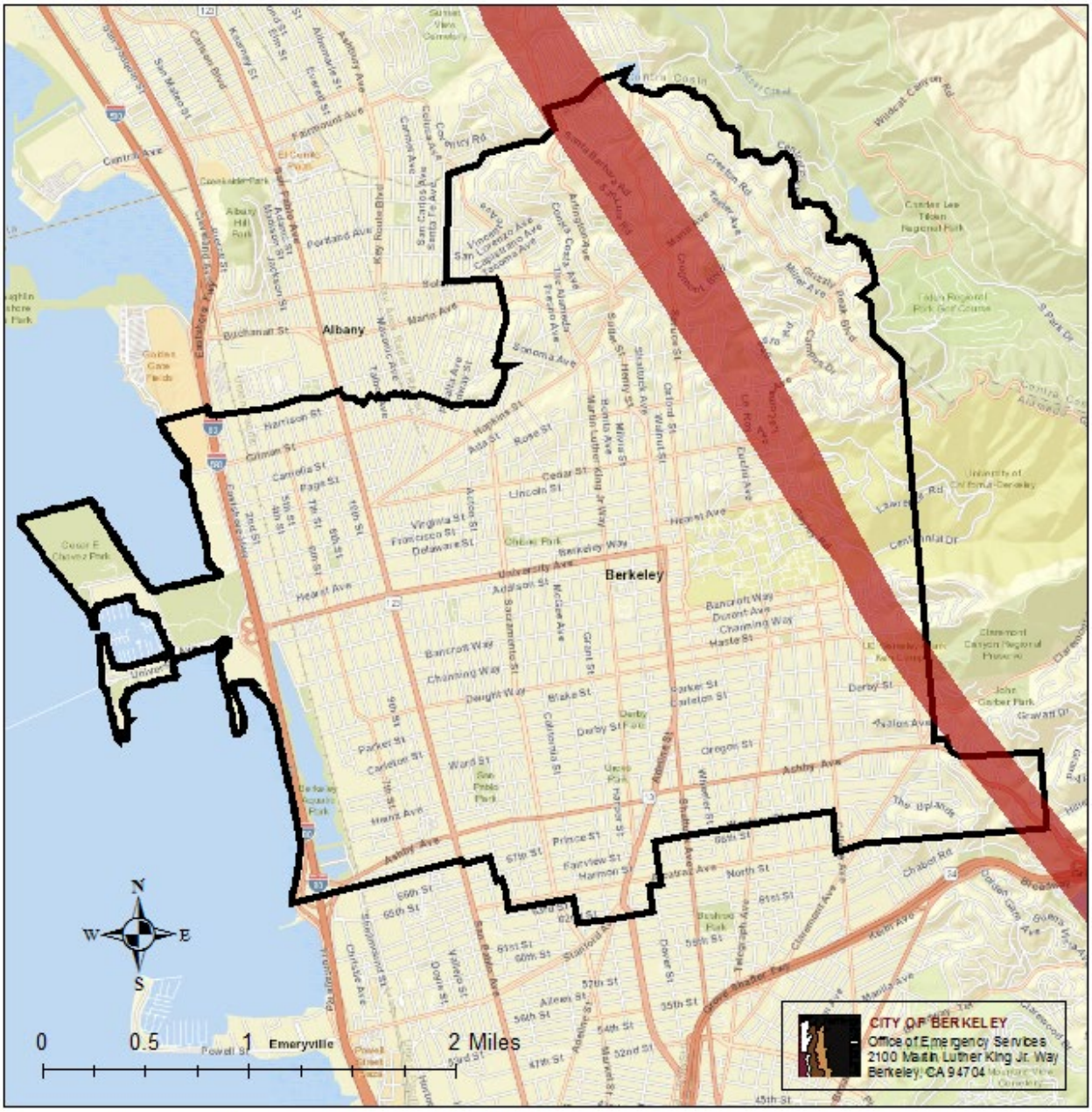
Fault Locations Map

Esri, CGIAR, USGS, California State Parks, Esri, TomTom, Garmin, SafeGraph, FAO, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USFWS, USGS Quarternary Faults 2022, City of Berkeley OES 10/22/2024

Location of Surface Fault Rupture:

Map 2 shows the location of the Earthquake Fault Planning Zone, which illustrates the location of the Hayward Fault and the area in Berkeley exposed to surface fault rupture. Map 2 presents Berkeley, with borders outlined in a thick black line. The Surface Fault Rupture Zone is presented as a thick red line running along the base of the Berkeley hills in a northwest to southeast direction. The line is approximately ¼-mile wide.

Map 2. ***California Geological Survey Earthquake Fault Planning Zone, 2019***



Source: California Geological Survey, Earthqauke Fault Planning Zone.
Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, © OpenStreetMap contributors, and the GIS User Community

Earthquake Fault Zone

City of Berkeley

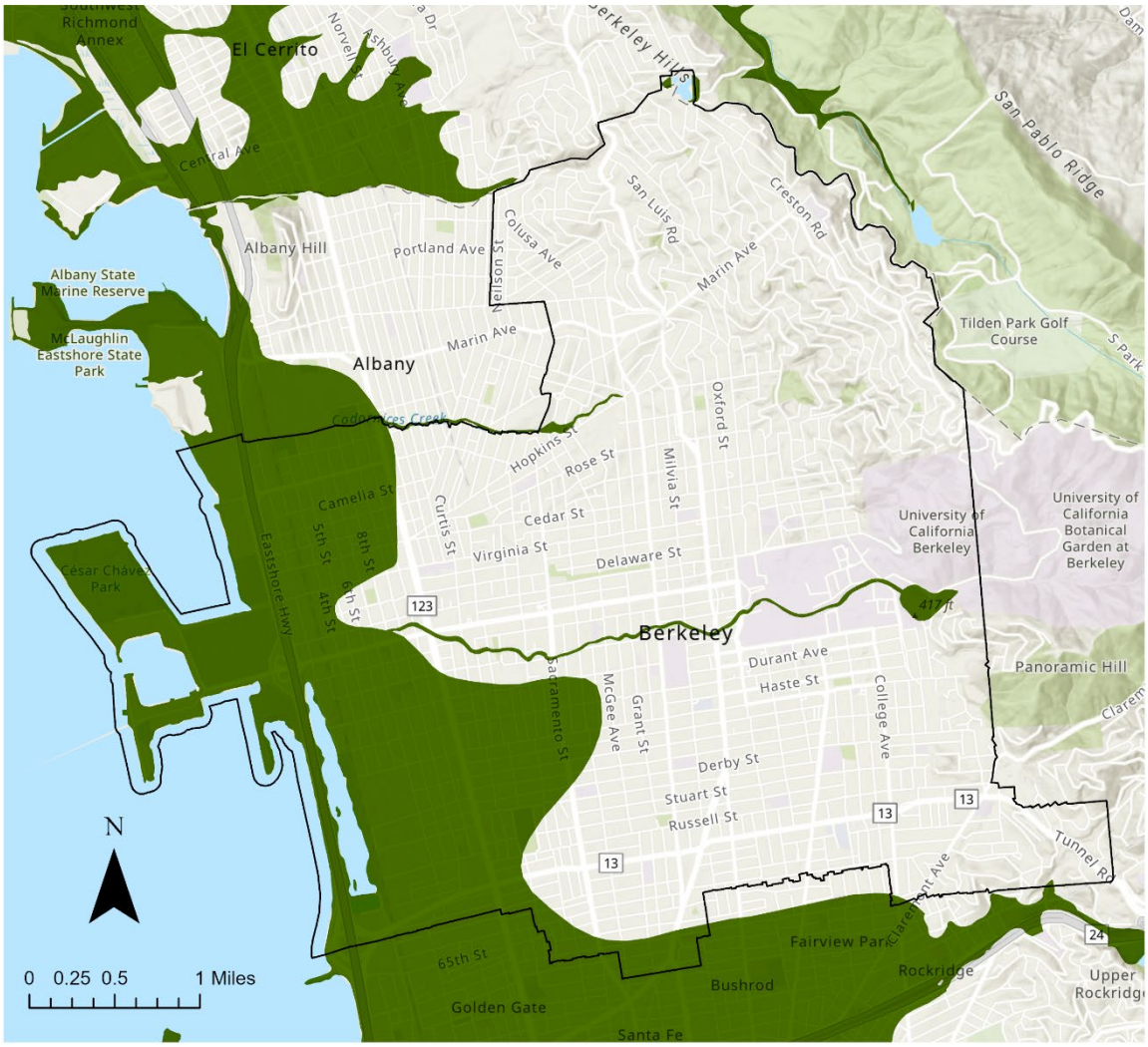
Location of Liquefaction

The USGS classified sediments in the Bay Area based on their susceptibility to liquefaction. Map 3 depicts the areas in Berkeley where soil types and groundwater conditions are more susceptible to liquefaction.

The following areas are shown in deep green, meaning they are in the liquefaction zone and experience liquefaction risk:

- The entire Berkeley Marina and Eastshore State Park
- Interstate 80
- Aquatic Park
- Codornices Creek and Strawberry Creek.
- In Northwest Berkeley the zone begins at the shoreline and ends at San Pablo Ave
- In Southwest Berkeley the zone begins at the shoreline and ends at McGee Ave

Map 3. ***Liquefaction Zones in Berkeley, 2024***



Liquefaction Zones Map

CGS Liquefaction Zones

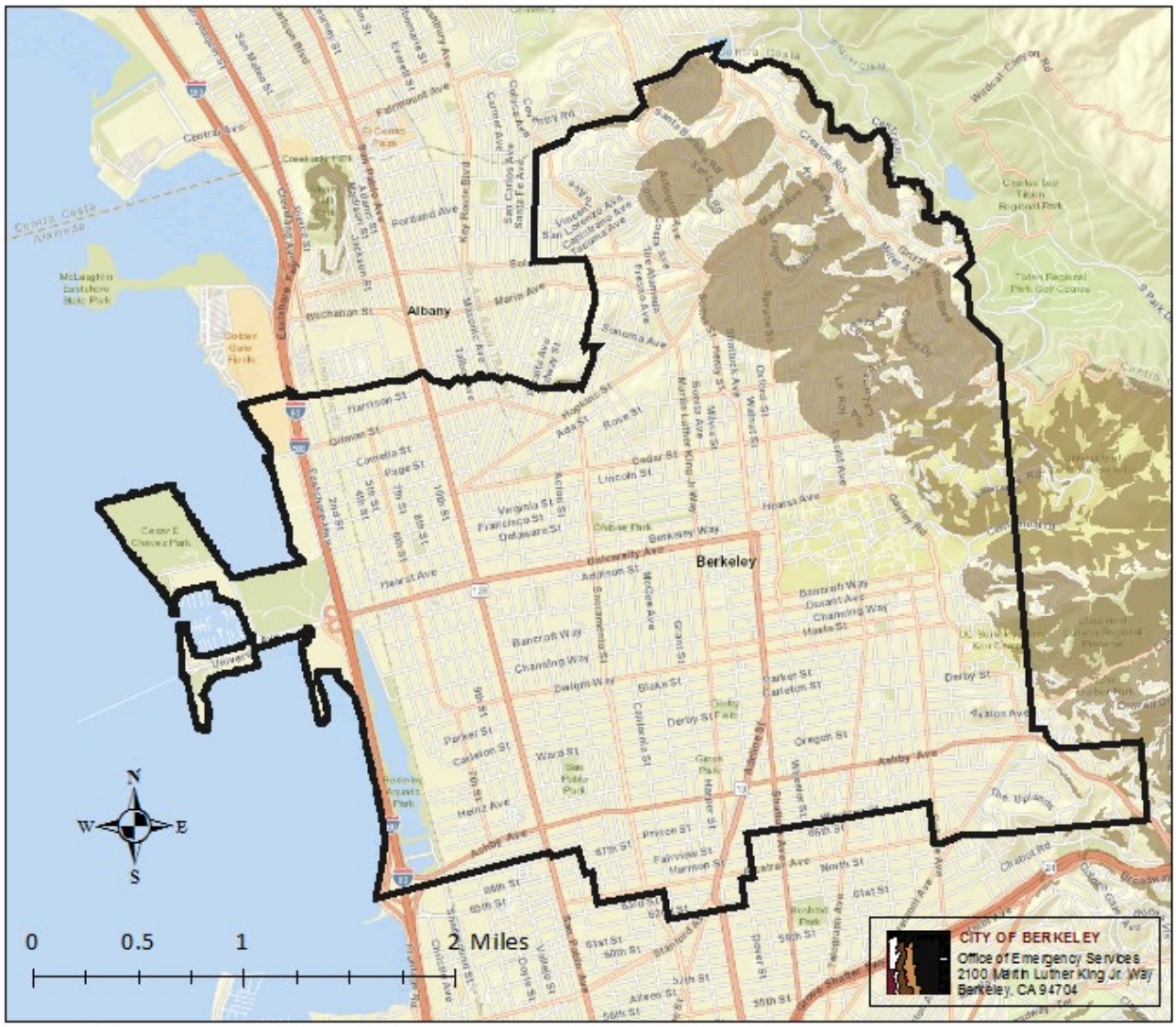
City of Berkeley Boundary

California State Parks, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA, USFWS, Esri, NASA, NGA, USGS, FEMA, CGS Liquefaction Zones 2024, City of Berkeley OES 10/22/2024

Location of Seismically-Triggered Landslides

The California Geological Survey has identified the areas of Berkeley with potential to experience earthquake-induced landslide. All areas underlain by known active or dormant landslides are included in the zone. These areas are identified by combining information on rock or soil strength, slope gradient (steepness), and anticipated future shaking levels. In Berkeley, the potential for landslide from seismic activity is high in the hill areas and along creek banks. Map 4 indicates that significant portions of the Berkeley hills have the potential to experience earthquake-induced landslide. These areas are shown in light brown on Map 4 throughout the Berkeley hills.

Map 4. ***California Geological Survey Earthquake-Induced Landslide Planning Zone, 2019***



Source: California Geological Society, Earthquake-Induced Landslide Planning Zone.
Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, © OpenStreetMap contributors, and the GIS User Community

City of Berkeley

Earthquake-Induced Landslide Planning Zone

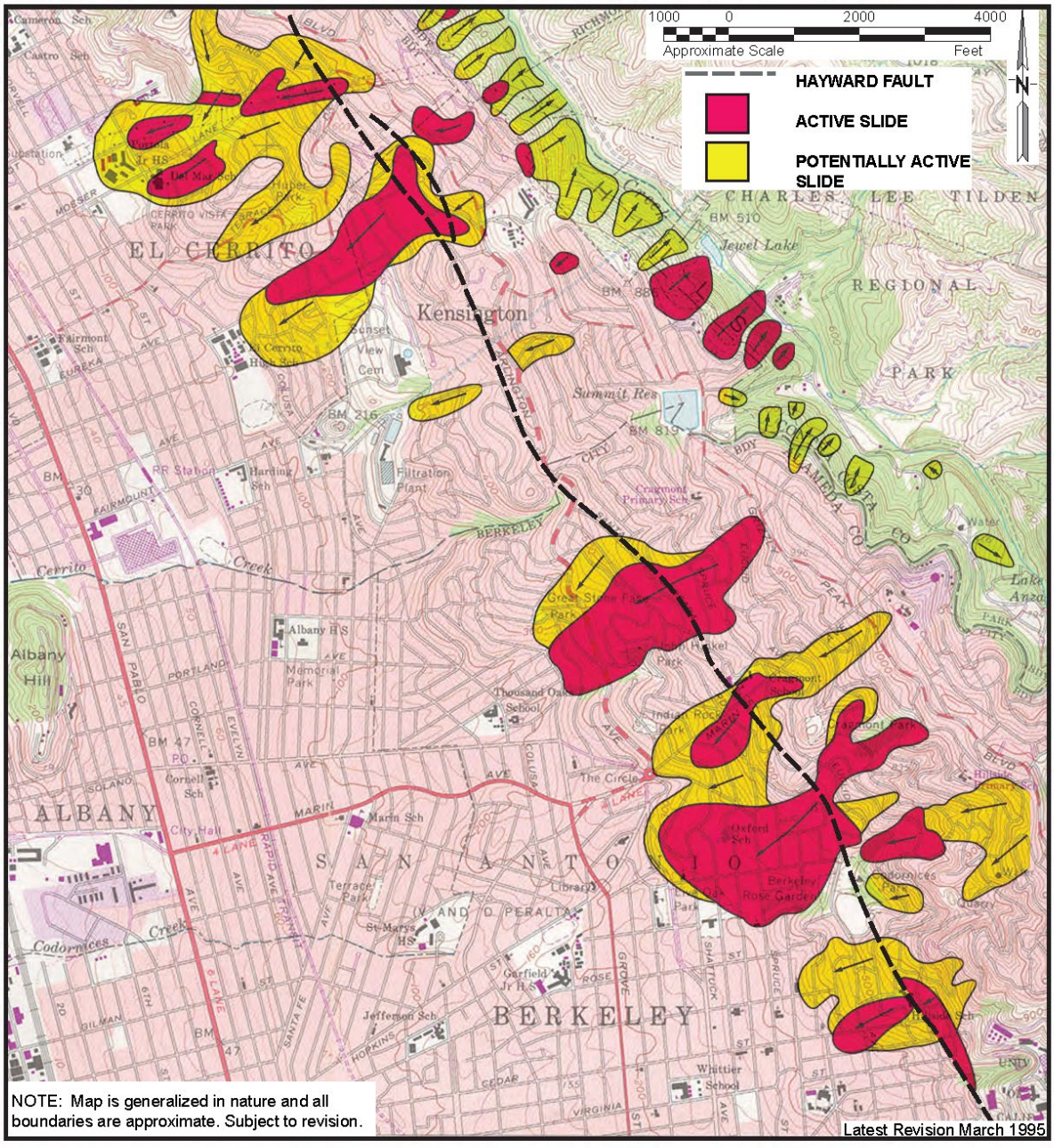
Map 5, created by Alan Kropp and Associates, focuses on a specific area in the northern part of the Berkeley hills, bordered by Virginia Street to the south and Summit Reservoir to the north. On the map, red and yellow blobs run approximately northeast to southwest, with arrows pointing in a southwestern direction.

This map illustrates this area in particular it has active landslides, indicated in red on the map. Potentially-active slides are indicated in yellow. In a Hayward fault earthquake, significant movement is likely in active landslide areas. Earthquake shaking and active slides together could activate other potentially-active slides.

While this map is outdated, it is included in the LHMP because it's the only map of its kind that exists. Alan Kropp and Associates studied this specific area in Berkeley, whereas most other maps available publicly today are not based on this in depth of a local analysis. Unfortunately, there are not currently resources available to recreate this map.

Map 5. ***Active and potentially-active landslides in Berkeley hills (developed by Alan Kropp Associates 1995 and used with permission)***

LANDSLIDES OF THE BERKELEY HILLS



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Location of Fire Following Earthquake

Fire following earthquake is a threat throughout Berkeley making it impossible to map the potential locations. We do know that seismically vulnerable buildings also likely to be a key source of earthquake-caused fires when gas or electricity lines break or rupture. Additionally, Berkeley has many older multi-unit apartment buildings without fire sprinkler systems. These buildings could both cause and feed fires following an earthquake. Ultimately, densely-populated neighborhoods with wooden homes, such as most of the residential areas in Berkeley, are at high risk of fire spread following a major earthquake.

However, even buildings that survive earthquake shaking can succumb to fire, including those buildings that have been seismically retrofitted.

B.2.c Extent of Earthquakes and Anticipated Intensities

Magnitude and intensity are the two commonly-used scales to represent different earthquake characteristics.[4]

*Magnitude**:** A*n earthquake has a single magnitude, which indicates the overall size and energy released by the earthquake. Magnitude is measured using moment magnitude (M).

*Intensity***:** In the same earthquake, different locations will experience different amounts of shaking. The shaking experienced at different locations varies based on:

- The earthquake's overall magnitude
- The distance from the fault that ruptured in the earthquake
- The ground type: thick valley deposits shake longer and harder than rock.

Intensity measures the strength of earthquake shaking at a particular location. Intensity is measured using the Modified Mercalli Intensity (MMI) scale. Intensity is based on observed effects. The MMI value assigned to a specific site after an earthquake provides a more meaningful measure of the earthquake's severity at that location than the magnitude, which applies one value to the entire earthquake.

MMI descriptions[5]

The MMI scale is composed of twelve increasing levels of intensity that range from imperceptible shaking to catastrophic destruction. Lower numbers on the intensity scale generally deal with the manner in which the earthquake is felt by people. Higher numbers on the scale are based on observed structural damage. Levels are as follows:

- MMI Level I (White): Shaking Not Felt: Not felt except by a very few under especially favorable conditions.
- MMI Level II (Lavender): Weak Shaking: Felt only by a few persons at rest, especially on upper floors of buildings.
- MMI Level III (Aqua): Weak Shaking: Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated.
- MMI Level IV (Blue): Light Shaking: Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.
- MMI Level V (Gray): Moderate Shaking: Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.
- MMI Level VI (Light Yellow): Strong Shaking: Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight.

- MMI Level VII (Medium Yellow): Very Strong Shaking: Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly build or badly designed structures; some chimneys broken.

- MMI Level VIII (Orange): Severe Shaking: Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned.

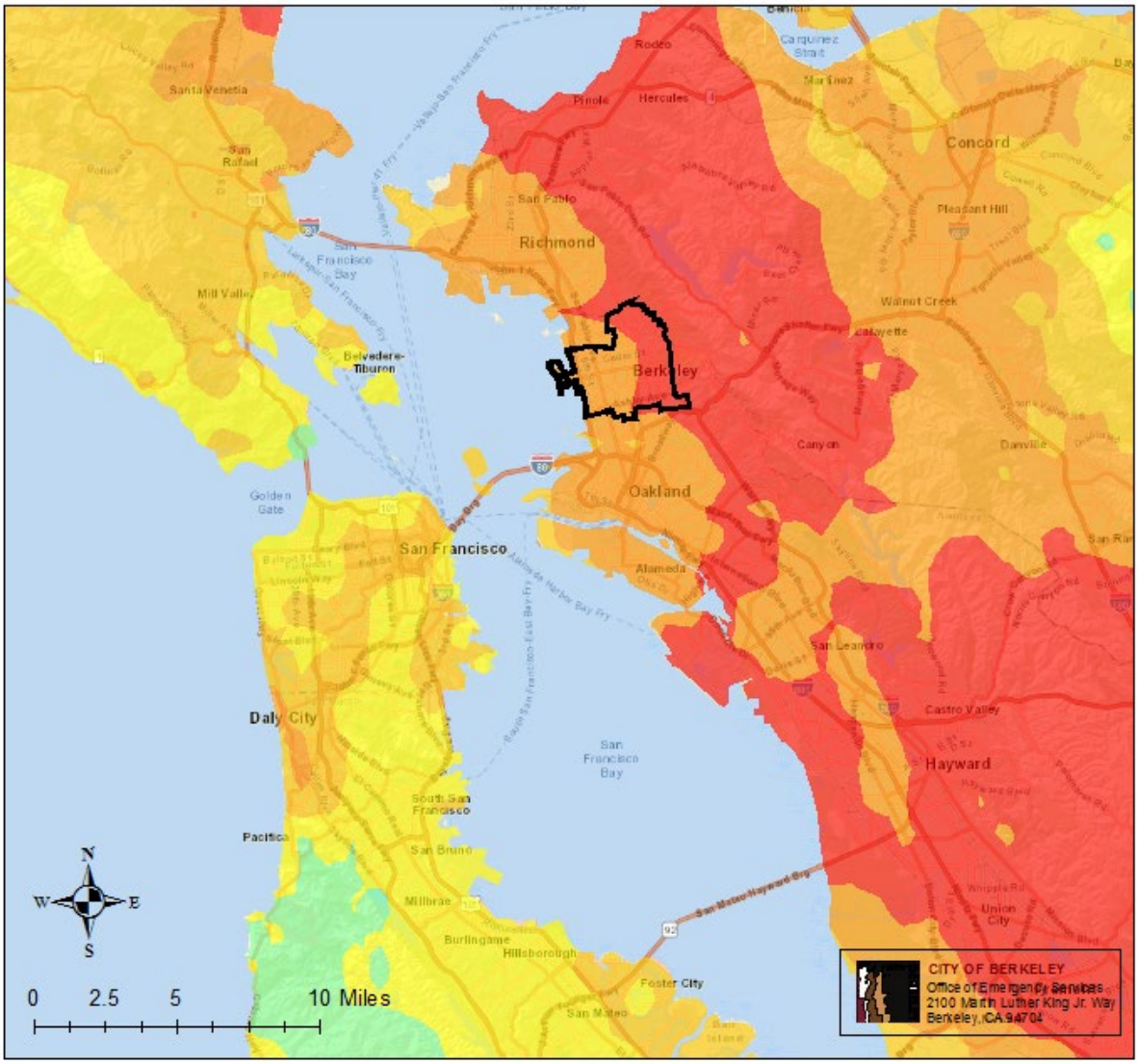
- MMI Level IX (Red): Violent Shaking: Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shift off foundations.

- MMI Level X+ (Dark Red): Extreme Shaking: Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.

Berkeley could experience earthquakes that span the range of the MMI scale. However, the most concerning is when the shaking is strong, very strong, violent, or extreme. To understand what this means for Berkeley, Map 6 shows most of the San Francisco Bay Area and the different levels of shaking intensity anticipated with a hypothetical magnitude 7.0 earthquake on the Hayward fault. Shaded in colors of yellow, orange, and red, the map shows that very strong, severe, and violent shaking will be felt all along the East Bay, stretching from Pinole to south of Hayward.

Berkeley is outlined with a thick black line and is shaded in colors of orange and red, indicating that in this scenario, the Berkeley flats will experience MMI Level VII (severe shaking), and eastern Berkeley will experience MMI Level IX (violent shaking).

Map 6. ***Modified Mercalli Intensity for HayWired Earthquake Scenario, 2017***



Source: USGS, HayWired Scenario, August 2017.
Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, © OpenStreetMap contributors, and the GIS User Community

City of Berkeley

I (Not Felt)
II - III (weak shaking)
IV (light shaking)
V (moderate shaking)
VI (strong shaking)
VII (very strong shaking)
VIII (severe shaking)
IX (violent shaking)
X+ (extreme shaking)

B.2.d Previous Earthquakes

The strongest, most recent earthquakes occurred in the Bay Area in 2022. A magnitude 5.1 earthquake struck near San Jose in October and a magnitude 3.6 struck near El Cerrito in December. Both of these earthquakes had minimal reported damages. There have been no federally-declared earthquake disasters in Berkeley since the last update.

Destructive earthquakes struck the Bay Area in 1838, 1868, 1898, 1906, 1911, 1989, and 2014. Impacts of the earlier earthquakes in Berkeley are not well documented, but the damage of the 2014 magnitude 6.0 South Napa Earthquake is fresh in the memory of many Berkeley residents. It killed two people, injured 300 others, and caused moderate to severe damage to more than 2,000 structures.[6] Electricity and water services sustained disruptions and there was minor damage to roads, water and natural gas lines, and wastewater treatment facilities.

The 1989 Loma Prieta earthquake also informs the Bay Area's understanding of earthquakes. Sixty-two people died in the Bay Area as a direct result of this earthquake. Most of the fatalities, 42, were caused by the collapse of a two-level elevated highway in Oakland only a few miles from the Berkeley city limits. Damage in the City of Berkeley was minor in comparison to many of its neighbors. Many residential structures experienced collapse of unreinforced masonry chimneys, and new cracks were found in the Martin Luther King, Jr. Civic Center Building. The earthquake epicenter was far from Berkeley, but region-wide impacts and disruption increased the Berkeley community's awareness of the high-risk Berkeley faces from much closer earthquakes.

The 1906 San Francisco Earthquake caused structural damage in Berkeley, including

chimney cracking and collapse, and considerable damage to some public buildings including Berkeley High School structures.[7] Other "small" earthquakes in Berkeley over the years have caused slight damage to and in some buildings.

B.2.e Probability of Future Events

Earthquakes, especially smaller ones, are a part of life in the San Francisco Bay Area. Smaller earthquakes happen regularly and sometimes cause damage, especially inside of homes when furniture or other items move. Although small earthquakes can cause some damage, they are not as concerning as a catastrophic earthquake with a magnitude of 6.0 or more.

According to the US Geological Survey, there is a 72% probability of one or more M 6.7 or greater earthquakes from 2014 to 2043 in the San Francisco Bay Region.[8] There is a 33% chance that a 6.7 or greater will occur on the Hayward fault system between 2014 and 2043.[9] This means that it is likely that many Berkeley residents will experience a severe earthquake in their lifetimes.

Researchers are still trying to understand how climate change is impacting the probability of future earthquakes. According to the United States Geological Survey, there is currently no pattern of earthquakes occurring more frequently during periods of heavy precipitation or drought.[10]

B.2.f Vulnerabilities

People

People with disabilities and people with access and functional needs, students, and low-

income individuals may live in older housing units that are more vulnerable to collapse or damage from earthquakes. These groups may also have less socioeconomic means to prepare for and recover from an earthquake that damages their home. Earthquakes cause power outages, and people who are dependent on medical or other assistive devices that use electricity are especially vulnerable. Significant damage to streets, curbs, and transportation systems may prevent people with disabilities and people with access and functional needs from navigating to their destinations. Earthquake damage to and reduced functionality of communication systems may create additional challenges for people to get assistance from their families, friends, and caregivers.

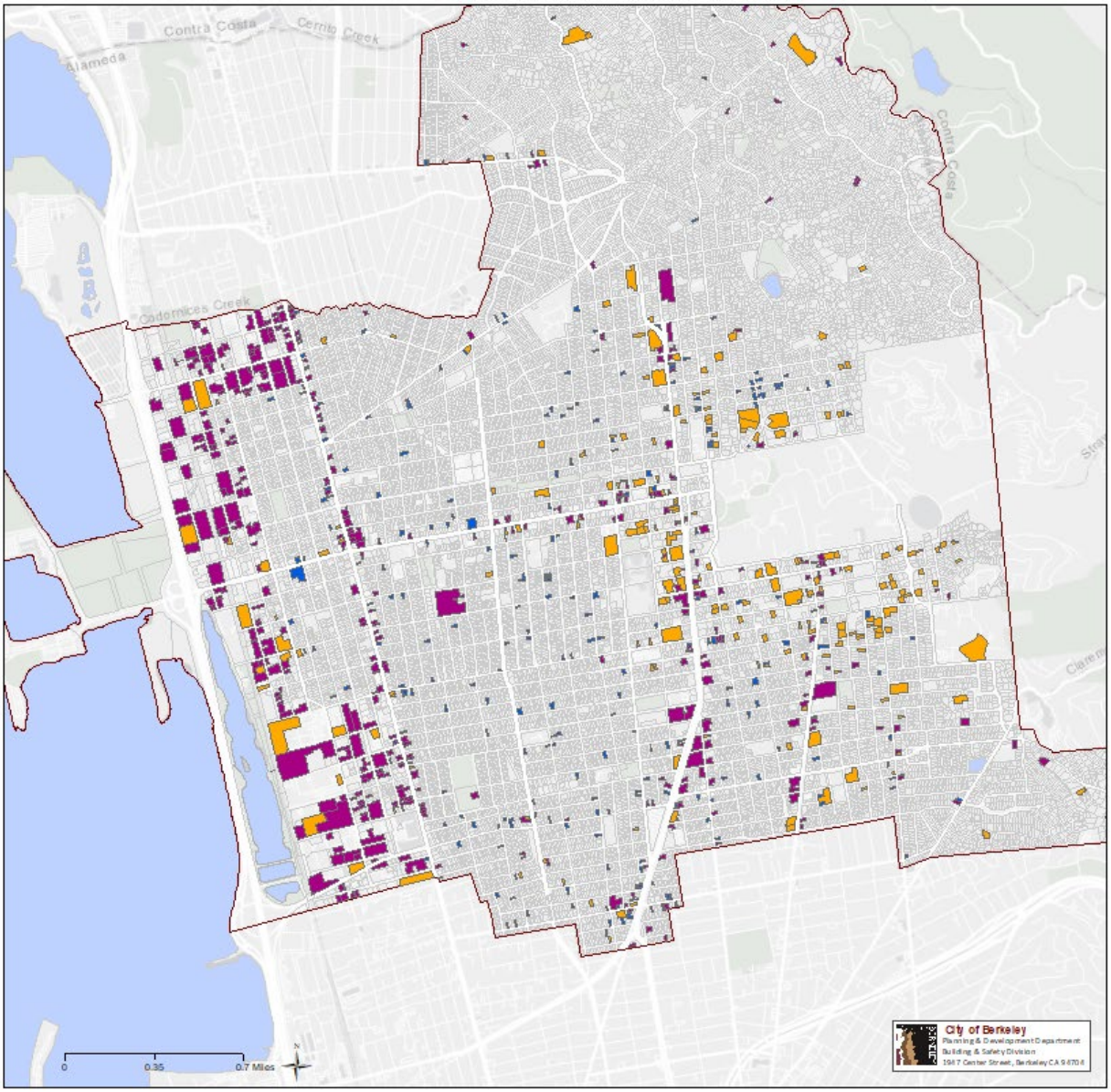
Structures

Several types of seismically vulnerable buildings are located throughout Berkeley, including wood-framed buildings with soft, weak or open front conditions (SWOF), unreinforced masonry (URM) buildings, tilt-up and other rigid wall-flexible diaphragm (RWFD) buildings, and non-ductile concrete buildings. Other wood-framed buildings with seismic deficiencies include those with inadequate anchorage to foundation and/or inadequate cripple wall bracing, multi-family “weak story” buildings, one-story open-front buildings, and buildings with unique configurations.

Map 7 shows Berkeley’s Inventory of Potentially Seismically Vulnerable buildings, developed in 2023. Potentially soft, weak or open front (SWOF) buildings are somewhat evenly spread throughout the City. Potentially non-ductile concrete buildings and rigid wall-flexible diaphragm buildings are more heavily concentrated along commercial corridors and west of San Pablo Avenue. Non-ductile concrete buildings are also

clustered in central Berkeley, and near the UC Berkeley Campus. Soft story buildings are depicted in blue, non-ductile concrete buildings in orange, rigid wall-flexible diaphragm buildings in purple, and unreinforced masonry buildings in red.

Map 7. ***Inventory of Potentially Seismically Vulnerable Buildings, 2023***



Parcel with Potentially Non-Ductile Concrete Building
Parcel with Potentially Rigid Wall-Flexible Diaphragm Building (Including Tilt-up)
Parcel with Potentially Soft Weak or Open Front Wood-Framed Building

Soft, Weak or Open Front (SWOF) Buildings

Soft story buildings are characterized as multi-story wood-frame buildings with extensive ground story openings such as windows, storefronts, garage openings, or open-air spaces such as parking. These buildings may have few perimeter or interior walls at the ground level, leading to a relatively soft or weak lateral load resisting system in this lower story.

Exhibit 6. Example soft story construction

Unreinforced Masonry (URM) Buildings

Unreinforced masonry (URM) buildings are generally constructed of brick, block, tile, stone, or other types of masonry, and were built prior to modern earthquake-resistant design. During an earthquake, unreinforced masonry walls that were originally built without adequate reinforcement (from embedded steel bars) are susceptible to collapse. In addition, URM buildings often include unreinforced masonry parapets, chimneys, and high brick veneers that tend to disconnect from the building and fall outward, creating a hazard for people below, and in some instances causing the building to collapse. Weak or nonexistent connections between the masonry walls and the floors and roofs place

occupants, pedestrians, and adjacent buildings in harm's way.

Exhibit 7. Example of unreinforced masonry construction

Rigid Wall-Flexible Diaphragm (RWFD) Buildings, Including Tilt-Up Buildings

Tilt-up or other rigid wall-flexible diaphragm building types are typically one- or two-story commercial buildings with reinforced concrete or reinforced masonry (brick or concrete block) walls. A "tilt-up" building is distinguished by its method of construction, using precast concrete walls. RWFD have "flexible" roof diaphragms that consist of wood or steel beams, trusses, or rafters with wood sheathing or metal decking above. They may also have flexible diaphragms at intermediate floor levels. These buildings commonly include warehouses, manufacturing facilities, large retail stores, and other similar structures. The most common deficiency is an inadequate connection between the rigid walls and the roof (and floors), leading walls to pull away and collapse during ground shaking.

Exhibit 8. Example of Rigid Wall-Flexible Diaphragm *Construction*

Non-Ductile Concrete Buildings

Non-ductile concrete buildings built prior to the mid-1970's and modern seismic code standards have performed very poorly in recent earthquakes, and have resulted in catastrophic collapses. In older concrete buildings, the detailing and construction of the reinforcing steel may be inadequate to safely resist large seismic forces caused by ground motions on these heavy structures. The most vulnerable buildings contain elements like columns, wall piers, and joints of beams and slabs that can fail in an earthquake. These buildings are considered "non-ductile" (i.e. brittle) concrete buildings and pose a high risk during a major earthquake. Retrofits of these buildings can vary widely in terms of scope and level of difficulty, and are often expensive to retrofit or rebuild.

Other Wood-Framed Buildings with Seismic Deficiencies

Throughout Berkeley, the most prevalent group of wood-framed buildings vulnerable to significant damage from an earthquake are those constructed prior to 1960 with inadequate cripple wall bracing and/or anchorage to the foundation, which can result in buildings sliding off supporting foundations and cripple wall collapses. These include hillside houses with increased risks of failure to cripple walls and poorly braced extra-tall

walls along the sloping sides.

Multi-family Weak-Story Buildings

In Multifamily Weak-Story buildings (3+ stories), the lowest story of the building may be vulnerable to significant damage due to high demand to-capacity ratios. Multi-family Weak Story buildings are primarily found among the areas of multi-family residential buildings to the south of UC Berkeley (Southside) and extending along College Avenue and nearby streets.

One-Story Open-Front Buildings

One-story open-front buildings, while having less mass to drive seismic response than multi-story buildings, are still anticipated to have very significant torsional response and to have potential concerns of partial or complete collapse. Single-story Open Front buildings can be found along the major commercial corridors, such as Telegraph Avenue, University Avenue, College Avenue, and similar locations.

Buildings with Unique Configurations

Buildings with unique configurations are also potentially vulnerable to an earthquake and are anticipated to be of an age that engineering for seismic loading would not have been provided at the time of construction. These buildings have been observed throughout the City's building stock.

Homes

Berkeley has about 50,046 housing units[11], serving the city's population of 124,321[12]. Most were built before 1980, meaning that few of Berkeley's homes were constructed to modern building code standards, which require earthquake-resistant structural measures,

fire-resistant materials, and landslide-resistant siting and landscaping. As described above, many people throughout Berkeley live in buildings with seismic vulnerabilities.

City-Owned Buildings

The City of Berkeley owns or leases approximately 221 buildings and structures. These facilities have multiple uses, including running City government, providing emergency services, low- income housing, and recreation. In recent years, the City has been seriously examining the risk to its buildings from disasters, particularly earthquakes. Many important City buildings have been assessed for seismic safety and, when possible, strengthened or replaced. However, additional assessments of City buildings are needed to further determine their level of vulnerability to seismic events. Some buildings' earthquake vulnerabilities may pose risks to life and/or emergency operations, including Old City Hall (2134 Martin Luther King, Jr Way) and Veterans' Memorial Building (1931 Center Street).

City-Owned Critical Response Facilities

Most of the City's critical response facilities have been strengthened or retrofitted because of their importance to continuing emergency services, as well as day-to-day operations.

The Civic Center Building's isolation system and retrofit elements were designed to provide life safety and limited repairable damage in a Design Basis Earthquake (DBE), and life safety and repairable damage in the Maximum Considered Earthquake (MCE). Although the building's base isolation system would meet the essential services standard of the 2010 California Administrative Code, the building was not built to essential services standards. The nonstructural systems and equipment in the Civic Center Building would

need to be evaluated to ensure that their support and bracing systems also meet essential services requirements. Nonstructural elements along the access path to the essential services area should also be evaluated to ensure unobstructed access to these areas in the aftermath of an earthquake.

Hospitals

There is one acute care hospital in Berkeley, Alta Bates Summit Medical Center, owned and operated by the Sutter East Bay Hospitals. The hospital has two campuses in Berkeley: Alta Bates and Herrick.

The Alta Bates campus is a full-service acute care hospital, while the Herrick campus provides acute care limited to mental health and cancer care services. Alta Bates is comprised of eight buildings used to provide acute patient care, five of which were built to pre-1973 seismic standards. These buildings are not considered a threat to life safety, but may not be functional or repairable after an earthquake.[13] The Hospital Seismic Safety Act requires these buildings to be retrofitted or replaced by 2030 to meet standards to be repairable or functional following an earthquake. Three additional buildings at Alta Bates and three at Herrick have already met this standard.[14] Four buildings at the Herrick Campus are considered to be a significant risk to life safety.[15] Acute care functions formerly housed in these buildings have been relocated into seismically compliant portion of the Herrick campus and/or to the Summit Campus.

Businesses

Businesses are vital to the economy of the city and provide jobs to city residents. Damage to commercial buildings could adversely impact business operations, increase economic

losses, disrupt supply distribution, disproportionately harm small businesses, reduce affordable commercial spaces, and slow recovery after a major earthquake. Ensuring that businesses and employers can return to normal function quickly will in turn ensure that the city recovers quickly from a disaster.

As described above, many Berkeley businesses operate from buildings with seismic vulnerabilities. Buildings of potentially non-ductile concrete construction or rigid wall-flexible diaphragm buildings have been observed along numerous commercial corridors within the city.

Systems

Berkeley's electrical, natural gas, aviation fuel, telecommunications, and potable water supply systems are not under the City's control, and are owned and managed by other quasi-governmental, private, or special district entities. Berkeley's transportation systems are managed by the City and other public entities.

All of these systems have earthquake exposure and vulnerabilities:

Electricity

Electricity is managed by Pacific Gas and Electric (PG&E). Berkeley's electricity system is almost entirely aboveground. Earthquakes can topple or break utility poles, and falling trees or collapsing structures can damage utility lines. Earthquakes can damage electrical switches and transformers in the distribution system, along with equipment at substations and transmission lines, possibly leading to systemwide loss of these utilities.

Because electrical system infrastructure exists throughout Berkeley, earthquake shaking,

liquefaction, fault rupture and earthquake-induced landslides can all damage this infrastructure both above and below the ground. This means that a major earthquake will cause significant power loss to Berkeley.

Natural gas

Natural gas is managed by PG&E. A natural gas transmission line runs the length of Berkeley (north-south direction) under Seventh Street, the area of Berkeley that is more susceptible to liquefaction. In an earthquake, if soils are shaken hard and long enough, liquefaction can occur, causing pipelines in liquefiable soils to tear apart. Underground systems are particularly prone to damage from ground failure in earthquakes and landslides. Underground damage is harder to detect and repair, and the length of service losses may be greater than for aboveground systems. Additionally, rupture compromises this lifeline unless redundant connections unaffected by the earthquake are available.

Natural gas line rupture is one of the chief causes of post-earthquake fires. Additionally, natural gas line rupture has climate implications. The main component of natural gas is methane, which is a potent greenhouse gas that is 25 times more harmful to the atmosphere over a 100-year period than carbon dioxide.[16]

Potable water

Potable water is managed by East Bay Municipal Utility District (EBMUD). EBMUD provides drinking water to approximately 1.4 million people and sewer services to 640,000 in the East Bay. EBMUD was created in 1923, and the age and extent of its system makes it particularly vulnerable to damage in earthquakes. Because the potable water system exists throughout Berkeley, its infrastructure will be subject to shaking and ground failure,

including liquefaction, surface-fault rupture, and landslide, leading to many pipeline breaks.

Sanitary sewer system

The City of Berkeley's sanitary sewer system is made up of pipelines with large diameter (six inches to 120 inches). Of the 260 miles of pipelines in the sanitary sewer system:

- 50 miles or 19% is in the Earthquake-Induced Landslide Planning Zone
- 29 miles or 11% is in the Fault Rupture Planning Zone.
- 101 miles or 39% is in the Very High, High or Moderate Liquefaction Zone.

Because the sanitary sewer system exists throughout Berkeley, its infrastructure will be subject to shaking and ground failure, including liquefaction, surface-fault rupture, and landslide.

Storm Drainage System

Areas of the city's storm drainage system are known to be extremely weak and at risk of collapse. Ground shaking, liquefaction, fault rupture and landslides as a result of an earthquake would cause significant damage to this system. If the next earthquake occurs during or shortly before a rainstorm, the city could experience significant flooding in areas that have not seen floodwaters previously.

Of the 94 miles of the storm drain system:

- 13 miles or 14% is in the Earthquake-Induced Landslide Planning Zone.
- 8 miles or 9% is in the Fault Rupture Planning Zone.

- 48 miles or 48% is in the Very High, High, or Moderate Liquefaction Zone.

Transportation systems

Transportation systems are managed by the City and other public entities, including Caltrans, Amtrak, Bay Area Rapid Transit, and Union Pacific.

- Nearly half of all City streets are have a moderate or greater exposure to liquefaction, meaning that vehicle movement throughout the city is likely to be impacted. This movement will also affect aboveground infrastructure (streets, curbs and sidewalks.)

- To Berkeley's east, 17 percent of City streets are situated in the earthquake-induced landslide planning zone. Landslides in this area could distort major and minor roads. This would make access difficult or impossible for firefighters and other emergency responders. It would also complicate evacuation for residents in the Berkeley hills.

- Fault rupture, if it occurs, could damage important east-west streets along the fault, making travel between the hills and flatland areas difficult where displacements are large. Interstate 80 is highly susceptible to earthquake-induced liquefaction and is main thoroughfare for Berkeley and the Bay Area.

Bay Area Rapid Transit District (BART) provides an important public transportation link between Berkeley, San Francisco, and other Bay Area locations to 172,000 riders daily, as of September 2023. In the 1960s, Berkeley taxpayers issued a separate tax to have the BART facilities in Berkeley (three stations and over four miles of tunnel) put underground. These tunnels are generally considered low risk by BART engineers. While the BART system is not exposed to landslide or surface-fault rupture from earthquakes, BART infrastructure in Berkeley will be subject to severe shaking and possibly to liquefaction in a catastrophic earthquake.

Telecommunications

Telecommunications are managed by a variety of private partners, including Verizon, AT&T, and Comcast, among others. Communications infrastructure is spread throughout Berkeley, and thus is exposed to all earthquake ground failure hazards.

Hazardous Materials

Hazardous materials are managed by private and public entities. The shaking and ground failure that can accompany earthquakes could cause hazardous materials release.

Following an earthquake, building structural failures, dislodging of asbestos or encapsulated asbestos, laboratory spills, transportation accidents, pipeline breaks, storage tank failures, and industrial equipment problems will be the major sources of hazardous materials release.

The City carefully tracks and regulates hazardous materials in both public and private structures through its Toxics Management Division. See the section on Hazardous Materials Release for details.

Aviation fuel

Aviation fuel is managed by Kinder Morgan, Inc. Two aviation and multipurpose pipelines run along the railroad tracks from Richmond to the Oakland Airport, through western Berkeley. These pipelines run along the Union Pacific railroad right-of-way in the western part of the city. Soils in this area are potentially susceptible to liquefaction. Rupture of these aviation fuel lines during an earthquake could spark and feed a dangerous fire.

Natural, historic, and cultural resources

Natural Resources

Parks and natural spaces are situated throughout Berkeley and may be damaged from shaking and ground failure based on their locations. Berkeley watersheds (see Floods section) and the San Francisco Bay Shoreline are vulnerable to hazardous materials release. All natural resources are vulnerable to and post-quake fire.

Historic Resources

Because historic structures were not built to meet current building and fire codes, they are especially vulnerable in earthquakes. Historic structures throughout Berkeley are vulnerable to earthquake shaking and ground failure based on their locations. All locations could be subject to hazardous materials release and post-quake fire.

Cultural Resources

Berkeley's culture comes from the people who make up the Berkeley community. Residents, businesses, and the UC Berkeley community are critical parts of Berkeley's culture and will all be impacted in a catastrophic earthquake. The Risk and Loss section below also describes impacts to natural and historical resources.

- Berkeley Resident Community: Based on experiences in large urban areas being rebuilt following disaster, planners expect that rebuilding activities will begin quickly, but will prove expensive as construction professionals around the Bay Area are overloaded with work. Owners of damaged multi-unit rental housing may not be able to rebuild affordable housing, and may choose to build condominiums or other higher-profit housing to replace the damaged structures. Many residents will discover they are underinsured for earthquake and fire damage, making it difficult or impossible for them to rebuild. Rebuilt homes, meeting modern codes and style considerations, will change the look of the city.

- Although much harder to predict, demographic shifts may also follow an upended housing market. Older homeowners may be unable or unwilling to rebuild, for

example, and young families may need to relocate, at least temporarily, to ensure the continuity of their children's education. The likely loss of older, more affordable housing stock will also change Berkeley's economic profile, creating displacement of thousands of households.

- Businesses may rebuild or may move to new, cheaper locations. Many local, independent businesses will need to make the tough decision to rebuild or close shop. Retail businesses will be affected by demographic changes after an earthquake. Businesses located in neighborhoods with significant damage will suffer as customer demand changes, even if the businesses themselves are undamaged by the earthquake.

- After a catastrophic earthquake, enrollment at UC Berkeley may slow for a few years, depending on the level of damage experienced on campus. In the unlikely but possible event of a catastrophic incident, such as significant loss of life in a residence hall or classroom building, declines in enrollment will be significant. Remaining students, currently about 30 percent of the city's population, may struggle to find affordable housing.

B.2.g Risk and Loss Estimates

No one knows what the characteristics of the next damaging quake to strike Berkeley will be. A quake could occur on any of the regional faults, be deep or shallow under the ground, and shake for a few seconds or up to nearly a minute. The degree of shaking and resulting damages will vary greatly depending on these characteristics.

Currently, there is not sufficient data or understanding of how climate change is impacting earthquakes. However, the cascading impacts from an earthquake might be more severe due to climate change. For example, areas in Berkeley might be even more susceptible to liquefaction due to sea level rise and shallow ground water rise.

Berkeley's population is expected to keep growing steadily. With more people in Berkeley, the more people are exposed to the catastrophic earthquake risk and the greater potential for impacts and losses. With population and housing demands, Berkeley has regular new development. Current building standards are high, resulting in safer structures that will

suffer minimal damage. High housing costs and insufficient supply of low-income housing today means that after a catastrophic earthquake, there will be even greater levels of homelessness and displacement.

FEMA developed the Hazards US (HAZUS) software to help estimate the consequences of different earthquake scenarios. HAZUS runs a computer model of a hypothetical earthquake, defining the earthquake's magnitude, epicenter location, rupture mechanism and time of day. Using this information, HAZUS estimates losses for that particular earthquake. **These theoretical losses will not exactly predict the actual damage of the scenario earthquake.** Instead, they provide reasonable data to help guide earthquake readiness activities.

Scenario Predictions

This section references three different HAZUS analyses:

- For the 2004 version of this plan, a magnitude 6.9 scenario earthquake on the Hayward fault underneath Berkeley was simulated using HAZUS.[17] In 2014, these loss estimates were combined with impact descriptions from newer HAZUS scenarios for a larger earthquake.[18] Because Berkeley's increased population and density since 2004, it is likely that these predictions underestimate the impacts and associated costs of such an event.

- For the HayWired Earthquake Scenario, a magnitude 7.0 scenario earthquake on the Hayward fault epicenter in Oakland was simulated using HAZUS. Predictions from this scenario consider all losses across the Bay Area, not just those in Berkeley specifically.

- Together, these HAZUS analyses create a broad picture of the impact to Berkeley and the Bay Area overall from a catastrophic earthquake:

People

- One hundred people in Berkeley could be killed by this earthquake. Fifty more will

be in critical condition requiring urgent medical care. Three hundred additional people will need hospitalization and 1,000 people will require first aid.

- From 3,000 to 12,000 households will be displaced from their homes after the quake. 200 more households will be forced to leave their homes due to fire damage. These numbers combined represent up to one quarter of households in Berkeley. One thousand to 4,000 of those households will seek temporary shelter provided by the City and the Red Cross. The remainder may stay with friends, relatives or in hotels.

Structures

- Over $2 billion[19] of building damage could occur in Berkeley. Commercial corridors will see damage to URM buildings. Damage to tilt-up buildings will impact businesses in the western area of the city. Soft-story buildings, which are situated throughout Berkeley, will be damaged. 620 buildings will be completely destroyed. 21,000 more will have slight to moderate damage, primarily residential structures.

- Low-income and student populations disproportionately live in soft-story multi-unit apartment buildings, older buildings with weak foundations, and other vulnerable types of structures. Much of the damage to residential structures will occur in housing for these populations.

- Following the earthquake, the city will need to remove and dispose of up to 570 tons of debris, consisting of building materials, personal property, and sediment will be generated by the earthquake.

- In the first day following the earthquake[20], fires could ignite in six to twelve[21] different locations around the city. Outside fire departments may not be able to provide mutual aid. Emergency personnel will be stretched thin fighting these fires and may need to use a temporary, aboveground water supply system to pump water from the Bay. Fire could burn for hours or days in a worst-case scenario. Post-earthquake fires could add $40 to $80 million[22] of damage to structures in Berkeley.

Systems

- Electricity: Immediately following the earthquake, 29,000 homes, more than 60% of Berkeley households, will be without electricity. Power will be down for days to a week.

- Natural Gas: The HayWired Scenario provides estimates for restoration of natural gas in the City of Oakland, to Berkeley's south. HayWired estimates that fifty percent of Oakland buildings will have service restored within 10 days of the quake,

and 90 percent will have service restored after 36 days.

- Water: EBMUD's 4,162 miles of pipe suffer about 1,800 breaks and 3,900 leaks during the earthquake sequence. The average EBMUD customer would be without water for 6 weeks, some for as many as 6 months.[23]

- Sewer: Interceptors (large sewer pipes) will suffer major damage following an earthquake. Loss of electrical power will render pumping plants unusable, causing sewage backups and spills through the street access holes, posing potential public health concerns. Open trenches may be necessary to carry sewage for short distances. Sewer pipeline breaks may cause "sinkholes" that undermine roads and buildings.

- Highways: In Oakland, Highways 580, 880, 980, and 24, where they form the MacArthur Maze, a complex of elevated interchange structures, are built on liquefiable soils. Closure of sections of the Maze due to inspection or damage will restrict access into and throughout areas of need in the East Bay.

- BART: BART could be damaged in neighboring cities on all sides, shutting off a major mode of public transit to San Francisco, Oakland and other destinations. The BART Berkeley Hills Tunnel which crosses the Hayward fault would be damaged in a major earthquake on that fault, cutting a key commuting link. Additional ferries and bus lines could be established within a week to provide substitutes for BART.

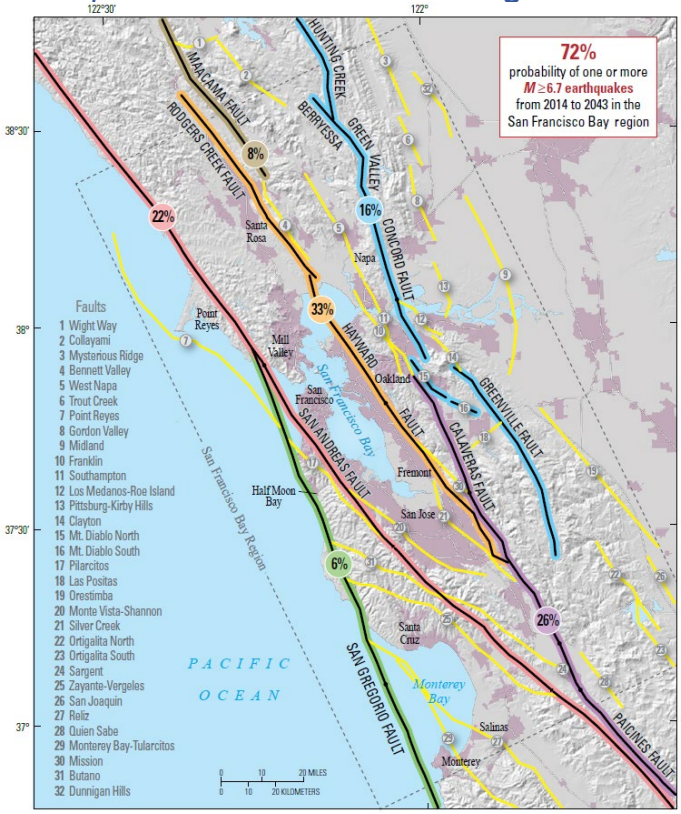
- Communications: Communications systems, particularly telephone networks, will sustain damage that reduces capacity. Power outages will reduce functionality in situations when the outages last longer than the performance of battery backup and maybe even generator refueling. Congestion will also reduce functionality to a great degree, for several hours or more.[24]

- Business closures: Additional losses to income will likely occur due to Berkeley business closures, estimated at $357 million.[25]

GFOA Analysis

Berkeley is susceptible to earthquake risk. Map 8 provides a map of major fault lines in the region.

Map 8. ***Known Active Geologic Faults***



To address earthquakes, we obtained a data set of simulated earthquakes from Aon for the Contra Costa and Alameda County area. The simulation includes projected economic losses for earthquakes. We then scaled these losses to Berkeley by comparing Berkeley's share of total property value to the rest of the two-county area. Berkeley comprises about 4% of the total property value, so we assumed Berkeley would experience about 4% of the economic losses from a given quake. We also set a limiter in our model to only address quakes above a 6.0 in magnitude. In the USGS report that Exhibit 3 came from describes the potential damage of a 6.0 quake as "light" so earthquakes below that might not cause a material amount of economic loss. That said, our model does provide the ability to manually adjust the threshold downward to include other quakes.

Exhibit 9. Provides a loss exceedance curve for ten years and 1 year, showing total economic losses for Berkeley.

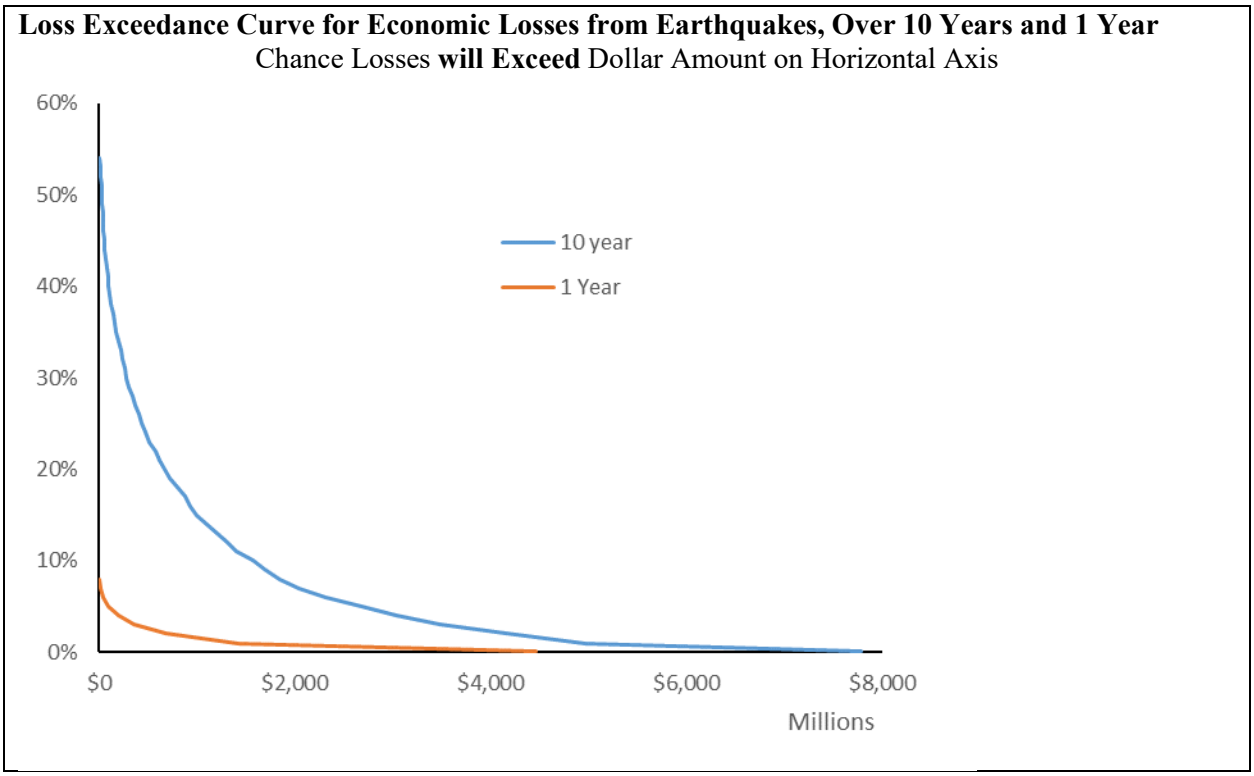


Table 2. *Chance that Economic Losses Will Exceed Dollar Amounts (Millions)**

Time Horizon	5%	10%	50%	90%
1-Year	$89M	NA	NA	NA
10-Year	$2,700M	$1,600M	$24M	NA

*Not Applicable (NA) means that the loss exceedance curve intersects zero before this point. See the graph to see where the curve meets the vertical axis for the chance of losses exceeding zero.

B.3 Wildland Urban Interface Fire

B.3.a Description of Wildland Urban Interface Fire and Related Hazards

Fire has always been a natural part of the California and East Bay wildland ecosystem. Fire has historically been a way to maintain forest health, control invasive species, and to provide a rich habitat for wildlife. In Berkeley, densely-built homes and vegetation have been introduced to hillside areas that otherwise required burning to maintain ecological balance. For many years people have tried to prevent fire in forests and developed areas, disrupting this balance. As a result, catastrophic fires are now occurring throughout the Bay Area and the world.

There are two primary types of wildfire: “wildland” fire and “wildland-urban interface” (WUI) fire. WUI fires, the primary concern in Berkeley, occur where the natural landscape and urban-built environment meet or intermix. It is especially difficult to control a fire in the wildland-urban interface, where homes and other infrastructure are close to and within wildland areas.

Ignition

WUI fires can be sparked by both human activity and natural causes. Human activity examples include power lines, sparks from campfires, fireworks, cigarettes, and arson. The only natural cause of wildfire is lightning strikes. In a study of wildfires of the United States from 1992 to 2015, human-caused wildfires accounted for 97% of the residential homes threatened (within 1 km of a wildfire) and nearly a third of suppression costs.[26] This study also shows that the WUI, which accounts for only a small portion of U.S. land

area (10%), hosts a major portion of fires, as these fires are almost exclusively human-started.

Spread

Low humidity and high sustained winds create the most dangerous conditions for wildfire spread. While WUI fires can occur at any time of the year, they are especially dangerous in fall when the landscape and vegetation are dry, and strong, hot, dry offshore winds further desiccate vegetation and can push a fire down or up a slope with amazing speed. Under these conditions, traditional firefighting becomes far more difficult.

Connection to climate change

Climate change is resulting in longer and drier summer conditions leading to wildfires of greater frequency and duration. Increased drought conditions cause fuels to become extremely dry and more fire prone. Additionally, climate change causes more frequent bouts of extreme weather, including low humidity and high winds associated with fire weather.

Connection to earthquakes

Earthquakes often spark fires, fueled by damaged gas or power lines. Damage to water pipes from earthquake shaking or ground failure can limit fire suppression. This sequence of events could grow into a firestorm, threatening neighboring jurisdictions. For information on Fire Following Earthquakes, see the Earthquake Section.

Connection to poor air quality

Air pollution from fires both in Berkeley and throughout the region can cause eye and

respiratory illnesses, and can exacerbate asthma, allergies, chronic obstructive pulmonary disease, and other cardiovascular diseases. For more information see the Poor Air Quality Section.

Connection to landslides and flooding

WUI fires can increase an area's risk of landslide. When all supporting vegetation is burned away, hillsides become destabilized and prone to erosion. The charred surface of the earth is hard and absorbs less water. Winter rains in burned areas lead to increased runoff, erosion and landslides in hilly areas. Erosion and land slippage subsequent to fires can lead to temporary or permanent displacement and property damage or loss,[27] [28] making erosion a secondary hazard that must be mitigated immediately after a fire.

Connection to power outage

Fire is related to power outage in two ways: preemptive power shutoff by utilities, or event-caused outages when fires damage power infrastructure.

Pacific Gas & Electric, Berkeley's electric utility, uses two approaches to preemptively cut power to reduce the likelihood of fire ignition. The first, Public Safety Power Shutoffs, involves preemptive cuts to power on specific power lines during times of high fire threat. See the Utility Outage section to learn more. Another PG&E approach is Enhanced Powerline Safety Settings (EPSS), which allow power lines to automatically turn off power within one-tenth of a second when there is a hazard, such as a tree branch falling into a power line. Some PG&E equipment in the Berkeley Hills areas have EPSS protection. According to PG&E, in 2022 there was a 68% reduction in ignitions on EPSS-enabled powerlines.

Loss of power can lead to many cascading and significant consequences, such as impacts to vulnerable infrastructure, inability to operate fuel and water systems that require electricity, communication and service disruptions, loss of heating or cooling, and loss of critical functions for people who rely on power for survival. Locations of Wildland Urban Interface Fire

Berkeley is most vulnerable to a wind-driven fire incident originating in an area adjacent to the City's eastern border, in land owned by UC Berkeley, the Lawrence Berkeley National Lab, the East Bay Regional Park District, the City of Oakland, or Contra Costa County.

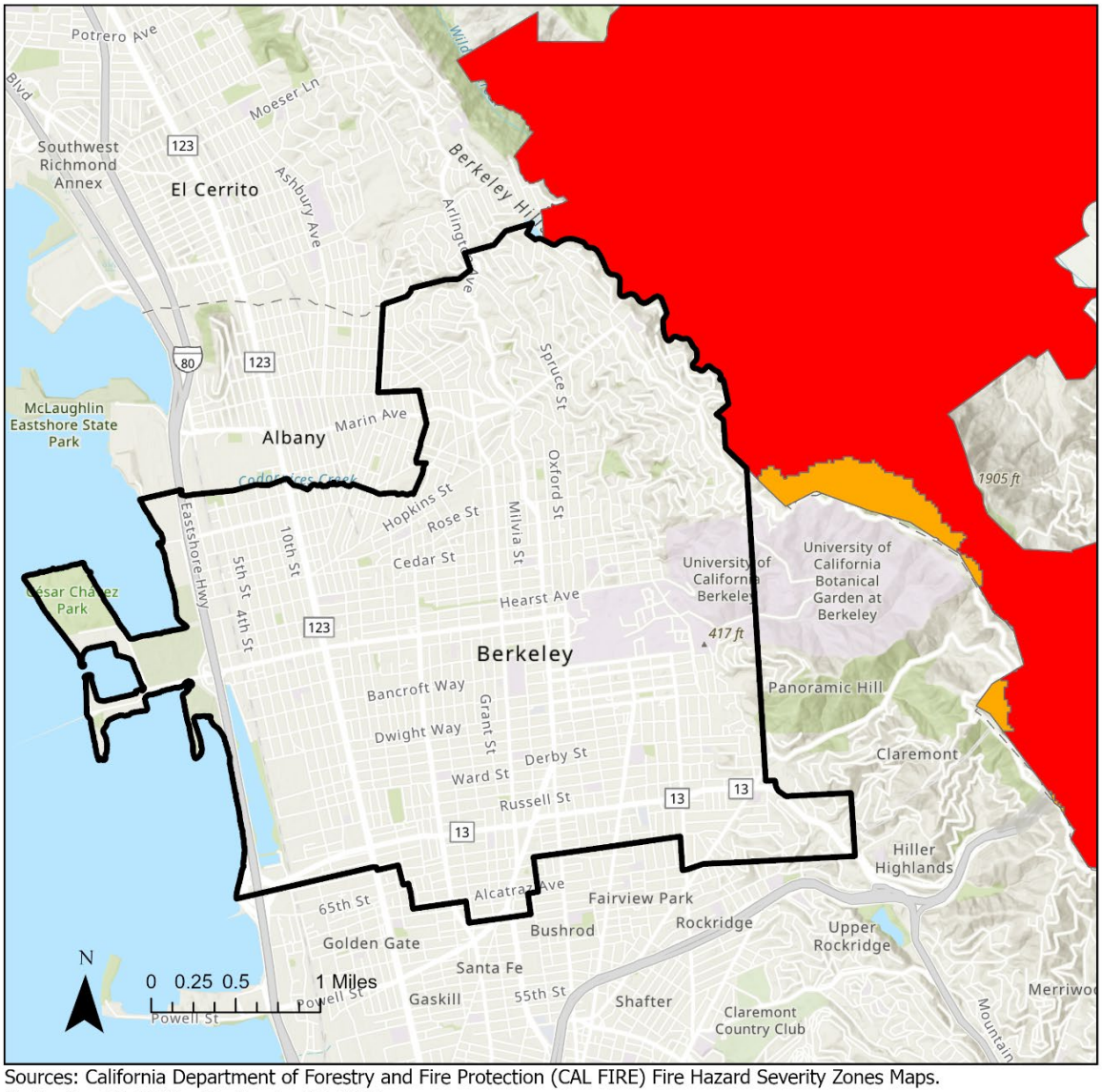
B.3.b Locations of WUI Fires and Related Hazards

Fire Hazard Severity Zones

Map 9 presents the State's Very High and High Fire Hazard Severity Zones. The State Fire Marshal is mandated to classify lands within State Responsibility Areas into Fire Hazard Severity Zones (FHSZ). Fire Hazard Severity Zones fall into one of the following classifications: Moderate, High, and Very High.

As shown in Map 9, the lands to Berkeley's east are almost uniformly the highest hazard classification, shown in in red and orange to the east of Berkley's border.

Map 9. ***Fire Hazard Severity Zones in State Responsibility Area, 2024***



Sources: California Department of Forestry and Fire Protection (CAL FIRE) Fire Hazard Severity Zones Maps. September 29, 2023, effective April 1, 2024.

Esri, NASA, NGA, USGS, California State Parks, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA, USFWS

Fire Hazard Severity Zones
in State Responsibility Area

- Moderate
- High
- Very High

The WUI fire risk facing Berkeley's wildland-urban interface area is compounded by the area's mountainous topography, dense fuel loads, constrained access and egress routes, and its location, overlaid upon the Hayward Fault.

Since before the 1920s, the City of Berkeley has established and adjusted fire zones in Berkeley. While the zones were initially established to address urban fire issues, they have evolved to designate the City's WUI fire hazard. These maps are now linked to the State Fire Marshal's work to classify fire hazards. In addition to the fire hazard map of State lands, shown in Map 9, the State Fire Marshal is also mandated to recommend maps of Very High Fire Hazard Severity Zones in Local Responsibility Areas, including the City of Berkeley.

Following receipt of the State recommendation of very high fire hazard severity zones, the City of Berkeley further interprets the hazard and has divided the city into Fire Zones 1, 2, and 3, designated in order of ascending fire risk. These zone boundaries are adopted by the City Council, along with the Fire Code. These zones are shown in Map 10.

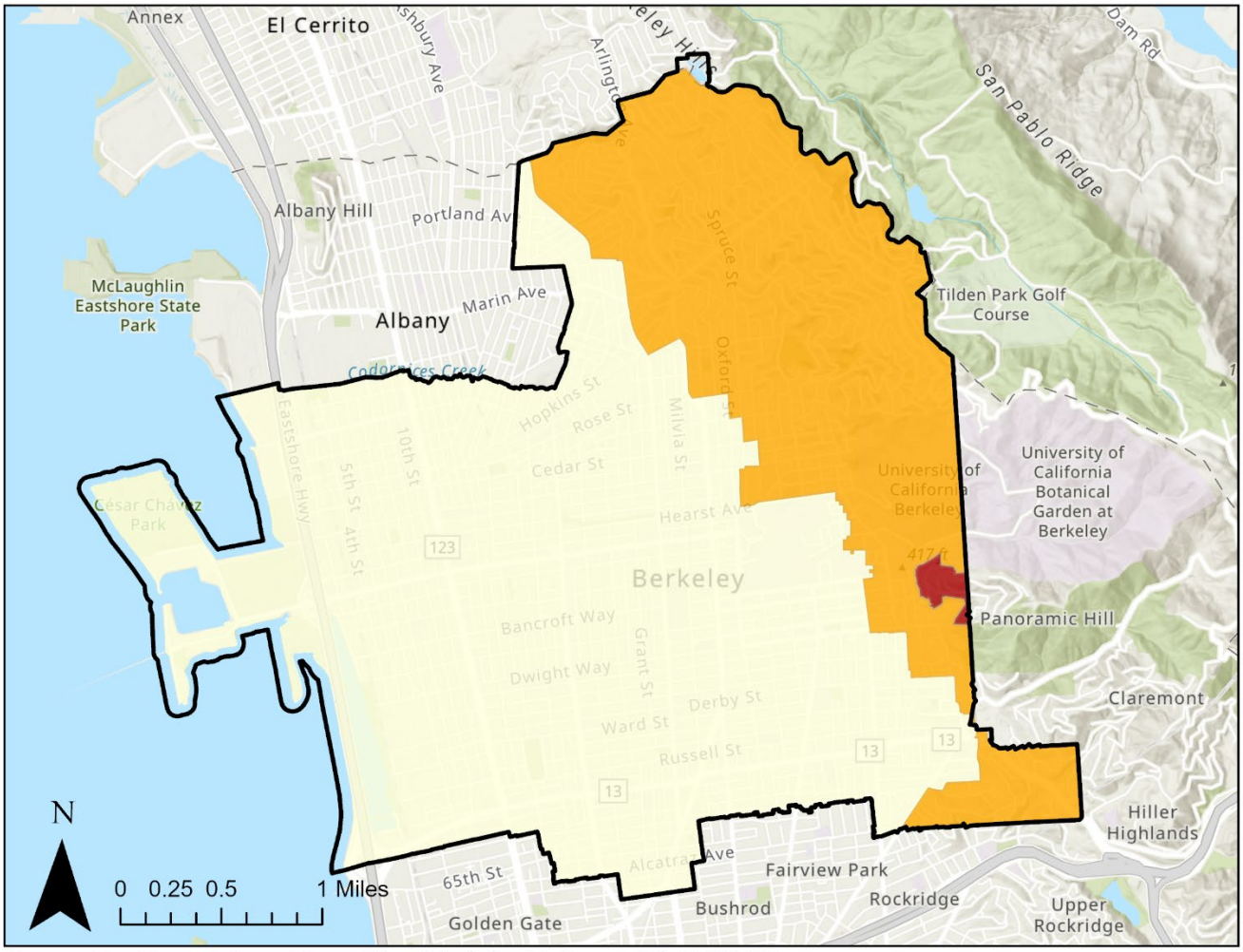
Map 10 shows Fire Zone 3, the Panoramic Hill area, colored in dark red. Fire Zone 2, colored in bright red, covers the remainder of the city's eastern hills up to the northern border. Fire Zone 1, with yellow coloring, covers the rest of Berkeley west of the hills.

Fire Zones 2 and 3 currently include 8,603 parcels with 32,109 residents. These zones have the strictest fire prevention standards in the City for issues such as building materials for new structures. The City also enforces vegetation management measures in these areas to create defensible space around homes.

Fire Zone 3, known as Panoramic Hill, has the greatest WUI fire vulnerability. Panoramic Hill includes areas in both Berkeley and Oakland. In the Berkeley part, there are about 277 parcels, with 989 units in 261 buildings and 2,591 residents. The Hill's minimal access and egress routes, and its exposure to fault rupture further exacerbate the area's WUI fire risk above that of Fire Zone 2.

While much of the concern for fire is placed on the Berkeley hills (Fire Zone 2 and 3), Berkeley's flatlands (Fire Zone 1) are at risk as well. The flatlands are densely covered with old wooden buildings, most not built to modern fire-resistant code. They also have a high risk of damage in an earthquake, which could spark multiple fire ignitions, for example, by damaging gas or electric lines.

Map 10. ***City of Berkeley Fire Zones, 2024***



Source: Fire Zones 1, 2, and 3 per City of Berkeley Ordinance NO. 7.157-NS.

Esri, NASA, NGA, USGS, California State Parks, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA, USFWS

Legend

- City of Berkeley Boundary
- Berkeley Fire Zone 1
- Berkeley Fire Zone 2
- Berkeley Fire Zone 3

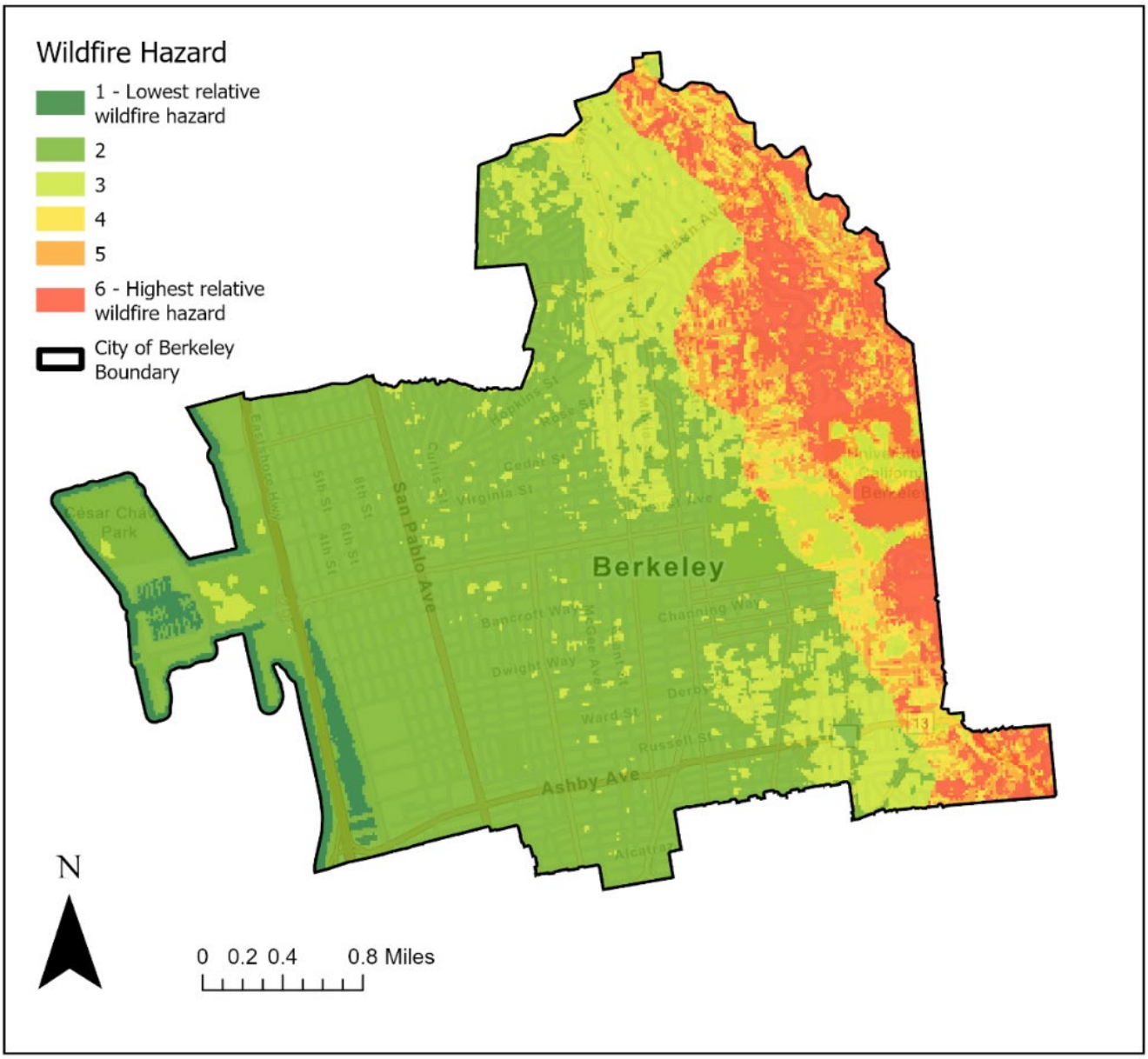
Wildfire Hazard Ratings

New data and modeling from Tukman Geospatial prepared for East Bay Regional Parks have characterized the relative wildfire hazard for Alameda and Contra Costa counties,[29] considering estimates from 2017-2022 for conditions including extreme fire weather potential, ember load, suppression difficulty, vegetation (or lack thereof), past fire ignitions, and proximity to human development and power lines.

Map 11 shows this data for Berkeley: the highest relative wildfire hazard (classes 4, 5, and 6) is in the eastern part of the city in yellow, orange, and red. Lower relative wildfire hazard is show in light and darker greens (classes 1, 2, and 3) in the flatlands and along the Bay.

Although the Berkeley flatlands are presented as having the lowest wildfire hazard, researchers were careful to classify this hazard levels as “relative.” An area with lower relative wildfire hazard does not have no risk, it simply means that it has less risk than other areas. Researchers also noted that this data does not account for home-to-home ignitions common in dense urban areas. This means the analysis likely underrepresents the wildfire hazard in Berkeley.

Map 11. ***Wildfire Hazard Map for Fire Prevention Planning, 2020***



Sources: 2020 Alameda and Contra Costa County Wildfire Risk to Structures and Wildfire Hazard Maps for Fire Prevention Planning, East Bay Regional Parks, et al.
California State Parks, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA, USFWS

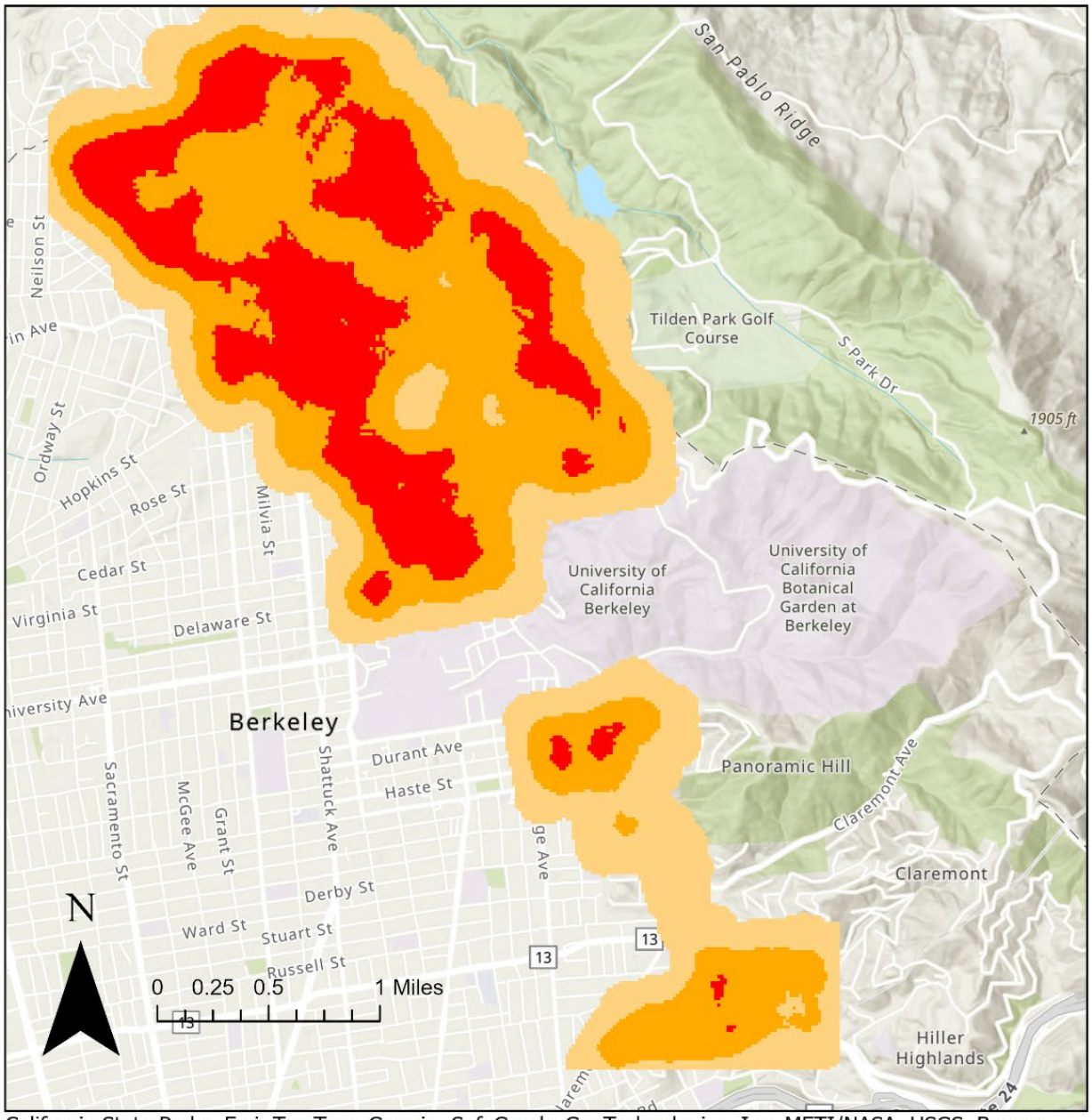
Structure Density

Increased structure density exacerbates wildland-urban interface fire risk. The rate of structure-to-structure ignitions increases when there are more structures per acre.

The National Institute of Standards and Technology (NIST) characterizes high structural density of wildland urban interface areas as more than 2 structures per acre.[30] Map 12 shows that most areas of the Berkeley hills have at least 2 structures per acre, considered high density and shown in dark orange. Further, areas in red, concentrated in the north Berkeley hills and a bit around Panoramic Hill, are the highest housing density in Berkeley with more than four structures per acre. Areas in orange have high housing density in the Berkeley hills with greater than two structures per acre. Areas in light orange have medium housing density with one or fewer structures per acre.

Map 12 demonstrates that the density of Berkeley's hills areas will be a critical factor in fire spread.

Map 12. ***Density of Structures in Berkeley Fire Zones 2 and 3, 2024***



California State Parks, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA, USFWS, Esri, NASA, NGA, USGS, FEMA

Structure density per acre

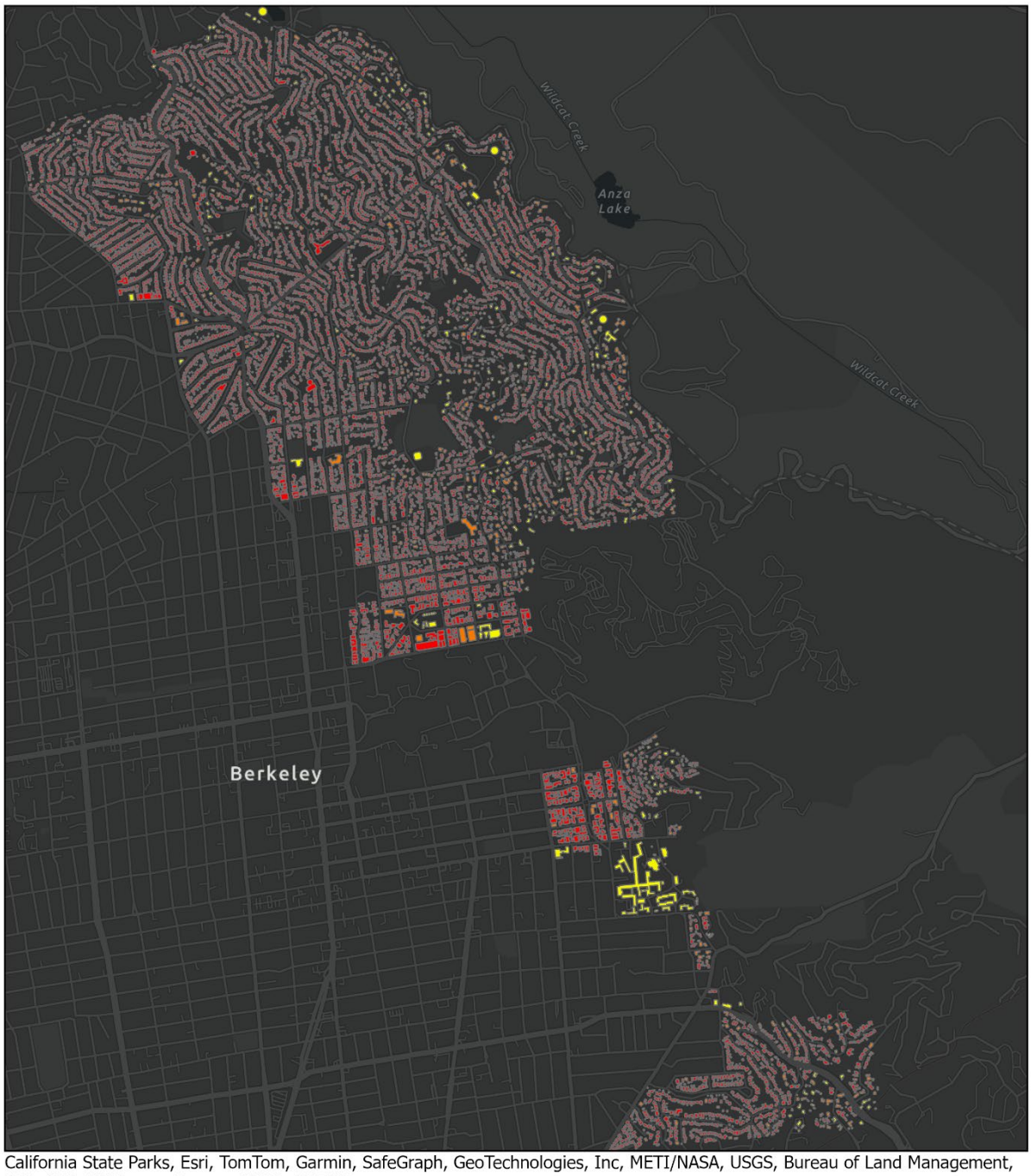
- 0.001 - 2
- 2.001 - 4
- Greater than 4

Structure Separation

Another critical element that helps characterize wildland-urban interface fire risk in Berkeley is the minimal separation between structures. Structures that are less than 25 feet apart are at extreme risk of directly spreading fire to one another, in a process called "structure-to-structure ignition." Fires in denser areas will have high rates of structure-to-structure ignition and high risk of losses.

Map 13 shows the distances between structures in Fire Zones 2 and 3. Structures with a separation distance of less than 25 feet are in red. Structures with a separation distance of 25 to 50 feet are in orange. Structures with a separation distance of greater than 50 feet are in yellow. In Berkeley many structures are less than 25 feet apart, which places the community in the highest risk category.[31] Map 13 demonstrates this risk with the predominantly red coloring in Fire Zones 2 and 3. There are some orange and yellow structures sprinkled throughout Fire Zones 2 and 3, most often on the edges of the boundaries. The greatest patch of yellow structures is near the Claremont Canyon Regional Preserve on the Clark Kerr Campus of the University of California – Berkeley.

Map 13. ***Distance Between Structures in Berkeley Fire Zones 2 and 3, 2024***



California State Parks, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, US Census Bureau, USDA, USFWS

N

0 0.25 0.5 1 Miles

Distance Between Structures

- 0 to 25 Feet
- 25 to 50 Feet
- Greater than 50 Feet

Hazardous Vegetation

Certain plant species, including native and non-native species, have characteristics that make them ignite readily and burn intensely contributing to wildfire risk. Characteristics may include being biologically prone to burn due to chemical composition, being difficult to maintain in a fire-resistant state, presenting challenges to routine maintenance, having high surface area to volume ratio, or being prone to rapid changes in moisture content in response to environmental conditions. While these characteristics make some plants more fire-hazardous, all plants can burn if they are dead, poorly maintained, or drought stressed.[32]

Historically, the East Bay Hills ecosystem burned regularly. Researchers have proposed that under indigenous land management, fires due to both natural and anthropogenic ignitions occurred every 5-15 years.[33] Fire is this ecosystem's natural way of clearing dead vegetation and maintaining forest health. Many California native plant species present in the East Bay Hills also need fire in order to reproduce.

Living in a fire-prone area means taking steps to mitigate risks while also recognizing that it's infeasible to remove all of our vegetation. The mere presence of a certain fire hazardous species does not always mean it must be removed. Other factors, such as maintenance and placement, are more important than the plant itself. For property owners thinking about their own landscaping, it's great to focus on California native or other pollinator friendly plants that require little water and are easy to maintain. However, "There are no published fire-wise or fire-resistant plant lists that are science based or peer reviewed. Design and maintenance are more important than plant selection."[34]

To protect life and property, the Berkeley Fire Department inspects all properties in the Very High Fire Danger Severity Zone for Defensible Space, which is the buffer created between a structure on your property and the grass, trees, shrubs, or other vegetation that surrounds it. This may include the removal of certain vegetation within 100 feet from any structure. These mitigation measures, along with home hardening, are the scientifically validated actions that have the most impact on reducing the ignition potential of homes. Failure to comply with recommendations results in citations and fines.

The City, often in collaboration with regional partners, works to remove and or clean up the understory of hazardous trees that are likely to burn and potentially impact people and infrastructure. For more information on these programs, review Element C: Mitigation Strategy.

Berkeley Overnight Camps

Since the 1920s, the City of Berkeley has operated three resident camps outside of the city limits: Echo Lake Camp, Berkeley Tuolumne Camp, and Cazadero Camp. The City owns the property at Cazadero and holds 30-year lease agreements with the United States Forest Service at Echo Lake Camp and Berkeley Tuolumne Camp. All three camps face significant wildfire risk because of their locations, topography, and dense fuel loads. Two of the three camps have experienced federally-declared fires in the last 12 years. See the section “Fires at Berkeley’s offsite overnight camps” for details.

Echo Lake Camp

The City of Berkeley has operated Echo Lake Camp since 1923. It is located on a ridge

in the El Dorado National Forest a 15-minute walk from Echo Lake. The Camp provides a comfortable experience for family and youth campers boasting a view of Lake Tahoe, a swimming pool, delicious meals, archery, arts and crafts and easy access to miles of hiking trails.

Berkeley Tuolumne Camp

Berkeley Tuolumne Camp, located in Tuolumne County just outside of Yosemite National Park, has been operated by the City of Berkeley since 1922. Primarily operated as a family camp, it has also offered programs for teen leadership, special needs populations, seniors and private group rental opportunities.

Cazadero Camp

The City of Berkeley has owned Cazadero Camp in Sonoma County since 1927. The 33-acre Cazadero Camp has been operated as a music camp for the past 60 years. In 2021, the City extended the Cazadero Performing Arts Camp's lease for another 25 years. The Camp provides a dynamic music education program for young musicians ages 10-18 including both summer camp music programs and JumpStart in Music, a low-cost weekend camp for school music programs.

B.3.c Extent of Wildland Urban Interface Fire and Anticipated Intensities

The extent and intensity of a WUI fire is closely tied to weather conditions and fuel moisture. Fires that ignite under periodic conditions of "Red Flag Warning" or "Extreme Fire Weather" may result in uncontrollable firestorms.

Red Flag Warning

The National Weather Service declares a "Red Flag Warning" when low humidity and high winds combine to elevate fire risk. In Berkeley, "Red Flag" weather generally presents as strong, hot, dry offshore winds (technically called "foehn" winds). These winds are known locally as "Diablo Winds" since they come from the north or northeast in the direction of Mount Diablo. "Diablo Winds" carry extremely dry air at high velocity, so they can quickly desiccate vegetation and other flammable materials and can push a fire down or up a slope with impressive speed.

Extreme Fire Weather

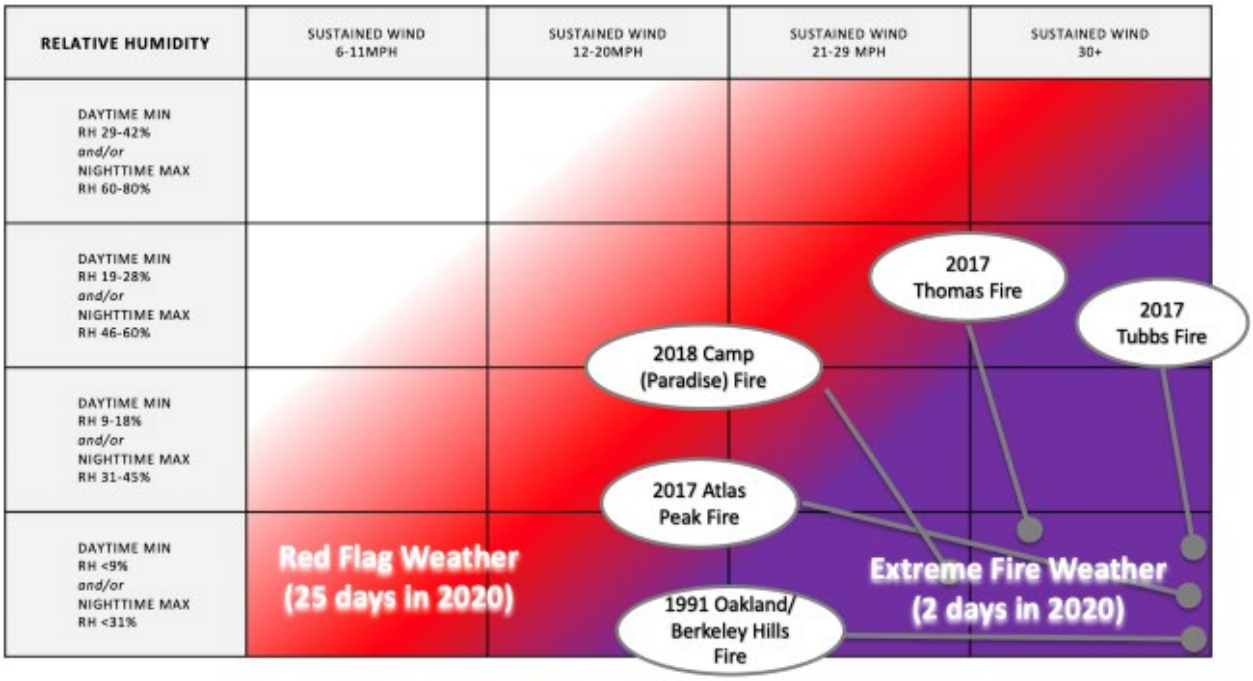
The Berkeley Fire Department has introduced the "Extreme Fire Weather" designation for

extremely windy and dry conditions, under which many catastrophic California wildfires have occurred. Under Extreme Fire Weather, fires spread at extraordinary speeds and ember storms can ignite spot fires far ahead of the main flame front. These ember storms are also the primary cause of home ignitions.

Extreme Fire Weather forecasts are far more rare than Red Flag Warnings. Berkeley's last forecasted Extreme Fire Weather was for two days in 2020. In the same year, Berkeley was forecast to have 25 days under Red Flag Warning.

Although Extreme Fire Weather is still relatively rare, these weather conditions are associated with catastrophic fires. Exhibit 1 shows Red Flag conditions and Extreme Fire Weather conditions. Relative humidity is on the Y axis. Sustained winds are on the X axis. As wind speeds increase and humidity decreases, conditions change first to Red Flag Weather and next to Extreme Fire Weather. The chart identifies five catastrophic fires that ignited under extreme fire weather conditions (all with very low relative humidity and most with sustained winds of 30+ mph). These fires are: the 2017 Atlas Peak Fire, the 2018 Camp (Paradise) Fire, the 2017 Thomas Fire, the 2017 Tubbs Fire, and the 1991 Tunnel Fire, which impacted Oakland and Berkeley. Based on reported conditions it is likely that the 2023 Maui Wildfire also started under Extreme Fire Weather conditions.

Exhibit 10. Graphic X: Red Flag Weather, Extreme Fire Weather, and Catastrophic Fires



Fires that ignite during Red Flag Weather or Extreme Fire Weather can be difficult to contain. A WUI fire can move with devastating speed. In the 2018 North Bay Fires, the fire burned the equivalent of a football field every second.[35]

During Extreme Fire Weather, when a fire builds to this magnitude and travels with such extreme speed and force, firefighters' primary focus often shifts from firefighting to supporting evacuations. This is because during this type of weather, some normally-available firefighting tools can be ineffective or even unusable – like planes and helicopters, which need to be grounded during high winds.

The Berkeley Hills have narrow, windy roads that make evacuation difficult, which is why the Berkeley Fire Department recommends that people leave the hills during Extreme Fire Weather.

While the ignition risk is highest in the Berkeley Hills, a wind-driven fire under Extreme Fire Weather can blow through the Berkeley flats, all the way to the Bay.

B.3.d Previous Wildland Urban Interface Fire Events

Catastrophic fires have occurred in the greater Bay Area in 2017, 2018, 2019, 2020, 2021, and 2022. Berkeley itself has significant WUI fire history, including the 2017 Grizzly Fire, the 1991 Tunnel Fire, and the 1923 Berkeley Fire. However, there have been no federally-declared wildfire disasters in Berkeley since the last update.

2017 Grizzly Fire

On August 5, 2017 a fire burned approximately 20 acres in the Berkeley and Oakland hills along Grizzly Peak Boulevard just north of South Park Drive. Nine agencies responded to the fire, with 150-200 firefighters working many hours to extinguish it. The suspected cause of this fire was arson.[36]

1991 Tunnel Fire

This fire in the Oakland/Berkeley hills started the day before as a vegetation fire in the drought-dried hills east of Oakland. It reignited and was whipped into firestorm proportions by 20-30 mph winds, gusting to 60 mph. In minutes, the fire spread to residential structures. While the fire burned a greater area in Oakland, it raged across city boundaries between Oakland and Berkeley, destroying entire neighborhoods in both cities and remaining out of control for more than 48 hours. 25 people died in this fire, most of them while trying to evacuate. This fire received a federal Major Disaster Declaration on October 22, 1991.

1923 Berkeley Fire

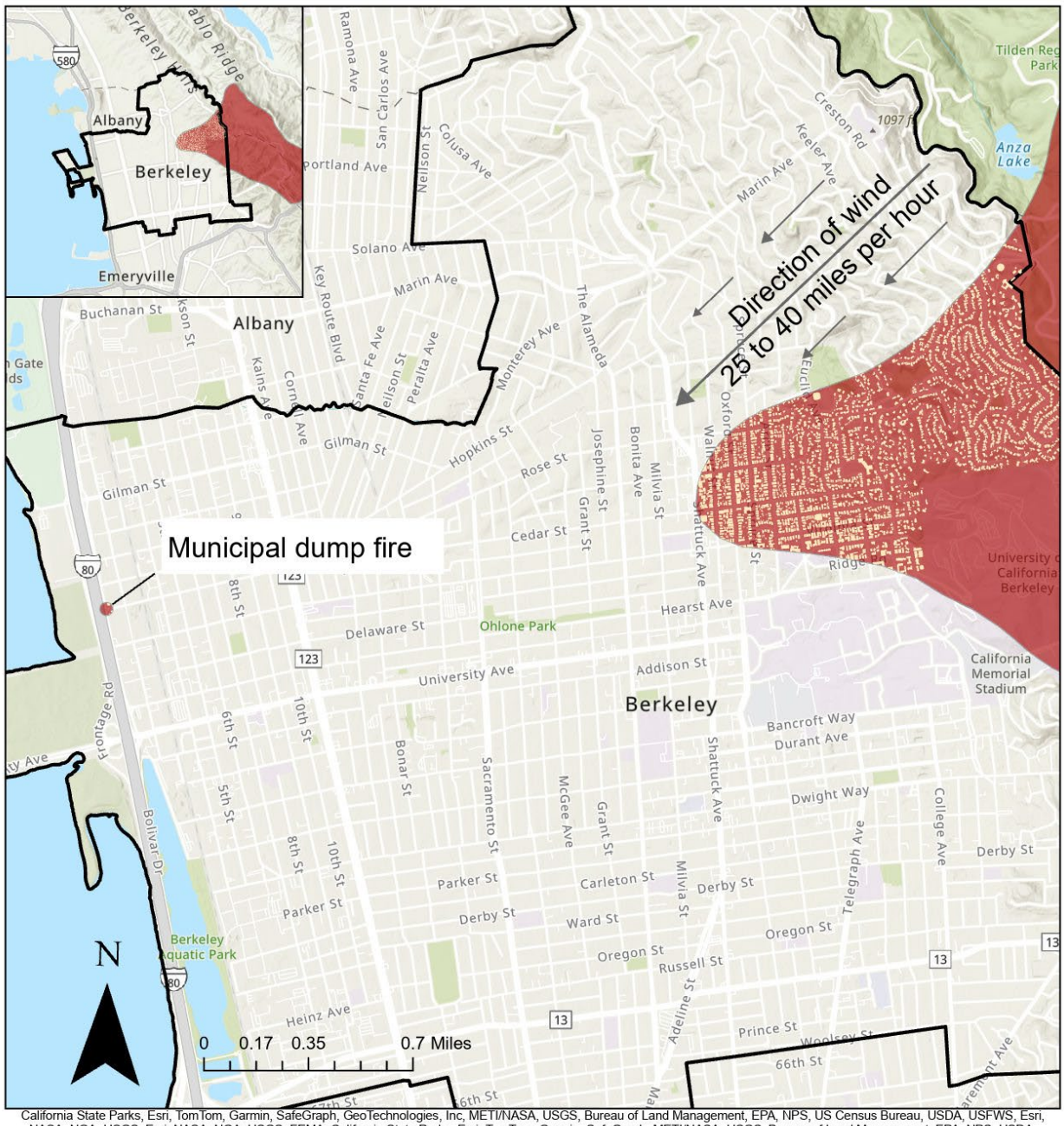
The Berkeley Fire of 1923 began in the open lands of Wildcat Canyon to the northeast and, swept by hot September Diablo winds, penetrated residential north Berkeley. The fire burned downhill all the way to Shattuck Avenue in central Berkeley. A total of 130 built-up acres were burned, and about 4,000 people were made homeless. After this devastating fire, officials stated that the only reason that the fire stopped spreading was because the northeast wind stopped and the damp western wind took over. Fire officials at the time were certain that if the northeast wind had not stopped, the buildings would have burned all the way to the bay in Berkeley, and the fire would have devastated Emeryville and moved south and west into Oakland.[37]

The fire destroyed 584 structures, including homes, apartments, fraternities and sororities, a church, a fire station and a library. Wood shake roofs are cited as a large contributing factor in the spread of this fire.

Map 14 depicts in red the area burned by the 1923 fire, which stretches from East Bay Regional Parks to Shattuck Avenue. It also overlays the Diablo wind pattern indicated by black arrows to demonstrate how the fire could have spread into the Berkeley flatlands even more, if the wind direction had not changed. According to San Francisco Fire Department records, San Francisco sent engine companies to respond, reporting that one of the San Francisco engine companies “helped control a fire at the municipal dumps at the foot of Cedar Street.”[38] This indicates that there was a fire on the western edge of the City, where Cedar meets the waterfront (shown with a dot on Map 14). It is possible that this dump fire was a concurrent but entirely unrelated event. However, there is a considerable likelihood that the fire at the Berkeley dump was ignited by embercast

traveling from the main fire front, which was approximately 2 miles away. This phenomenon has precedent in more recent fires, such as the 2017 Tubbs Fire, during which embers traveled over a mile from the main front. Although wildfire is generally thought of as a problem limited to the Berkeley hills, this historical anecdote, alongside these more recent experiences, indicate the wildfire vulnerability of Berkeley's flats.

Map 14. ***Fire Spread in 1923 Berkeley Fire, 2024***



California State Parks, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, US Census Bureau, USDA, USFWS, Esri, NASA, NGA, USGS, Esri, NASA, NGA, USGS, FEMA, California State Parks, Esri, TomTom, Garmin, SafeGraph, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA, USFWS, East Bay Parks Fire History Map, City of Berkeley OES.

City of Berkeley 1923 Fire Map

1923 Fire

Current Buildings in 1923 Fire Area

Fires at Berkeley's offsite overnight camps

- Berkeley Tuolumne Camp, located in Tuolumne County just outside of Yosemite National Park, was destroyed by the Rim Fire in August 2013. Since that time, the City has reconstructed the Camp. The Berkeley Fire Department WUI Division visited the Camp in 2023, mapping the area in order to plan future mitigation projects. Efforts like this will help to make the Camp more protected and defensible in the event of another wildfire.

- The Caldor Fire in August 2021 started 32 miles away from Echo Lake Camp, in El Dorado County in the El Dorado National Forest. On August 30, the front lines of the Caldor Fire reached Camp. The Berkeley Fire Department deployed its firefighters to defend the camp. For several days they engaged in active firefighting, at one point being forced to retreat from Camp due to the intensity of the fire approaching the property. Thankfully, firefighters were able to return to defend Camp and continued to engage in active firefighting until the threat had passed. While no Camp structures were significantly damaged, several neighboring private cabins less than 100 yards away were destroyed, and areas of the surrounding forest were burned. The fire burned on all sides of Camp, up to within feet of the Ridge Cabins, Recreation Lodge, and Camp Office, but when standing in the center of Camp, one might not know that a fire had threatened the property. Since the fire, City staff have assessed the status of trees and structures on the 15-acre property.

B.3.e Probability of Future Events

Fire is a natural part of the California and East Bay wildland ecosystem, and they will continue to occur in the future. Calculating the probability of a future needs to consider both the likelihood of ignition and the likelihood of spread.

Likelihood of ignition

Historically and more recently, most fire ignitions have been due to human activity and electrical equipment. According to Cal Fire, of the top 20 most destructive California wildfires, three had "human related" causes, five were caused by powerlines, and three had electrical causes.[39]

Likelihood of spread

A significant WUI fire is one that will spread out of control. The likelihood of fire spread primarily relates to three factors: weather, fuel moisture, and the built environment.

Weather

A significant WUI fire is most likely to occur in Berkeley under Extreme Fire Weather conditions. In 2020, Berkeley was forecast to have 25 days under Red Flag Warning, with the Berkeley Fire Department declaring two of those forecasted days to qualify as Extreme Fire Weather. 2021, 2022, and 2023 were uncharacteristically mild, with one or zero Red Flag Warning days. Despite these mild years, we know that Berkeley will experience more fire weather in the years to come.

Climate change also creates more volatile weather patterns, extending fire season and with it the number of days Berkeley is in Red Flag Warning or Extreme Fire Weather status.

Vegetative Fuel Moisture

The moisture content of live and dead vegetation is not in itself a weather element. It is a product, however, of the cumulative effects of past and present weather events and must be considered in evaluating the effects of current or future weather on fire potential. Fuel moisture content limits fire propagation. When moisture content is high, fires are difficult to ignite, and burn poorly if at all. With little moisture in the fuel, fires start easily, and wind and other driving forces may cause rapid and intense fire spread.

Climate change, which is ongoing, increases drought, reducing the moisture of vegetation and increasing its flammability.

Built Environment

Fire spreads through manmade structures as well as vegetation. According to NIST, “structures represent a significant density of fuels that impact fire spread and, in many cases, directly contribute to the ignition of additional structures, propagating fire throughout the community.” The two primary fuel loads in the Berkeley hills are vegetation and the homes themselves. The “Locations of Wildland Urban Interface Fire” section above outlines how the density and close proximity of structures in the WUI area increase the likelihood of fire spread.

Most Berkeley homes were constructed prior to modern home hardening (fire resistive) codes were put in place, leaving homes in this area vulnerable to ignition from embers, direct flame impingement, or radiant or convective heat. Additionally, the structures’ density and minimal separation distance, and proximity to dense vegetation and wooden fences will increase the rate of fire spread through the area. See “Location of Wildland Urban Interface Fire” for details.

B.3.f Vulnerabilities

The entire City is vulnerable to WUI fires, as described in the historical outline of the 1923 fire. This section focuses on Berkeley’s areas of highest fire risk: Fire Zones 2 and 3, the hills areas.

People

32,109 number of people live in Berkeley Fire Zones 2 and 3. Wind driven, fast-moving fires are particularly dangerous for people, resulting in injuries and deaths from burns and smoke inhalation.

Fires also contribute to poor air quality, which can impact people locally and far away, especially sensitive groups, including infants, young children, people with respiratory illnesses, and people who live or work outside.

Evacuation

All of the Berkeley Hills are marked by windy, narrow roads, which makes evacuation difficult. History demonstrates that residents in the path of a major fire will attempt to leave the area via private vehicles crammed with personal belongings. When there is a catastrophic fire or earthquake, emergency access and egress on overwhelmed residential roadways will be highly constrained. People trying to leave a dangerous condition will hinder emergency personnel trying to address it or trying to reach others who need help to leave.

Because of these challenges, the Berkeley Fire Department recommends that people leave the hills ahead of Extreme Fire Weather. Evacuation is particularly challenging for people with disabilities, people with access and functional needs, and seniors.

Of particular concern is Panoramic Hill. Panoramic Way is the only paved road into and out of this neighborhood. It forms a single loop, 12-18’ wide, that begins and ends just south of Memorial Stadium. The street’s narrow width and hairpin turns make it barely accessible to fire apparatus, which are required to perform three-point-turns to ascend the Hill. Panoramic Way’s narrow width also means that at many points the road is not wide enough to allow vehicles to pass one another. Under normal conditions, vehicles responding to medical emergencies have been impeded by commercial vehicles, trash collection trucks, and illegally-parked personal vehicles. Further, an earthquake-induced

landslide impacting Panoramic Way could also block any vehicles from entering or leaving the area. Panoramic Way could also block any vehicles from entering or leaving the area.

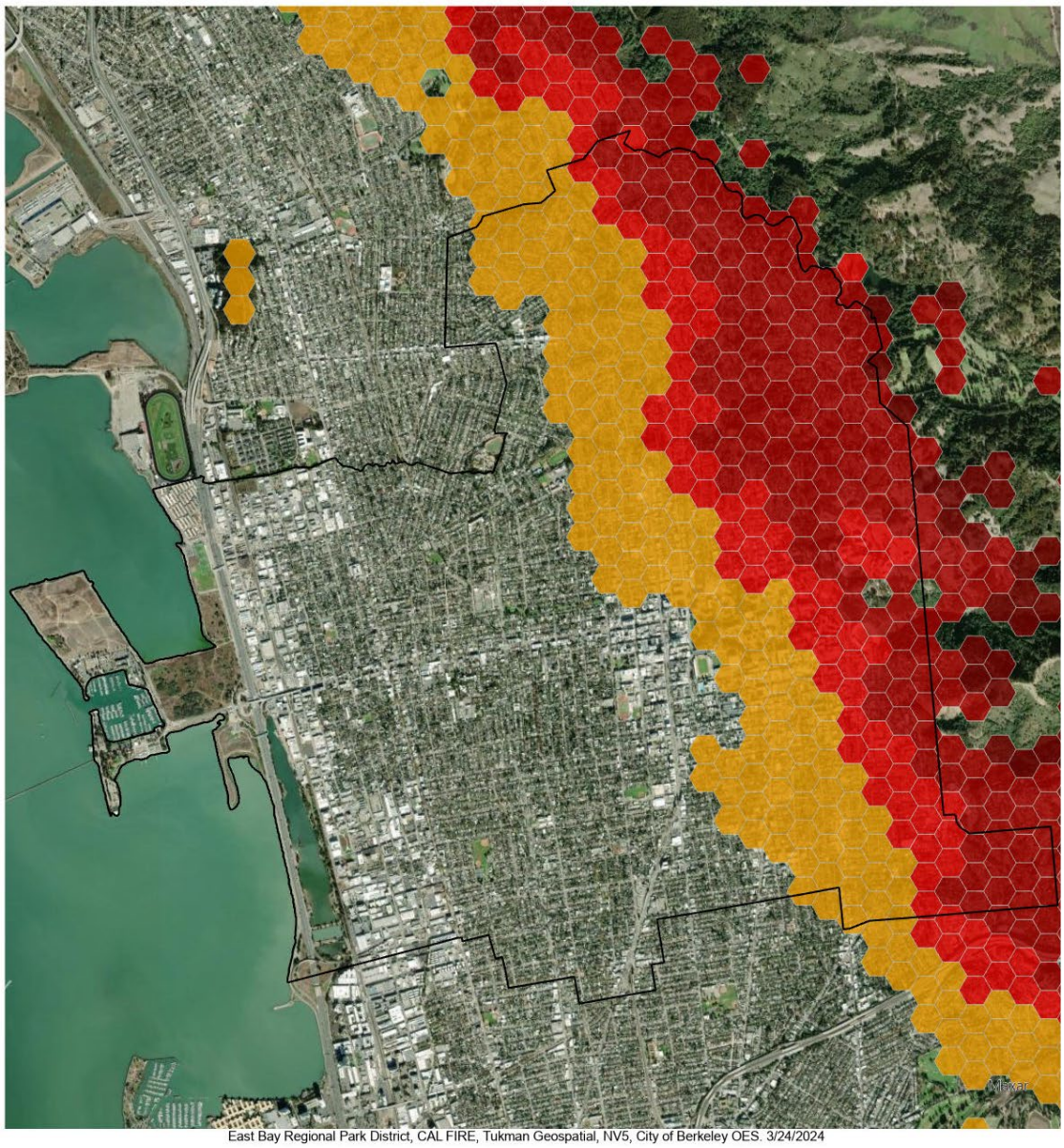
Structures

There are 8,603 parcels in Berkeley Fire Zones 2 and 3. A wildfire will quickly threaten homes and burn infrastructure. The intense heat associated with a firestorm can also deteriorate concrete and asphalt pavement, curbs, sidewalks, and drainage structures.

The “Locations of Wildland Urban Interface Fire” section above outlines how the density and close proximity of structures in the WUI area increase the vulnerability of structures in the area.

Map 15 presents the wildfire risk to structures in the Berkeley hills. It divides the area into 10-acre hexagon shapes, and ranks the risk to structures for each shape. Areas with high housing density and high wildfire hazard have the highest hazard rating. Map 5 shows that these areas are located on the Eastern border of the city, with most of them bordering Tilden Park. The very high hazard and high hazard hexagons are located in the Claremont Neighborhood, Southside, La Loma Park, and Berkeley Hills. The moderate hazard areas are in the same neighborhoods, and also approach Central Berkeley.[40]

Map 15. ***Wildfire Risk to Structures Map, 2024***



Systems

Many of the systems that Berkeley residents, visitors, businesses, institutions, and other partners rely on for day-to-day life are vulnerable to fire. The heat associated with fire can destroy or damage infrastructure that our utility, transportation, and communication systems rely on to operate. This includes aboveground wiring for electricity, telephone and cable lines that allow for communications, and poles for lights and street signals.

Fire can also damage and contaminate water systems, threatening public health and drinking water supplies.

Natural, historical, and culture assets

The City of Berkeley has a variety of natural, historical, and cultural assets spread throughout all Fire Zones. Fire Zone 1 has restaurants, arts and culture and organizations, community organizations, and other businesses that serve the Berkeley community. Fire Zone 3, the Panoramic Hill area, includes one of Berkeley's most architecturally-significant residential districts, which is listed in the National Register of Historic Places because of its association with the Arts and Crafts movement.

Fire Zone 3 includes a number of City parks, playgrounds and recreational facilities. The East Bay Regional Parks immediately to Berkeley's east provide a variety of recreational activities for residents and visitors to enjoy.

Situated outside the City of Berkeley boundaries, the City's overnight camps also provide the Berkeley community with a wide breadth of outdoor opportunities in some of California's most beautiful natural settings.

B.3.g Potential Impacts and Losses

Climate change is expected to increase the potential impacts and losses associated with wildland-urban interface fire. Expected changes in population patterns potentially increase impacts and losses associated with wildland-urban interface fire. As the population steadily increases, more people are exposed to the wildfire risk and the demands on the evacuation infrastructure. Changes in land use and development may potentially increase impacts and losses. New state laws are mandating increased density throughout the city, including in the eastern hills, which are more exposed to wildland-urban interface fire.

Previous wildfires in Berkeley provide some lessons on what the potential impacts and losses might be from a future event.

Impacts to human life

Twenty-five people died in the 1991 Tunnel Fire. Fortunately, there were no deaths in the 1923 Fire, Grizzly Fire, or at the Berkeley overnight camps during the Caldor Fire and Rim Fire. However, a catastrophic WUI fire occurring in Berkeley in the present day, considering Berkeley's density of structures and considerable evacuation challenges, is more likely to see death tolls comparable to catastrophic fires like the 2018 Camp Fire, with 85 civilian deaths, and the 2023 Maui Fire, during which 101 people died.

Fires also have other devastating human impacts. For example, the 1923 Berkeley Fire made over 4,000 people homeless. Berkeley's population has more than doubled since 1923, and the Bay Area is now in a housing crisis. This means that a repeat of the 1923 fire in the present day would destroy the homes of many more people, and also leave

them without alternate local housing options.

Impacts to infrastructure

The 1923 fire was the most extensive WUI fire to impact Berkeley in recent history. This plan calculates losses that would occur if that fire were to recur today. A repeat of this fire would cause significantly more damage in Berkeley than the 1991 Tunnel fire.

The 1923 Berkeley Fire started in Wildcat Canyon to the northeast of the city and burned south and west down to Shattuck Avenue, stopping at the edge of UC Berkeley. Map 15 shows the area burned by this fire. The California Railroad Commission documented the burned area in 1923, three months after the fire. By superimposing this historical map onto the current day building data in Berkeley using the City's Geographic Information System, we find that, today, there are 1,858 buildings located in the footprint of the 1923 fire. These structures include single-family homes, multi-family residences (many of which house UC Berkeley students), stores, restaurants, and offices central to downtown Berkeley.

If a fire occurred today that burned the same area, the loss to structures would be in the billions of dollars.[41] Efforts to stabilize hillsides after the fire to prevent massive landslides would also add costs.

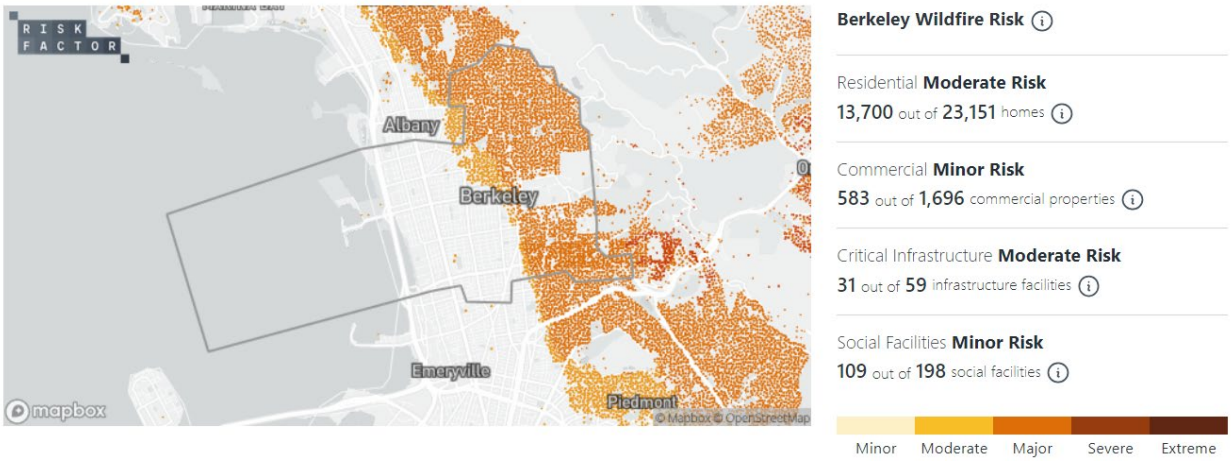
While the financial losses from this scenario are staggering, the social impacts of such a fire would be devastating as well. Thousands of families would be homeless following such an event, losing all of their possessions. Many more would need short-term shelter while the fire was burning, and in the immediate aftermath. Residents and firefighters

could be killed, especially in difficult-to-access areas. Local, independent businesses might disappear forever. A large portion of the city would need to be entirely rebuilt. In short, the entire face of Berkeley would be completely changed.

B.3.h GFOA Analysis

According to the First Street Foundation, “there are 15,085 properties in Berkeley that have some risk of being affected by wildfire over the next 30 years. This represents 57% of all properties in Berkeley.” Exhibit 5 shows a wildfire risk map from First Street.

Exhibit 11. Wildfire Risk in Berkeley (according to the First Street Foundation)



Though the First Street data does help illuminate the potential of actual fires in the City of Berkeley, it does not address consequences of nearby fires, like smoke heavy enough severely impede daily life in Berkeley. Therefore, regional losses might be a more accurate indicator of the consequences of fires.

Even aside from smoke, fire risk in Berkeley is a function of more than fires the happen inside city boundaries. Fires in the region could still be relevant. Therefore, GFOA used data from Aon which provided the annual chance of a fire along with the size of a fire in both Contra Costa and Alameda Counties. This provides total economic loss potential in

the region. Examining the two-county region provides a broader sense of total wildfire exposure. Having access to this "big picture" could be useful because, for example, the economic losses from smoke would impact Berkeley, even if the fire is not in or immediately adjacent to Berkeley. Unfortunately, wildfire loss data is not detailed enough, as of this writing, to accurately apportion economic losses to Berkeley versus other locales in the two-county area.

Exhibit 12. Loss exceedance curve for total economic losses in the two-county region, for both a 1 year and 10-year time horizon.

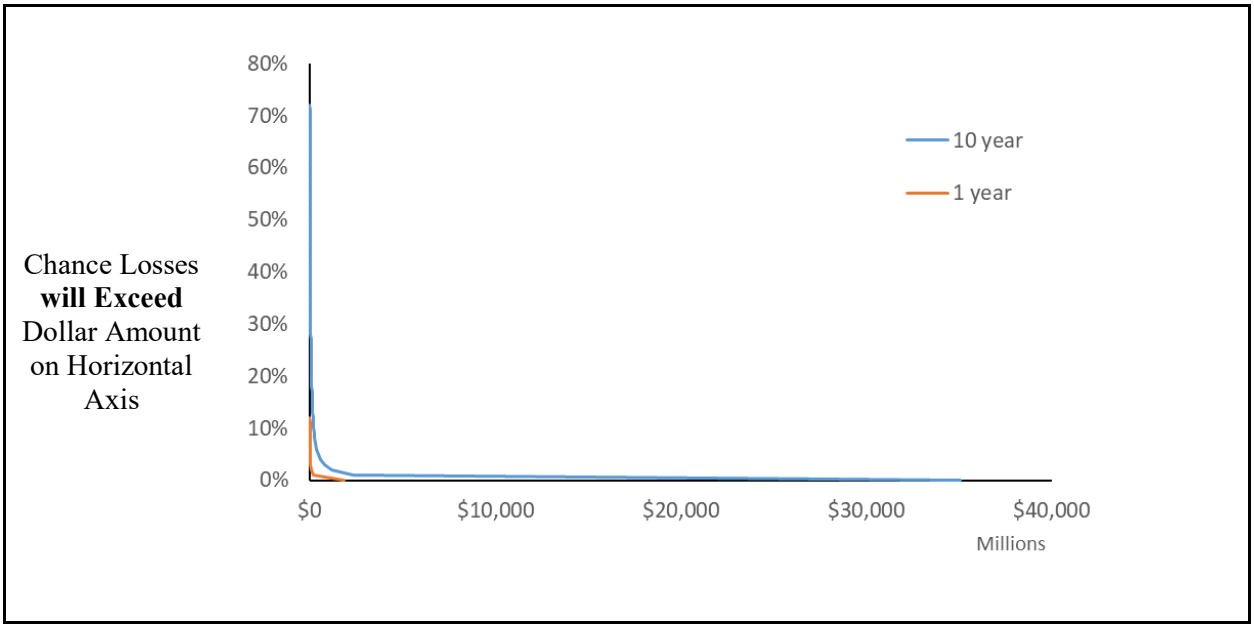


Table 3. *Chance that Losses Will Exceed Dollar Amounts (Millions) over 1 and 10-year time horizons*

Time Horizon	5%	10%	50%	90%
1-Year	$22M	$6.5M	NA*	NA*
10-Year	$462M	$211M	$18M	NA*

*Not Applicable (NA) means that the loss exceedance curve intersects zero before this point. See the graph to see where the curve meets the vertical axis for the chance of

losses exceeding zero.

This data does not factor in the impact of climate change, so the 10-year losses may be understated. Finally, the 1-year curve is far less visible then in some of the other loss exceedance curves for other risks. This is not because the 1-year risk is low; rather it is because the further we look out in the future, the better chance we have of experiencing the most extreme outcomes – outcomes that can be quite different from what is experienced in a single year.

B.4 Extreme Heat

B.4.a Description of Extreme Heat and Connection to Other Hazards

According to Cal-Adapt, California's database of climate information, multiple factors contribute to the extreme heat hazard:

Extreme heat days: An extreme heat day is when temperatures reach the 98th percentile of historic maximum temperature. In Berkeley, an extreme heat day is a day above 88.3 degrees Fahrenheit (F).

Warm nights: A warm night in Berkeley is considered to be one that does not cool below 61.7 degrees F. Warm nights can increase health risks significantly, as people do not have the ability to cool down and recover.

Heat wave: When there are five or more days of extreme heat.

Duration of heat wave: Longer heat waves have proportionally more negative impacts

than shorter heat waves.

Extreme heat during unexpected times of year: When extreme heat occurs outside of historically hotter months.

Urban heat island effect

Extreme heat events can be further exacerbated by the urban heat island (UHI) effect, through which densely-built cities like Berkeley experience higher temperatures in comparison to surrounding more rural areas.

Factors contributing to the UHI effect include:

- A relative lack of vegetation;
- Reduced air flow;
- An abundance of hard, dark surfaces—such as buildings, streets, cars and sidewalks— which absorb heat rather than reflect it. These surfaces also slowly release that absorbed heat throughout the night, contributing to warmer nighttime temperatures.

The UHI effect can also worsen air quality (particularly ground-level ozone) in urban environments.[42] The UHI effect increases heat-related illnesses and fatalities, particularly after two to three days of extreme heat.[43]

Vegetation helps mitigate the UHI effect through evaporative cooling. This makes urban tree cover, parks, and green roofs essential tools to combatting the UHI effect. Green roofs, cool roofs, and cool pavements (light-colored materials that reflect, rather than absorb, solar energy) reduce the UHI effect, and can also lower cooling loads in buildings. Urban vegetation and increased urban tree cover reduce temperatures and provide

benefits such as improved air quality and needed shade (for buildings and people) during heat events.

Connection to climate change

Due to climate change, projections indicate that the number of extreme heat days, warm nights, and heat waves will increase exponentially in the next few decades. In addition to this increased frequency and duration, heat waves are also expected to occur in months not typically associated with extreme heat.

Connection to wildland-urban interface fire

While hot temperatures do not specifically start fires, they are associated with decreased moisture in vegetation, increasing its flammability and the length and severity of fire season.[44] Warming temperatures combined with increased development in the wildland-urban interface are projected to increase fire risk in most of the Bay Area.

Connection to poor air quality

While naturally-occurring ozone that exists higher in the Earth's atmosphere is beneficial to the climate, ground-level ozone can be extremely harmful to human health. Extreme heat can lead to the formation of ground-level ozone when emissions from industrial facilities, power utilities, cars, trucks and other sources chemically react in the presence of heat and sunlight. Ground-level ozone contributes to smog and other secondary air pollutants.

Extreme heat can also cause stagnant air conditions, causing the smog to stay low longer, and increase community exposure.[45] Community reactions to extreme heat – including

use of cars for transport and use of cooling systems in buildings – can compound the already heightened creation of ozone. For this reason, the availability of non-polluting modes of transportation and ultra-efficient building systems can mitigate both the direct impacts of the heat on the community and the worsened air quality.

Exposure to increased ozone concentrations is associated with pneumonia, asthma, allergic rhinitis, and other respiratory diseases, as well as premature death. Elderly people, infants, and children are particularly susceptible.[46]

Connection to utility disruption

Increased power demand during hot weather and extreme heat events can overload electrical equipment, causing power outages. The local utility company, PG&E may also initiate a public safety power shutoff during these high heat events in areas that have high fire risk to prevent wildfires. Outages can also occur when circuit breakers or other protective equipment shuts off the flow of power in order to prevent damage to the electrical system.

B.4.b Location of extreme heat

Two important factors influence how hot it is in certain parts of Berkeley: the urban heat island effect and thermal belting.

Urban heat island effect

The urban heat island effect often makes temperatures hotter in the urban, more dense parts of a city. To visualize what parts of Berkeley might more likely suffer from the urban heat island effect, Map 16 shows the tree coverage throughout Berkeley. Urban tree

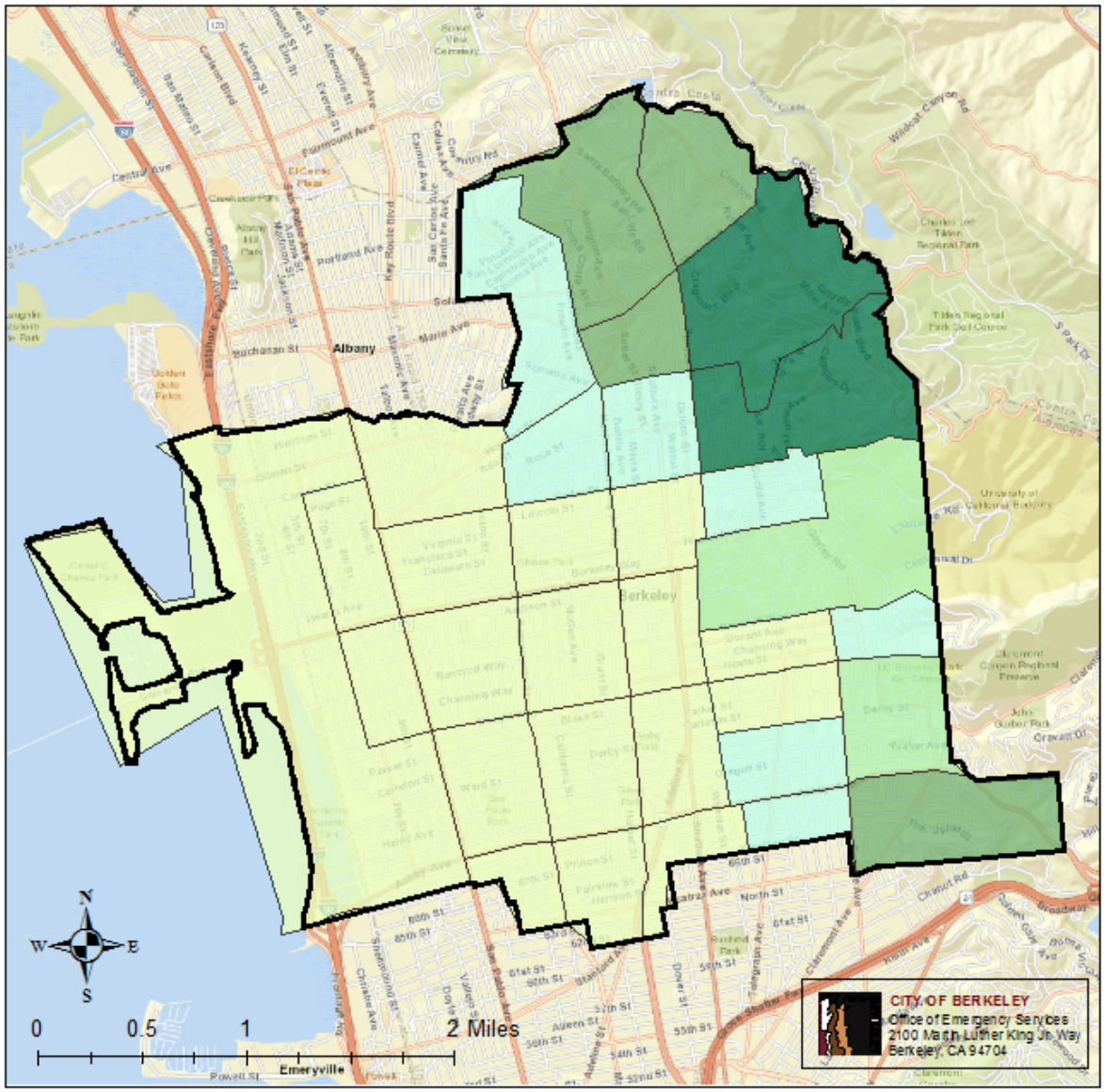
canopy directly reduces surface and air temperatures through shading and absorption, combating the urban heat island effect. In addition, this shading can reduce cooling loads in buildings and provide shade for individuals as well. Trees also improve air quality that often worsens during extreme heat. A dense tree canopy can result in fewer heat-related emergencies.[47]

In Berkeley, census tracts have between 4% and 48% tree coverage. Map 16 shows the current percentage of tree coverage for each census tract in Berkeley. Table 3 below describes the information on Map 16.

Table 4. *Percentage of Tree Coverage in Different Areas of Berkeley*

Area	**Percentage Tree Cover**
The Berkeley flats and areas to the south of the UC Berkeley campus	Less than 10%
Western part of Hopkins street north to the Berkeley border	11% to 20%
area immediately north of the UC Berkeley campus	11% to 20%
Panoramic Hill	11% to 20%
Elmwood	11% to 20%
UC Berkeley campus	21% to 30%
Areas to the north/south of the western part of Derby street	21% to 30%
Claremont	31% to 40%
Berkeley Hills north of Marin Avenue	31% to 40%
Berkeley Hills south of Marin Avenue	41% to 50%
Berkeley Hills north of Cedar	41% to 50%

Map 16. ***Percentage of tree coverage in City of Berkeley, 2019***



Source: Cal Adapt https://cal-adapt.org/
Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, © OpenStreetMap contributors, and the GIS User Community

City of Berkeley

Tree Coverage

- 41% to 50%
- 31% to 40%
- 21% to 30%
- 11% to 20%
- Less than 10%

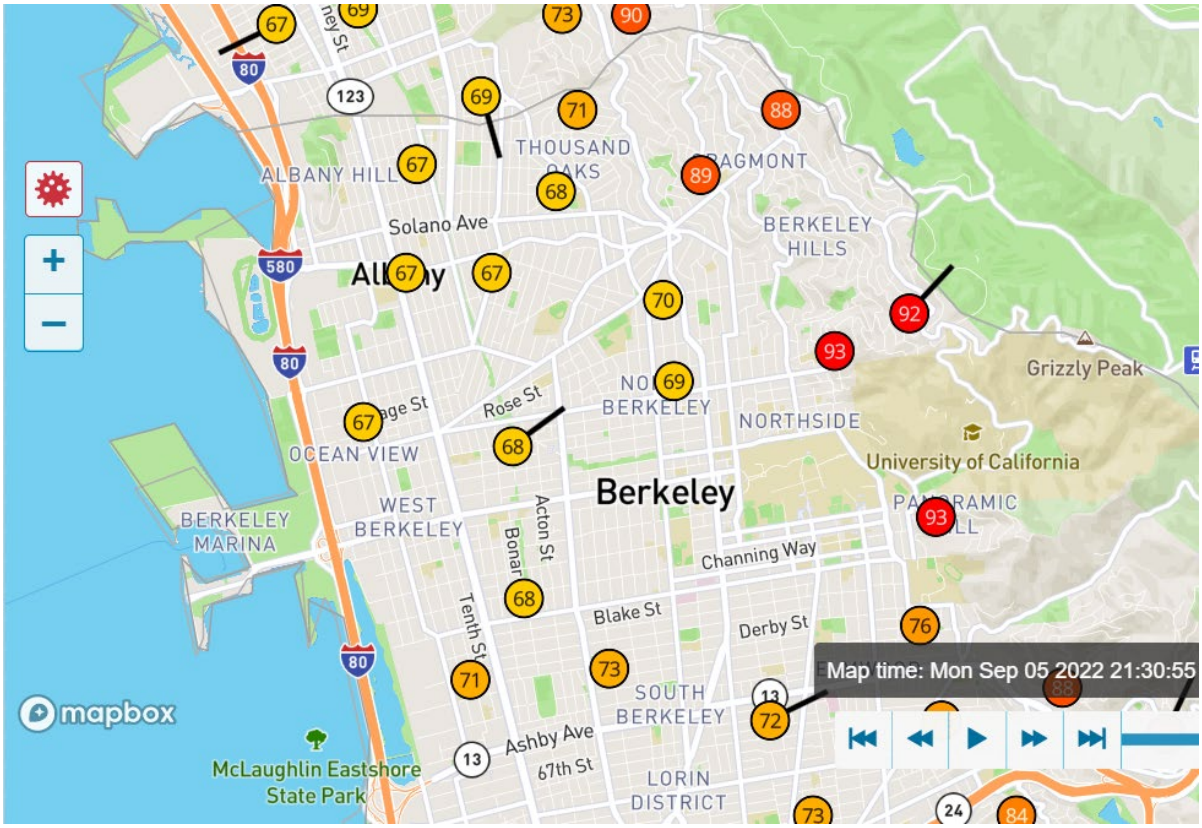
Thermal belting

Although the Berkeley hills have a greater tree canopy, temperatures are often higher there than in the rest of the city, due to a phenomenon known as thermal belting. Thermal belting occurs in areas where there is a hillside and a valley below. Heat is absorbed by the ground during the day, and the heat energy radiates up from the soil at night. As the warm air rises, the radiation of the heat causes the air closest to the ground to cool. Since cold air is heavier than warm air, cooler air sinks down the hillside into the valley. As the cooler air fills the valley, the warm air heads upwards. This warm air becomes trapped on the hilltop and is referred to as a thermal belt. For Berkeley, this means that during extreme heat events, the Berkeley hills are likely to be hotter at night than the rest of the city.

Map 17 illustrates the thermal belting phenomenon in Berkeley during a heat wave in September 2022. The graphic is taken from Weather Underground website's Wundermap, which displays temperatures and wind directions at citizen weather monitoring stations throughout Berkeley.

Map 17 shows temperature differentials between the Berkeley hills, flats, and coast at 11:30 pm at night on Monday, September 5, 2022. The Berkeley hills have temperature readings in the upper 80s and 90s while the flats and waterfront have temperatures in the 60s and 70s F. In some cases, temperature differentials are more than 20 degrees F in a distance of ten city blocks.

Map 17. ***Thermal belting during September 2022 heat wave***



B.4.c Extent of Extreme Heat and Anticipated Intensities

The National Weather Service uses different tools to describe and forecast the extent and intensity of extreme heat events.

Heat Index

The National Weather Service Heat Index considers relative humidity alongside air temperature to establish how hot it feels to a human body. Exhibit 12 is the Heat Index chart. The chart demonstrates the interaction between temperature and relative humidity, and how increasing temperatures and increasing relative humidity creates the increased likelihood of heat disorders with prolonged exposure or strenuous activity.

Along the X axis, the chart displays temperatures ranging from 80 degrees F to 100

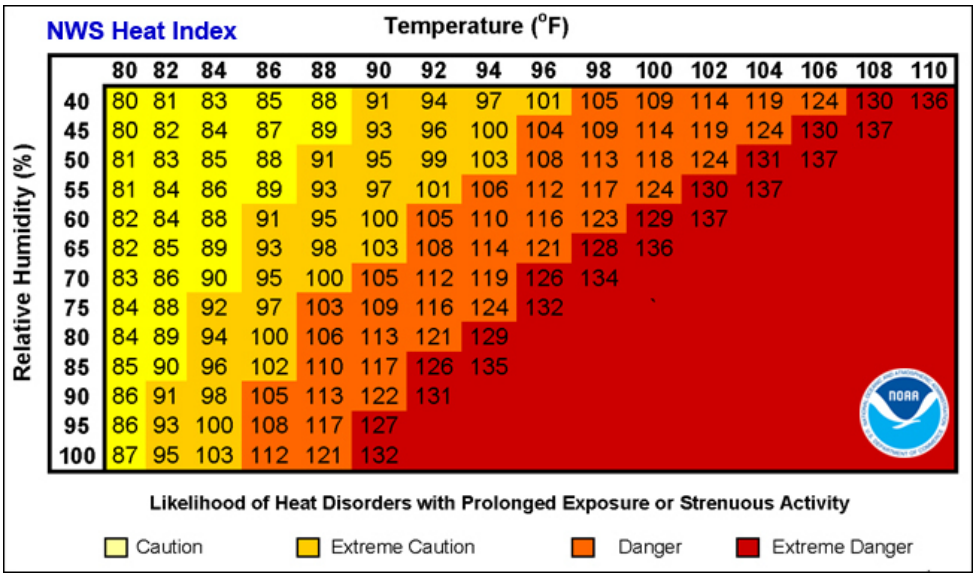
degrees F. Along the Y axis, relative humidity is displayed from 40% to 100%. The chart shows how perceived temperatures (Heat Index temperatures) increase as the humidity increases. Examples from the chart:

- 80 degrees F with 40 percent humidity creates a Heat Index temperature of 80 degrees
- 80 degrees F with 100 percent humidity creates a Heat Index temperature of 87 degrees
- 90 degrees F with 65 percent humidity creates a Heat Index temperature of 103 degrees
- 90 degrees F with 95 percent humidity creates a Heat Index temperature of 127 degrees
- 100 degrees F with 40 percent humidity creates a Heat Index temperature of 109 degrees
- 100 degrees F with 65 percent humidity creates a Heat Index temperature of 136 degrees

The chart also shows the likelihood of heat disorders at each perceived temperature, using colors and descriptions ranging from:

- **Light yellow ("caution")** – Heat Index 80-90 degrees F
- Medium yellow ("extreme caution") – Heat Index 91-103 degrees F
- **Orange ("danger")** – Heat Index 104-124 degrees F
- **Red ("extreme danger")** – Heat Index 126-137 degrees F

Exhibit 13. National Weather Service Heat Index



Forecasting Heat Risk

The National Weather Service HeatRisk Prototype is a new tool that forecasts risk of heat-related impacts in a given day for a given area. In forecasting risk, the HeatRisk tool considers temperature, how unusual the heat is for the time of year, and the duration of the heat, including daytime and nighttime temperatures. The index supplements official National Weather Service heat information to provide risk guidance for decision-makers and heat sensitive populations who needs to take actions at lower levels.

HeatRisk defines the risk of heat-related impacts using the following categories.

Table 5. *Heat Risk Categories*

Number	Color	Description
0	**Light Green**	Little to no risk from expected heat.
1	**Yellow**	Minor - This level of heat affects primarily those individuals extremely sensitive to heat, especially when outdoors without effective cooling and/or adequate hydration.
2	**Orange**	**Moderate** - This level of heat affects most individuals sensitive to heat, especially those without effective cooling and/or adequate hydration. Impacts possible in some health systems and in heat-sensitive industries.
3	**Red**	**Major** - This level of heat affects anyone without effective cooling and/or adequate hydration. Impacts likely in some health systems, heat-sensitive industries and infrastructure.
4	**Magenta**	**Extreme** - This level of rare and/or long-duration extreme heat with little to no overnight relief affects anyone without effective cooling and/or adequate hydration. Impacts likely in most health systems, heat-sensitive industries and infrastructure.

B.4.d Previous Extreme Heat Events

Berkeley has experienced extreme heat events regularly, and has experienced extreme heat each year from 2019 through 2023. However, there have been no federally-declared extreme heat disasters in Berkeley since the last update. The National Oceanic Atmospheric Administration Storm Database describes some of the most notable events:

- In July 2006, there were five consecutive days with temperatures above 110 F in the Bay Area, and approximately 75 heat-related deaths during this period. The last comparable extreme heat event prior to this 2006 event occurred for two days in 1972.[48]

- In August 2017, the Bay Area experienced record-setting high temperatures.[49] A Berkeley weather station on the University of California, Berkeley campus near Hearst and Euclid Avenues reported a temperature of 108.5 F.[50] The National Weather Service issued an excessive heat warning that lasted five days for the Bay Area. During this time there were six heat-related deaths in nearby San Francisco and San Mateo Counties.

- In June 2019, a combination of high pressure and strong offshore flow resulted in an early season heat wave across the Bay Area. Multiple daily records were broken across the region and multiple power outages were reported due to the heat. Approximately 26,000 people across the region lost power, followed by an additional 30,000 on the following day. Three fatalities were reported in the region.

- From August 14-19, 2020, a prolonged and oppressive heat wave swept the Central Coast and Bay Area for almost a week, with widespread record-breaking temperatures observed across the region. Multiple days of triple-digit afternoon highs were recorded inland with some coastal locations even reaching the mid-90s. Several days of hot and dry weather further dried vegetation in the area, increasing fire danger. During this event, a surge of monsoonal and tropical moisture from a former Tropical Storm moved northward with sufficient instability to generate multiple high-based and dry thunderstorms that produced several thousand lightning strikes over the Greater Bay Area. Many locations saw wind gusts of 40-50 miles per hour (mph) with isolated areas seeing gusts of 60-75 mph. This prompted the San Francisco Bay Area forecast office to issue a rare severe thunderstorm warning. At the same time, all of the wildfires burning simultaneously across the state gave the Bay Area the worst air quality in the world.

- In September 2020, a large area of high pressure over the west brought excessive heat and dry conditions to the region. Numerous record high temperatures were broken, including 13 broken records on Sunday September 6th alone. Temperatures reached 110 degrees F across the interior, with 90s along the coast to start the weekend, and even reaching 100 degrees in San Francisco on Sunday. Once the ridge began to break down towards the end of the weekend, offshore winds increased flaring up some of the wildfires that were ignited during August's lightning storm. These winds also enabled smoke from various wildfires across the state to blanket much of the Bay Area. The skies were tinted orange and red with ash accumulating for many locations.

- In July 2021, strong high pressure building over the region in early to mid-July brought warm to hot temperatures across the interior. Daytime highs rose into the 100s with locations across the East Bay up to 110 degrees between July 9-11. Overnight lows remained warm, particularly across higher elevations where temperatures were still in the 70s and 80s in the early mornings. Additionally, prolonged dry conditions resulted in near record dry fuels for July. This along with breezy afternoon winds prompted the Diablo Fire in Contra Costa County.

B.4.e Probability of Future Events

Climate models from the Cal-Adapt tool[51] from the California Energy Commission predict the average number of extreme heat days (above 88.3 degrees F) in Berkeley to

continually increase by the end of the century. The specific number of extreme heat days expected in Berkeley depends on the level of greenhouse gases (GHGs) emitted from human activities into the atmosphere:

Medium Emissions Scenario (GHG emissions peak in 2040 and then decline)

- 2035-2064: 7 extreme heat days in Berkeley
- 2070-2099: 9 extreme heat days in Berkeley

High Emissions Scenario (GHG emissions continue to rise throughout the 21st century)

- 2035-2064: 9 extreme heat days in Berkeley
- 2070-2099: 16 extreme heat days in Berkeley

B.4.f Vulnerabilities

People

Across California, the highest risk of heat-related illness occurs in the typically cooler regions found in coastal areas like Berkeley. Vulnerability is increased for these communities as they are relatively unaccustomed to extreme heat. As a result, they are less acclimatized or potentially less aware of preventative behavior and are less likely to have air conditioning or cooling in their homes.[52]

Public health impacts associated with extreme heat events include premature death, cardiovascular stress and failure, and heat-related illnesses such as heat stroke, heat exhaustion, and kidney stones.[53] Studies have also found links between rising temperatures and a range of mental health issues including mental fatigue, aggression,

and even higher rates of suicide.[54]

People with disabilities, people with access and functional needs, people with chronic diseases, the elderly, and children under five years old are the most at risk to heat-related illnesses.[55] People working outdoors and unhoused populations are also more exposed and at risk. Research also indicates that communities of color, and the poor suffer more during extreme heat events because of lack of access to common heat adaptation strategies, such as tree canopy for shading, air conditioning and insulation in buildings, or car ownership to travel to public cooling centers that allow them to escape the heat.[56]

These increased vulnerabilities to heat events among lower-income communities are illustrated using the University of California, Los Angeles Heat Maps Tool[57]. The tool examines excess emergency room visits during heat events based on location.

The data in the Table 5 below, tracked from 2009-2018, shows impacts in various parts of Berkeley:

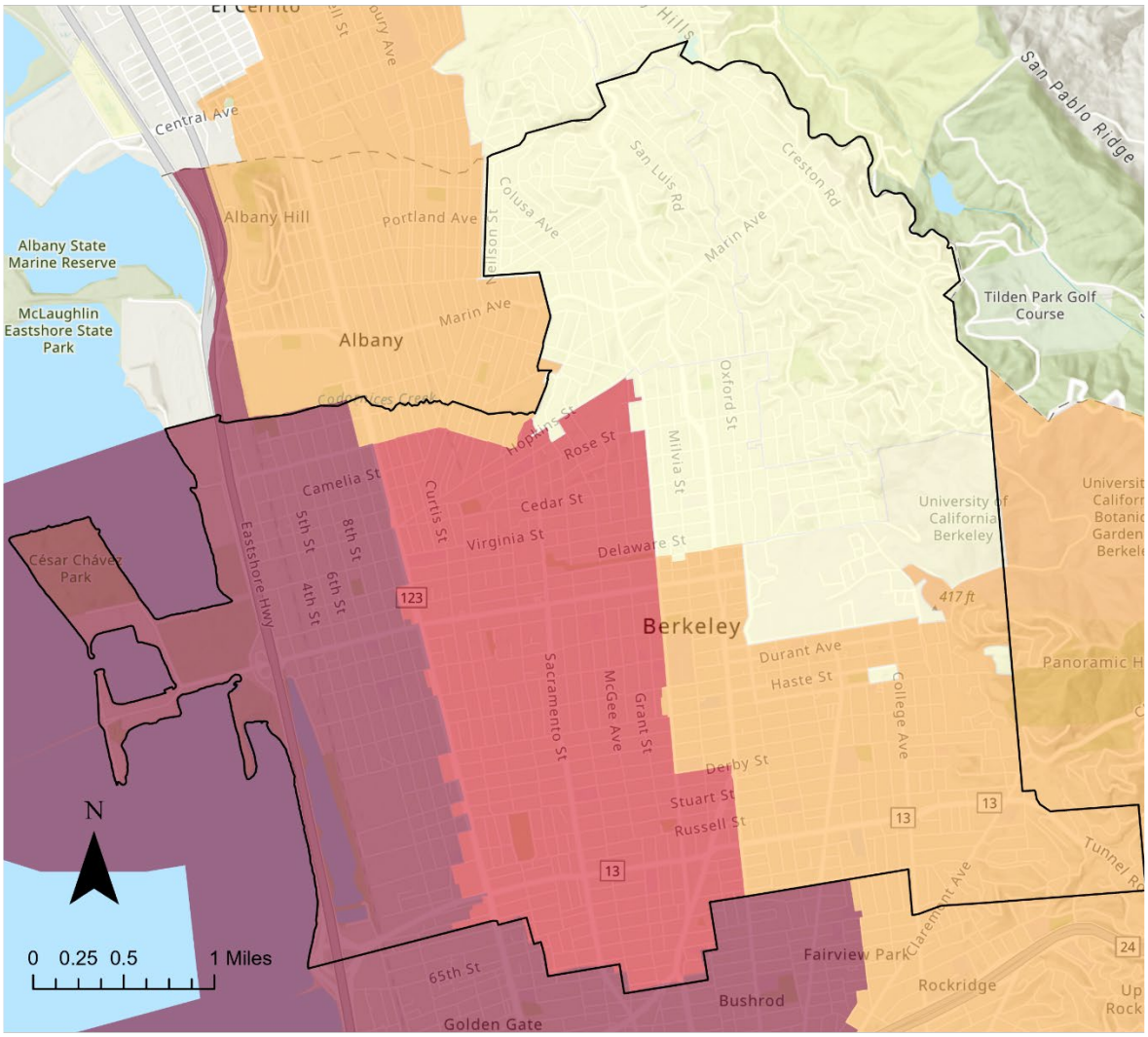
Table 6. *Excess Emergency Room Visits by Zip code*

Zip Code	Rate of Excess ER visits per Extreme Heat Day	Total Excess ER visits (2009-2018)
94710	6	617
94702	8	1,446
94703	4	1,413
94704	2	660
94705	3	701
94707	2	545
94708	2	487
94709	2	333

Map 18 visualizes the data above, demonstrating higher rates of excess hospital visits on

hot days for people in central, south, and west Berkeley. Although the thermal belting phenomenon described above creates hotter temperatures in the Berkeley hills, heat waves appear to have outsized impacts on the health of people living in the Berkeley flats. This likely relates to historic patterns of disinvestment on people with low incomes and people of color.

Map 18. ***Rate of Excess Emergency Room Visits Per Extreme Heat Day Per 10,000 people, 2024***



Rate of Excess ER Visits Map

Rate of Excess ER Visits
1
2
3
4
5
6

California State Parks, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA, USFWS, Esri, NASA, NGA, USGS, FEMA, UCLA Heat Maps 2018, City of Berkeley OES 2024

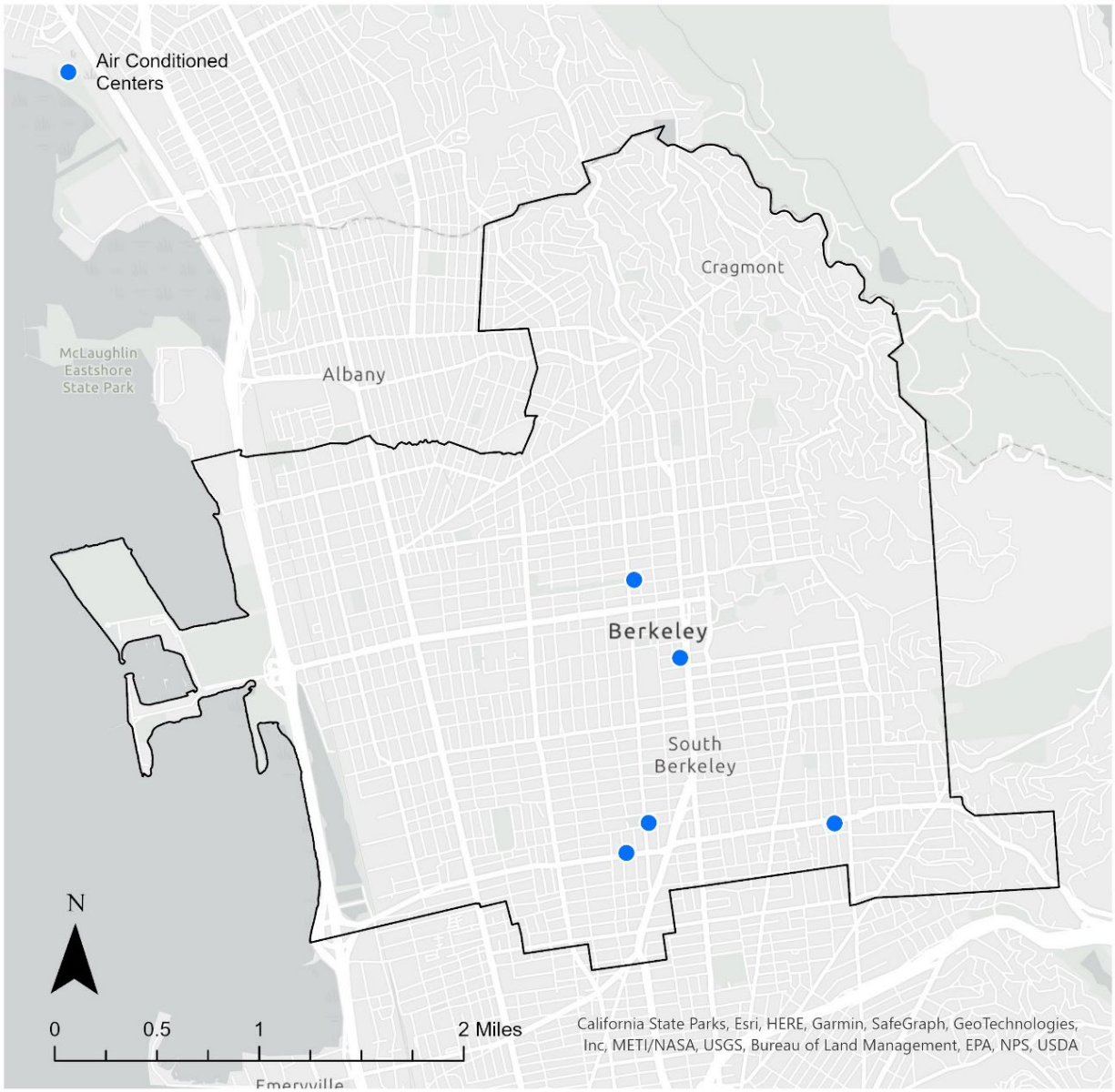
Structures

Well insulated buildings and those with access to air conditioning, or buildings with ventilation, can make a huge difference to individuals during periods of extreme heat. Berkeley has some public buildings with air conditioning that can serve as cooling centers during extreme heat events:

- North Berkeley Senior Center, 1901 Hearst Ave, Berkeley, CA 94709
- South Berkeley Senior Center, 2939 Ellis St, Berkeley, CA 94703
- Central Library, 2090 Kittredge St, Berkeley, CA 94704
- Claremont Branch Library, 2940 Benvenue Ave., Berkeley, CA 94705
- Tarea Hall Pittman South Branch Library, 1901 Russell St., Berkeley, CA 94703

Map 19 shows the location of these sites on a map of Berkeley using blue dots.

Map 19. ***Public-facing City sites with air conditioning, 2024***



As extreme heat becomes more frequent and severe, Berkeley buildings, including City facilities, will need to add cooling capacity. This effort will need to be done strategically over the coming decades to find building upgrade solutions that are clean, efficient, and functional during electrical grid outages. For existing buildings and new construction, consideration will be given to heat pump technology, a highly-efficient electric HVAC system (up to 400% efficient[58] in energy efficient buildings) with both heating and cooling

capabilities. Cooling approaches will also include natural ventilation and passive cooling techniques whenever possible, such as shading, orientation, and building envelope.

Strategic planning is also needed to ensure the readiness of critical City facilities during grid failure. The ability for these facilities to island off of the grid and rely on clean backup energy during a power outage would improve the City's energy assurance during extreme heat events. The City is currently partnering with Ava Community Energy (its local community choice aggregator and electricity provider) to design and install solar panels and backup batteries at some critical municipal facilities to advance this energy assurance goal.

Systems

High temperatures can damage critical infrastructure, including transportation systems. During a Fall 2017 extreme heat event, BART and Caltrain operated trains at reduced speeds in order to avoid damage to the tracks.[59] Unreliable public transit during extreme heat could cause more people to drive, adding to the heat and worsening air quality. Extreme heat events also create needs for additional infrastructure maintenance, particularly for roadways where heat can contribute to deformation or premature failure.[60]

Extreme heat can also lead to power outages. Due to Berkeley's historically mild climate, many buildings are not equipped with efficient cooling systems, and therefore rely on inefficient and sometimes ineffective methods of indoor cooling, such as window air conditioning units. This increases electricity demands which in turn can overwhelm the power grid, causing power outages when people need their cooling devices the most. Power outages can lead to many cascading and significant consequences including

impacts to electrically powered fuel and water systems as well as communication infrastructure. The loss of power can also be devastating for people with disabilities who rely on electricity to power medical devices." The Utility Disruption section of this plan has more information about the impacts of power outages.

Natural, historic, and cultural resources

Berkeley's tree canopy provides some measure of protection during extreme heat events but also is vulnerable to extreme heat. Sudden limb failure is a commonly-noted phenomenon in trees during extreme heat events. The precise mechanism leading to limb failure is not well understood, but poses hazards to trees, as well as people trying to escape the heat by sitting in their shade.

Berkeley and its immediate surrounding cities have bodies of water that are usually places to cool down and seek relief from the heat. Locations such as Lake Anza or the Bay are prime examples. However, extreme heat can cause harmful algae to bloom when water temperature is warmer than usual. When this kind of algae is present, community members cannot enjoy or seek relief in the water.

Activities that have value

As noted earlier, studies have shown that extreme heat causes mental fatigue and aggression. These feelings and behaviors can impact family and social dynamics, work productivity, and participation in community events and outdoor activities. Researchers have also linked high heat to decreased academic performance, with lower-income, older, and other marginalized populations being disproportionately impacted.[61]

B.4.g Potential Impacts and Losses

According to California Climate Change Center, by mid-century with climate change, extreme heat in urban centers could cause two to three times more heat-related deaths than occur today.[62] Population patterns in Berkeley could also increase the potential impacts. The senior population has grown steadily in Berkeley as well as the population experiencing homelessness. These groups suffer greater impacts of extreme heat. Development has the potential to decrease the impacts of extreme heat, as new buildings are designed to mitigate heat and energy use.

A study of the 2006 heat wave in California estimated excess statewide healthcare costs of $120 - $175 million, lost productivity costs nearing $10 million, and the societal cost of over 650 premature deaths, which exceeded $5 billion.[63] Unfortunately, little useful research exists on economic impacts of high heat at the local level – research focuses on aggregated losses at the national or international level.

GFOA's Extreme Heat Analysis

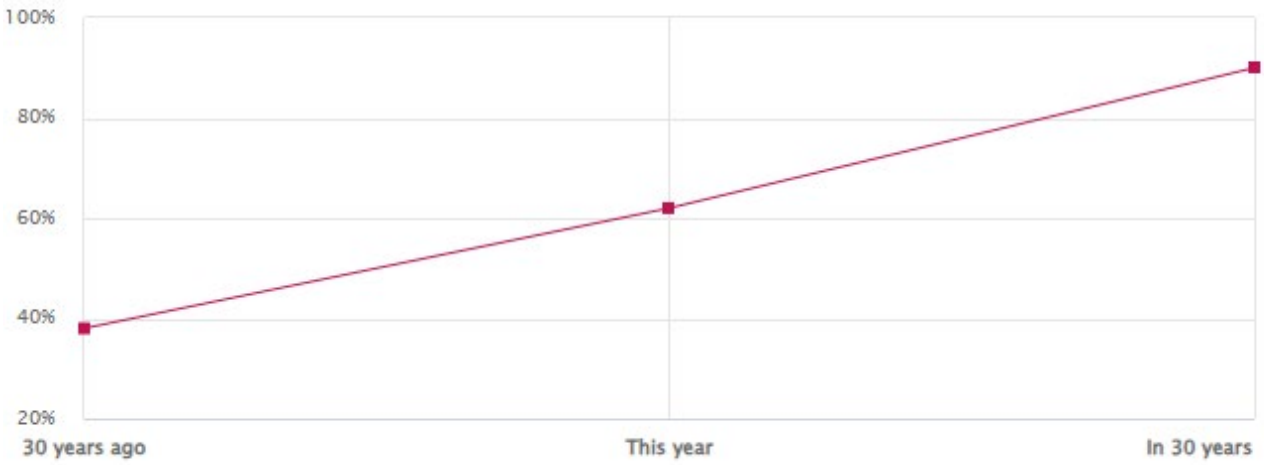
According to the First Street Foundation's Risk Factor tool, Berkeley has a "moderate" risk for heat. This analysis defines a hot day as temperatures above 83 degrees F, and the likelihood of this kind of hot day is increasing. "Feels like" temperatures have also been rising, but First Street also posits that homes in Berkeley have moderate vulnerabilities to heat based on factors like shade and proximity to bodies of water.

Exhibit 8 shows First Street's rising expectations for heat waves in the future. It shows:

- 30 years ago, there was a 40% likelihood of a 3+ day heat wave

- This year, there is a 62% likelihood of a 3+ day heat wave
- In 30 years, there will be a 90% likelihood of a 3+ day heat wave

Exhibit 14. Likelihood of 3+ days above 83 degrees Fahrenheit



Data was used from First Street to simulate the number of heat days along the following thresholds, where the indicated temperature is the "feels like" temperature, so includes humidity (which increases the perceived temperature). First Street provided an estimate of the average number of days between 80 and 90 degrees F and above 90 degrees F for the next 30 years. Table 6 focuses on the next ten years. The difference between what First Street's algorithm would have predicted for past years was compared to what actually happened, to estimate the potential variation between what First Street's algorithm predicts for the future and what actually happens.

Table 7. *Summary of Simulation Results for Number of High Heat Days*

"Feels Like" Temperature	Annual Average Now	Annual Average in 10 Years	Annual 90th Percentile Now	Annual 90th Percentile in 10 Years
80-85 Degree Days	17	18	25	26
85-90 Degree Days	8	10	13	16
90-100 Degree Days	6	7	11	12
100+ Degree Days	0	1	2	2

Unfortunately, not much useful research exists on economic impacts of high heat at the local level – research seems to focus on aggregated losses at the national or international

level. Because the available data was so broad, it was not used as the basis for a local estimate.

B.5 Poor Air Quality

B.5.a Description of Poor Air Quality and Related Hazards

Poor air quality is a growing concern in Berkeley and in California. According to the California Air Resources Board, 90% of Californians breathe unhealthy levels of outdoor air during some parts of the year. The Bay Area Air Quality Management District (BAAQMD) offers continuous monitoring for 11 pollutants, set by state and federal standards to protect the health and climate. More information about those 11 pollutants and how they compare to federal or state standards is available on the BAAQMD website.

In the Bay Area, the air pollutants of greatest concern include ozone, particulate matter, and toxic air contaminants.

- *Ozone* is formed in the atmosphere through chemical reactions between pollutants emitted from vehicles, factories and other industrial sources, fossil fuels, combustion, consumer products, evaporation of paints, and many other sources. Ozone is the main ingredient in summertime smog.

- *Particulate matter* is composed of an assortment of tiny airborne particles that vary in size and mass (ultrafine, fine, and coarse), physical state (solid or liquid), chemical composition, toxicity, and how they behave in the atmosphere. These particles originate from a variety of manmade and natural sources, including fossil fuel combustion, refining crude oil, residential wood burning and cooking, wildfires, volcanoes, sea salt, and dust. Residential wood burning is the largest source of particulate matter in the Bay Area during the winter.

- *Toxic Air Contaminants* are generally present in very small amounts in the air, but are extremely hazardous to human health. In the Bay Area, the toxic air contaminant of greatest overall concern is exhaust from diesel engines.

Poor air quality is a major public health concern. Poor air quality can irritate the eyes, nose, and throat, cause shortness of breath, aggravate asthma and other respiratory conditions, and affect the heart and cardiovascular system. Poor air quality can last for a few hours or a few weeks, depending on its source. It can also be a chronic issue, for example in places near industry or highways. The air quality can also change quickly due to weather conditions, such as rain or wind.

Connection to climate change

According to the National Climate Assessment, the global warming observed over the industrial era is unequivocally caused by greenhouse gas emissions from human activities—primarily burning fossil fuels. Climate change will affect human health by increasing air pollution, affecting ozone and/or particulate matter. Scientists are also predicting that climate change will contribute to longer, hotter, and drier fire seasons, which will increase the risk of severe wildfires and exposures to wildfire smoke. While climate change can harm everyone's health, its impacts exacerbate long-standing disparities that result in inequitable health outcomes for historically marginalized people, including people of color, Indigenous Peoples, low-income communities, and sexual and gender minorities, as well as older adults, people with disabilities or chronic diseases, outdoor workers, and children.

Connection to extreme heat

As the world's climate has shifted toward warmer conditions, the frequency and intensity of extreme cold events have declined over much of the US, while the frequency, intensity, and duration of extreme heat have increased. Extreme heat can lead to negative health

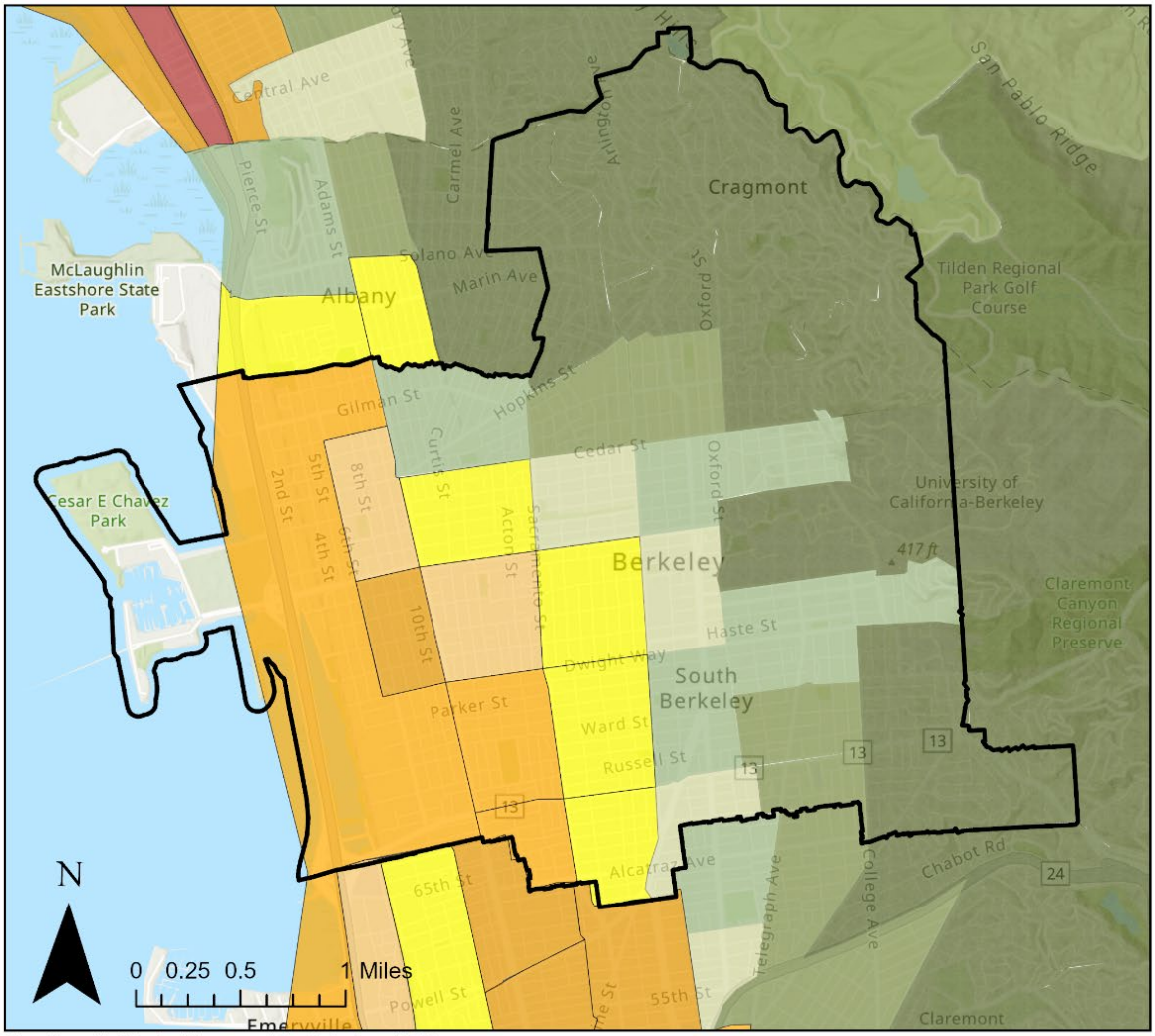
risks including heat-related illness and death. People who regularly struggle to afford energy bills—such as low-income, and older fixed-income households and communities of color—are especially vulnerable to more intense extreme heat events and associated health risks, particularly if they live in homes with poor insulation and inefficient cooling systems.

B.5.b Location of Poor Air Quality

Poor air quality can impact all of Berkeley, for those both indoors and outdoors. South and west Berkeley are generally more exposed to everyday poor air quality from outdoor pollutants due to the areas' proximity to the train, highways, and industrial facilities.

The California Communities Environmental Health Screening Tool CalEnviroScreen is a screening methodology that can be used to help identify California communities that are disproportionately burdened by multiple sources of pollution. Map 20 shows the CalEnviroScreen percentile for Berkeley. Higher percentiles indicate that an area experiences more pollution burden. Generally, the everyday pollution is higher in west Berkeley and lower in the eastern areas of the city. Areas in west and south Berkeley carry higher pollution burdens with percentiles in the 50s, 60s, and 70s, shown in the shades of orange color. The Berkeley hills show percentiles of 10s, 20s, and 30s. The eastern portion of the Berkeley flats shows percentiles in the 40s.

Map 20. ***Pollution Experienced in Berkeley, 2021***



Credits: CalEnviroScreen 4.0, October 2021

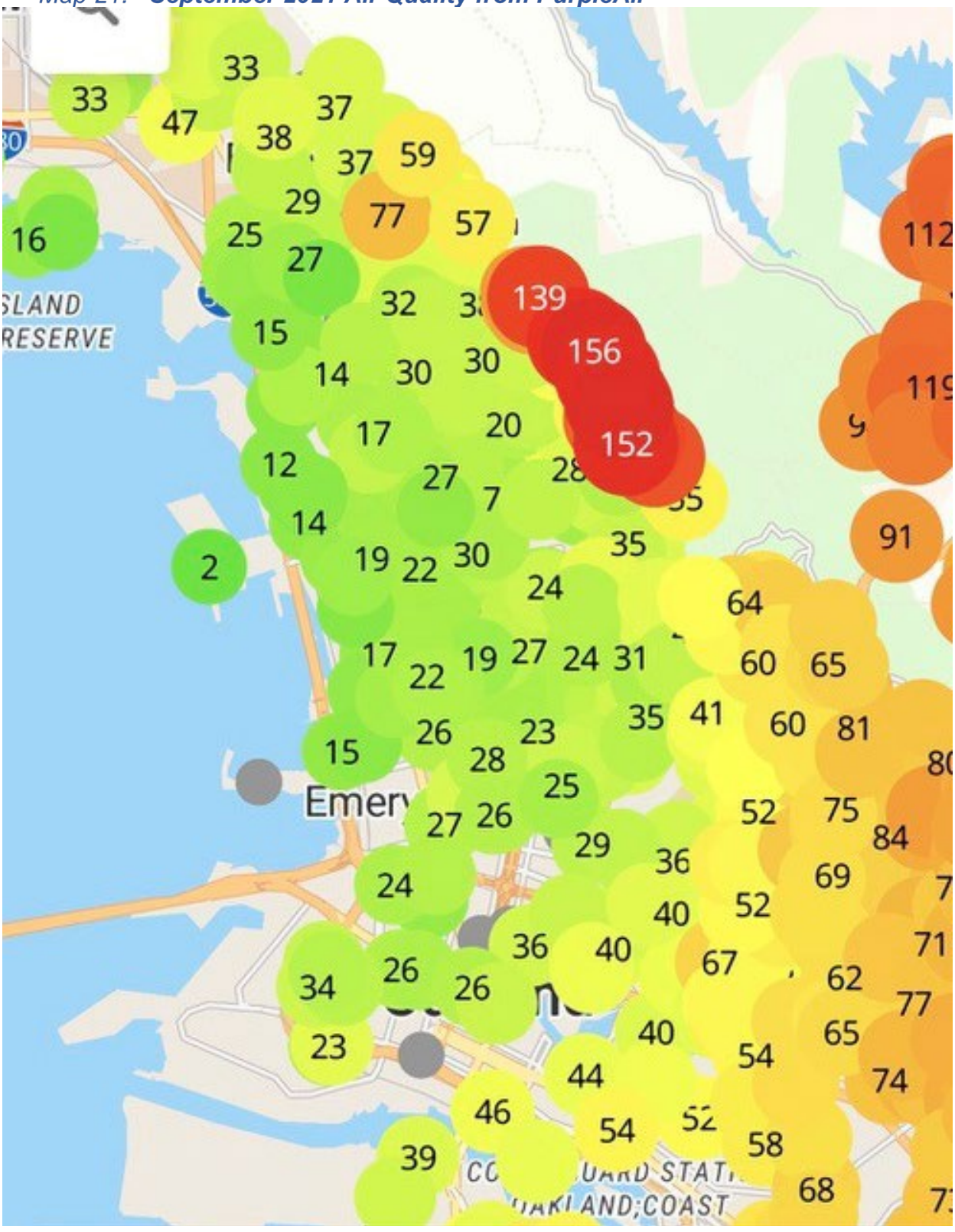
Esri, NASA, NGA, USGS, California State Parks, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/ NASA, USGS, Bureau of Land Management, EPA, NPS, USDA

CalEnviroScreen Percentile

- City of Berkeley Boundary
- 0 to 10%
- 10 to 20%
- 20 to 30%
- 30 to 40%
- 40 to 50%
- 50 to 60%
- 60 to 70%
- 70 to 80%
- 80 to 90%
- 90 to 100%

While day-to-day pollution is more common in Berkeley's western neighborhoods, smoke from wildfires often concentrates in the Berkeley Hills, due to the marine layer inversion effect that prevents air higher in the air from mixing with lower air near the ground, effectively trapping smoke above it.[64] The map below from September 2021 provides an example of the differences in air quality in Berkeley, with air quality numbers above 150 clustered in the hills. Air quality over 150 means that the air is unhealthy for the entire population.

Map 21. ***September 2021 Air Quality from PurpleAir***



Older housing stock, which accounts for much of the homes throughout Berkeley, is more likely to have leaky windows and doors, letting in poor air from outside. In addition to outdoor pollution and smoke, our indoor environments are often filled with chemicals from consumer products, gas appliances, building materials, smoking, furniture, and other household materials. Given that most people spend more time indoors than outside, the quality of indoor air is important. Indoor air quality monitors and air filtration systems are on the market, but are expensive.

B.5.c Extent of Poor Air Quality and Anticipated Intensities

The Air Quality Index (AQI) issued by the Environmental Protection Agency is used for reporting daily air quality. Metro areas with a population of more than 350,000 are required to report the daily AQI. The AQI reports how clean or polluted the air in a given area is, and any associated health effects. The AQI focuses on health effects that may be experienced within a few hours or days after breathing the polluted air.

Table 8. AQI Basics for Ozone and Particle Pollution

Daily AQI Color	Levels of Concern	Values of Index	Description of Air Quality
Green	*Good*	*0 to 50*	*Air quality is satisfactory, and air pollution poses little or no risk.*
Yellow	*Moderate*	*51 to 100*	*Air quality is acceptable. However, there may be a risk for some people, particularly those who are unusually sensitive to air pollution.*
Orange	*Unhealthy for Sensitive Groups*	*101 to 150*	*Members of sensitive groups may experience health effects. The general public is less likely to be affected.*
Red	*Unhealthy*	*151 to 200*	*Some members of the general public may experience health effects; members of sensitive groups may experience more serious health effects.*
Purple	*Very Unhealthy*	*201 to 300*	*Health alert: The risk of health effects is increased for everyone.*
Maroon	*Hazardous*	*301 and higher*	*Health warning of emergency conditions: everyone is more likely to be affected.*

B.5.d Previous Poor Air Quality Events

Everyone in Berkeley can be impacted by poor air quality – some neighborhoods experience moderate or unhealthy air quality on a regular basis due to proximity to various sources of pollutants like highways and industry, and there have also been several extreme examples of poor air quality that impacted the entire City due to nearby wildfires.

In September and October of 2017, the wildfires in North Bay sent smoke to Berkeley, causing unhealthy air for sensitive groups. In November 2018, smoke from the Camp Fire brought very unhealthy air quality. Schools were cancelled, and there were calls for the entire population to avoid outdoor activities for multiple days. In October 2019, smoke from the Kincade Fire brought unhealthy air to Berkeley for a few days. In September and

October of 2020, multiple northern California wildfires brought very unhealthy air to the Bay Area for over twenty consecutive days. In August and September 2021, smoke from northern California wildfires created moderate air quality in the Bay Area for a few days. In December 2022, the Bay Area had unhealthy air mostly due to local residential wood burning and active wildfires in the state.

There have been no federally-declared poor air quality disasters in Berkeley since the last update.

B.5.e Probability of Future Events

Spare the Air was created in 1991 by BAAQMD to alert residents when air quality is forecasted to be unhealthy and to share information on ways to reduce air pollution. Since 1991, there has been at least one Spare the Air issued for the Bay Area per year.

Table 9. *Number of Spare the Air days since 2017*

Year	Number of Spare the Air Days
2023	3
2022	17
2021	16
2020	52
2019	26
2018	13
2017	18

According to a new report from the Federal Reserve Bank of San Francisco[65], frequency of heavy smoke events has increased the San Francisco-Oakland metro area from about one day every four years to about 12 days each year. In the last decade, the average person in the San Francisco-Oakland metro area went from experiencing about three days per year of medium smoke to an average of 13 days per year.

With climate change and the increasing number of extreme heat days, the number of poor air quality days is likely to increase the number of days with Spare the Air notices.

B.5.f Vulnerabilities

People

Poor air quality creates negative health impacts for everyone, including irritation of the eyes, nose, and throat, coughing, chest tightness, shortness of breath, fatigue, and headaches. Poor air quality can also exacerbate other respiratory problems like asthma. According to the United States Environmental Protection Agency (EPA), some studies have shown a link between poor air quality and severe cardiovascular issues. Groups most at risk during poor air quality events include the elderly, children, infants, pregnant women, people with preexisting conditions, people who work or live outdoors, and people who live in neighborhoods that have been historically overburdened by pollution and other environmental contaminants, such as west and south Berkeley.

Structures

The effect of air pollution on physical structures may be seen in terms of discoloration, material loss, structural failing and soiling. The smell and residue of smoke can also permeate homes, which may cause a financial burden to clean or replace items.

Natural, historic, and cultural resources

According to the EPA, there is a robust body of research that links the negative impacts that air pollution can have on natural ecosystems. Pollutants can put excess levels of acids into bodies of water, damage soils, and harm plants, trees, and other wildlife.

Berkeley is lucky to be in an area of rich environmental diversity, including close proximity to regional parks. All of these natural resources can suffer due to poor air quality.

Activities that have value to the community

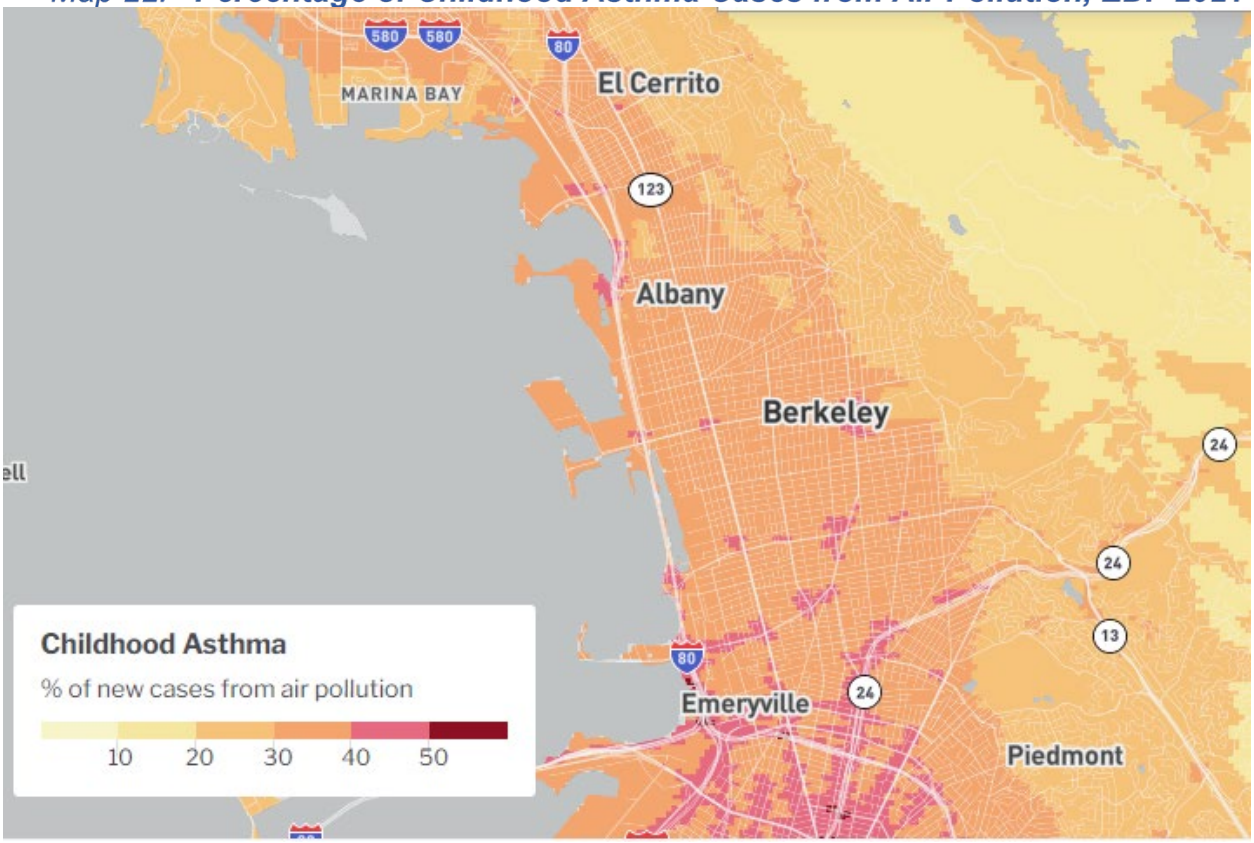
Berkeley provides great access to a wide variety of outdoor activities, including parks, recreation facilities, commerce, outdoor dining, and other unique experiences. These activities can be unsafe during poor air quality events, causing residents and visitors to miss out on the opportunity to visit and enjoy these special parts of Berkeley. The Parks, Recreation, and Waterfront Department hosts a number of activities for children and families throughout the year. During the COVID-19 emergency, when there were poor air quality days, activities had to be cancelled as it was unsafe to have children indoors or outdoors. Additionally, businesses that rely on outdoor activities experience financial losses during these events.

B.5.g Potential Impacts and Losses

The biggest impacts related to poor air quality are those on human health. Southerland et al., published a study in 2021[66] on the harmful impacts of pollution in the Bay Area. According to these estimates, more than 2,500 people die and 5,200 children develop asthma every year due to traffic-related air pollution exposure in the Bay Area.

Map 22 from the Environmental Defense Fund shows the percentage of new childhood asthma caused by air pollution in the East Bay. Most of Berkeley is in dark orange category, meaning over 40 percent of new asthma cases in Berkeley are attributable to air pollution. Some pockets of the Berkeley flats near major intersections rise to fifty percent. The eastern edges of Berkeley in the peaks of the hills drop to thirty percent.

Map 22. ***Percentage of Childhood Asthma Cases from Air Pollution, EDF 2021***



Until recently, most of the research on the health impacts of air pollution were not wildfire-specific. Increased fire activity has led to an uptick in published research on health outcomes. A growing body of scientific evidence links wildfire smoke exposure to various adverse health effects. It is often assumed that while most healthy people will recover from short-term exposure to wildfire smoke, others might experience more severe symptoms, especially people with preexisting medical conditions or other factors, like inadequate housing or lack of access to health care.[67]

B.6 High Wind

B.6.a Description of High Wind

According to the National Oceanic and Atmospheric Administration (NOAA), wind is air in motion, traveling between areas of high pressure to areas of low pressure. Bigger differences in air pressure create strong winds. High- and low-pressure systems are created by ascending and descending air, caused most often by differences in temperature. Wind is described using its horizontal speed and the direction it is coming from.

National Weather Service Definitions

The National Weather Service (NWS) defines "high winds" as:

- Sustained wind speeds of 40 miles per hour (mph) or greater lasting for one hour or longer, or
- Wind gusts of 58 mph or greater for any duration.

Sustained wind speed is different than a wind gust. A wind gust is a brief increase in the wind speed typically around 20-30 seconds.

The NWS issues a wind advisory when there are sustained winds of 31 to 39 mph, or gusts of 46 to 57 mph.

Seasonality of High Wind

In Berkeley, high wind events are typically associated with the seasons.

- In the winter, high winds come with weather systems and cold fronts, generally between November through March.

- In the summer, temperature and pressure differences between the Pacific Ocean and the interior valleys to Berkeley's east create stronger afternoon and evening winds coming from the west.

- Primarily in the fall, dry offshore foehn winds, known as the "Diablo Winds," occur. Diablo Winds are associated with fire weather.

Connection to climate change

Climate change creates more intense and variable weather conditions (both wet and dry), including high wind.

Connection to wildland urban interface fire

Diablo winds can create significant fire danger. Diablo winds are dry and fast. Fires that ignites when Diablo winds are blowing will spread more quickly. See the Wildland Urban Interface Fire Section of this plan for details.

Connection to utility disruption

High wind events can lead to downed trees and/or power lines, causing power disruption. Sometimes when high wind events coincide with extreme heat and dry conditions, in some cases the local utility PG&E may initiate a public safety power shutoff (PSPS) event, temporarily shutting of power in areas of high fire risk to prevent wildfires. Similarly, Enhanced Powerline Safety Settings (EPSS) allow PG&E power lines to automatically turn off power within one-tenth of s second. This can happen when there's a hazard, like a tree branch falling into a power line, which can cause a fire. These settings are in high-fire risk and surrounding areas.

B.6.b Location of High Wind

The location and elevation allow high winds to be felt throughout Berkeley. The westerly wind carries oceanic moisture toward the city, and as the wind flow hits the Berkeley Hills, it splits, producing northward and southward winds. The hot and dry Diablo Winds, particularly common in the spring and fall, affects the Berkeley Hills area more, while the cold storms, more common in the winter, increase wind speeds in the flats.

B.6.c Extent of High Wind and Anticipated Intensities

Beaufort Wind Scale

The Beaufort Wind Scale measures wind severity according to visible environmental impacts, without the use of instruments:

- 0 is calm, meaning calm wind. Smoke rises vertically with little if any drift.
- 1 is light air, with speeds of 1 to 3 mph. The direction of wind is shown by smoke drift, not by wind vanes. Little if any movement with flags. Wind barely moves tree leaves.
- 2 is light breeze, with speeds of 4 to 7 mph. Wind felt on face. Leaves rustle and small twigs move. Ordinary wind vanes move.
- 3 is gentle breeze, with speeds of 8 to 12 mph. Leaves and small twigs in constant motion. Wind blows up dry leaves from the ground. Flags are extended out.
- 4 is moderate breeze, with speeds of 13 to 18 mph. Wind moves small branches. Wind raises dust and loose paper from the ground and drives them along.
- 5 is fresh breeze with speeds of 19 to 24 mph. Large branches and small trees in leaf begin to sway. Crested wavelets form on inland lakes and large rivers.

- 6 is strong breeze with speeds of 25 to 31 mph. Large branches in continuous motion. Whistling sounds heard in overhead or nearby power and telephone lines. Umbrellas used with difficulty.

- 7 is near gale, with speeds of 32 to 38 mph. Whole trees in motion. Inconvenience felt when walking against the wind.

- 8 is gale, with speeds of 39 to 46 mph. Wind breaks twigs and small branches. Wind generally impedes walking.

- 9 is strong gale, with speeds of 47 to 54 mph. Structural damage occurs, such as chimney covers, roofing tiles blown off, and television antennas damaged. Ground is littered with many small twigs and broken branches.

- 10 is whole gale, with speeds of 55 to 63 mph. Considerable structural damage occurs, especially on roofs. Small trees may be blown over and uprooted.

- 11 is storm force, with speeds of 64 to 75 mph. Widespread damage occurs. Larger trees blown over and uprooted.

- 12 is hurricane force, with speeds of over 75 mph. Severe and extensive damage. Roofs can be peeled off. Windows broken. Trees uprooted. RVs and small mobile homes overturned. Moving automobiles can be pushed off the roadways.

Damage to Trees and Vegetation

The extent of damage caused by a high wind event is related to what meteorologists call antecedent conditions. Essentially, if previous weather conditions have been wet, the impacts of high winds on trees, for example, could be higher since the ground is weak with saturation. Timing can also play a role. If it's the first high wind event of the season, there might be more foliage, limbs, or branches that fall as the wind blows for the first time in a while.[68]

B.6.d Previous High Wind Events

The strong wind can create dangerous conditions, especially when combined with low humidity and dry fuels. This combination could escalate fires if ignition occurs or damage

infrastructure and human health. Therefore, wind speed is constantly monitored. Using data collected by observational instruments placed at the Lawrence Berkeley National Lab, we identified several days with sustained winds exceeding 25 miles per hour (Category 6, considered a strong breeze with speeds of 25 to 31 mph). The highest wind speed recorded was 31 mph on March 21, 2023, and 29 mph on January 26, 2021. Additionally, there are numerous days with wind gusts surpassing 31 miles per hour, the highest being 63 mph on March 14, 2013, and 61 mph on March 21, 2023. The winter months (December, January, February, and March) statistically experience prevailing strong winds of 20 mph or higher.

The winter months of 2023 had several severe storms that included flooding, high winds, and landslides. During January to April 2023, there were three federally declared disasters in Alameda County, including DR-4699, DR-4683, and EM-3591.

B.6.e Probability of Future Events

As temperatures increase worldwide due to climate change, changes in rising sea levels, humidity, and storminess are unavoidable as the physical processes are all interlinked. Given the prevalence of previous high-wind events, it is expected that each year will bring more. By analyzing past and present weather patterns, scientists predict an increase in wind speed and wave height in coastal areas, including the Bay Area and Berkeley.

B.6.f Vulnerabilities

People

High winds can pose significant safety risks to people. Large branches can break off or

topple trees, putting people outside or inside adjacent buildings at significant risk. Winds may dislodge other heavy objects, and dust and debris can cause injuries to the eyes, throat, and mouth.

High winds can be particularly dangerous for people experiencing homelessness, people who work outside, and people who live in mobile or unanchored homes.

Structures

Downed trees or blowing objects can damage infrastructure, including homes, public and private buildings, and vehicles.

Systems

High winds can topple trees, which in turn can take down power lines and/or cause other objects to do the same. Downed power lines pose an immediate risk to people in the area, and can also have widespread impacts via power outages.

Natural, historic, and cultural resources

High winds can severely damage or kill trees, such as when major limbs fail or the trunk topples to the ground. For example, in 2022 a redwood tree fell at Willard Park after a windstorm. In the 2023 storms, the City lost an 80-foot Guadalupe Cypress in Caesar Chavez Park and UC Berkeley lost a redwood tree in the UC Botanical Garden.

According to the University of California Statewide Integrated Pest Management Program[69], wind can harm gardens, landscapes, and other parts of the natural environment. Wind can damage bark, flowers, foliage, fruit, and limbs of most trees or

shrubs.

B.6.g Potential Impacts and Loss Estimates

Climate change is expected to increase the potential impacts and losses associated with high wind, as it brings more varied and extreme weather. Changes in population patterns and in development are not expected to drastically change the potential impacts of high winds.

Because high wind events are generally associated with either winter storms or fire weather, the impacts from high winds alone are not tracked specifically.

However, winter storms in 2023 illustrate potential impacts. Berkeley's Parks, Recreation, and Waterfront Department estimates that these storms toppled 85 trees on City property, many of them falling around the Berkeley waterfront. This count does not include trees that fell on private property. There is not a comprehensive list of damages or estimates of total damage, but reported damage includes one tree falling onto a house and another on a pickup truck.[70] From December 2022 to April 2023, there were more than 300 calls to 311 about broken branches and trees, more than any winter since 2015-2016.

Damage from these storms resulted in three federally-declared disasters in Alameda County and created a backlog of tree removal work that limited staff capacity and time for tree planting and maintenance.

GFOA's High Wind Analysis

High winds can cause damage in the community. High winds can occur relatively frequently. For example, data from the National Weather Service indicates that there have

been 118 wind events in the entire San Francisco Bay Shoreline zone since 2011, with an average speed of 43 miles per hour.

Of course, not every wind event in this zone will impact Berkeley. An examination of wind data from a local weather station for the last 24 months showed that the average windspeed of the 10 sustained wind events was about 30 mph. For comparison, FEMA regards 67 mph as a very strong wind event that would be likely to cause significant damages. During the same 24-month period, the San Francisco Bay Shoreline Zone experienced three events over 40 mph. The biggest was on April 11, 2002. On that day in Berkeley, the maximum sustained wind period was around 40 mph. It should be noted that sustained winds (customarily measured over ten minutes) are not as strong as short wind gusts that can happen during the wind event. For example, during a recent two-year period the top speed of a wind gust was an average of 4.7 mph greater than the speed measured for the associated sustained wind event.

To estimate the number of wind events per year on average Berkeley can expect to experience, 24 months of local weather station data was compared to the same period from the National Weather Service data. The wind events for the San Francisco Bay Shoreline zone were fully felt in Berkeley in four out of eleven cases (36%). That same portion was then applied to the entire 12-year period of history to arrive at an assumption that there will be an average of 3.5 wind events per year, on average.

An assumption was made that there is a 3% chance of a wind event with sustained winds of 67 mph or greater, which is equivalent to assumptions from FEMA's estimates of losses for Berkeley. 50% of wind events were assumed to be 45 mph or less, which is consistent

with historical data. To estimate damage, estimates were taken from FEMA for damages from a very strong wind event (67 mph), based on total exposed value and expected rates of loss, which was $43,200 per event. That loss was then scaled down to expected damage from a 45mph event. According to the Beaufort Wind Scale, winds at 45 mph result in damages such as twigs and small branches broken from trees. It was therefore assumed that damage was minimal at winds of this speed. These assumptions resulted in the loss exceedance curve shown in Exhibit 14.

Exhibit 15. Loss Exceedance Curve for High Wind, 10 Year and 1 Year Risks (millions of dollars)

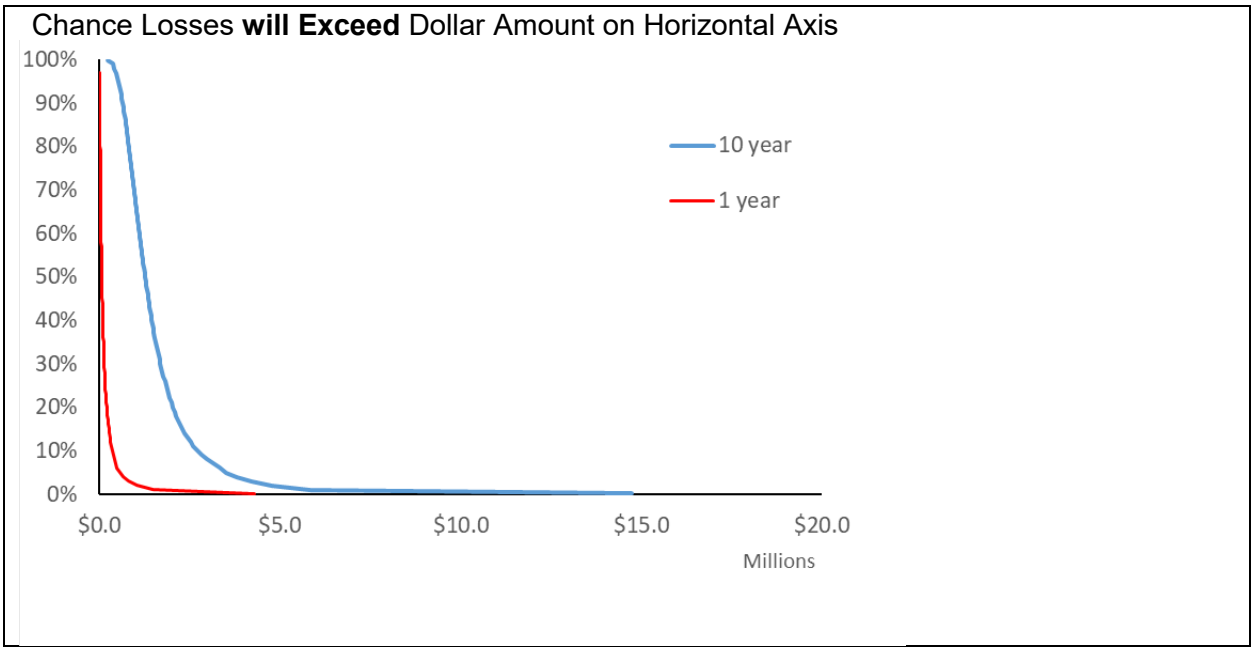


Table 10 pinpoints key ideas from Exhibit 14 above. For example, over a one-year period, there is a 5 percent chance that there will be a wind event causing $600,000 of damage, but there is a 90 percent chance of zero damage. However, over a ten-year period, the risk increases. There is a 5 percent chance that there will be a high wind event causing $3.5 million in damage, and a 90 percent chance that there will be at least $600,000 in damage due to high winds.

Table 10. *Chance that Economic Losses Will Exceed Dollar Amounts (Millions)*

Time Horizon	5%	10%	50%	90%
1-Year	$0.6M	$0.3M	$0.1M	$0**
10-Year	$3.5M	$2.7M	$1.3M	$0.6M

1 *Not Applicable (NA) means that the loss exceedance curve intersects zero before this point. See the graph to see where the curve meets the vertical axis for the chance of losses exceeding zero.

2 **Potential damages are so low that we round to zero

B.7 Rainfall-Triggered Landslide

B.7.a Description of Rainfall-Triggered Landslide

According to the United States Geologic Survey, a landslide is a movement of a mass of rock, debris, or earth down a slope. The term “landslide” includes five modes of slope movement, including falls, topples, slides, spreads, and flows. They are further subdivided by the type of geologic material (bedrock, debris, or earth).

In the United States, the most frequent and widespread damaging landslides are started by prolonged or heavy rainfall. The majority of rainfall-triggered landslides are shallow (less than a few meters deep), small, and move rapidly. Rainfall-trigged landslides often turn into debris flows (fast moving slurries of water, soil, and rock) as they travel down steep slopes.

Rainfall, snowfall, changes in water level, erosion, ground water, and human activity can contribute to landslides. Examples of human activity include grading for roads, home construction, and landscaping, all of which can decrease hillside stability by adding weight to the top of a slope, destabilizing the bottom of a slope, and/or increasing water content of the underlying materials.

Connection to climate change

Climate change is creating more intense and varied weather conditions, including intense rainfall, which can contribute to landslides.

Connection to wildland-urban interface fire

Tree roots and vegetation can be important to providing support and preventing erosion. Fires can burn trees and vegetation, removing that hillside support. Post-fire landslide hazards include fast-moving, highly destructive debris flows that can occur in the years immediately after wildfires in response to high intensity rainfall events.

B.7.b Location of Rainfall-Triggered Landslide

The California Geological Survey has produced two maps that together provide helpful data on where landslides are most likely to be triggered by winter storms.

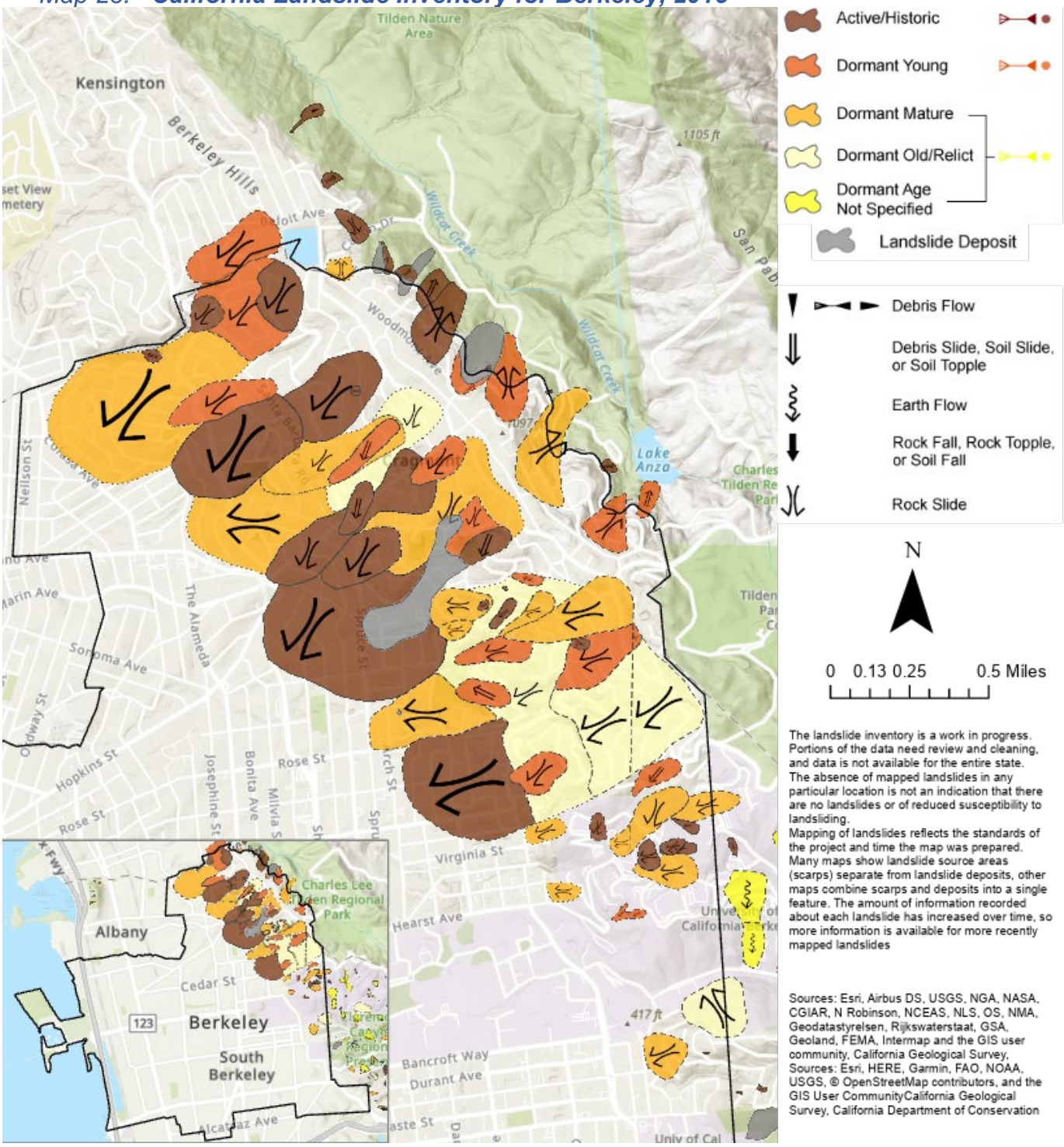
The Landslide Inventory is an ongoing project to collect and display current and historical landslide data for the State of California. Map 23 shows the Landslide Inventory for Berkeley, focused on the Berkeley hills. Landslide movement could range from a few inches to tens of feet in any given year, but ground surface displacements as small as a few inches are enough to break typical foundations.

On Map 23:

- Active landslides are shown in brown.
- Dormant landslides are shown in orange, yellow, or light yellow. These are deep-seated or dormant landslides that are not currently moving, but that may have moved in historic time or in recent geologic time. These dormant landslides could be reactivated by changing surface or subsurface conditions.

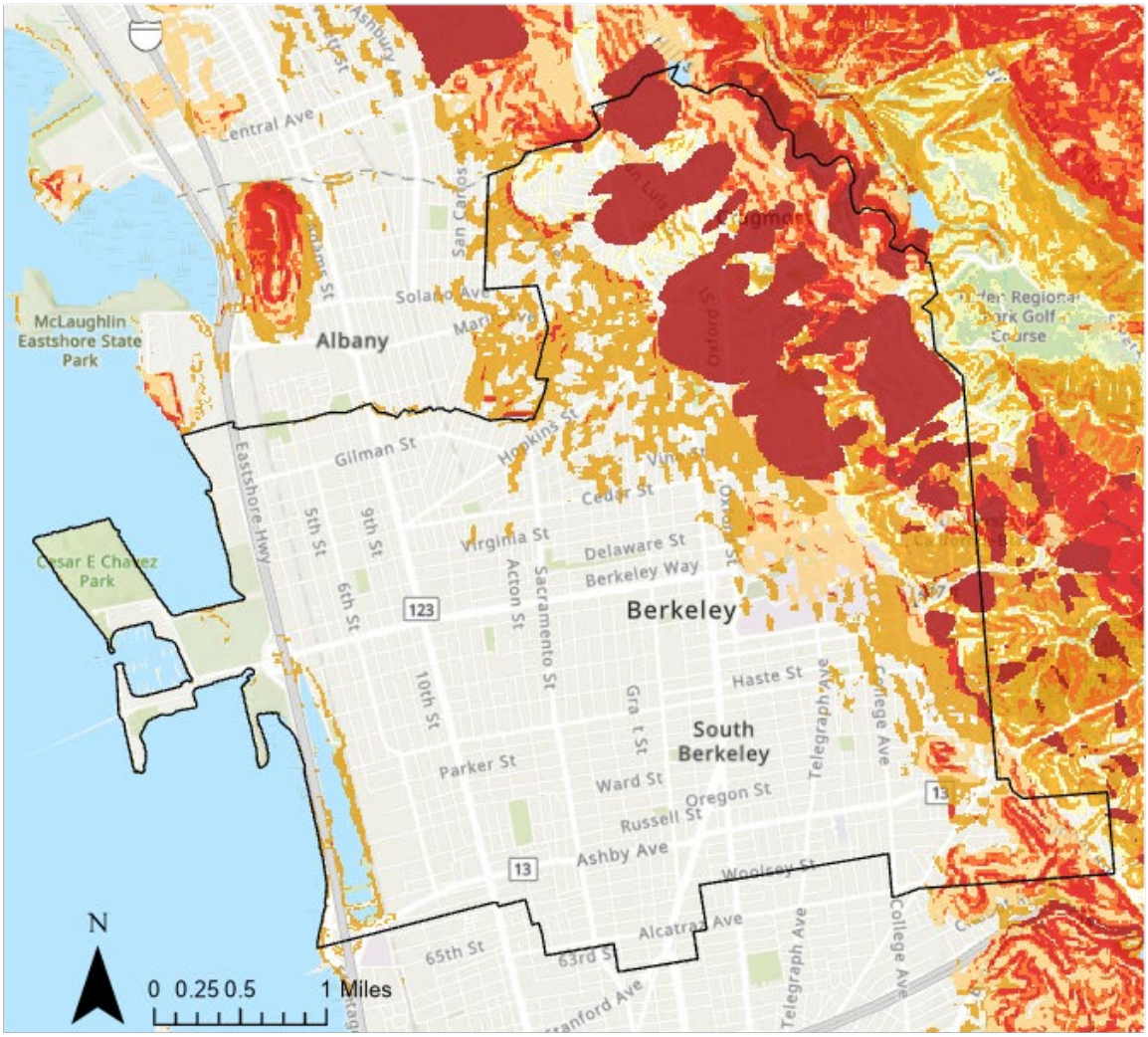
Generally speaking, in Berkeley, there are active and dormant landslides spread throughout locations in the Berkeley hills.

Map 23. ***California Landslide Inventory for Berkeley, 2015***

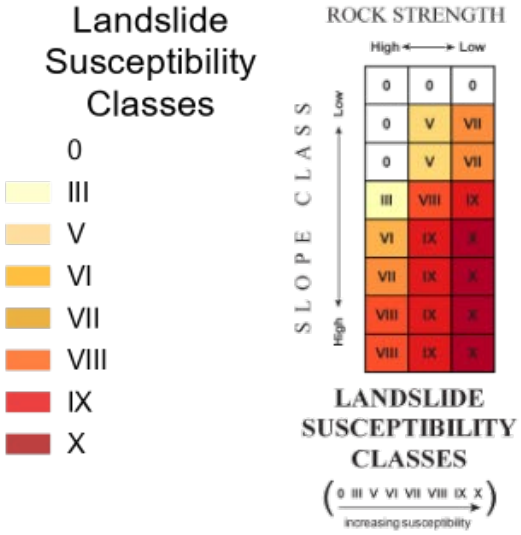


Map 24 shows the overall susceptibility to deep seated landslides in areas throughout Berkeley. Rock strength and slope are combined to create classes of landslide susceptibility. These classes express the generalization that on very low slopes, landslide susceptibility is low even in weak materials, and that landslide susceptibility increases with slope and in weaker rocks. Very high landslide susceptibility, classes VIII, IX, and X, includes very steep slopes in hard rocks, and moderate to very steep slopes in weak rocks. Generally speaking, these classes in Berkeley are concentrated in northeast Berkeley and in the Berkeley hills. The further east in the Berkeley hills have greater susceptibility with steeper slopes and weaker rocks (shown with darker red colors).

Map 24. ***Landslide Susceptibility in Berkeley, 2015***



Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community, Sources: Esri, HERE, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community, DOC/CGS California Geological Survey, California Department of Conservation



B.7.c Extent of Rainfall-Triggered Landslides and Anticipated Intensities

The most dangerous landslides in terms of life safety are fast-moving, generally shallow debris flows. These are triggered when intense rainfall follows storms that have already saturated hillsides. Debris flows initiate in concave slope areas where subsurface water is concentrated, elevating pore pressure above the natural strength of the soil. Once initiated, debris flows can travel great distances at relatively high velocities, flowing down drainages and onto alluvial fans and damaging any structures lying in their paths. Preexisting and recently-active, larger landslides (such as those shown in Map 23) are more often triggered by exceptionally long periods of seasonal rainfall, and sometimes do not start moving until long after the rain has stopped. These types of slides may not move as rapidly as debris flows, but can damage large areas and many structures, resulting in extensive landslide losses.

B.7.d Previous Rainfall-Triggered Landslide Events

The most recent landslide in Berkeley occurred in January 2023 and it was federally declared disaster DR-4683. In December 2022 and January 2023, six atmospheric river events brought over 15 inches of rain to Berkeley, along with wind gusts over 55 miles per hour. A large chunk of hillside located on the eastern edge of Zaytuna College's Upper Campus broke loose. The landslide traveled onto the private property immediately downslope, destroying an outbuilding and damaging the home. In total, residents were evacuated from one impacted property, along with seven more threatened properties further downslope). There were no injuries but homes remained evacuated for multiple weeks while the slide was remediated.

Another landslide occurred in Berkeley in January 2017. At the time, the overall rainfall in

California was on pace to be the wettest season in over 100 years on record. Rain saturated the soil in Berkeley and throughout the State. The slide occurred on an undeveloped lot in the North Berkeley hills and threatened to close the street situated in the path of the slide. Repairs to the hillside were completed in late 2018. There were no injuries.

During the winter of 1997-1998, another landslide occurred in North Berkeley, when soils became oversaturated from heavy rains brought by the El Nino weather system. One home was significantly damaged and had to be demolished. Residents had to evacuate two additional homes but were able to reoccupy these homes after the hillside was stabilized. No one was hurt.

In 1996, a minor slide collapsed the Euclid Avenue retaining wall, blocking the roadway.

At other times over the 20th century, landslides from rainfall-saturated ground in the Berkeley Hills damaged and sometimes destroyed homes and public infrastructure, including streets, sewers, and other utilities. Most of the areas damaged were later rebuilt or built over.[71]

B.7.e Probability of Future Events

Berkeley has a number of active landslides (shown in Map 23), which means they are currently moving or movements have been recorded in the past. There are a number of deep-seated landslides that continuously move, with the rate of movement affected by rainfall and groundwater conditions.

There have been 4 damaging landslides,[1] triggered by rain, in Berkeley since 1982. Using this rate of three landslides in 41 years, there is a 7% annual chance of a landslide.

However, climate change will likely increase this risk. Climate change results in more intense rainfall events, creating favorable conditions for more devastating landslides. There is not currently a way to quantify how climate change increases the probability of a damaging landslide.

B.7.f Vulnerabilities

People

People may be hurt or killed during a landslide. Damage to roads and sidewalks may prevent people from evacuating, and will challenge responders to access the area.

Structures

Landslides are most likely to damage residential or privately-owned structures because the landslide risk predominately affects residential areas. According to a USGS report approximately 6,000 structures are located in areas at moderate to high risk of landslides.[72]

Property owners are responsible for mitigating landslide risks to their own properties. Homeowner's insurance often excludes landslides, forcing property owners to manage damage and costs without coverage.

The hazard is greater in steeply-sloped areas, although slides may occur on slopes of 15

[1] By "major and damaging" we simply mean that the damage was large enough to require intervention by City government and cause City government a significant cost.

percent or less if the conditions are right. Slope steepness and underlying soils are the most important factors affecting the landslide hazard. However, surface and subsurface drainage patterns also affect the landslide hazard, and vegetation removal can increase the likelihood of a landslide.

The hazard can be reduced through grading, strengthening, geotechnical engineering, drainage, and other landscape methods. The City does regulate and inspect new development activities, but most of the Berkeley hillside development predates current best practices and codes. Further, mitigation efforts can be costly and out of reach for many residents on a fixed budget.

Systems

Roads and sidewalks may be damaged as a result of a landslide.

Underground utilities (water, sewer lines, storm drains, natural gas lines, and conduits) and aboveground utilities (electricity, telecommunications, cable) may be damaged in a landslide. Damage to underground utilities may pose serious health and environmental risks. Interruptions in electrical power may require with disabilities and people who depend on electrical equipment for medical needs to evacuate or to have emergency power supplies, even if they are not directly impacted by a landslide.

In Berkeley, several collector streets that are critical for emergency access and evacuation are located in areas susceptible to landslides.

Natural, historic, and cultural resources

The Berkeley hills, where landslide risk is most present, include homes of architectural

significance. There are also several parks, recreational areas, as well as institutions that may be impacted by a landslide.

According to Map 24, significant portions of the University of California - Berkeley campus, as well as the Lawrence Berkeley National Lab, are susceptible to landslide.

B.7.g Potential Impacts and Losses

Landslides can cause serious injury or death. Fortunately, recent landslides have not caused any deaths or injuries. There is currently no data on how many deaths or injuries to expect with a given landslide, but Berkeley's landslide-exposed areas are densely populated, meaning that there is significant risk to people.

Climate change is expected to increase the potential impacts and losses associated with rainfall-triggered landslides. Expected changes in population patterns potentially increase impacts and losses associated with rainfall-triggered landslides. As the population steadily increases, if there is additional development in the eastern hills, more people could be exposed to landslide risk. Changes in land use and development may potentially increase impacts and losses. New state laws are mandating increased density throughout the city, including in the eastern hills, which are more exposed to wildland-urban interface fire and landslides.

GFOA's Rainfall-Triggered Landslide Analysis

A search of historical records indicates that there have been 4 damaging landslides, triggered by rain, in Berkeley since 1982. We used this as the basis for the potential frequency of landslides in the future: 3 landslides in 41 years implies a 7% annual chance

of a landslide.

For potential damages landslides might cause we looked at two sources:

1. FEMA estimates of total exposure to landslides in each census tract in Berkeley and estimated loss ratios. This provided a starting point for what losses might be from a landslide.

2. Historical records of losses from landslides in the region. This provided a sense of the variation that can take place.

We put all these pieces of data together to develop a range of possible landslide outcomes. This resulted in the potential community economic losses shown in Exhibit 10.

Exhibit 16. Loss Exceedance Curve for Landslides, 10 Year and 1 Year Risks (thousands of dollars)

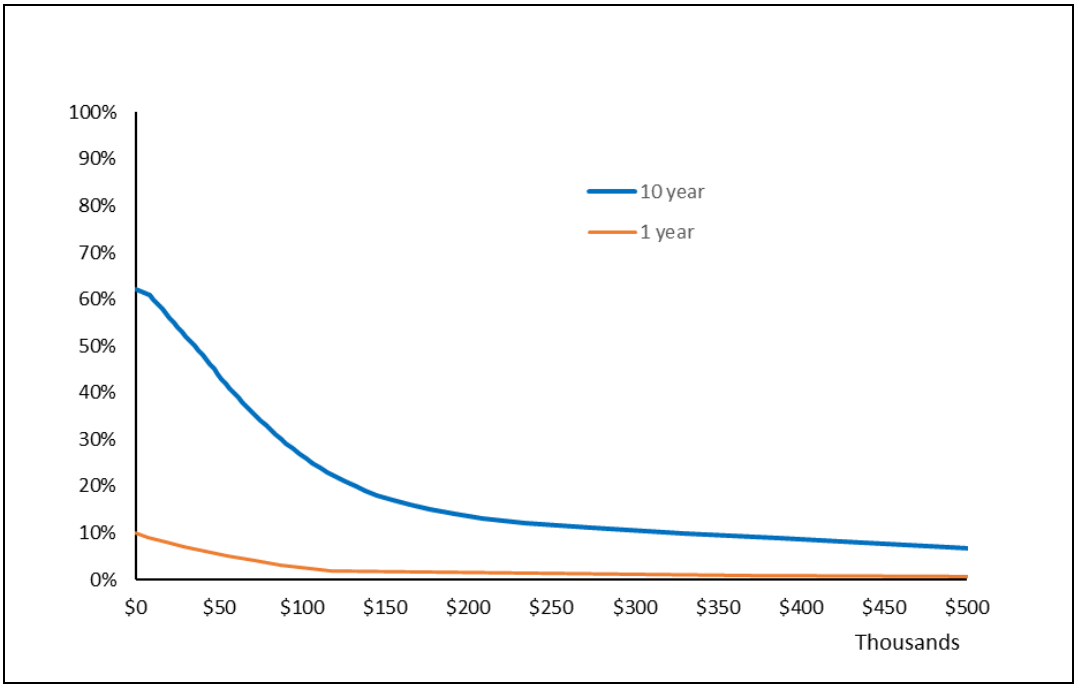


Table 10 pinpoints key ideas from Exhibit 10 above. For example, over a one-year period,

there is a 5 percent chance that there will be a landslide causing $55,000 of damage. Over a ten-year period, the risk increases, and there is a 5 percent chance that there will be a landslide causing $600,000 in damage.

Table 11. *Chance that Economic Losses Will Exceed Dollar Amounts*

Time Horizon	5%	10%	50%	90%
1-Year	$55K	NA*	NA*	NA*
10-Year	$600K	$330K	$35K	NA*

*Not Applicable (NA) means that the loss exceedance curve intersects zero before this point. See the graph to see where the curve meets the vertical axis for the chance of losses exceeding zero.

B.8 Tsunami

B.8.a Description of Tsunami

A tsunami occurs in a body of water when a rapid disturbance vertically displaces the water, causing a series of surges. These changes can be caused by an underwater fault rupture (that generates an earthquake) or underwater landslides (typically triggered by earthquakes).

Tsunamis affecting the Bay Area can result from offshore earthquakes within the Bay Area, or from very distant events. While it is most common for tsunamis impacting the Bay Area to be generated by faults in Washington and Alaska, local tsunamis can be generated from local faults running underwater (such as the small tsunami that was triggered by the 1906 earthquake). The San Andreas Fault runs along the coast off the Peninsula and the Hayward fault runs partially through San Pablo Bay.

Connection to climate change

As sea levels and temperatures rise, so does the potential impacts of tsunami. Increases in sea levels and higher tides may be contributing factors to more frequent and intense coastal flooding.

B.8.b Locations of Tsunami

In 2021, the California Geological Survey (CGS) and the California Governor's Office of Emergency Services (Cal OES) updated the existing tsunami inundation maps for Alameda County, shown in Map 25. In this update, the tsunami boundaries have changed to reflect the best available science as well as local geographic features that impact evacuation safety.

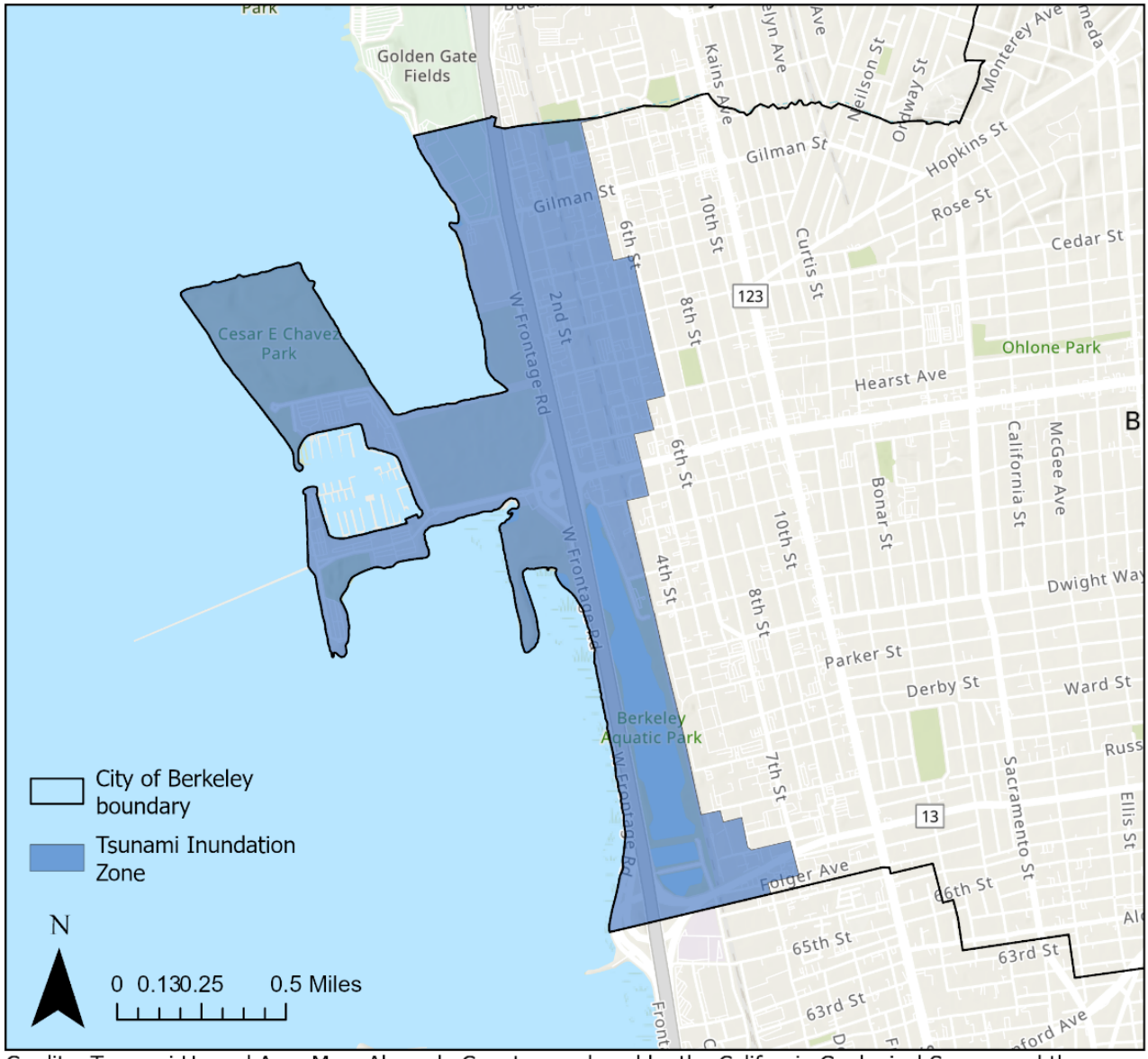
Map 25 shows in blue shading the area of potential tsunami inundation in Berkeley. It does not reflect the inundation area from any singular tsunami, but represents what is possible from large, realistic scenarios primarily from the Alaska and Cascadia subduction zones. This map is intended to be used to evacuation planning purposes only.

Given Berkeley's sloping terrain and the Bay's waters at their current levels, tsunami inundation will not extend far inland from the shoreline, but the zone has increased slightly since the last update to reflect new science and local features. According to Map 25 and shaded in blue, the tsunami inundation zone extends along the entire shoreline of the Bay. Starting at the city's northern border, the zone stretches east from the Bay until it meets Fifth Street. At Page Street, the edge of the zone stretches as far east as Sixth Street until Delaware Street. At Hearst Street, the edge of the zone runs east to Fifth Street. At University Avenue, the edge of the zone runs east to Fourth Street. From

Addison to Heinz Avenue the eastern edge runs to Third Street or to where Union Pacific Railroad is located. At the far south end of the city after Heinz Avenue, the eastern edge of the zone runs to Fifth Street for one block and to Seventh Street at Potter and Folger Avenue.

According to Map 25, the zone captures Golden Gate Fields, the Tom Bates Regional Sports Complex, Eastshore State Park, the Berkeley Marina, the Dona Spring Animal Shelter, portions of Interstate 80 and the frontage roads beside it, the San Francisco Bay Trail, the Amtrak Station, and Aquatic Park. It also captures the Fourth Street Business District.

Map 25. ***Berkeley Tsunami Inundation, 2021***



Credits: Tsunami Hazard Area Map, Alameda County; produced by the California Geological Survey and the California Governor's Office of Emergency Services; 2021, mapped at multiple scales.

California State Parks, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, US Census Bureau, USDA, Esri, NASA, NGA, USGS, FEMA

B.8.c Extent of Tsunamis and Anticipated Intensities

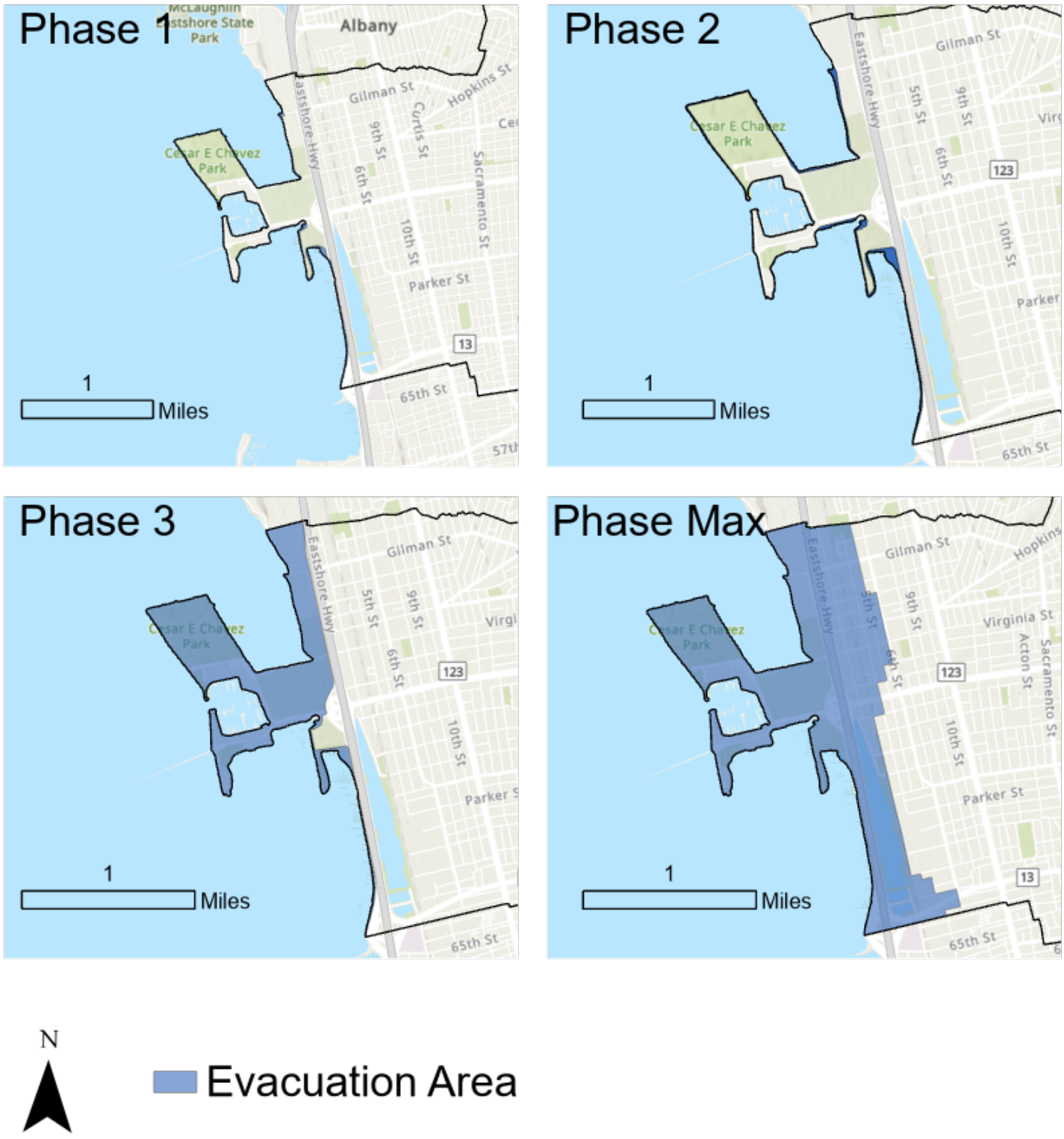
In 2023, the California Geological Survey, the California Governor's Office of Emergency Services, and the National Ocean and Atmospheric Administration (NOAA) released an updated California Tsunami Evacuation Playbook for Alameda County.

Tsunami Evacuation Playbooks reflect more refined and detailed planning, in which forecasted tsunami amplitudes, storm surge, and tidal information can help guide which areas might be inundated in different scenarios, depending on the extent of the event. This analysis uses helps NOAA to better predict inundation areas during actual tsunami events. Local emergency managers can use this information to better target evacuation areas during actual tsunami events.

Map 26 below present these Playbook zones for evacuation as "Evacuation Phases." The areas covered under each phase expand as follows:

- Phase 1 includes beaches, harbor docks and boats, and piers.
- Phase 2 adds small areas of land south of University Avenue and west of the West Frontage Road.
- Phase 3 adds Golden Gate Fields, the Tom Bates Regional Sports Complex, Eastshore State Park, the Berkeley Marina, and portions of the San Francisco Bay Trail.
- The Maximum Phase is presented blue and reflects the full tsunami inundation zone presented on Map 25. The Maximum Phase includes Golden Gate Fields, the Tom Bates Regional Sports Complex, Eastshore State Park, the Berkeley Marina, the Dona Spring Animal Shelter, portions of Interstate 80 and the frontage roads beside it, the San Francisco Bay Trail, the Amtrak Station, and Aquatic Park. It also captures the Fourth Street Business District.

Map 26. ***Berkeley Tsunami Evacuation Phases, 2021***



Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community, Sources: Esri, HERE, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

B.8.d Previous Tsunami Events

There have been no federally-declared tsunami disasters in Berkeley since the last update. But in January 2023, an underwater volcano erupted near Tonga, resulting in a tsunami advisory for Berkeley. Residents evacuated from boats, docks, and near the shoreline. While there were some noticeable swells and strong current leading to entrance of the Berkeley Marina, there wasn't any reported damage.[73]

The most recent tsunami to cause damage in Berkeley was associated with the March 2011 earthquake off the coast of Japan. As a result of the tsunami, a half-meter-tall surge was observed nearby in Oakland with 4-6 knot current. The tsunami surge entered the Berkeley Marina, causing $158,000 of damage to docks and boats.[74]

Tsunamis generally impact the Pacific Coast of California, and reports of tsunamis entering the San Francisco Bay are rare. Tsunamis, or seiches as they are called when they occur within an enclosed body of water, can also be generated within the Bay by the Hayward fault, which passes under San Pablo Bay. The 1868 Earthquake on the Hayward fault is reported to have created a seiche within the Bay. It is unknown whether the seiche impacted the City of Berkeley. The 1964 Alaska earthquake caused extensive tsunami damage that flooded and heavily damaged coastal northern California near Crescent City; data is not available regarding impacts to Berkeley.

B.8.e Probability of Future Events

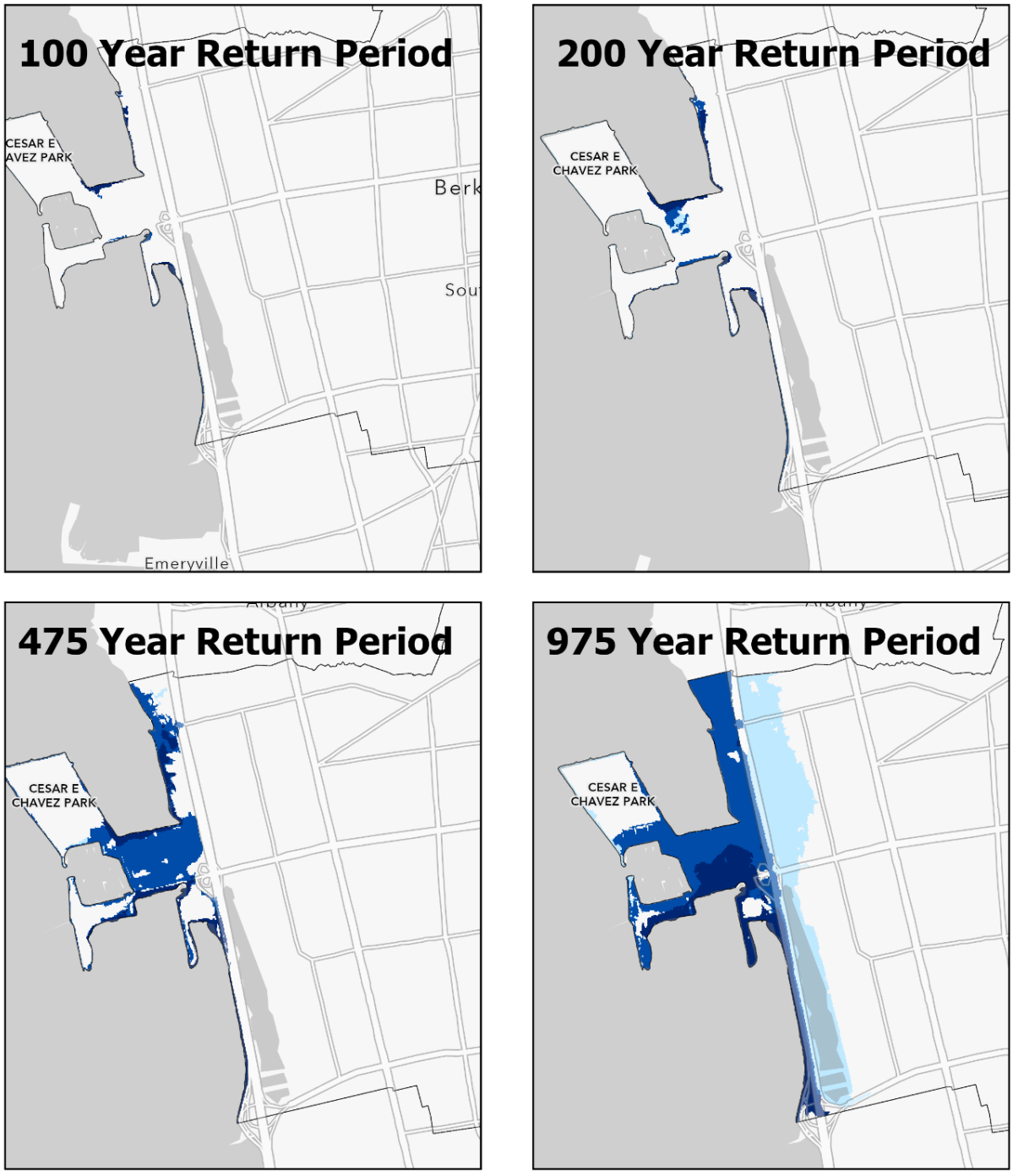
The probability of a tsunami occurring is typically described in return periods, or the estimated average amount of time between events. Map 27 shows the extent of inundation in Berkeley associated with a 100-year, 200-year, 475-year, and 975-year

events.

- A 100-year event has a 1% chance of occurring in a given year.
- A 200-year event has a .5% chance of occurring in a given year.
- A 475-year event has a .2% chance of occurring in a given year.
- A 975-year event has a .1% chance of occurring in a given year. In other words, a 975-year event has a 5% chance of occurring once in the next 50 years.

The areas of impact for these events are fairly similar to the tsunami evacuation phases presented earlier.

Map 27. ***Inundation associated with 100-year, 200-year, 475-year, and 975-year return periods, 2023***



State of California, 2023. Probabilistic Tsunami Hazard Analysis Raster Data – Version 1, California Geological Survey and AECOM Technical Services; dated 2023.

California State Parks, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA

B.8.f Vulnerabilities

People

The people most at risk in any kind of tsunami are those that live on boats at the Berkeley Marina. This includes 100 liveaboard households, as well as 13 houseboats, for a total of 113 households. The Berkeley Marina has 1,000 boat slips. Approximately 200 residents live onboard boats in these slips. An additional estimated 13 live onboard houseboats, and regulations permit all slip holders to spend 12 nights per month on their boats.

Everyone who lives in or visits Berkeley's tsunami inundation area (Map 25) is exposed to tsunami. According to ESRI Demographic Data, 1,416 people in 502 households live in Berkeley's tsunami inundation zone. Of that population, 58 households include a member with a disability, 213 include a member who is over 65 years old, and 23 households are below the poverty line. Berkeley's tsunami inundation area has an estimated daytime population of 6,840, including employees, visitors, and people recreating. This data likely undercounts individuals who are unhoused and those that live at the Berkeley Marina as mentioned above.

According to ESRI Demographic Data, there are 448 businesses with 4,821 employees in the tsunami inundation zone. These businesses are estimated to have a high visitor potential, which may make evacuation more challenging, if customers are unfamiliar with tsunamis and or the geography of the area.

Warning systems typically allow for enough notice for at-risk individuals to evacuate. In the event of a distant-source tsunami, where the underlying earthquake does not impact Berkeley, warnings can be issued before the tsunami arrives onshore in Berkeley.

However, the limited number of egress routes will slow evacuations. Evacuations will also be slowed by the pinch point created on the stretch of University Avenue between Marina Boulevard to the west and West Frontage Road to the east. This stretch of roadway is the only eastward driving option out of the Marina.

Evacuation

The numbers of people and assets exposed to a tsunami are relatively low as compared with other hazards presented in this Plan. However, evacuation routes for Marina residents and visitors are limited. Interstate 80 runs north-south along the eastern edge of the Marina, bisecting the area from the rest of the city. There are six access/egress routes from the Marina into Berkeley:

1. Via the University Avenue Bridge
2. Via the frontage road north to Gilman Street
3. Via the frontage road south to Ashby Avenue/CA-13
4. Via Interstate 80
5. Via the I-80 Bicycle/Pedestrian overcrossing[75]

An earthquake occurring in the waters close to Berkeley could cause a near-source tsunami, which would allow for little to no time to provide warning to people in the inundation area. A near-source tsunami could severely compound evacuation challenges

for individuals in the Marina. These evacuation challenges will disproportionately impact people with disabilities and people with access and functional needs. They may not have immediate transportation options to evacuate quickly. Additionally, in the event of a tsunami, they may be separated from their caregivers and may need assistance to evacuate.

Tsunamis can cause the release of pollutants, toxic substances, and other hazardous materials, threatening public health, water, and the environment. Debris and hazardous materials may also impede evacuations and or emergency response.

Structures

Of primary concern to the City is the Berkeley waterfront, which is primarily used for recreational purposes, educational and environmental programming, industrial, non-profit, and commercial operations.

At the Berkeley Marina, existing docks are a range of ages, with an average age of around 40 years old. Many docks are in significantly deteriorated condition. Broken finger docks, utilities, and pilings pose a safety risk to Marina customers and their vessels. This deteriorating infrastructure exacerbates the area's vulnerability to tsunami. D & E docks were damaged badly in the Tsunami of 2011 (and are scheduled to be replaced in 2024), and many finger docks and pilings are still unusable and have not been repaired or replaced. This results in lost revenue to the Marina, lost capacity, and a reduction in the recreational resources available to the public.

Recent tsunami inundation models[76] provided in the 2018 Harbor Improvement Plan from

the California Geologic Survey have identified a moderate tsunami vulnerability in the Gas Dock, Docks B-K, and Dock O. Docks D and E are considered the area's most vulnerable to modeled tsunami events, with a moderate level of vulnerability to all events. The next most vulnerable are Docks B and C, which have a moderate vulnerability to particular scenario events. In this study, moderate vulnerability was defined as damage to 10% - 90% of cleats and pile guides.

The most significant financial losses to the City of Berkeley in the event of a tsunami would be inundation of the following structures:

- Dona Spring Animal Shelter[77]
- Marina Boat Docks
- Berkeley Yacht Club
- Shorebird Nature Center
- Marina Corporation Yard
- Marina Administration Building
- Skates on the Bay restaurant
- 199 Seawall Drive
- 125-127 University Avenue (office buildings, Berkeley Police Department's Traffic Division are based there)
- Hana Japan Restaurant
- Cal Sailing and Cal Adventures
- Berkeley Marine Center

Other City- and privately-owned facilities of significant value also sit in the tsunami inundation zone. These facilities host a number of businesses and community recreation assets. Tsunami damage could also lead to a drop in revenue to the City from the buildings it leases to others, as well as a drop in tax revenue from businesses operating in the area.

The Tsunami Inundation area includes the DoubleTree Hotel with 378-rooms, many of which are on the ground floor. The DoubleTree regularly hosts events with 500-600 attendees, potentially making it the City's most densely-populated location with tsunami exposure.

The waterfront also includes three restaurants, several offices, commercial boating operations, sailing clubs and businesses, nonprofit offices, two small-scale commuter ferry operations, the Adventure Playground, Shorebird Park Nature Center, Shorebird Park, and an industrial boat yard. A number of waterfront restaurants, such as Skates on the Bay, often have large numbers of customers.

Systems

Tsunamis can damage critical utility infrastructure. This may cause a loss to basis services such as power, sewer, and water. The DoubleTree Hotel is the only business in the area with a generator. See the Utility Disruption Section for details on potential impacts from utility disruption.

Inundation maps show tsunami inundation affecting parking areas and buildings in the Marina. The University Avenue access road is also within the inundation zone. The

University Avenue overpass over Interstate 80 is also shown to be within the inundation zone. While the overpass itself is unlikely to be inundated due to its height, if inundation extends to Second Street, the access ramps on either end of the overpass would be covered, making the overpass impassable.

Natural, historical, and cultural Resources

The Berkeley Waterfront is a public asset and community resource within the City of Berkeley and San Francisco Bay area. The Waterfront is well-loved by the local community, who enjoy the diverse recreational opportunities and the exceptional coastal landscape and biodiversity.

B.8.g Potential Impacts and Losses

Climate change is anticipated to increase the potential impacts and losses associated with tsunamis. With a steadily increasing population, more people will be exposed in the tsunami inundation area. New state laws are mandating increased density throughout the city, which may increase development in the tsunami inundation zone. However, any new development would be required to comply with the applicable regulations to ensure avoidance of and/or adequate mitigation of hazard-induced risk.

Estimating losses from tsunami inundation is difficult given that the inundation maps do not represent inundation from a single scenario event. Inundation from any single event will almost certainly be less severe than depicted in Map 25, which is intended to display worst-case scenario run-up heights from all potential tsunami sources across the Pacific Rim.

SAFRR Analysis

The 2013 SAFRR tsunami scenario[78] depicts a hypothetical but plausible tsunami, created by an earthquake offshore from the Alaska Peninsula. The study projected impacts on the California coast, which included:

- Pilings in the Berkeley Marina will not be overtopped by tsunami waters, but over half of the docks in California coastal marinas will be damaged or destroyed
- One-third of boats in California coastal marinas will be damaged or sunk
- In Alameda County, tsunami inundation will create $20 million in building damage and $164.4 million in damage to building contents
- Wastewater treatment plants in Alameda County will be inundated and could release raw or partially-treated sewage and wastewater-treatment chemicals.

GFOA Analysis

Berkeley is at some risk from tsunami. The worst tsunami that researchers have commonly contemplated is the 1-in-900-year tsunami. This represents a tsunami so large that we would expect to see one that large only once in 900 years. Map 25 shows the area of the City we could expect to be impacted by such a tsunami. A tsunami of this size is expected to impact about 1,400 residents, a daytime population of 6,800, and 448 buildings.

The damage of less intensive tsunamis is substantially less. A tsunami of sufficient intensity to occur only once every 475 years is only estimated to impact 125 residents, 1,100 daytime population, and 14 businesses.

Unfortunately, researchers have not produced usable estimates of projected economic losses from a major tsunami. Further research is needed to fully assess Berkeley's

tsunami hazard, including structural assessment of buildings and infrastructure in the inundation zone, to determine if they are designed and constructed with the strength and resilience needed to resist the effects of tsunami surges.

The City will leverage ongoing research and coordinate with regional, State and federal partners to help answer these questions.

B.9 Sea Level Rise and Shallow Groundwater Rise

B.9.a Description of Sea Level Rise and Shallow Groundwater

Sea Level Rise

Sea level rise is an increase in the level of the world's oceans. Warmer temperatures associated with climate change are causing global sea levels to rise through two processes:

- Warmer temperatures are increasing the amount of ice melt from the world's glaciers, ice caps and ice sheets. This melted ice increases the volume of water in the ocean.
- In a process termed "thermal expansion," warmer temperatures cause ocean water to expand, further increasing the ocean's volume.

Shallow Groundwater Rise

Recent scientific studies have begun to evaluate the impact of the shallow groundwater rising in low-lying coastal areas (like Berkeley) combined with sea level rise. According to the San Francisco Estuary Institute and the Pathways Climate Institute[79], as sea levels

rise in San Francisco Bay, shallow groundwater underneath low-lying coastal communities will also rise. For this reason, low-lying inland areas could flood from below by emergent groundwater long before coastal floodwaters overtop the shoreline. As groundwater rises, it will increasingly infiltrate sewer systems, flood basements, and damage underground infrastructure. Rising groundwater will also interact with contaminated lands around the Bay, creating a potential exposure pathway that could impact the environment and public health. And rising groundwater will increase liquefaction hazards in response to earthquakes, particularly in former open water, mudflat, marsh, and floodplain areas that have been filled for development. Liquefaction occurs when loosely-packed, water-logged sediments at or near the ground surface lose their strength in response to strong ground shaking.

Connection to climate change

Burning fossil fuels releases carbon dioxide and other heat-trapping gases into the atmosphere; oceans then absorb the majority of this heat. As water becomes warmer, it expands. This results in ocean levels rising worldwide.

The Intergovernmental Panel on Climate Change (IPCC) has identified four potential scenarios that reflect different future scenarios for greenhouse gas concentrations of the atmosphere. The scenarios are known as Representative Concentration Pathways (RCPs). They range from:

- RCP 2.6: Represents stopping all current greenhouse gas emissions, as well as significant carbon sequestration (a negative carbon output), to
- RCP 8.5: Represents continuing and increasing carbon emissions.

Each scenario presents estimates for expected increase in sea level rise as the planet warms and melting rates increase. Table 11 provides analyses of sea level rise projections for the State and the Bay Area under these different climate scenarios in the year 2100.[80]

Table 12. Sea Level Rise Projections in year 2100 for Different Carbon Emissions *Scenarios*

Source	Carbon Sequestration & Eliminate Carbon Emissions (RCP 2.6)	Significant Carbon Emissions Reductions (RCP 4 .5)	Carbon Emissions Increase (RCP 8.5)
State Projections (Fourth CA Climate Assessment)[81]	N/A	2.4 ft	4.5 ft
Bay Area Projections (Ocean Protection Council)[82]	1.6 ft	N/A	2.5 ft

Connection to flooding

Sea level rise increases flooding frequency in the following ways:

- Groundwater table and stream water levels rise, increasing areas subject to flooding.
- Storm surges rise, exposing new areas previously not at risk of flooding.
- Coastal erosion increases, expanding areas exposed to flooding and inundation[83].
- Levees and storm walls have to endure increasing loads and may be susceptible to overtopping, making these traditional measures to address sea level rise no longer adequate or financially feasible.

Connection to hazardous materials release

Rising groundwater could push toxic materials stored underground upward, which could

create major impacts on public health and the environment. The City is planning to expand on the new science around groundwater rise combining with sea level rise to better understand specific impacts on hazardous materials in Berkeley.

B.9.b Location of Sea Level Rise and Shallow Groundwater

Sea level rise and shallow groundwater are most prevalent in the western edge of Berkeley along the shoreline. For further details, read the Extent and Anticipated Intensities analysis below.

B.9.c Extent of and Anticipated Intensities of Sea Level Rise and Shallow Groundwater

Sea Level Rise Analysis

An interactive, Bay Area-specific map called the Bay Shoreline Flood Explorer[84] was produced by the Adapting to Rising Tides (ART) program of the San Francisco Bay Conservation and Development Commission (BCDC), a State agency working to increase the resilience of San Francisco Bay Area communities to sea level rise and storms.

Three maps below depict the permanent inundation that may occur based on sea level rise of 2 feet, 4 feet, and 5.5 feet. These maps indicate that sea level rise is expected to mainly affect the shoreline areas of Berkeley. The Berkeley Waterfront is the most vulnerable.

These maps were purely based on topography and do not account for riverline flooding, wave hazards, groundwater, erosion and subsidence, marsh vegetation, and salt ponds and wetlands.

Map 28 shows that with two feet of sea level rise, which is considered very likely by 2100, the Berkeley shoreline will experience shallow inundation, with small sections of the northern and southern edges of McLaughlin Eastshore State Shoreline experiencing inundation further in.

Map 28. ***Berkeley Shoreline Areas Prone to Permanent Inundation due to 2-ft of Sea Level Rise (Very likely by 2100), 2017***

Map 29 shows that with four feet of sea level rise, which is considered likely by 2100, all of Berkeley's coastline will experience at least some inundation. Areas along the northeastern corner of the Marina, where the Doubletree hotel is situated, are expected to receive some inundation. Further inundation is expected along the edges of the McLaughlin Eastshore State Shoreline. Additionally, shallow inundation is expected in the northwestern corner and western edge of the Tom Bates Regional Sports Complex.

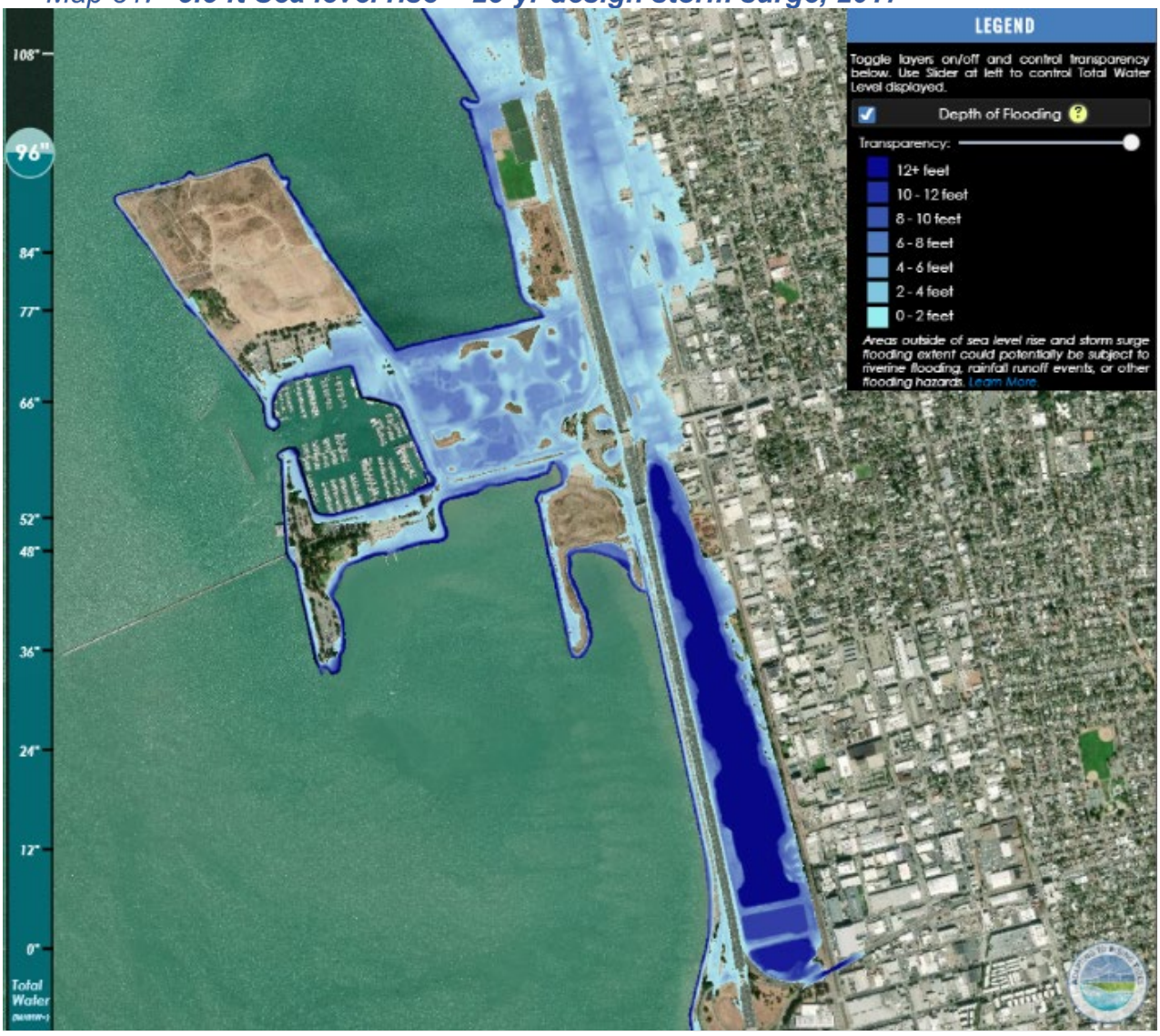
Map 29. ***Berkeley Shoreline Areas Prone to Permanent Inundation due to 4-ft of Sea Level Rise (Likely by 2100), 2017***

Map 30 shows inundation from 5.5 feet of sea level rise, which is not as likely by 2100 but still possible. In addition to inundated areas in the other scenarios, 5.5 feet of sea level rise will inundate the majority of the McLaughlin Eastshore State Seashore with varying depths of water. Areas along the northeastern corner of the Marina, where the Doubletree hotel is situated, will be further inundated. Inundation also increases along the western side of the Tom Bates Regional Sports Complex.

Map 30. ***Berkeley Shoreline Areas Prone to Permanent Inundation due to 5.5-ft of Sea Level Rise (not as likely by 2100), 2017***

Map 31 below layers another hazard – a 25-year design storm – atop the 5.5-foot sea level rise scenario presented in Map 3. With these combined hazards, water could inundate Interstate 80 and potentially as far east as Fifth Street in Berkeley.

Map 31. ***5.5 ft Sea level rise + 25-yr design storm surge, 2017***



Groundwater Rise Analysis

New data and maps from the Pathways Climate Institute LLC and the San Francisco Estuary Institute provide insight into how rising groundwater can impact coastal communities and interact with sea level rise.

Map 32 shows that Berkeley already faces high groundwater (within six feet of the ground surface) in multiple areas, posing risks to underground infrastructure that is mostly built within 6 feet of the surface. However, emergent groundwater is limited to a small area in the northeast corner of McLaughlin Eastshore State Seashore.

Map 33 presents future groundwater level projections associated with the sea level rise scenarios presented in Maps 28-31, as well as another worse sea level rise scenario.

Map 32. ***Current Conditions Map of Depth to Groundwater in Feet, 2024***

Current Conditions Map

Depth to Groundwater (ft)

Value	
≤ 0	≤ 6
≤ 3	≤ 9
	≤ 12

SFEI Update: 12/16/22

California State Parks, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, US Census Bureau, USDA, USFWS, SFEI, City of Berkeley OES 10/29/24

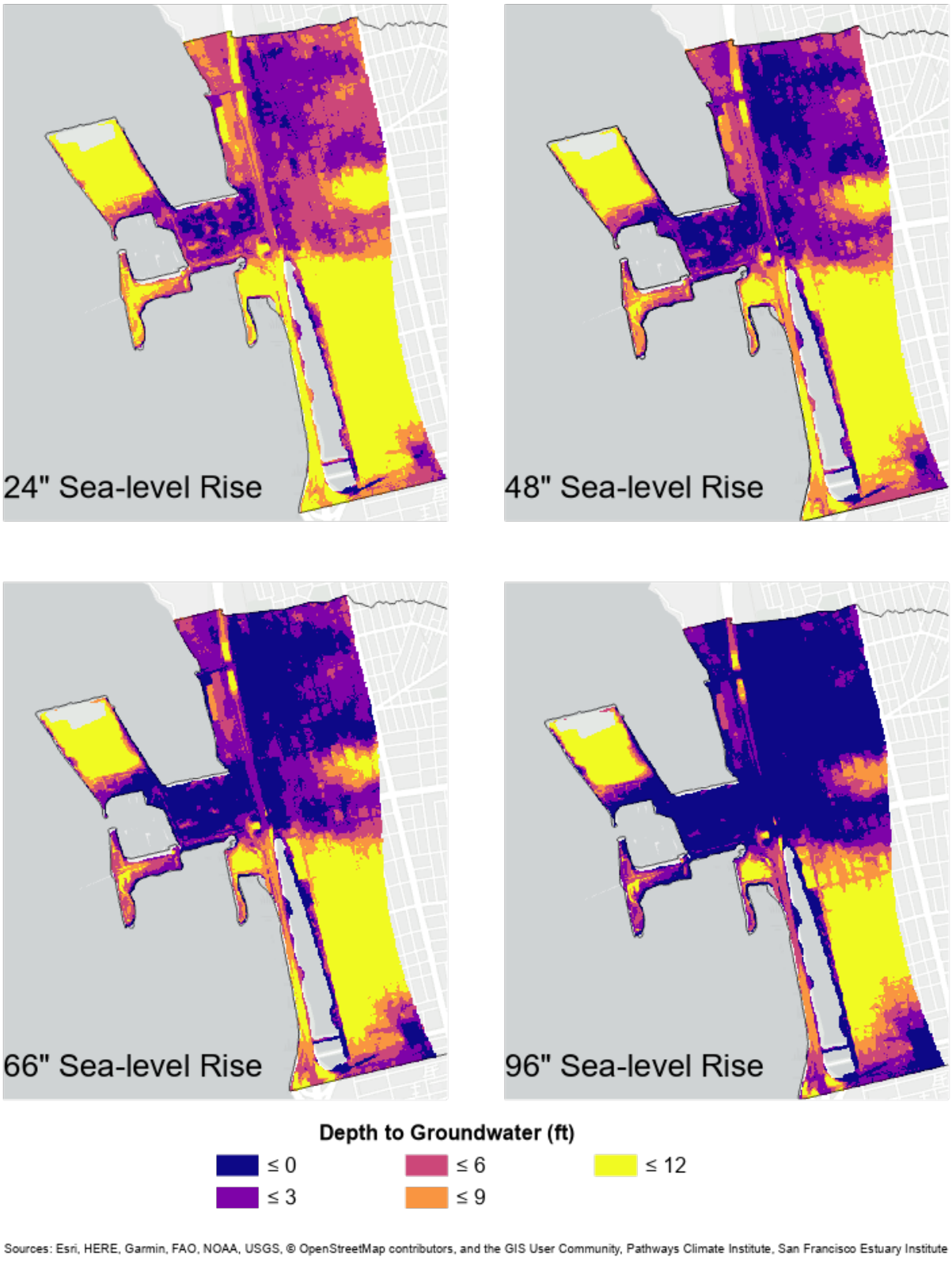
Combined Effects of Sea Level Rise and Groundwater Rise

Sea level rise analysis shown in Maps 28-31 is purely based on topography and does not account for groundwater rise. Groundwater levels presented in Map 32 reflect current conditions but do not consider future sea level rise scenarios.

In these scenarios, emergent groundwater begins to appear in dark blue. Emergent groundwater is when the groundwater surfaces, making the depth of the groundwater zero. Emergent groundwater can damage surface infrastructure like roadways and add to surface flooding, especially during rain events. As sea level rises, more emergent groundwater is projected.

- At 24” sea level rise (very likely by 2100), we begin to see “emergent” groundwater.
- At 48” sea level rise (likely by 2100), emergent groundwater increases, particularly in West Berkeley north of University Avenue.
- At 66” sea level rise (not as likely by 2100), emergent groundwater is apparent in about half of the Berkeley area north of University Avenue.
- At 96” sea-level rise (probability currently unknown) a large portion of West Berkeley north of University Avenue is covered by emergent groundwater.

Map 33. ***Comparison Maps of Depth to Groundwater at 24", 48", 66", and 96" Sea Level Rise, 2024***



B.9.d Previous Sea Level Rise Events

It is estimated that the San Francisco Bay has already risen approximately eight inches since 1900.[85]

There have been no federally-declared sea level rise disasters in Berkeley since the last update.

B.9.e Probability of Sea Level Rise

Sea level rise in the Bay Area will continuously rise in the next few decades, but most considerably in the latter half of the 21st century. The probability of sea level rise relates to future greenhouse gas emissions, as is described in Table 12.

Recent studies have suggested that the Antarctic ice sheets are melting at rates much faster than previously reported.[86]

B.9.f Vulnerabilities

People

Sea level rise will have disproportionate impacts on disadvantaged communities in Berkeley. For example, the areas most likely to experience flooding with increased sea level rise are in West Berkeley, which has a higher percentage of communities of color and low-income communities. These are the same neighborhoods that were historically redlined, have poorer air quality, and experience higher incidents of hospitalization due to asthma. West Berkeley also has a history of industrial buildings and usage, resulting in more hazardous materials stored underground. As the groundwater table rises along with the sea level, these materials can also rise and move, causing environmental and

public health hazards.

Structures

Consideration of storm surge and other compounding flooding risks on structures is increasingly important, particularly when designing infrastructure with finite effectiveness, such as sea walls or barriers. Both permanent inundation from sea level rise as well as more frequent and more extensive flooding events will need to be considered in long-term planning along Berkeley's coast.

The 2019 Draft Berkeley Marina Area Sea Level Rise Assessment is a site-specific analysis for compliance with State requirements in AB 691. The document identifies three locations in the Berkeley Waterfront that are most susceptible to intermittent inundation in the future due to sea level rise:

1. Virginia Street Extension (north shore of McLaughlin Eastshore State Seashore) intersection with Marina Boulevard
2. South Shore of University Avenue
3. North-East side of the Berkeley Inner Harbor.

The 2019 Draft Berkeley Marina Area Sea Level Rise Assessment is a living document and will be used to inform future City of Berkeley projects and development at the Marina.

Systems

As sea levels rise, storms could cause key underpasses and roads accessing Highway 80, including Ashby Avenue (State Highway 13), to flood more often or be permanently inundated, impacting transportation on this major regional artery.

Berkeley's stormwater and sanitary sewer pipes are vulnerable to inundation. In addition, flooding resulting from sea level rise in combination with severe storms may threaten natural gas pipelines regionally. Prolonged and more frequent inundation from sea level rise can accelerate structural failures and threaten the functionality of California's natural gas distribution system.[87] This infrastructure vulnerability can lead to disrupted service and the leakage of methane gas from the system. Methane is both a health and safety hazard as well as a highly potent greenhouse gas, further contributing to climate change.

Cultural and Natural Resources

According to the 2019 Draft Berkeley Marina Area Sea Level Rise Assessment, in Berkeley the major risk of sea level rise to the shoreline is the loss and/or degradation of the revetment, which is a structure intended protect the bank from erosion. This could jeopardize the landfill of César E. Chávez Park, causing erosion and loss of landmass. There is a potential of erosion and loss of the integrity of both the San Francisco Bay Trail Spur and University Avenue.

Several trails and access to the Marina viewing points and coastal access will be impacted by projected sea level rise. Degradation of the trails will make walking and running less accessible and will also cut off potential for small boat recreation.

Damage to natural resources includes potential damage to the protected natural area within César E. Chávez Park and the Western Burrowing Owl habitat, both located in the northeast corner of the park. Because there is significant inundation within the McLaughlin Eastshore State Seashore, any habitat within the grassland will be significantly impacted starting in 2030.

Sea level rise will inundate beaches and shoreline habitats. These changes are expected to substantially alter the Bay ecosystem, reducing wetlands, and adversely affecting water quality and wildlife.[88]

Landfilled areas and areas experiencing drought—both common in the Bay Area—are particularly susceptible to land subsidence, which is the gradual settling or sudden sinking of land.[89] In the Bay Area, this includes developed areas that sit on top soft compressible bay mud.[90] Land subsidence can expand areas susceptible to sea level rise as these areas sink while sea levels are rising to meet them.[91]

Scientists predict that climate change will have many effects on freshwater and marine environments. These effects, along with nutrient pollution, could increase the frequency, intensity, and exposure to harmful algal blooms. Algal blooms endanger human health, the environment, and the economy. Sea level rise would create more shallow and stable coastal water, conditions that are perfect for algae growth.[92]

Activities that have value

The Berkeley Waterfront is a critical community asset for recreation, education, and local businesses. Recreation activities occur both on land and surrounding waters. Nonprofit sailing clubs operate out of the Berkeley Waterfront and many boaters and fishers use the area. Recreation areas on land include César E. Chávez Park, Shorebird Park and the Shorebird Nature Center, Horseshoe Park, and Adventure Playground. César E. Chávez Park features a bird habitat, and an off-leash dog area.

Many businesses operate out of the area, including restaurants, the DoubleTree hotel,

boat repair/storage facilities, and stores. In the Berkeley Marina, there are about 1,100 boat slips including about 100 liveaboard slips. Additionally, two small-scale commuter ferries operate out of the Berkeley Marina along with fishing charter boats.

B.9.g Potential Impacts and Losses

Potential financial impacts to the Berkeley Marina caused by projected sea level rise include damage to commercial and public buildings and infrastructure, loss of public resources, loss of habitat and natural resources, and loss of berth rental revenue to the City.

All current and upcoming capital projects in the Berkeley Marina near the shoreline band will be designed to be resilient to mid-century sea-level rise and be adaptable to end of century. These projects' sea level rise mitigation measures will be reviewed and approved by Bay Conservation Development Commission's permit review process, ensuring the latest sea level rise requirements are being met by the design.

Table 13. *Estimated costs from sea level rise at Berkeley Waterfront*

Cost Type	Current	2030	2050	2100
Repair, Replacement, Maintenance[ii]	$0	$0	$3,019,000	$17,0940,000
Losses in nonmarket value[iii]	$0	$0	$0	$12,000,000
Adaptation costs[iv]	$0	$1,050,000	$11,050,000	$15,592,600

According to BayAdapt, a regional Bay Area sea level rise organizing effort coordinated by the Bay Conservation Development Commission, the following are at risk of flooding in 48" of sea level rise throughout the Bay Area:

- 28,000 socially vulnerable residents
- 1,900 residents living near contaminated sites
- 13,000 existing housing units
- 70,000 new housing units
- 104,000 existing jobs
- 85,000 new jobs
- 20,000 acres of wetlands, lagoon, and tidal marsh habitat
- 5 million daily highway vehicle trips
- 60,000 daily rail commuters

B.10 Floods

B.10.a Description of Floods

Floods occur when there is an overflow of water in areas that are normally dry. In Berkeley, three types of flooding typically occur: coastal flooding, creek flooding, and storm drain overflow.

Coastal Flooding

Coastal flooding occurs when water inundates or covers normally dry coastal land as a result of high or rising tides or storm surges. Higher tides and sea level rise reduce creek and storm drainage flow capacity in the western portions of the City. See the Sea Level Rise section of this Plan for more information.

Creek Flooding

Like in many urban areas, creeks in Berkeley have been affected by urban development. Stretches of creeks in Berkeley are completely contained by culverts, and open channel segments of the creeks are often segmented by shorter culverts that enable streets and development.[93] Creeks in west Berkeley flow year-round. The upper reaches of creeks only flow for a short time after rainfall. When the level of runoff exceeds the capacity of a creek, the flood waters overtop the banks and flood into properties and streets. Creek flooding in Berkeley generally originates on private property. Blockages can happen in creeks, thus the City increases cleaning efforts on the right of way ahead of and during significant rainfall events. Residents are responsible for maintaining creeks and related infrastructure within their property.

Storm Drain Overflow

The City's storm drainage infrastructure collects urban runoff and carries it either directly to the Bay or to nearby watercourses that discharge to the Bay. Causes for storm drain overflow are generally rainfall events that exceed the capacity of the storm drainage facilities, blockages in the storm drainage facilities, or damage to storm drainage infrastructure that reduces its capacity.

When storm water runoff exceeds the capacity of the storm drain infrastructure, the excess water flows into city streets. Most of Berkeley's storm drain infrastructure is engineered to accommodate a 10-year design storm.[94] Using this 10-year design storm standard is considered the most cost-effective design practice, and provides guidance for computing flows and for sizing storm drainage infrastructure.[95] Maintenance helps preserve the flow capacity of the infrastructure, reducing the frequency of flooding, however many components of Berkeley's storm drain infrastructure are over 90 years old and are past their useful life expectancy. Concrete pipes have eroded or separated and metal pipes have corroded over the years. In some locations sink holes have formed as soil enters the storm drain through cracks and other defects.

Connection to Climate Change

Climate change increases the intensity and severity of rainfall events, which leads to more frequent flooding. Climate change also creates sea level rise, which in turn will lead to rising groundwater, increasing flood risk. For more information, review the Sea Level Rise section of this Plan.

Connection to Infectious Diseases

According to the National Institutes of Health, the risk of viral infection increases after a flood.[96] Floods can increase the transmission of viral diseases, especially waterborne infections, vector-borne diseases, and respiratory infections.

Connection to Utility Disruption

An unknown number of property owners rely on electric sump pumps to keep their homes and buildings free from water during the rainy season. A power outage that disables sump pumps during a storm can lead to flooding inside structures.

Connection to Sea Level and Shallow Groundwater Rise

New studies have linked sea level rise and groundwater rise to increased flood risk in the San Francisco Bay Area.[97] For more information, review the Sea Level Rise section of this Plan.

B.10.b Location of Floods

The City maintains approximately 93 miles of storm drain pipelines and appurtenant structures in the public right-of-way and in easements. The City is responsible for the maintenance of approximately 0.5 miles of open creeks and nearly 4 miles of creek culverts running in the right of way or in City owned properties. A majority of the City's stormwater assets are nearing or past their expected useful life and others require an evaluation of hydraulic capacity.

Map 34: *Berkeley Area Watersheds* shows Berkeley's watersheds:

- Codornices

- Marin
- Cerrito
- Wildcat
- Strawberry
- Schoolhouse
- Aquatic Park
- Potter
- Temescal
- Gilman

Map 34. ***Berkeley Area Watersheds, 2019***

Source: Stormwater Plan (1984) identified 10 major drainage systems in Berkeley. Last updated 2004.
Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, © OpenStreetMap contributors, and the GIS User Community

Watershed

Storm Drain Overflow

In 2011 the City's Public Works Department developed the Watershed Management Plan (WMP), which examined two of the watersheds in the City, represented in Map 34: *Berkeley Area Watersheds*. The Potter and Codornices Watersheds were selected because they represent the full range of the urban drainage spectrum in Berkeley:[98]

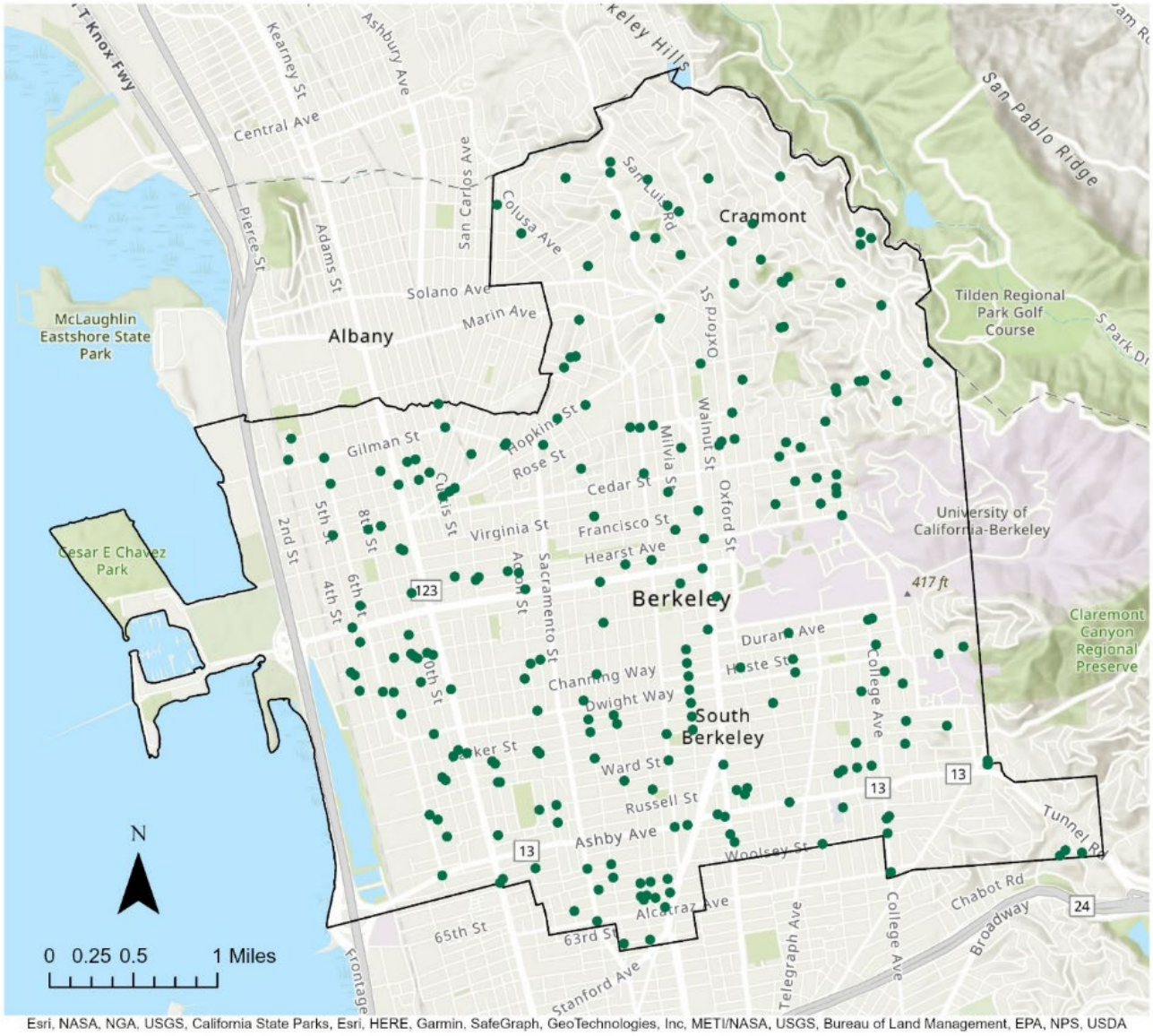
- The Potter Watershed is the largest in the City. It experiences localized flooding in many areas, and contributes some runoff to the Aquatic Park Lagoons. Tidal effects from the Bay also influence flooding issues in the Potter Watershed. This is due to the water surface of the Bay effectively reducing the discharge ability of the storm drain outfall to the Bay.
- The Codornices Watershed is regionally significant as Codornices Creek is one of the least culverted creeks in the East Bay; and is one of the few with a salmonid population.

The City is working with a contractor to develop a comprehensive stormwater master plan, which is expected to be completed at the end of 2025.

Areas of Observed Storm Drain Overflow

During storms and flooding, community members call Berkeley's 3-1-1 service to report locations of storm drain backup or other locations where water is pooling. Map 35 presents locations of community reports of these issues from January-June, 2023. This time period included two federally-declared storm emergencies. This map does not reflect locations of proactive work performed by field crews to mitigate or respond to flooding. It also does not distinguish between locations with multiple calls for service. The map shows locations throughout Berkeley.

Map 35. ***Community Storm Calls for Service, Jan-June 2023***



Creek Flooding: FEMA National Flood Insurance Program

Berkeley's creek flooding exposure is assessed through the National Flood Insurance Program (NFIP), which makes federally-backed flood insurance available to homeowners, renters, and business owners in participating communities. Participants in the NFIP must regulate development in floodplain areas in accordance with NFIP criteria.

Berkeley has participated in the NFIP since September 1, 1978 and is currently in good standing with the program. NFIP compliance is monitored by FEMA regional staff and by the California Department of Water Resources under a contract with FEMA.

Berkeley's Areas of Predicted Flooding Map shows the locations of various flood hazards that could affect the city, including:

1. Locations of the 100-year and 500-year Floodplains, sourced from FEMA's National Flood Hazard Layer tool in September 2023.
2. Street segments in the 100-year Floodplain and the 500-year Floodplain.
3. Anticipated street flooding due to storm drain overflow, sourced from the Watershed Management Plan.

Floodplains

The 100-year Floodplain shows the area that has a 1% chance of experiencing creek flooding in any given year. The 500-year floodplain has a 0.2% chance of experiencing creek flooding in a given year. Areas in the 100-year floodplain are assumed to also flood in a 500-year flood scenario. Because floods reaching the level of the 500-year Floodplain occur so rarely, they are not as well-researched and specific impacts are less known.

100-year Floodplain

As shown in Map 36: *Flood Zone Map* in medium blue, in Berkeley the 100-year Floodplain is located:

- Along the edge of the Bay
- Along the interior edge of the Aquatic Park lagoon
- Along Codornices Creek in northwest Berkeley
- Along Strawberry Creek in central Berkeley (on the University of California campus).

The following street segments are in the 100-year Floodplain:

- Along Codornices Creek: 580 Highway, 2nd St, 5th St, 6th St, 8th St, 9th St, 10th St, Sacramento St, Monterey Ave
- Potter St
- Bay St
- W Frontage Rd
- On the UC Berkeley campus: Frank Schlessinger Way, W Entrance, Wickson Rd

500-year Floodplain

As shown in Map 36: *Flood Zone Map* in light blue, the 500-year Floodplain both expands on areas in the 100-year floodplain, and adds more area to show:

- Additional inundation along the edge of the Bay
- Significant inundation of the McLaughlin Eastshore State Park in the land north of University Avenue
- Significant inundation of the Marina in the land west of Marina Blvd and south of Spinnaker Way

- Inundation in west Berkeley between Interstate 80 and approximately 4th Street
- Inundation along Strawberry Creek in Central Berkeley, from Sacramento west to Strawberry Creek Park
- Inundation along Claremont Creek in the Temescal area, on Claremont between Hazel Road to Berkeley's southern border.

The following street segments are in the 500-year Floodplain:

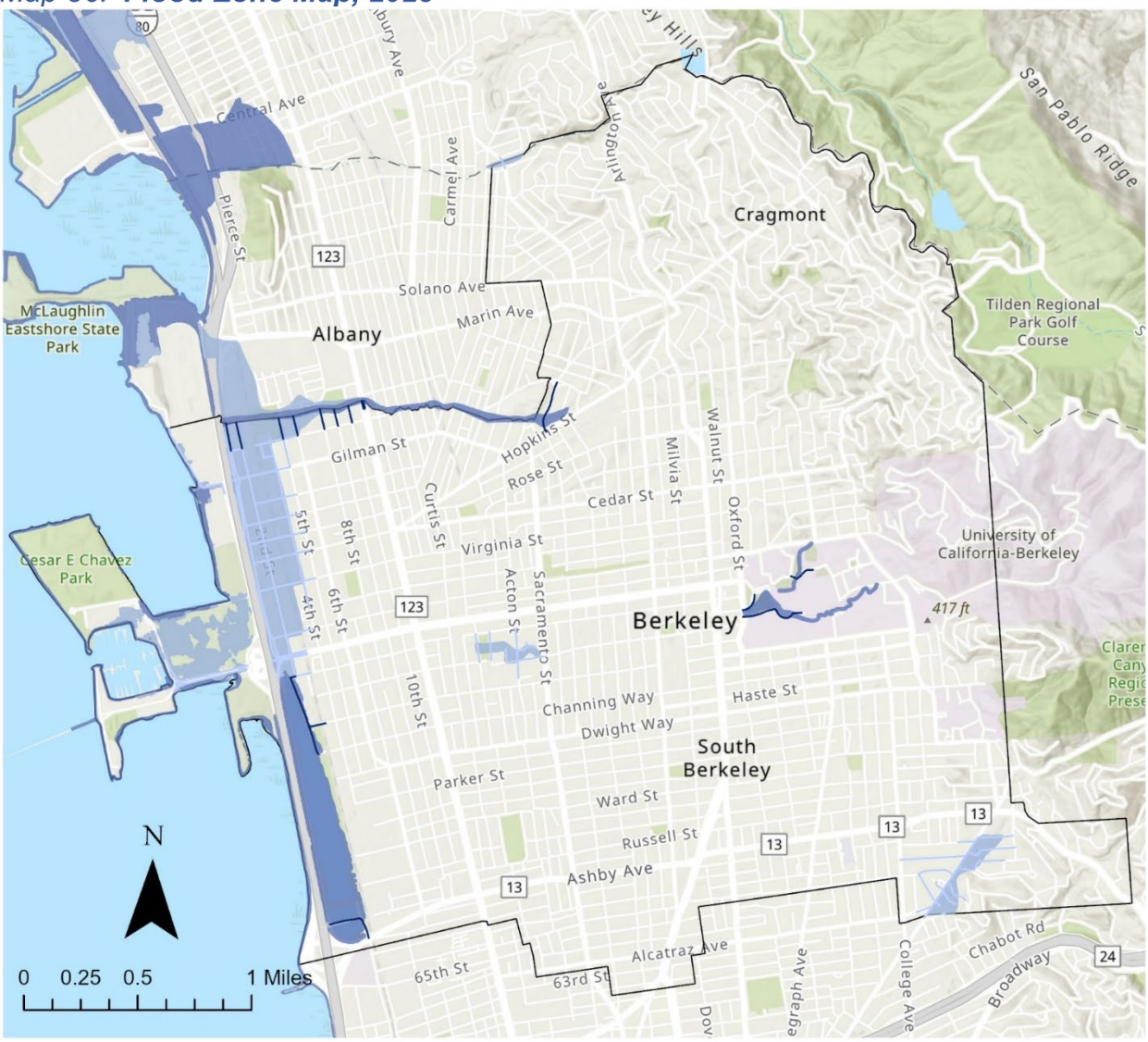
- West Berkeley:
    - I-80
    - 1st St (From Harrison St to Addison St)
    - 2nd St (From Harrison St to Addison St)
    - 3rd St (From Harrison St to Addison St)
    - 4th St (From Harrison St to Addison St)
    - 5th St (From Harrison St to Addison St)
    - University Ave (Near Marina)
- North Berkeley:
    - Colusa Ave (along Cerrito Creek)
- Central Berkeley:
    - Allston Way (From N Valley St to Sacramento St)
    - Bonar St (Between Addison St and Allston Way)
    - West St (Between Addison St and Allston Way)

- N Valley St
- Acton Crescent
- Acton Circle
- Acton St (From Addison to Acroft Ct)

- Claremont:
  - Claremont Ave (Between Hazel Rd and Mystic St)
  - Alcatraz Ave (From Lewiston Ave to Claremont Ave)
  - Eton Ave
  - Eton Ct
  - Brookside Ave
  - Hillcrest Rd (Only near Claremont Creek)
  - Woolsey St (Between Eton Ave and Claremont Ave)
  - The Uplands (Only Near Claremont Creek)
  - Encina Pl
  - The Plaza Dr
  - Prince St (From College Ave to Claremont St)
  - Oakvale Ave

- Hazel Rd
- Webster St (Between Pine Ave and Claremont Ave)

Map 36. ***Flood Zone Map, 2023***



Flood Zone Map

Street Segment in 500-Year Floodplain

Street Segment in 100-Year Floodplain

FEMA Floodplains

100 Year Floodplain

500 Year Floodplain

FEMA National Flood Hazard Layer
Last updated for Alameda County: June 22, 2020

Esri, NASA, NGA, USGS, FEMA, California State Parks, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA

Stormwater Master Plan

The City is working with a contractor to develop a comprehensive stormwater master plan (SWMP), which is expected to be completed at the end of 2025. The SWMP will provide an updated inventory of system-wide deficiencies and establish a capital stormwater improvement plan to address these deficiencies based on an equity and risk-based prioritization model. The SWMP will also provide updated maintenance and inspection plans for the City's stormwater assets and identify green infrastructure implementation opportunities. The SWMP will analyze potential funding mechanisms to supplement current funding levels for the program as needed to support enhanced operations, regulatory compliance implementation, and capital improvements identified in the master plan.

B.10.c Extent of Floods and Anticipated Intensities

Floods can last for a few minutes to a few weeks. This timing often depends on the duration of the rainfall and the land on which it occurs. In low and flat areas, slow moving water can linger for days or weeks. Excessive rainfall from winter storms is the most common cause of flooding between November and March.

The following factors contribute to the frequency and severity of flooding in a given event:

- Rainfall intensity and duration
- Existing saturation
- Features of the watershed
- Natural features
- Coastal conditions

For example, an intense rainstorm at the end of a rainy winter when soils are already saturated is more likely to result in flooding than if the same storm occurs at the beginning of the rainy season when soils are not as wet.

Depth and velocity are common ways of measuring the severity of a flood. These provide information on how deep the water is and how fast it is moving. The depth and velocity of a flood are good predictors of how much damage it may cause.

B.10.d Previous Flood Events

Berkeley's most recent flooding occurred in December 2022 and January 2023 when a powerful series of storm systems brought more than 15 inches of rain. This much rain in a 20-day timeframe occurs only once every 50 years, according to the National Oceanic Atmospheric Agency (NOAA). The winter months of 2023 had several severe storms that included flooding, high winds, and landslides. During January to April 2023, there were three federally declared disasters in Alameda County, including DR-4699, DR-4683, and EM-3591.

In October 2022, an atmospheric river brought heavy rains and strong winds to Berkeley, resulting in nuisance flooding as well as many downed trees and powerlines.

In 2004, widespread flooding occurred throughout Berkeley during a 25-year rainfall event. Flooding also occurred during the 1997 - 1998 El Niño season.

In the early 1960s, the Strawberry and Codornices Creeks overflowed, along with flooding of streets and intersections. The flooding was of short duration and shallow depth and occurred in small areas. A few buildings flooded, including some on the University of

California, Berkeley campus.

B.10.e Probability of Future Events

According to the National Oceanic and Atmospheric Administration Storm Events Database, there have been an estimated 45 days with flooding in Alameda County in the last 20 years. This equates to about 2 days per year, as an estimate. Climate change will likely bring stronger storms with heavy rains, increasing the number of days per year of flooding in Alameda County.

B.10.f Vulnerabilities

People

The 100 year and 500 years floodplains are concentrated in west Berkeley along the Bay and around the Aquatic Park. West Berkeley has historically been the home to underserved communities and marginalized populations, including people experiencing homelessness. People in West Berkeley may not have the resources to take household mitigation measures and or manage the impacts of floods if they occur.

Floods pose a number of risks to people. Serious injury or death can occur when people do not evacuate areas that are flooded or enter floodwaters. Urban runoff and flooding can also result in contaminated drinking water and an increase in the transmission of infectious diseases. Mold and mildew can also grow on any damp surface within 24 to 48 hours, posing additional serious health risks to people and animals.

Structures

Flooding can cause serious damage to buildings. Floods can cause structural damage,

such as loose floors or foundation cracks. There may also be broken electrical wires, appliance damage, damage to water and septic systems, and mold and mildew.

Heavy rains can also put stress on culverts. Berkeley is underlain by a patchwork of creek culverts, most privately constructed and over 100 years old. A culvert failure could be physically and economically catastrophic in an area such as Downtown Berkeley where buildings have deep basements, many underground utilities, and streets are congested with vehicle and pedestrian traffic. Most culverts are located on private property, with some located beneath private improvements. Failure of a private culvert may cause significant damage to private property, and require improvements to that property. The City intends to repair culvert breaks beneath public property as-needed, as it currently does if there is a break in a storm drain. However, many private property owners are unaware that improvements on their property may be situated above a culvert.

Flooding can impact utilities, including power, water, and gas. Severe storms and deep waters can damage power lines and underground infrastructure, impacting buildings and other infrastructure.

Systems

In past rainfall events, flooding along low-lying roadways has hindered traffic flow. Low-lying underpasses leading to Interstate 80, as well as highly-trafficked city streets, have flooded. This creates traffic impacts for community members and first responders.

Natural, historic, and cultural assets

Local gardens face a threat of contamination if they are exposed to urban runoff. Heavy

storm water runoff can contaminate the ocean, lakes, and other bodies of water with other bacteria.[99]

B.10.g Potential Impacts and Losses

The potential impacts and losses associated with floods are expected to increase due to climate change. Berkeley's population continues to steadily increase, adding people exposed to the area's hazard and their cascading impacts. The 100 year and 500 years floodplains are concentrated in west Berkeley along the Bay and around the Aquatic Park. These areas haven't changed since the last update, and development in this area of the City is characterized by industrial and heavy commercial uses, although there is some residential development. Any new development would be required to comply with the applicable regulations to ensure avoidance of and/or adequate mitigation of hazard-induced risk.

GFOA's Flood Analysis

In 2006, Berkeley, along with 16 other cities in Alameda and Contra Costa counties experienced a storm that was severe enough to receive assistance from FEMA. This event was used as a starting point to simulate future storms. Data from severe storms in early 2023 also inform this model.

Frequency: There have been three severe storms in Alameda and Contra Costa counties that were received FEMA support since 1998. Berkeley was impacted by two of the storms. Hence, the model simulated an 12% annual chance of storms, with a 66% chance that Berkeley would be impacted by any given storm.

To simulate damages, per capita damage from each of the cities impacted by the 2006 storms was assessed, providing a range of potential losses. This range was then used to simulate Berkeley's potential losses from future storms: both economic losses to the community at large and financial losses to the City government.

Exhibit 16 shows the loss exceedance curve for the economic losses to the entire community from severe storms. Some very large losses seem possible, even if highly unlikely.

Exhibit 17. 5.G.1 - Loss Exceedance Curve for Tsunamis for Berkeley Community, 10 Year Risk (millions of dollars)

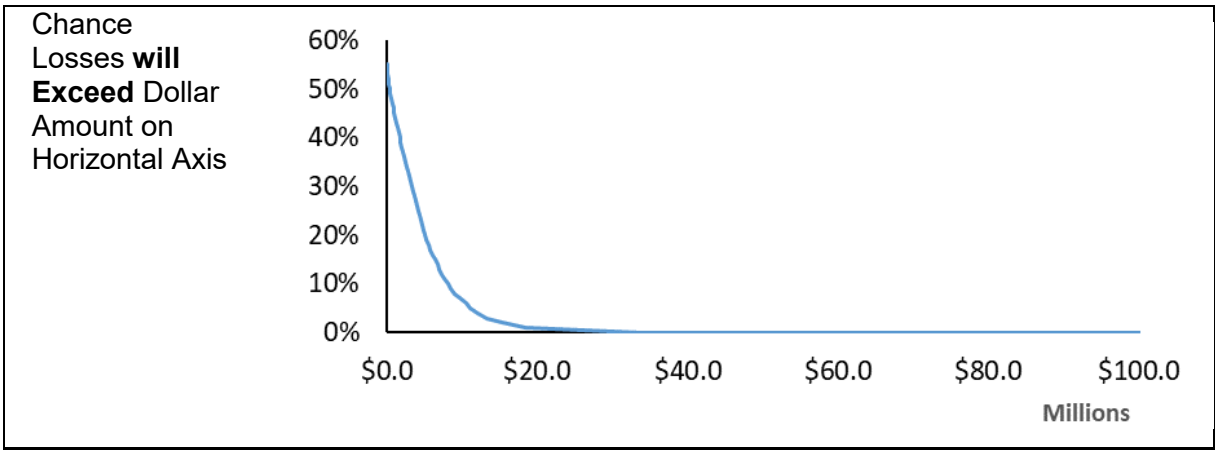


Table 14. *Chance that Economic Losses Will Exceed Dollar Amounts*

Time Horizon	5%	10%	50%	90%
1-Year	$1.1M	NA*	NA*	NA*
10-Year	$10.5M	$8M	$0.4M	NA*

*Not Applicable (NA) means that the loss exceedance curve intersects zero before this point. See the graph to see where the curve meets the vertical axis for the chance of losses exceeding zero.

2004 Flood Analysis

A 2004 analysis explored Berkeley's flood exposure and vulnerabilities to a one percent annual chance flood occurring in Berkeley. This analysis predicted that:

- The maximum flood depth would be two feet deep, mostly near creek channels.
- Approximately 675 structures would be impacted to various degrees:
    - The majority would be inundated by one foot or less of water.
    - Approximately 200 structures could flood with up to two feet of water.

A flood depth of one to two feet has the potential to damage structures, first floor and basement finishes, contents and appliances in exposed buildings.

The 2004 analysis used FEMA's standard loss curves to determine the percent of replacement value of damage caused by various heights of creek flooding. These curves are based on years of data from flood losses on insured properties around the country. Single-story structures with one foot of floodwater are estimated to have structural damage equal to 14% of their replacement value and damage to 21% of the structures' contents. Single-story structures with three feet of water on average experience 27% loss of their replacement value and 40% loss to their contents.

In the 2004 plan, flood losses were estimated using the following calculations:

Table 15. *One Foot Flood Waters*

	Value	% Damage	Damage
Structures	$250 mill	14%	$35 mill
Contents[100]	$250 mill	21%	$53 mill
Totals (2004)	$500 mill		$88 mill

Table 16. *Three Feet Flood Waters*

	Value	% Damage	Damage
Structures	$70 mill	27%	$19 mill
Contents[101]	$35 mill	40%	$14 mill
Totals (2004)	$105 mill		$33 mill

Table 17. *Combined Damages: One Foot Flood Waters and Three Foot Flood Waters*

	2004	*Totals (2023)*[102]
Structures	$54 mill	$90 mill
Contents[103]	$67 mill	$111 mill
Totals (2004)	$121 mill	**$201 mill**

The estimated losses to properties in Berkeley from a one percent annual chance flood

total $201 million in 2023 dollars. Approximately $90 million is damage to the building structures, including walls, finishes, etc. $111 million is losses to contents, including damage to furniture in homes and equipment and inventory in commercial and industrial properties.

These numbers are likely significant underestimates, because they do not account for the flooding caused by storm drain overflow, which would occur concurrently with creek flooding. Berkeley's exposure to a one percent annual chance flood has likely increased since 2004 but resources are not available at this time to perform a new analysis.

Few Berkeley property owners are known to carry flood insurance, presumably because of negligible flood damage in recent decades, so those losses would be borne almost entirely by building owners.

Some of these losses could be avoided if property owners protected properties through sandbagging or other activities, particularly in areas expected to receive one foot or less of flood water. The City offers free sandbags to city occupants, but remediation activities like sandbagging require property owners to have adequate warning time and manpower.

Due to Berkeley's small watersheds and paved, urban environment, floodwaters are likely to both rise and recede quickly. This means residents and business owners may have only a short warning period for impending floodwaters, but they should be able to begin the cleanup and repair process quickly. Building cleanup will occur within a handful of days; repairing and replacing furniture and equipment will take weeks to months.

Repetitive Loss Properties

Berkeley does not have any Repetitive Loss Properties as defined by the National Flood Insurance Program.[104]

B.11 Utility Interruption

B.11.a Description of Utility Interruption

Utility interruption is any loss of a public service which includes but is not limited to electrical service, telecommunications, wastewater and potable water, and natural gas. Interruption can be planned and include a warning, such as with Power Safety Power Shutoffs that proactively turn off electricity to mitigate wildfire risk, or interruption can come as a secondary impact of a natural hazard described in this plan. Interruption can also occur without a preceding natural hazard, with a variety of causes, for example maintenance and repair or accidental damage.

In Berkeley, electrical service, telecommunications, potable water, and natural gas infrastructures are not under the City's control, but rather are owned and managed by other quasi-governmental, private, or special district entities.

- Most electricity (generation) is provided by Ava Community Energy. Pacific Gas and Electric or PG&E provides a small portion of electricity, manages the transmission and distribution of electricity, responds to outages, and provides billing and customer service. Berkeley's electricity system is almost entirely aboveground, making it vulnerable to earthquake, fire, landslide, and storm damage.
- Potable water is provided by East Bay Municipal Utility District or EBMUD. EBMUD provides drinking water to approximately 1.4 million people and sewer services to 640,000 in the East Bay. EBMUD was created in 1923, and the age and extent of its system makes it particularly vulnerable to damage.

- Telecommunications are managed by a variety of private partners, including Verizon, AT&T, and Comcast, among others. Telecommunications infrastructure is spread throughout the city, and therefore susceptible to damage from the variety of natural hazards mentioned in this plan. Telecommunications also rely on the electricity system to function.
- Natural gas is managed by PG&E. The natural gas transmission line runs the length of Berkeley (north-south direction) under Seventh Street, which is an area susceptible to earthquake liquefaction.

The City manages some utility infrastructure, including storm drains and the sanitary sewer collection system that links to the EBMUD system. The sewer and storm drainage systems are also old and have weak components, making them vulnerable to damage.

The systems described in this section provide the foundation for day-to-day life in Berkeley. These systems are also vital to many of the City's disaster response activities, and restoration of these systems will be critically important to Berkeley's recovery.

Utility Poles and Wires

Aboveground utility poles and wires are both vulnerable to natural hazards and when destabilized can themselves become hazardous and create fires. Utility-caused fires have become a major contributor California's fire hazard. Aboveground utility lines are vulnerable to strong winds, earthquake shaking and ground failure, and to object coming into contact with wires. When utility poles are destabilized or wires are damaged, the wires themselves can become hazardous as they continue to conduct electricity, putting people in harm's way, creating sparks, and igniting fires. Live wires coming in contact with combustible fuel, as well as other disruptors like squirrels, rodents, birds, and vehicles knocking down utility poles, contribute to the fire ignition hazards.

Undergrounding is the process of placing overhead power lines, poles, cables, and other

utility infrastructure underground. Undergrounding reduces the likelihood of a fire ignition and has been shown to stabilize power and communications reliability, beautify the urban environment, and enhance public safety by eliminating fire ignition sources and obstruction of evacuation routes.

According to the 2018 Conceptual Study to Underground Utility Wires in Berkeley presented by the Public Works, Disaster and Fire Safety, and Transportation Commissions, Berkeley is comprised of diverse neighborhoods with a mix of commercial and residential properties. Undergrounding could be a beneficial adjustment in the city, improving safety, quality of life, and reliability from natural and human-induced disasters. Currently, approximately 16% (34.6 miles) of utility wires are undergrounded on all streets in Berkeley.

To reduce risks associated with overhead wires and other utilities, in 2023 the State adopted SB 884 (McGuire), allowing the use of federal infrastructure funds for undergrounding utility lines. Following this, PG&E committed to protecting communities from wildfire threats by undergrounding 10,000 miles of power lines in the Highest Fire Threat Districts. On January 30, 2024, the Berkeley City Council adopted a resolution to urge PG&E to underground utility wires in Berkeley's Very High Fire Hazard Severity Zone (VHFHSZ) in order to mitigate wildfire risk and limit obstruction of evacuation and ingress. See the Wildland-Urban Interface Fire section for more details on the WUI fire hazard.[105]

Connection to climate change

Climate change is increasing the severity and variability of storms and other natural hazards. These events pose serious risks to our utilities.

Connection to hazards of concern

Most of the hazards included in this plan can impact utilities. In the Vulnerabilities Section of each hazard, there is information about how the hazard can impact Systems, including utilities.

B.11.b Location of Utility Interruption

Utility interruption is usually localized, as in the event of a damaged power line, water main, or some other relevant infrastructure. However, the natural hazards covered in this plan can create more widespread outages that can impact larger portions of the city. All locations in Berkeley may experience utility interruption. Locations with greater hazard exposure are more likely to experience utility interruption resulting from the natural hazard.

Public Safety Power Shutoff

Power Safety Power Shutoffs are planned power outages when there is high risk of wildfires. When originally begun, PG&E's Public Safety Power Shutoffs affected large portions of the Berkeley hills. Since then, PG&E has narrowed the areas affected by PSPS, but some parts of Berkeley may still experience a Public Safety Power Shutoff, including:

- Along Summit Road at Ajax Place to where it meets Grizzly Peak and Senior Avenue.
- Around the top of Marin Avenue.
- East of Vistamont Avenue to Wildcat Canyon Road.
- A portion of the Northeast Berkeley hills that includes roughly around the following streets: Santa Barbara Road, Vermont Avenue, Michigan Avenue, Cragmont

Boulevard, Spruce Street, Northampton Avenue, Acacia Avenue, Montrose Road, Euclid Avenue.

B.11.c Extent of Utility Interruption and Anticipated Intensities

The extent and severity of utility interruption depends on many factors, including cause, location, duration, and time of year. For example, the cause of the interruption directly impacts how widespread the outage will be. One broken water main will likely on impact a small geographic area, but a storm with high winds might impact power lines all across the city. Utility interruption can also range from a small localized event to a larger, regional outage. The severity of the interruption is much higher if it impacts a large geographic area, affecting more people and critical infrastructure. Longer interruptions are also more intense than shorter ones, as people rely on utilities for a variety of basic needs. Time of year also relates to severity, as losing power on a hot or cold day is more intense, especially if people need cooling or heating infrastructure.

B.11.d Previous Utility Interruption Events

There have been no federally-declared utility interruption disasters in Berkeley since the last update. There is not a comprehensive list of all the utility interruption events in the last five years in Berkeley. However, a few notable events had widespread impacts:

- Winter storms in 2023 toppled trees and power lines, resulting in over 10,000 customers losing power.
- A water main broke in 2020 cutting off running water supply to the entire Berkeley Marina.
- A pole fire in 2020 cut internet service for 5,000 customers in and around Berkeley.
- PG&E Public Safety Power Shutoffs in 2019 left thousands without power for multiple days.

B.11.e Probability of Future Events

The probability of utility interruption is high, given the number of systems involved, aging infrastructure, and significant exposure of each system to the many hazards presented in this plan.

B.11.f Vulnerabilities

People

Berkeley residents, visitors, businesses, institutions, and other partners rely on utilities for day-to-day life.

Electricity

Electricity powers everything in our daily lives, from essential domestic functions such as heating, cooling, and lighting, to a wide range of household appliances and technologies, as well as transportation, including electric cars, scooters, and public transportation. Electricity is also often used to manage industrial and hazardous materials, which can be released and cause serious damage if there is a power failure.

Loss of electricity for prolonged periods pose a significant threat to individuals who depend on specific medical equipment or medications. According to data from the U.S. Department of Health and Human Services (HHS) emPOWER program, some Berkeley residents rely on electricity- or power-dependent devices and durable medical equipment (DME), including 287 electric beds, 111 motorized wheelchairs or scooters, and 340 oxygen concentrators. Prolonged power outages increase the risks for those dependent on these devices, potentially leading to a surge in vulnerable community members requiring emergency services and hospital care.

If the electricity is out during an extreme temperature event, people who are sensitive to high or low temperatures, including the elderly, children, and people with certain medical conditions will be even more at risk. Without electricity, people may lose food supplies, especially impacting people with low incomes and people with various health needs. Businesses, grocery stores, gas stations, and other services might also have to close, impacting the local economy and people's ability to get basic necessities.

Water

The water supply is critical to human safety and survival. People rely on safe running water for daily activities, including, eating, drinking, bathing, and going to the bathroom. Consumption of contaminated water can lead to the transmission of diseases and serious illnesses and even death. While some people have emergency water supplies, many do not. People would either have leave their home and or purchase water from nearby suppliers.

The water supply is also crucial to firefighting and emergency response activities. If there is a widespread water supply interruption, it could negatively impact firefighting capabilities.

Telecommunications

Telecommunications is a key aspect of daily life. The City government, including our first responders, use telecommunications for daily operations. Back up options are available, but may hamper services to the public.

People rely on telecommunications for personal use, work, and to report emergencies. People rely on their phones to gather information, have entertainment, and to

communicate with their families. Without this as an option, people may struggle to do these things, impacting their mental, physical, and emotional health.

Structures

In most cases utility outages do not lead directly to structural damage. However, water damage is serious, costly, and can occur in association with damage to sewer, drainage, or wastewater systems. Water damage, if not quickly addressed, can lead to mold, which is detrimental to public health and makes buildings unsafe for human use.

Systems

The utility systems in Berkeley, including electricity, water, telecommunications, and natural gas are susceptible to outages, either from day-to-day conditions or natural hazards mentioned in this plan. Further details about the utility vulnerabilities associated with the natural hazards in this plan are included in their respective sections.

Natural, historic, and cultural resources

Berkeley is home to a number of natural, historic, and cultural resources that could be negatively impacted by utility disruption. If there is damage to water systems, contaminated water could spill into the Bay or into other natural ecosystems, such as creeks and parks, around Berkeley.

Berkeley is home to many businesses that rely on water, natural gas, and electricity to operate. Not having these utilities for a long period of time could put them out of business with lost goods and profit. There are other cultural institutions in Berkeley, such as arts organizations, theatres, and businesses that cannot operate without utilities and a

prolonged outage could threaten their existence.

Activities that have meaning

Utilities are a key part of day-to-day life for Berkeley government, residents, businesses, and visitors. Electricity and internet are crucial to City operations and its ability to serve the public. Private businesses, employers, UC Berkeley, and schools also rely on utilities to operate every day and welcome their students, employers, and customers. Transportation systems rely on electricity too, which would make it difficult for people who rely on it to reach destinations and activities around the Bay Area.

B.11.g Potential Impacts and Loss Estimates

There is currently no data on the economic impacts from utility disruption for Berkeley. However, utility disruptions do cause notable economic impacts, including lost income and food for example if the power is out. There are also added costs to City operations as well as to businesses, employers, schools, and other local groups.

There may be replacement and content costs for any structures that have water damage.

B.12 Hazardous Materials Release

B.12.a Description of Hazardous Materials Release

Hazardous materials release could harm community members by exposing people to vapors that are toxic, suffocating, cause burns or are irritating. Hazardous materials release can threaten not only life and property, but also the environment, in areas such as creeks, the Aquatic Park lagoons and the San Francisco Bay.

The impacts of a release depend on its chemical characteristics, the amount and rate of substance spilled, the location, and its dispersion. Flammable and combustible materials can cause fires in areas that are largely constructed of wood; they may also cause explosions. Wind speed and direction, as well as topography, can greatly impact the dispersion plume of a release.

The City's Toxics Management Division (TMD), within the Department of Planning and Development, maintains the Hazardous Materials Area Plan, which identifies facilities that, in the event of a regional disaster, may pose the greatest risk to human health or the environment.

The Fire Department is the first responder for hazardous materials incidents within the City, and has access to chemical inventories, locations and emergency planning for all these facilities. The chemical inventories and facility maps are available electronically to the Fire Department.

The Department of Public Works manages the City's hazardous materials emergency response to spills on the right-of-way and also manages the hazardous materials emergency response contractor.

Connection to climate change

According to the Environmental Protection Agency, climate change may increase our exposure to chemicals. Climate change is causing more frequent and intense storms and varied weather, which can result in more release of hazardous materials.

Connection to hazards of concern

Most of the hazards of concerns in this plan can result hazardous materials release, including earthquake, flooding, wind, and wildland-urban interface fire.

B.12.b Locations of Hazardous Materials Release

A hazardous materials release can occur throughout the city near where hazardous materials are manufactured, stored, used, or transported. Hazardous materials release can occur as a result of a natural hazard, such as earthquake shaking, or can happen accidentally. In Berkeley, a hazardous material event is more likely to occur in the City's industrial area in West Berkeley where there is a concentration of industrial sites and transportation routes.

Map 37 identifies the locations of Hazard Level 1 Industrial Sites. Level 1 industrial sites are identified as square red icons on the map.

Map 37. ***Level 1 Industrial Sites, 2024***

Level 1 Industrial Sites Map

Hazardous Campus
Hazardous Site

California State Parks, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA, USFWS, City of Berkeley OES 10/29/24

Airborne toxic plumes, including smoke, can travel into Berkeley from surrounding cities. Petrochemical refineries and other large chemical facilities in Contra Costa County could release hazardous materials that could impact the Berkeley community.

Hazardous materials also travel through Berkeley by truck and rail. Specific routes known to carry hazardous chemicals are:

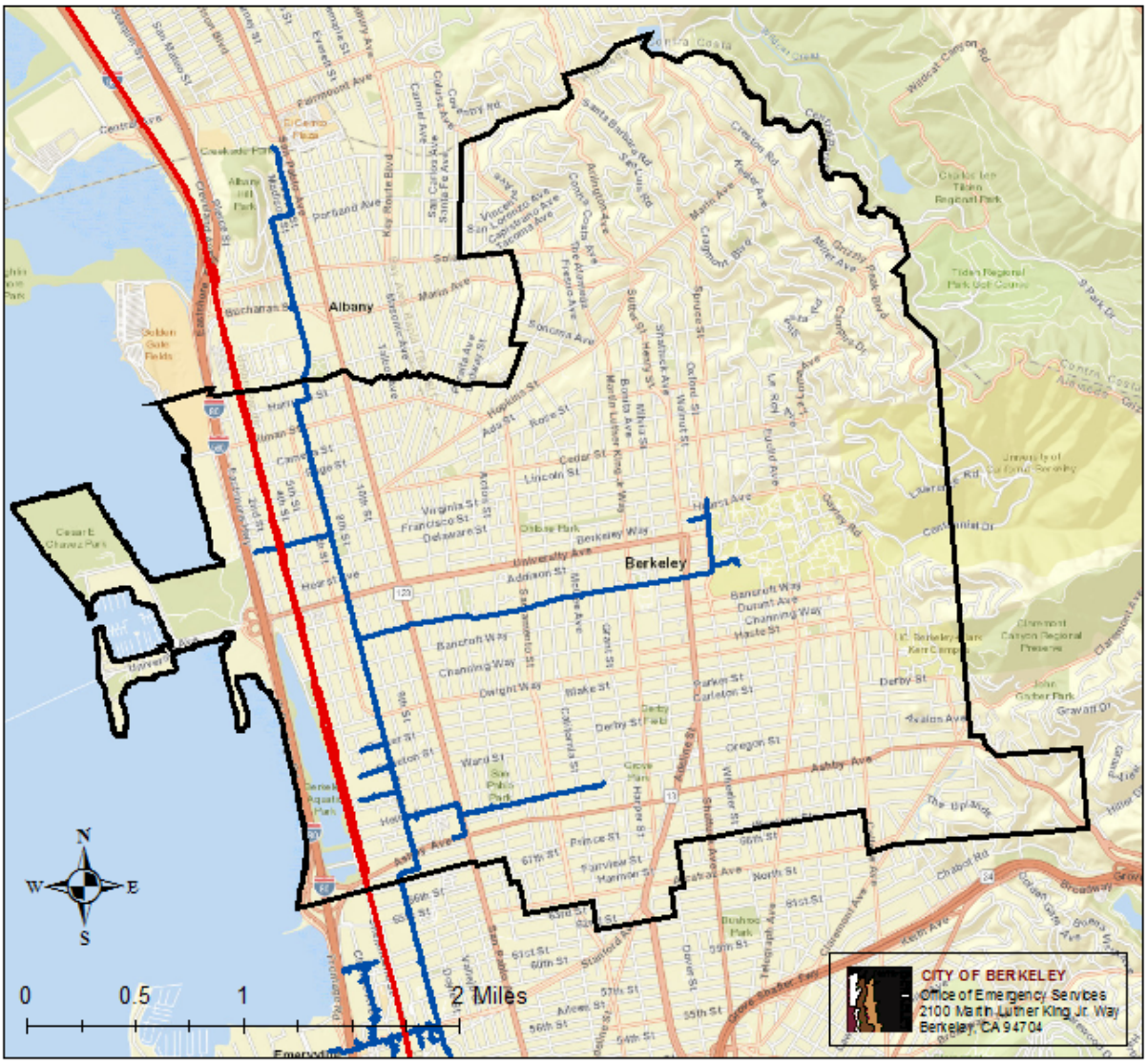
- Interstate 80
- San Pablo Avenue and the industrial areas to the west
- State Highway 13/Ashby Avenue
- Gilman Avenue
- University Avenue
- Union Pacific Railroad
- Fuel pipelines in the western edge of the City

Map 38 shows the natural gas transmission line that runs the length of Berkeley (north-south direction) under Seventh Street.

- The Seventh Street transmission line branches out to the West in four locations: Grayson, Carleton, Parker and Virginia Streets. The Virginia street branch runs almost all the way to the Eastshore Freeway.
- The Seventh Street transmission line branches out to the east in two locations. The first is at Heinz Avenue, continuing onto Russell Street after passing San Pablo Avenue. The transmission line ends where Russell Street crosses McGee Avenue. The second is at Allston Way. The transmission line extends the entire length of Allston Way, to the edge of UC Berkeley campus at Oxford Street, where it splits. One short transmission line continues into the campus and the other follows Oxford Street north just past Hearst Avenue, where it ends.

Map 38 also shows in a thick red line the location of pipelines carrying aviation fuel. These pipelines run along the Union Pacific railroad right-of-way in the western part of the city.

Map 38. ***Gas Transmission Pipelines and Jet Fuel Line, 2019***



Sources: PG&E and Kinder-Morgan

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, © OpenStreetMap contributors, and the GIS User Community

City of Berkeley

Jet Fuel Line

Gas Transmission Lines

B.12.c Extent of Hazardous Materials Release and Anticipated Intensities

There are 528 facilities[106] within Berkeley that are regulated by TMD.[107] TMD has grouped these facilities into Hazard Levels 1, 2 and 3:

- Level 1: Facilities that have substantial quantities of hazardous materials onsite, and/or have hazardous materials that can easily disperse or explode, and are toxic or pose other special hazards to human health and the environment.
- Level 2: Facilities that have medium to large quantities of hazardous materials onsite, and/or materials with known hazards.
- Level 3: Facilities for which Berkeley Fire Department engine companies can handle incidents without additional facility storage information, because the hazards are known or familiar (e.g., gas station without welding cylinders, or a facility with motor oil).

The majority of the 528 facilities in Berkeley are Level 3 automotive- or medically- related facilities with limited quantities of hazardous materials and hazardous waste.

B.12.d Previous Hazardous Materials Release Events

There have been no federally-declared hazardous materials release disasters in Berkeley since the last update. Berkeley has not recently experienced significant hazardous materials releases secondary another natural hazard. However, the city has experienced industrial accidents from both mobile and fixed sources. Truck accidents involving potentially harmful materials have occurred in the western part of the City, on Interstate 80 and its ramps. Industrial sites have released small amounts of dangerous substances, such as anhydrous ammonia from an ice rink and a sake brewery.[108] In 2011, an uncontrolled release of 1,600 gallons of diesel on the UC Berkeley campus resulted in diesel entering the stormwater system, and discharging into Strawberry Creek.[109] In 2017 a truck accident on Interstate 80 released approximately 200 gallons of diesel fuel on the roadway next to the estuary. The fuel was contained and the fuel did not release into the

estuary. After the incident, the roadway barriers have been strengthened and improved.

B.12.e Probability of Future Events

Transportation accidents have occurred with trucks carrying dangerous materials. These accidents will undoubtedly occur in the future.[110] A release on the freeway or railway would most immediately impact the western industrial area of the city. Winds typically blow from the west to the east, meaning that a gaseous release could easily spread to the City's eastern residential areas.

The City has completed a Hazardous Materials Commodity Flow Study with a grant from the California Office of Emergency Services and the federal Department of Transportation. This study retrieved or collected data on bulk chemicals being transported on freeways, major city streets, and the railroad and through pipelines.

B.12.f Vulnerabilities

People

According to the Environmental Protection Agency, hazardous materials may irritate the skin or eyes, make it difficult to breath, cause headaches and nausea, or result in other types of illness. Some hazardous substances can cause far more severe health effects, including: behavior abnormalities, cancer, genetic mutations, physiological malfunctions, physical deformations, and birth defects.

Structures

Fourteen Hazard Level 1 facilities hold sufficiently large quantities of toxic chemicals to pose a high risk to the community.[111] TMD works directly with each of these sites to make

sure they meet stringent safety requirements. Facilities in Table X are at the highest risk level.

Table 18. *Berkeley industrial sites with large quantities of hazardous substances*

Name	**Site Address**
Airgas USA LLC	1224 Sixth Street
Bayer Healthcare LLC	800 Dwight Way
Berkeley Forge & Tool INC.	1331 Eastshore Highway
Comeback Brewing II, DBA Trumer Brauerei	1404 Fourth Street
Davlin Coatings	700 Allston Way
Electro Coatings, INC.	893 Carleton Street
Form Energy	2810 Seventh Street
Henkel Corporation	800 Grayson Street
Lawrence Berkeley National Laboratory	1 Cyclotron Road
PC Cargo	2424 Fourth Street
Polyplus Battery Company	2431 Fifth Street Suite B
Takara Sake USA, INC.	708 Addison Street
TPMG Regional Lab (KAISER)	1725 Eastshore Highway
UC Berkeley - Main Campus	200 California Hall MC

In the wildland-urban interface (WUI) in the Berkeley hills, there are two major sources of dangerous chemicals: UC Berkeley and the Berkeley Lab. Both have significant amounts of flammable and toxic chemicals, including radioactive chemicals. While both sites have active disaster preparedness programs, WUI fires are notoriously difficult to fight and hazardous materials could be released in a major conflagration.

Systems

Transportation: Roadway or railroad closes during to a transportation-related hazardous material release could have serious impacts on the local economy and the ability to provide essential services. Hazardous materials can also contaminate water systems, impacting service and public health.

Natural, historic, and cultural resources

Hazardous materials can be devastating to animals and the natural environment. Hazardous materials can kill organisms, destroy plants and animals, causing health complications in animals, and or limit the ability of the ecosystem to survive.

B.12.g Potential Impacts and Losses

Previous events can provide valuable information about potential future scenarios. The 1994 Northridge Earthquake, classified as a moderate earthquake, resulted in a long list of earthquake-induced hazardous materials releases (EIHRs). Relevant releases include a train derailment resulting in 2,000 gallons of spilled sulfuric acid, 9 ruptures along the underground petroleum pipeline, and extensive hazardous materials releases resulting in serious fires in 3 buildings at California State University, Northridge.[112]

Because of the uncertain nature of industrial accidents, loss estimates are not presented in this plan. City staff uses PEAC software to plan for and respond to chemical emergencies.

B.13 Infectious Disease Outbreak

The City of Berkeley works in alignment with Alameda County, Bay Area Region, and California Department of Public Health to plan and respond to infectious disease.

B.13.a Description of Infectious Diseases

Infectious diseases are illnesses caused by germs, such as bacteria, viruses, and fungi; that enter the body, multiply and cause an infection. Some infectious diseases are contagious, meaning they can spread from one person to another. These diseases can be spread many ways, including direct contact, insect bites, food or water contamination, and airborne transmission. A threat of infectious diseases is an epidemic, which affects a large number of people in a population, community or region, or pandemic, which affects several countries or continents.

It should also be noted that bioterrorism can also involve communicable diseases. The Centers for Disease Control (CDC) has identified high priority biological agents that have the potential for major public health impact. These include:

- Anthrax (Bacillus anthracis)
- Botulism (Clostridium botulinum toxin)
- Plague (Yersinia pestis)
- Smallpox (variola major)
- Tularemia (Francisella tularensis)
- Viral hemorrhagic fevers (filoviruses [e.g., Ebola, Marburg] and arenaviruses [e.g.,

Lassa, Machupo])

The State of California has a list of over 95 communicable diseases, which must be reported by health providers or laboratories to local public health officials.

Connection to climate change

According to the Center for Disease Control and Prevention, our risk for infectious diseases is increasing because of climate change.[113]

B.13.b Location of Infectious Diseases

All of Berkeley is susceptible to infectious diseases. The populations at the highest risk for infectious diseases are the very young, the elderly, or individuals who are immunocompromised. However, higher-poverty neighborhoods of color are at greater risk due to the effects of health and social inequalities. In addition, because of the communicable nature of these diseases, those who are especially at-risk include people experiencing homelessness and people in congregate settings, such as people in long-term care facilities or dormitories.

B.13.c Extent of Infectious Diseases and Anticipated Intensities

Infectious diseases vary in their impact and severity depending on the disease. These complications can range from minor to severe illness or death. The impact of the disease is also affected by environmental factors and human behavior.

B.13.d Previous Infectious Disease Events

Since the last update, there was a federal declared disaster for the COVID-19 pandemic (DR-4482). In 2020, the start of the COVID-19 pandemic began. A total of 23,887

polymerase chain reaction (PCR) cases were confirmed in the City of Berkeley. In response to the pandemic, City of Berkeley issued several health alerts and protocols to align with the Bay Area, California Department of Public Health (CDPH), and Centers for Disease Control (CDC) guidance to limit the spread of infection.

Berkeley residents have been affected by the following other infectious disease outbreaks, epidemics, and pandemics over the last 15 years.

- In 2009, H1N1 caused over 8,917 hospitalizations and 578 deaths in California. The California Department of Public Health (CDPH) released stockpiled N95 respirators for use by health care facilities experiencing shortages. Berkeley Public Health Division distributed supplies to Health care facilities experiencing shortages. Points of dispensing were set up Bay Area-wide to administer pandemic influenza vaccine.

- In 2011, there were 24 confirmed cases of mumps in Berkeley, with approximately 2 additional suspect cases. All confirmed cases were within the UC Berkeley campus community, and all persons had received 2 or more doses of the measles, mumps, and rubella (MMR) vaccine. In consultation with CDPH, City of Berkeley recommended a 3rd dose of MMR for UC Berkeley students living in congregate settings such as dormitories to help control the outbreak.

- In 2014, more than 54 cases of pertussis were reported in Berkeley. This was a 5-fold increase compared to previous years. Berkeley cases ranged from infants to teenagers, with most being 10 - 17 years of age. Cases involved at least two schools in the Berkeley Unified School District. The state experienced more than 1,700 cases of pertussis. Clinicians were advised to immunize women with the tetanus, diphtheria, and pertussis (Tdap) vaccine during every pregnancy between 27-36 weeks' gestation to optimize antibody transfer and protection of infants at birth, and to immunize young infants promptly with the diphtheria, tetanus, and pertussis (DTaP) as young as 6 weeks during a community outbreak.

- In 2015, California experienced a measles outbreak with over 100 confirmed cases statewide. Berkeley had 1 confirmed case; there were 6 cases in Alameda County and many in surrounding Bay Area counties. Berkeley Public Health notified schools, preschools and daycare communities recommending staff and students be protected against measles with the MMR vaccine.

- In 2018, multiple outbreaks and cases of norovirus were reported to the City of

Berkeley Public Health Division. A health alert was issued to remind ill persons to practice good handwashing and to avoid preparing food for others while they are sick and for at least 48 hours after symptoms resolve. Clinicians were advised to consider norovirus in patients presenting with diarrhea, vomiting, nausea and abdominal pain, and Instruct patients with norovirus/gastrointestinal (GI) illness to remain home from work or school until 48 hours after symptoms have resolved.

- In 2019, an outbreak in San Diego, Santa Cruz and Los Angeles counties alerted Alameda County and the City of Berkeley to take precaution, and provide post-exposure prophylaxis and pre-exposure prophylaxis to high-risk populations. Groups at highest risk included persons using illicit drugs, men who have sex with men, persons with chronic liver disease, and persons experiencing homelessness.

- In 2022, multiple clusters of monkeypox (mpox) virus were reported in several countries, including the US. Many of the cases involved men who have sex with men (MSM) without a history of travel to an endemic country. There were 16 confirmed cases in the City of Berkeley. As a precaution, multiple Bay Area counties provided post-exposure prophylaxis and pre-exposure prophylaxis to high-risk populations. City of Berkeley partnered with Alameda County, CDPH, East Bay Advance Care, Asian Health Services, and Steamworks to provide mass vaccination sites weekly at Steamworks for 5 months.

B.13.e Probability of Future Events

The concern for future events is determined by asking the following questions:

- How easily does the disease spread?
- How susceptible is the population to this disease?
- Has this disease been a recent issue?
- These questions were evaluated using the following factors:
- How easily does the disease spread?
- Mode of Transmission
- R_0 – Rate of infection in a susceptible population
- How susceptible is the population to this disease?

- Vaccine Effectiveness
- Vaccine Coverage
- Has this disease been a recent issue?
- Confirmed cases in Berkeley in 2022 alone
- Confirmed cases in Berkeley 2010-2022
- Year of the last outbreak or epidemic in Berkeley, Alameda County or California

Scores were assigned to the responses or values for each factor. Low scores indicate less concern, higher scores indicate more concern. The average of the scores for the factors available were used to determine and overall measure of no, low, medium or high concern.

Table 19. *Factor scoring table*

Factor	**No concern - 0**	**Low Concern - 1**	**Medium Concern - 2**	**High Concern - 3**
Mode of Transmission	Not transmissible	Physical contact, Fecal-oral	Respiratory droplets	Airborne
R_0	0	<2	2-7	>7
Vaccine Effectiveness	100%	>75%	50-74.9%	<50%
Vaccine coverage for at least 1 dose	>95%	80- 94.9%	50-79.9%	<50%
Confirmed cases 2022	0	1-10	11-50	>50
Confirmed cases 2010-2022	<10	10-29	30-99	>100
Year of last outbreak/epidemic	>15 years ago	10-15 years ago	5-10 years ago	<5years ago
Concern for major outbreak or epidemic average score	Overall average score = 0-0.99	Overall average score = 1-1.99	Overall average score = 2-2.99	Overall average score = ≥3

Table 20. *Factors to determine concern for future events*

Infectious Disease	Mode of Transmission	R_0 – Rate of infection in a susceptible population	Vaccine Effectiveness	Vaccination Coverage	Berkeley Confirmed Cases in 2022 alone	Berkeley Confirmed Cases 2010-2022	Year of last outbreak or epidemic in Berkeley, Alameda County or California	Concern for major outbreak or epidemic
Seasonal Influenza	Respiratory droplets	0.9-2.1[cxiv]	19-60%[cxv]	US 2022– Children 6 months – 17 years old – 55.6% Adults 18+ - 47.4%[cxvi]	No Data	No Data	N/A	Med
2009 H1N1 Influenza	Respiratory droplets	1.46-1.48[cxvii]	62%[cxviii]	US 2009 – all people 6 months and older– 41.2%[cxix]	No Data	No Data	2009	Low
COVID-19	Respiratory droplets	1.5-3.5[cxx]	17-80%[cxxi]	Berkeley 2023 All people – 94% primary series completed; 38% up to date[cxxii]	15,500+	23,800+	2020-present	Med
Pertussis	Respiratory droplets	12-17[cxxiii]	34-73%[cxxiv]	California 2018-2020 – Children 24 months old, ≥4 doses – 84%[cxxv] US 2013 – adults – 28.9%[cxxvi]	1	106	2014	Med
Mumps	Respiratory droplets	10-12[cxxvii]	78-88%	California 2018-2020 – Children 24 months old, ≥1 doses – 91.4%[cxxix]	0	29	2011	Low

Infectious Disease	Mode of Transmission	R_0 – Rate of infection in a susceptible population	Vaccine Effectiveness	Vaccination Coverage	Berkeley Confirmed Cases in 2022 alone	Berkeley Confirmed Cases 2010-2022	Year of last outbreak or epidemic in Berkeley, Alameda County or California	Concern for major outbreak or epidemic
Measles	Airborne respiratory droplets	12-18[cxxx]	93-97%[cxxxi]	California 2018-2020 – Children 24 months old, ≥1 doses – 91.4%[cxxxii]	0	5	2015	Low
Mpox	Physical contact	1.10-2.40[cxxxiii]	47.4-78.1%	California 2023 – at risk population – 66% one dose; 41% fully vaccinated[cxxxv]	16	16	2022	Med
Hepatitis A	Fecal-oral	1.71-3.67[cxxxvi]	95-97% [cxxxvii]	US 2017 – Children 35 months and older – 76.6% ≥2 doses Adolescents 13-17 years old – 68.4% ≥2 doses Adults ≥19 years – 10.9% ≥2 doses	0	4	2017	Low
Norovirus	Fecal-oral	1.1-7.2[cxxxviii]	No vaccine available	No vaccine available	No Data	No Data	2018	Med

B.13.f Vulnerabilities

People

Infectious diseases can be difficult to evaluate due to the wide variation in disease characteristics. Therefore, they pose difficulties in terms of comprehensive risk assessments. According to the Alameda County Department of Public Health, "In Alameda County, communities of color face inequitable conditions that increase the risk of chronic diseases. Others especially at-risk of infection and disease transmission are people experiencing homelessness and people in congregate settings."

As of July 2023, 80 Berkeley residents lost their lives as a result of COVID-19 infections. The death rate for African Americans residents is four times greater than Latino residents and nearly six times greater than whites, demonstrating the disproportionate impact on disease and death on African American residents.

B.13.g Potential Impacts and Losses

In most infectious disease outbreak, the impact is limited, with the majority of illnesses treatable and the likelihood of fatalities low. Large-scale outbreaks like the onset of COVID-19 in the spring of 2020 can strain existing health care facilities. As of July 2023, 250 Berkeley residents have been hospitalized as a result of COVID-19 infections and 80 Berkeley residents lost their lives as a result of COVID-19 infections.

The impacts of a pandemic go far beyond positive cases, hospitalizations and deaths. During the COVID-19 pandemic the stress, collective grief, physical and social distancing needed to slow the spread of the virus, and the resulting distress from lost wages,

unemployment, and closures of educational and youth development programs created a secondary public health crisis.

End Notes

1 Documentation is on file at the Berkeley Planning Department

2 The discipline of "Probability Management" was developed by Dr. Sam Savage, author of *The Flaw of Averages*. You can learn more about Probability Management at probabilitymanagement.org.

Earthquake

3 ATC 52-1. 2010. San Francisco Department of Building Inspection, Community Action Plan for Seismic Safety (CAPSS) Project. *Here Today Here Tomorrow: The Road to Earthquake Resilience in San Francisco.* http://www.sfgsa.org/modules/showdocument.aspx?documentid=9753.

4 Information adapted from the United States Geological Survey: http://earthquake.usgs.gov/learn/topics/mag_vs_int.php

5 https://wim.usgs.gov/geonarrative/safrr/haywired_vol1/

6 Johnson, L. and Mahin, S. California Seismic Safety Commission Pacific Earthquake Engineering Research Center (PEER). 2016. The Mw 6.0 South Napa Earthquake of August 24, 2014: A Wake-up Call for Renewed Investment in Seismic Resilience across California. http://peer.berkeley.edu/publications/peer_reports/reports_2016/CSSC1603-PEER201604_FINAL_7.20.16.pdf

7 Schwartz, Richard. Earthquake Exodus, 1906, 2006.

8 Detweiler, Shane and Wein, A., 2018, The HayWired Earthquake Scenario – Earthquake Hazards: U.S. Geological Survey Scientific Investigations Report 2017-5013-A-H, p.3.

9 Detweiler, Shane and Wein, A., 2018, The HayWired Earthquake Scenario – Earthquake Hazards: U.S. Geological Survey Scientific Investigations Report 2017-5013-A-H, p.4.

10 https://www.usgs.gov/faqs/can-large-amounts-rain-california-cause-increase-earthquakes

11 City of Berkeley Budget Book FY23-24, Community Profile Data

12 2020 American Community Survey (ACS) 5-year Estimates.

13 These buildings are categorized as SPC-2 according to the Hospital Seismic Safety Act. Structural Performance Category (SPC) 1 is the most vulnerable ranking for buildings. Many SPC 1 hospitals pose significant collapse risks. SPC 5 hospitals pose the least structural risk. Significant changes impacting life safety were made to the Building Code in 1973, particularly regarding reinforced concrete buildings. These changes built on lessons learned in California earthquakes, including the 1971 San Fernando earthquake. According to state law, SPC-2 buildings must comply with standards intended to keep hospitals open and providing medical care following a severe earthquake by 2030.

14 These buildings are categorized as SPC-3 and SPC-4. Structural Performance Category (SPC) 1 is the most vulnerable ranking for buildings. Many SPC 1 hospitals pose significant collapse risks. SPC 5 hospitals pose the least structural risk.

15 These buildings are categorized as SPC-1. Structural Performance Category (SPC) 1 is the most vulnerable ranking for buildings. Many SPC 1 hospitals pose significant collapse risks. SPC 5 hospitals pose the least structural risk.

16 Methane Emissions (EPA, 2018) https://www.epa.gov/ghgemissions/overview-greenhouse-gases#methane

17 The 2004 scenario was calculated using HAZUS-MH. The program's default data on buildings (types and economic values) and soils (for liquefaction and landslides) were used. 2004 shelter figures are taken from a previous analysis conducted by the Association of Bay Area Governments. HAZUS estimates of shelter populations were lower. Special thanks to Rich Eisner for help preparing these estimates.

18 This 2013 LHMP Update includes impacts described in the 2008 FEMA/Cal EMA (Cal OES) Catastrophic Earthquake Incident Scenario. This scenario is based on a HAZUS-MH™ study completed by Charles A. Kircher, Hope A. Seligson, Jawhar Bouabid, and Guy C. Morrow as part of a series of papers presented at the 100th Anniversary Conference on the 1906 San Andreas Fault Earthquake. Descriptions of damage in this scenario is based on impacts expected from a magnitude 7.7 to 7.9 earthquake on the San Andreas fault, but the general level and type of impacts are expected to be similar for a Hayward fault event. The report was based on the most accurate data available at the time and the results were reviewed by peers. Additional analysis and data were prepared by Kircher, et al. for Golden Guardian 2006.

19 In 2004, estimate was $1.5 billion. Updated for 2018 using Consumer Price Index Inflation Calculator at http://data.bls.gov/cgi-bin/cpicalc.pl.

20 About 20% of ignitions typically occur within the first hour after the earthquake, 50% within about 6 hours and almost all ignitions occur within the first day.
Risk, S. P. A. "Enhancements in HAZUS-MH Fire Following Earthquake, Task 3: Updated Ignition Equation pp. 74pp. *SPA Risk LLC, Berkeley CA. Principal Investigator C.Scawthorn. Prepared for PBS&J and the National Institute of Building Sciences, San Francisco* (2009).

21 Estimation derived from Ch. 10, particularly Eqn. 10-1, of HAZUS Earthquake Tech Manual MR 4: FEMA, 2003. Multi-hazard Loss Estimation Methodology, Earthquake Model, HAZUS- MH MR4 Technical Manual. Developed by: Department of Homeland Security, Federal Emergency Management Agency, Mitigation Division, Under a contract with: National Institute of Building Sciences Washington, D.C., p. 712.

22 In 2004, estimate was $20 million damage from 5 estimated fires. This plan estimates 6-12 fires. If $4 million/ignition assumed, $24 million - $48 million damage is estimated in 2004 dollars. This figure was then updated for 2023 to $40 million - $80 million using Consumer Price Index Inflation Calculator at http://data.bls.gov/cgi-bin/cpicalc.pl.

23 Detweiler, Shane and Wein, A., 2018, The HayWired Earthquake Scenario – Engineering

Implications: U.S. Geological Survey Scientific Investigations Report 2017-5013-I-Q, p.6.

24 Detweiler, Shane and Wein, A., 2018, The HayWired Earthquake Scenario – Engineering Implications: U.S. Geological Survey Scientific Investigations Report 2017-5013-I-Q, p.390.

25 In 2004, estimate was $215 million. Updated for 2018 using Consumer Price Index Inflation Calculator at http://data.bls.gov/cgi-bin/cpicalc.pl.

Wildland Urban Interface

26 Mietkiewicz, et al. (2020) "In the Line of Fire: Consequences of Human-Ignited Wildfires to Homes in the U.S. (1992–2015)". Fire 2020, 3 (3), 50: https://doi.org/10.3390/fire3030050

27 California Department of Public Health. 2008. Public Health Climate Change Adaptation Strategy for California. http://resources.ca.gov/climate_adaptation/docs/Statewide_Adaptation_Strategy.pdf

28 Pacific Institute. (2010). A Review of Social and Economic Factors that Increase Vulnerability to Climate Change Impacts in California.

29 2020 Alameda and Contra Costa County Wildfire Risk to Structures and Wildfire Hazard Maps for Fire Prevention Planning, East Bay Regional Parks, et al.

30 Map 5 of Berkeley, with data from Tukman Geospatial, uses the wildfire hazard data from Map 3 and structure density data from Alameda county from 2017-2022 and Microsoft Building Footprints from 2019-2020. The resulting risk to structures map provides an explicit ranking for 10-acre hexagons, assigning each hexagon with a ranking for wildfire hazard and a ranking for housing density. From a risk to structures perspective, hexagons with high housing density and high wildfire hazard are of greatest concern. Map 13 shows the highest hazard hexagons are located on the Eastern border of the city, with most of them bordering Tilden Park. The moderate hazard areas area in the same neighborhoods, but begin coming in closer to Central Berkeley. Researchers chose to only show hexagons with a "Moderate" hazard and at least one structure. As a result, the Berkeley flatlands do not have any coloring because it is classified as having a low relative hazard.

31 Maranghides, A., et al. (2022) WUI Structure/Parcel/Community Fire Hazard Mitigation Methodology. NIST Technical Note 2205. National Institute of Standards and Technology. Gaithersburg, MD. https://doi.org/10.6028/NIST.TN.2205

32 https://firesafemarin.org/

33 Stanford B, Grossinger RM, Askevold RA, Whipple AW, Leidy RA, Beller EE, Salomon MN, Striplen CJ. 2011. East Contra Costa County Historical Ecology Study. Prepared for Contra Costa County and the Contra Costa Watershed Forum. A Report of SFEI's Historical Ecology Program, SFEI Publication #648, San Francisco Estuary Institute, Oakland, CA.

34 https://firesafemarin.org/create-a-fire-smart-yard/plants/fire-hazardous-plants/

35 Judson Jones. "One of the California Wildfires Grew so Fast It Burned the Equivalent of a Football Field Every Second." CNN. Accessed May 16, 2019.

https://www.cnn.com/2018/11/09/us/california-wildfires-superlatives-wcx/index.html.

36 Grizzly Peak fire reduced to 'patrol status'; being investigated as possible arson (berkeleyside.org)

37 City of Berkeley. Fire Hazard Mitigation Plan. February 25, 1992.

38 San Francisco Fire Department Report on the 1991 Oakland-Berkeley Hills Conflagration. https://sfmuseum.org/oakfire/berkeley.html

39 https://www.fire.ca.gov/our-impact/statistics

40 Maranghides, A., et al. (2022) WUI Structure/Parcel/Community Fire Hazard Mitigation Methodology. NIST Technical Note 2205. National Institute of Standards and Technology. Gaithersburg, MD. https://doi.org/10.6028/NIST.TN.2205

41 Total square footage of buildings in burn area is 9,386,281 square feet.

42 Excessive Heat Events Guidebook (EPA, 2006, Updated Appendix A 2016) https://www.epa.gov/sites/production/files/2016-03/documents/eheguide_final.pdf

43 2017 Clean Air Plan (BAAQMD, 2017, Chapter 3, pg 11) http://www.baaqmd.gov/~/media/files/planning-and-research/plans/2017-clean-air-plan/attachment-a_-proposed-final-cap-vol-1-pdf.pdf?la=en

44 http://www.climateassessment.ca.gov/

45 Rising Temperatures, Worsening Ozone Pollution, Union of Concerned Scientists (2011), p7 https://www.ucsusa.org/sites/default/files/legacy/assets/documents/global_warming/climate-change-and-ozone-pollution.pdf

46 Rising Temperatures, Worsening Ozone Pollution, Union of Concerned Scientists (2011), p12.

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49 California Statewide Heat Wave September 2017 (Climate Signals Beta, Updated July 20, 2018) http://www.climatesignals.org/headlines/events/california-statewide-heat-wave-september-2017

50 https://www.kqed.org/news/11614957/what-you-need-to-know-about-bay-areas-heat-wave

51 https://cal-adapt.org/about/

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54 Seo, H. (2022, August 19). How heat waves take a toll on Mental Health. The New York Times. https://www.nytimes.com/2022/08/19/well/mind/heat-mental-health.html

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59 https://sanfrancisco.cbslocal.com/2017/09/01/bart-trains-heat-wave-track-concerns/

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Air Quality

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High Wind

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69 Managing Pests in Gardens: Environmental Factors: Wind—UC IPM (ucanr.edu)

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Landslide

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Tsunami

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Sea Level Rise

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80 California's Fourth Climate Change Assessment San Francisco Bay Area Region Report (State of California, 2018) http://www.climateassessment.ca.gov/regions/docs/20180827-SanFranciscoBayArea.pdf

81 California's Fourth Climate Change Assessment San Francisco Bay Area Region Report (State of California, 2018) http://www.climateassessment.ca.gov/regions/docs/20180827-SanFranciscoBayArea.pdf

82 State of California Sea-Level Rise Guidance 2018 Update (California Ocean Protection Council, 2018). http://www.opc.ca.gov/webmaster/ftp/pdf/agenda_items/20180314/Item3_Exhibit-A_OPC_SLR_Guidance-rd3.pdf. This is the median probabilistic projections, meaning 50% probability sea-level rise will meet or exceed this level.

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89 Land Subsidence in the United States, USGS Fact Sheet (USGS, 2000). https://water.usgs.gov/ogw/pubs/fs00165/

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Floods

93 In Berkeley, culverted creeks are below ground and within a pipe or box-shaped conduit in a creek bed.

94 The City of Berkeley Watershed Management Plan Appendix D, Page 9 lists design storms. The depth of the 10-year, 6 hour duration event varies from 1.81" to 2.27" depending on if the desired location is in the Bay Plains or in the hills.

95 The City uses a 10-year design storm as representation of a rainfall event that reflects local conditions.

96 Possible viral infections in flood disasters: a review considering 2019 spring floods in Iran - PMC (nih.gov)

97 Shallow Groundwater Response to Sea Level Rise | San Francisco Estuary Institute (sfei.org)

98 The Potter Watershed drains approximately one-third of the land area of the City through storm drain pipe infrastructure. The Codornices Watershed drains about one-tenth of the City through open watercourses and creek culverts. Findings from these two watersheds could be extrapolated to the other watersheds, but it is preferable to continue hydraulic modeling of the remaining watersheds.

99 California Adaptation Planning Guide, July 2012.

100 Contents were assumed to be worth 50% of the total structural replacement value for single-family homes and 100% of the total structural replacement value for commercial

and industrial properties. The majority of structures in the zone with up to 3 feet of floodwaters are residential, so contents for all structures in this zone were estimated at 50% of structure value. The majority of structures in the zone with up to 1 foot of water are commercial or industrial, and contents value was assumed to equal structure value for these properties.

101 Contents were assumed to be worth 50% of the total structural replacement value for single-family homes and 100% of the total structural replacement value for commercial and industrial properties. The majority of structures in the zone with up to 3 feet of floodwaters are residential, so contents for all structures in this zone were estimated at 50% of structure value. The majority of structures in the zone with up to 1 foot of water are commercial or industrial, and contents value was assumed to equal structure value for these properties.

102 In 2023, loss estimates quoted in the narrative were updated using Consumer Price Index Inflation Calculator at http://data.bls.gov/cgi-bin/cpicalc.pl.

103 Contents were assumed to be worth 50% of the total structural replacement value for single-family homes and 100% of the total structural replacement value for commercial and industrial properties. The majority of structures in the zone with up to 3 feet of floodwaters are residential, so contents for all structures in this zone were estimated at 50% of structure value. The majority of structures in the zone with up to 1 foot of water are commercial or industrial, and contents value was assumed to equal structure value for these properties.

104 Repetitive loss properties are those that have submitted claims for flood reimbursement through the National Flood Insurance Program at least twice in the last ten years. The goal of mapping these properties is to identify what locations flood repetitively and seek to mitigate the problem to reduce flood damage.

Utility Interruption

105 Public Works Commission, Disaster and Fire Safety Commission, and Transportation Commission. 2018. CONCEPTUAL STUDY TO UNDERGROUND UTILITY WIRES IN BERKELEY, p. 1-214. https://loridroste.com/wp-content/uploads/2022/11/Conceptual-Study-for-Undergrounding-2018.pdf

Hazardous Materials Release

106 Of the 528 facilities indicated, 469 meet chemical minimums; the remainder are smaller hazardous waste only generators that do not meet volume thresholds quotes. There are many more facilities that have some sort of hazardous materials on their sites, but they are not regulated by the City's Toxics Management Division (per Jamie Cooney, City Toxics Management Division, August 2023).

107 These facilities have a minimum of 55 gallons of aggregate liquid chemicals, 500 pounds of aggregate solid chemicals, or 200 cubic feet of aggregate gaseous chemicals, or they may generate hazardous waste.

108 Both of these accident sites no longer store anhydrous ammonia.

109 UC Berkeley and Berkeley Lab have since evaluated their storm water systems as potential hazardous materials conduits to the creeks.

110 The Northridge earthquake derailed a train carrying 2,000 gallons of sulfuric acid that began leaking. Firefighters were on the scene within two hours and the situation was stabilized with three and a half hours.

111 City Toxics Management Division, as of July 2023.

112 Earthquake-Induced Hazardous Materials Releases: Lessons from the Northridge Earthquake, Michael K. Lindell & Ronald W. Perry, August 1995.

Infectious Disease

113 https://www.cdc.gov/ncezid/what-we-do/climate-change-and-infectious-diseases/index.html

114 https://sph.umich.edu/pursuit/2020posts/how-scientists-quantify-outbreaks.html

115 https://www.cdc.gov/flu/vaccines-work/effectiveness-studies.htm

116 https://www.cdc.gov/flu/fluvaxview/dashboard/vaccination-dashboard.html

117 https://sph.umich.edu/pursuit/2020posts/how-scientists-quantify-outbreaks.html

118 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3647645/

119 https://www.cdc.gov/flu/fluvaxview/coverage_0910estimates.htm

120 https://sph.umich.edu/pursuit/2020posts/how-scientists-quantify-outbreaks.html

121 https://covid.cdc.gov/covid-data-tracker/#vaccine-effectiveness

122 https://berkeleyca.gov/safety-health/covid-19/covid-19-dashboards

123 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8489951/

124 https://www.cdc.gov/vaccines/vpd/dtap-tdap-td/hcp/about-vaccine.html#:~:text=In%20studies%20demonstrating%20the%20efficacy,people%204%20years%20after%20vaccination

125 https://downloads.aap.org/AAP/Vaccine/index.html

126 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5819000/

127 https://www.ajicjournal.org/article/S0196-6553(20)30994-9/pdf

128 https://www.cdc.gov/vaccines/vpd/mmr/public/index.html#:~:text=One%20dose%20of%20MMR%20vaccine%20is%2093%25%20effective%20against%20measles,(weakened)%20live%20virus%20vaccine

129 https://downloads.aap.org/AAP/Vaccine/index.html

130 https://pubmed.ncbi.nlm.nih.gov/28757186/

131 https://www.cdc.gov/vaccines/vpd/mmr/public/index.html#:~:text=One%20dose%20of%20MMR%20vaccine%20is%2093%25%20effective%20against%20measles,(weakened)%20live%20virus%20vaccine

132 https://downloads.aap.org/AAP/Vaccine/index.html

133 https://www.mdpi.com/2076-393X/11/6/1093

134 https://www.nejm.org/doi/full/10.1056/NEJMoa2215201

135 https://www.cdc.gov/poxvirus/mpox/cases-data/mpx-jynneos-vaccine-coverage.html

136 https://www.jstor.org/stable/26515647; https://www.thelancet.com/journals/lanepe/article/PIIS2666-7762(22)00120-X/fulltext;

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6152969/#:~:text=The%20different%20statistical%20methods%20suggest,are%20consistent%20with%20this%20range

137 https://www.cdc.gov/vaccines/pubs/pinkbook/downloads/hepa.pdf

138 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5851036/#:~:text=However%2C%20we%20found%20that%20the,values%20estimated%20for%20particular%20outbreaks

C. Mitigation Strategy

Berkeley aims to be a disaster-resilient community that can survive, recover from, and thrive after a disaster. Berkeley envisions a community in which the people, buildings, and infrastructure in and serving Berkeley, are resilient to disasters; City government provides critical services in the immediate aftermath of a devastating event of any kind; and basic government and commercial functions resume within thirty days of a damaging earthquake or other significant event.

Disaster mitigation reduces or eliminates long-term risks to people and property from hazards and their effects, and/or provides passive protection at the time of disaster impact. Disaster mitigation is a foundational element of disaster resilience.

Element C of this plan outlines Berkeley's mitigation strategy, and how it connects to Berkeley's disaster resilience vision. The strategy identifies and analyzes a comprehensive range of specific mitigation actions and activities being considered to reduce the effects of each hazard described in Element B: Risk Assessment. The Strategy is based on existing authorities, policies, programs, and resources, as well as Berkeley's ability to expand on and improve these existing mitigation tools as described in Elements C.1 of this plan.

C.1 Authorities, Policies, Programs, and Resources

The table on the following pages highlights some of the regulatory authorities, policies, programs and other resources that support Berkeley's hazard mitigation efforts. The "Category" columns indicate whether the resource includes Planning and Policy, Financial, Administrative and Technical, and/or Training and Outreach Elements. The "Ability to support mitigation activities" column overviews the City's ability to use the identified resource to expand on and improve mitigation activities.

Following the table is a detailed discussion of these and other authorities, policies, programs, and resources. Finally, this section provides a table of State and federal requirements related to hazard mitigation and describes how Berkeley complies with these requirements.

Name of Authority, Policy, Program, or Resource	Category				Ability to support mitigation activities
	Planning and Policy	Financial	Admin & Technical	Training & Outreach	
Guiding Policies and Goals	x				Many City policies shape Berkeley's growth. In addition to disaster resilience, City goals include protecting the environment, promoting sustainable development, providing low-income housing, preserving historic structures, and maintaining City infrastructure. Some of these policies directly support mitigation efforts; together they all ensure that mitigation activities account for City values.
Public Works	x		x		The City of Berkeley's Public Works Department is the largest department in the City and provides both direct services to the community, as well as critical support services to the City organization.

Name of Authority, Policy, Program, or Resource	Category				Ability to support mitigation activities
	Planning and Policy	Financial	Admin & Technical	Training & Outreach	
Emergency Management	x		x	x	The City's Fire Department - Office of Emergency Services (OES) works to increase the Berkeley's readiness through community education, staff support to the Disaster and Fire Safety Commission, and coordination of the City's emergency management activities. OES develops, maintains, and exercises the City's Emergency Operations Plan as well as the Local Hazard Mitigation Plan.
Taxing Authorities		x			The City's General Fund gets the majority of its money from: a) property taxes and property-based revenues; b) economically sensitive revenues such as sales tax, business license tax, transient occupancy tax, etc.; and c) interest and fees such as ambulance fees; and parking and traffic fines.

Name of Authority, Policy, Program, or Resource	Category				Ability to support mitigation activities
	Planning and Policy	Financial	Admin & Technical	Training & Outreach	
Measure T1		x			Measure T1 provides $100 million of funding from bond revenue to pay for improvements to City infrastructure and facilities. Berkeley voters passed Measure T1 in November 2016. Measure T1 funds are used for a variety of infrastructure improvements, including upgrading Senior Centers and Community Centers to immediate occupancy and increase their ability to serve the community regularly and during disasters. Future mitigation actions could include upgrading additional buildings and or building new ones.
Measure FF		x			On November 2020, Berkeley voters passed Measure FF with 74.2% approval. Measure FF provides $8.5 million in funding annually from parcel taxes to pay for fire services, emergency response, 9-1-1 communication, hazard mitigation and wildfire prevention.

Name of Authority, Policy, Program, or Resource	Category				Ability to support mitigation activities
	Planning and Policy	Financial	Admin & Technical	Training & Outreach	
Measure GG		x			In November 2008, Berkeley voters passed Measure GG, which authorizes the levying of a special tax that funds fire protection and emergency responses and preparedness.
City Budget		x			The City's budget process assigns resources to address the goals, objectives, and community priorities set by the City Council. This process determines if and when money is spent on mitigation actions.
Municipal Building Improvements	x	x	x		The City, supported by an active public, local and State bond measure funding and FEMA grants, has strengthened and rebuilt numerous key buildings in Berkeley. Since 2014, the City has continued its program to strengthen or replace key at-risk structures.
Building Code	x		x		The City enforces disaster-resistant development through the application of the California Building Code, as well as more stringent local code amendments.

Name of Authority, Policy, Program, or Resource	Category				Ability to support mitigation activities
	Planning and Policy	Financial	Admin & Technical	Training & Outreach	
Plan Set A	x			x	The City's adoption of Standard Plan Set A educates homeowners and contractors about measures to improve seismic resistance of their homes. Contractors' adherence to this Standard simplifies the City's plan review and inspection process.
Mandatory Retrofit Ordinances	x				The City has approved ordinances requiring owners of unreinforced masonry buildings and soft story buildings with five or more units to evaluate their buildings, obtain retrofit permits and complete seismic retrofits according to a schedule based on each building's risk categorization. Future mitigation actions include ensuring that these retrofits happen and exploring future ordinances for other hazardous buildings.

Name of Authority, Policy, Program, or Resource	Category				Ability to support mitigation activities
	Planning and Policy	Financial	Admin & Technical	Training & Outreach	
Retrofit Grants Program	x	x	x	x	The Building and Safety Division of the Planning Department developed a Retrofit Grants program with funding from a Hazard Mitigation Grant from the Federal Emergency Management Agency (FEMA) and the California Governor's Office of Emergency Services (Cal OES). Mitigation actions include disbursing grants, and continuing to seek Hazard Mitigation Grants to fund future rounds of the Retrofit Grants Program.
City Transfer Tax Rebate Program	x	x	x	x	By ordinance, the City created a program to rebate up to one-third of the transfer tax amount to be applied to earthquake upgrades on homes. Mitigation actions include advertising this program and conducting outreach to homeowners.

Name of Authority, Policy, Program, or Resource	Category				Ability to support mitigation activities
	Planning and Policy	Financial	Admin & Technical	Training & Outreach	
Earthquake Brace + Bolt	x	x	x	x	The City participates in the Earthquake Brace + Bolt (EBB) program, a grant program administered by the California Earthquake Authority, which provides grants of up to $3,000 for seismic retrofits of owner-occupied residential buildings with 1-4 dwelling units. Mitigation actions include advertising this program and conducting outreach to building owners.
Earthquake Soft Story (ESS)	x	x	x	x	The City participates in the Earthquake Soft-Story (ESS) Retrofit grants, offered by California Residential Mitigation Program, providing homeowners grants of up to $13,000 for seismic retrofits of single-family houses with a “soft story” living space built over a garage. Mitigation actions include advertising this program and conducting outreach to building owners.

Name of Authority, Policy, Program, or Resource	Category				Ability to support mitigation activities
	Planning and Policy	Financial	Admin & Technical	Training & Outreach	
Expanded Inventory of Potentially Seismically Vulnerable Buildings	x		x		With the launch of the Retrofit Grants Program, staff conducted extensive research to update and refine the City's inventory of potentially seismically vulnerable buildings. In addition to soft story buildings not currently subject to mandatory retrofit such as those with 3-4 residential units or commercial uses, Berkeley has numerous non-ductile concrete and tilt-up or other rigid wall-flexible diaphragm (RWFD) buildings. Future expansion includes conducting research to determine other hazardous buildings that should be inventoried and exploring additional mandatory retrofit ordinances.
Property Assessed Clean Energy (PACE)		x			Property owners can borrow money to pay for green building improvements and spread the cost out over time with PACE financing.

Name of Authority, Policy, Program, or Resource	Category				Ability to support mitigation activities
	Planning and Policy	Financial	Admin & Technical	Training & Outreach	
Fire Department: Prevention Division	x		x	x	Berkeley Fire Departments Fire Prevention Division works to decrease the number and severity of all fires in Berkeley. Mitigation actions include active code-enforcement program, public education activities, and engineering and plan review.
Fire Code	x		x		The City of Berkeley adopted the 2022 California Fire Code along with more stringent Local Amendments. Mitigation actions include code updates and enforcement.
Hazardous Fire Area Zones	x		x		The City has established and adjusted fire zones in Berkeley. While the zones were initially established to address urban fire issues, they have evolved to designate the City's WUI fire hazard. Currently, the Berkeley Fire Department has divided the city into Fire Zones 1, 2, and 3, designated in order of ascending fire risk.

Name of Authority, Policy, Program, or Resource	Category				Ability to support mitigation activities
	Planning and Policy	Financial	Admin & Technical	Training & Outreach	
Fire Department: WUI Division	x		x	x	City of Berkeley Fire Department instituted a WUI division in 2021 supported with funding from Measure FF. The WUI Division is primarily responsible for the coordination of wildland mitigation efforts and related inspection activities. The ability for the Division to expand on mitigation activities is outlined in the Action Plan of the Community Wildfire Protection Plan (CWPP).
Defensible Space Inspections and Home Hardening Assessments	x		x		The WUI Division coordinates defensible space inspections and home hardening assessments of all homes in Fire Zones 2 and 3.
Resident Assistance Program		x			The resident assistance program aims to provide financial assistance to residents who demonstrate physical or financial hardship in completing their required prescriptions for defensible space. Mitigation actions include expanding the program to more residents.

Name of Authority, Policy, Program, or Resource	Category				Ability to support mitigation activities
	Planning and Policy	Financial	Admin & Technical	Training & Outreach	
Community Wildfire Protection Plan	x				In 2023, the City of Berkeley approved its first Community Wildfire Protection Plan (CWPP). The CWPP is a roadmap for fire hazard mitigation and preparedness at both the City and neighborhood levels, identifying ways to mitigate Berkeley's wildfire risk. The CWPP strategy includes goals for improving wildfire response, community preparedness, fuels management, infrastructure, ignition reduction, and home hardening.

Name of Authority, Policy, Program, or Resource	Category				Ability to support mitigation activities
	Planning and Policy	Financial	Admin & Technical	Training & Outreach	
Firewise Communities	x			x	The Firewise USA® program, led by the National Fire Protection Association (NFPA), offers a structured approach for communities to enhance their wildfire resilience in California. The Berkeley Fire Department staff provide guidance to help interested neighborhoods achieve Firewise recognition. Currently, Berkeley has multiple Firewise communities. Future mitigation actions include expanding the number of communities.
Vegetation Management	x		x	x	The City runs a number of vegetation management programs to reduce fuel loads. Future mitigation actions include searching for funding to expand and add programs.
Hills Emergency Forum	x			x	The City of Berkeley is a charter member of the Hills Emergency Forum, a consortium of nine agencies working on fire mitigation measures for the East Bay Hills. Future mitigation actions include partnering with the other agencies to reduce collective wildfire risk.

Name of Authority, Policy, Program, or Resource	Category				Ability to support mitigation activities
	Planning and Policy	Financial	Admin & Technical	Training & Outreach	
Diablo Firesafe Council	x			x	The City is involved with Diablo Fire Safe Council (DFSC), a 501(c)3 nonprofit organization.
Community Readiness	x		x	x	The City runs a number of programs aimed to help enhance the resilience of people in the Berkeley community by providing disaster preparedness outreach, training, and materials. Training is provided in person and online, to individuals, neighborhoods, and community-based organizations. A number of these programs teach residents about mitigation actions that they could take individually, such as reducing earthquake hazards in the home and preparing their homes for wildfire season. Future mitigation actions include expanding on the household mitigation actions included in this plan and identifying powerful ways to deliver that information to residents.

C.1.a Guiding Policies and Goals

Many City policies shape Berkeley's growth. In addition to disaster resilience, City goals include protecting the environment, promoting sustainable development, providing low-income housing, preserving historic structures, and maintaining City infrastructure. Key policies impacting development are detailed below.

Sustainable Development

Berkley promotes sustainable development policies. The General Plan includes policies to maintain sufficient land zoned for high-and medium-density residential development. These policies allow for sufficient new construction to meet Berkeley's fair share of regional housing needs. Policies are coordinated to ensure that all new development is sensitive to Berkeley's unique physical character and scale, and that new housing and future development occur in areas of the city that are best served by public transportation.

Affordable Housing

Berkeley also promotes affordable, seismically-safe housing. The General Plan includes policies promoting access to quality housing for people at the lowest income levels, and inclusion of low-income groups in new housing development. The General Plan also encourages maintenance and improvements to prepare buildings for a major seismic event, with the expectation that improvements do not necessitate substantial rent increases for tenants. In January 2023, City Council adopted the Housing Element, which identifies policies and programs to provide and preserve healthy, resilient housing at a range of prices, with special attention given to special needs housing, homelessness prevention, and affirmatively furthering fair housing (AFFH).

Restoration of Natural Waterways

The General Plan's Environmental Management section encourages the restoration of natural waterways. Many Berkeley streams were culverted in the 1960s as a flood control measure. Any change in the status of these culverts, already in a weakened state, would alter the Berkeley's flood risk.

Climate Mitigation and Adaptation

As outlined in Berkeley's 2009 Climate Action Plan, Berkeley has community-wide goals to reduce emissions and mitigate our impact on global anthropogenic climate change. This includes reducing energy and water usage, moving toward clean energy in our buildings and transportation, reducing our waste, and ensuring sustainable and equitable development. In addition, the Berkeley community must adapt to the current impacts the community is already facing from the changing climate, as well as plan for future impacts projected to occur. Climate mitigation strategies are outlined in the Climate Action Plan, and continue to be implemented Citywide. The City's climate adaptation strategies are included in the Local Hazard Mitigation Plan and the Resilience Strategy.

Preserving Historic Character

The City values preserving historic character. Any hazard, and earthquakes and fires in particular, could destroy many historic structures, which tend to be more vulnerable to these hazards than newly-constructed buildings. The General Plan's Urban Design and Preservation Element encourages support of long-term protection of historically- or architecturally-significant buildings to preserve neighborhood and community character through maintenance of the historic resources inventory, and use of the State Historical Building Code, Rehabilitation Tax Credits, and Mills Act contracts preservation incentives.

The Berkeley community recognizes that disasters have the potential to undercut all of the City's goals. As stated in the General Plan:

The city's healthy environment with its unique character and quality of life based on cultural, social and economic diversity could be dramatically and enduringly altered by a serious hazard event. Berkeley must protect what we already have as well as what we build through employing sound development practices and building and planning code enforcement, and continuously working to reduce the vulnerability of existing buildings and infrastructure, to improve emergency response and to prepare for recovery. Without these measures, disasters will occur and the other goals of the General Plan will be lost.

C.1.b Public Works

The City of Berkeley's Public Works Department is the largest department in the City and provides both direct services to the community, as well as critical support services to the City organization. Public Works is responsible for maintaining the City's physical assets and infrastructure in a safe and serviceable condition. Public Works provides services ranging from refuse and recycling collection, diversion and disposal, to property management, infrastructure improvements, and improving safety in the public right-of-way.

Significant objectives expected to be accomplished by the department during FY 2023 and FY 2024 include the replacement of the City's Transfer Station, developing a Zero Waste Strategic Plan, updating the citywide watershed management and storm drain master plans, construction of the underground utility district #48, and developing a Sewer Master Plan.

Three publicly-staffed commissions provide community oversight over Public Works activities:

- Commission on Disability
- Transportation and Infrastructure Commission
- Zero Waste Commission

C.1.c Fire Department

The Berkeley Fire Department provides 24-hour response to fires, medical emergencies, hazardous materials events, water rescues, disasters, and other life-threatening situations. The Department serves the City of Berkeley and UC Berkeley and responds to over 16,000 calls each year.

Berkeley Fire Department's Fire Prevention Division works to decrease the number and severity of all fires in Berkeley through an active code-enforcement program, public education activities, engineering and plans review, and vegetation management. When fires do occur, Fire Prevention staff investigate fire origin and cause and, if needed, prosecute those who are responsible.

The Fire Department established a WUI division in 2021 using funds from voter-approved Measure FF. The WUI Division is primarily responsible for the coordination of wildland fire mitigation efforts and related inspection activities. This Division manages or assists wildfire suppression operations, emergency scenarios, planning department-wide activities and functions, programs, and coordinating personnel for the purpose of community service and fire protection.

The Disaster and Fire Safety Commission serves as the citizens' oversight committee for expenditure of the proceeds of tax measures FF and GG.

C.1.d Emergency Management

The City's Fire Department - Office of Emergency Services (OES) works to increase the

Berkeley's readiness through community education, staff support to the Disaster and Fire Safety Commission, and coordination of the City's emergency management activities. OES staff meets regularly with City's designated emergency response staff to provide training and coordination. OES develops, maintains and exercises the City's Emergency Operations Plan. OES has 4 FTE positions.

Emergency management is a shared responsibility among all City departments. Department Directors are responsible for ensuring their respective departments' readiness to contribute to disaster response activities. All City staff members are Disaster Service Workers and are required to provide services in the event of an emergency or disaster.

The Disaster and Fire Safety Commission participates in the review of emergency, disaster and mutual aid plans and agreements and makes recommendations to the City Council regarding legislation and regulations needed to implement such plans and agreements.

C.1.e Taxing Authorities

The City's General Fund gets the majority of its money from: a) property taxes and property-based revenues; b) economically sensitive revenues such as sales tax, business license tax, transient occupancy tax, etc.; and c) interest and fees such as ambulance fees; and parking and traffic fines. The balance of the City budget is comprised of other funding sources such as grants, special tax revenue (e.g. parks, libraries and paramedic services), and fees for specific services (marina berth fees, garbage and sewer fees, building permits, etc.).

California property taxes are set at 1% of the assessed value of the property. The City of Berkeley receives about a third of every property tax dollar collected in Berkeley, and schools get 43% of every property tax dollar. These proportions have been about the same since 1979.

Property tax revenue goes into the General Fund. This revenue is dependent on the fluctuating real estate market, and can vary dramatically from year to year. To protect City services from this volatility, much of this revenue is used for one-time infrastructure needs, such as streets and transportation projects.

C.1.f Measure FF

In November 2020, Berkeley voters passed Measure FF with 74.2% approval. Measure FF provides $8.5 million in funding annually from parcel taxes to pay for fire services, emergency response, 9-1-1 communication, hazard mitigation and wildfire prevention. The Fire Department manages the emergency response and preparedness projects funded by Measure FF, and the Disaster and Fire Safety Commission and the City Council review and approve projects to receive Measure FF funding. In the 2022 fiscal year, the City of Berkeley spent $3 million on 11 projects in the areas of disaster preparedness, department operations, emergency medical services, and employee development and training. $1.5 million was spent on disaster preparedness through three key projects:

1. Established a Wildland Urban Interface Division within the Fire Department to focus on improving the City's preparedness for and resilience to wildfire. This team inspected 8,500 properties (83% more than the previous year) to ensure that they meet the City's requirements for 'defensible space,' buffer between buildings and any combustible materials (such as vegetation).

2. Initiated public outreach for the development of a Community Wildfire Protection Plan, which has since been approved by City Council. The CWPP identifies the risks that Berkeley faces from wildfires along with goals and projects to help manage these risks.

3. Purchased a citywide outdoor warning system to assist with emergency notifications. Installation of the 15 sirens is expected to be complete in 2024.

C.1.g Measure GG

In November 2008, Berkeley voters passed Measure GG, which authorizes the levying of a special tax that funds fire protection and emergency responses and preparedness. In fiscal year 2024, the estimated total collections were around $5 million. Tax proceeds are first used to eliminate rotating closures of operating fire stations and to provide advanced life support personnel and equipment on all first responder vehicles. The funds are also used to hire additional training officers, hire staff to conduct Community Emergency Response Training and other similar public disaster training and preparedness efforts, as well as equipment to allow compatible radio communications throughout the City and with outside public agencies.

C.1.h City Budget

The City's budget process assigns resources to address the goals, objectives, and community priorities set by the City Council. The City's FY 2023 & FY 2024 Biennial Budget was adopted by the Berkeley City Council at its June 28, 2022 meeting. The FY 2024 Adopted Update was approved by the Council at the June 27, 2023 meeting. The City's budget follows the fiscal year - beginning on July 1st and ending on June 30th.

The City's FY 2024 General Fund budget is approximately $276 million. The balance of the City's budget is made up of special funds ($452 million combined), which are dedicated to specific services. While special fund revenue is dedicated, it is not guaranteed. Special funds also shrink in tough economic times.

There are three broad categories of special funds:

1. Special Revenue and Grant Funds are legally restricted to a specific service, e.g.: Federal transportation funds, State public health funds, and the Parks, Library, and Paramedic Tax Funds.

2. Special Assessment Funds are for the financing of public improvements or services, such as the Clean Storm Water Fund and the Streetlight Assessment District Fund. Those two funds are examples of special funds where the revenues have not kept pace with the cost of delivering the service.

3. Enterprise Funds come from the collection of the fees associated with providing the service or program. For example, the Refuse Fund pays for the pickup and collection of garbage, recycling, and green waste. Services in this category include the Permit Service Center, the Sanitary Sewer Fund, and the Marina Enterprise Fund.

Additionally, the City has deferred maintenance on much of its capital infrastructure. As the economy begins to slowly recover, the City is being mindful of the need to address deferred maintenance, as well as to remain prepared to address the impacts of future cost increases in areas such as health and pension benefits.

The City Council has adopted budget development policies that have served Berkeley well over the long term, including:

1. Focusing on the long-term fiscal health of the City by adopting a two-year budget and conducting multi-year planning.

2. Building a prudent reserve based upon the City's adopted General Fund Reserve policy and using the goal of reaching a reserve of 30% of General Fund revenues by 2027 as a guideline.

3. Developing long-term strategies to reduce unfunded liabilities.

4. Controlling labor costs while minimizing layoffs and promoting recruitment and retention of City staff.

5. Primarily allocating one-time revenue for one-time expenditures (e.g., capital investments and deferred maintenance).

6. Requiring enterprise and grant funds to balance and new programs to pay for themselves.

7. Any new expenditure requires new revenue or expenditure reductions.

8. Property transfer tax:

    a. Allocate excess property transfer tax over the baseline to short-term operational needs, General Fund reserves and the City's capital infrastructure plan, including funding an approach to returning and maintaining the City's roads at an acceptable Pavement Condition Index.

    b. Increase the property transfer tax baseline for operational needs to $18.0 million for fiscal years 2023 and 2024, with a permanent adjustment to $16.0 million beginning in fiscal year 2025.

9. Revenue generated from Measure P is excluded (exempt) from this policy.

10. As the General Fund subsidy to the Safety Members Pension fund declines over the next several years, the amount of the annual decrease will be used to help fund the new Police Employee Retiree Health Plan.

11. Allocating annual savings derived from the prepayment of the annual CalPERS unfunded liability payments to the City's Section 115 Pension Trust up to $5.5 million per fiscal year or as advised by the City's actuarial and staff.

12. Allocating any additional revenue earned from investments that is over the annual (fiscal year) baseline of $6 million in the following manner:

a. 1/3 to the Section 115 Pension Trust up to $5.5 million per fiscal year, or as advised by the City's actuarial and staff,

b. 1/3 to General Fund reserves up to 30% of General Fund revenue, or as recommended by Council policy, and

c. 1/3 to address the City's capital infrastructure plan.

c.1.i City Buildings and Systems

Municipal Building Improvements

The City, supported by an active public, local and State bond measure funding and FEMA grants, has strengthened and rebuilt numerous key buildings in the city. Since 2014, the City has continued its program to strengthen or replace key at-risk structures.

In 2021, work was completed on the Live Oak Community Center. A seismic structural update was necessary in order to prevent major damage to the building and to achieve an "immediate occupancy" rating in the event of an earthquake or other major disaster, as the site is included on the City's list of potential shelters. Other upgrades for energy efficiency and sustainability were included to come closer to meeting the City's climate action plan and resiliency goals. The project also included necessary upgrades to increase accessibility at the site to meet new and current building codes. Funding sources included Measure T1 and Measure F bonds.

In 2022, work was completed on the North Berkeley Senior Center. The renovations and seismic upgrade project modernized the interior and provides much needed upgrades to improve safety and functionality of the building, including seismic for "care and shelter" requirements as well as ADA compliance.

Currently, the City is using T1 Funds on the MLK Jr. Youth Services Center Retrofit and

Renovation project and the Willard Park Clubhouse and Restroom Replacement Project. Both of these facilities will be upgraded to immediate occupancy status, meaning that post earthquake, only limited structural damage will have occurred. The Willard Park Clubhouse is currently under construction and the MLK Jr. Youth Services Center is in the design part of the process. Using T1 and General Funds, the African American Holistic Resource Center is currently in the design part of the process. The African American Holistic Resource Center (AAHRC) will be a facility to house culturally relevant services to help eliminate inequities within Berkeley's African American Community. The vision for the African American Holistic Resource Center is to host services to benefit the community with education, employment, health, mental health, and housing advocacy and supports. It will be built to immediate occupancy status.

Using funds from Measure T1 and funding from a FEMA grant, the South Berkeley Senior Center is being renovated to include disaster preparedness, electrification, energy efficient building systems, and other enhancements to the community building. It's in the design phase.

The City is currently seeking opportunities for funding and grants to develop the design and complete construction for the Frances Albrier Community Center.

The City is regularly assessing vulnerabilities of other key City buildings and is developing funding strategies to upgrade buildings with known vulnerabilities.

Emergency Water Supply for Firefighting

In 2010, the City put into operation an aboveground, portable water system that can pump water from any source, including the San Francisco Bay, in the event of drained tanks or damaged pipelines. This system is designed to carry up to 20,000 gallons of water per minute for a distance of one mile and elevation gain of 100 feet; it will also carry smaller flows to higher elevations.

C.1.j Privately-Owned Buildings

The City offers a comprehensive suite of programs to encourage the community to strengthen buildings to be more hazard-resistant. A number of City incentive programs and educational efforts promote seismic strengthening activities.

Building Codes

The City enforces disaster-resistant development through the application of the California Building Code, as well as more stringent local code amendments. The Provisions of the California Building Code are applicable to all new construction, additions, alterations and repairs.

Plan Set A

The City's adoption of Standard Plan Set A educates homeowners and contractors about measures to improve seismic resistance of their homes. Contractors' adherence to this Standard simplifies the City's plan review and inspection process.

Mandatory Retrofit Ordinances

The City of Berkeley has worked diligently to enhance public safety and reduce physical threats from earthquakes by requiring owners of soft story and unreinforced masonry buildings to retrofit their structures. Berkeley Municipal Code (BMC) Chapter 19.39, effective January 4, 2014, mandated owners of soft story (also known as soft, weak or open front / "SWOF") buildings with five or more dwelling units to apply for a building permit for a seismic retrofit by December 31, 2016. Owners were given two years to complete the work upon submission of the permit application. Previously, the City approved an ordinance in 1991 (BMC 19.38) requiring owners of unreinforced masonry (URM) buildings to evaluate their buildings, obtain retrofit permits and complete seismic retrofits according to a schedule based

on each building's risk categorization but in all cases no later than 2001.

Through these hazard mitigation measures, the City of Berkeley hopes to increase the safety and resilience of the city's building stock to prevent injury and loss of life and reduce post-disaster recovery time.

Soft Story Ordinance for Buildings with Five or More Dwelling Units

Soft story buildings are characterized as multi-story wood-frame buildings with extensive ground story openings such as windows, storefronts, garage openings, or open-air spaces such as parking. These buildings may have few perimeter or interior walls at the ground level, leading to a relatively soft or weak lateral load resisting system in this lower story. Since the collapse of soft story buildings in the 1989 Loma Prieta and the 1994 Northridge earthquakes, there has been considerable concern in California about tenant safety and the seismic deficiencies in these buildings. In 2005, Berkeley was the first city in the country to pass an ordinance to address this potentially unsafe condition.

Berkeley's original 2005 ordinance added Chapter 19.39 to the Berkeley Municipal Code, requiring owners of soft story buildings with five or more dwelling units to submit a seismic engineering evaluation report analyzing the ability of the building to resist earthquake forces and describing possible work to remedy weaknesses. The ordinance also required owners to notify tenants of the building's soft, weak or open front (SWOF) condition and post an earthquake warning notice at the building entrance.

On December 3, 2013, Council adopted amendments to Berkeley Municipal Code Section 19.39.110 establishing mandatory seismic retrofit requirements for soft story buildings with five or more dwelling units. The ordinance established December 31, 2016 as the deadline for property owners to apply for a building permit. Owners must complete retrofits within two years of submitting the permit application.

The initial wood-frame SWOF inventory included 321 buildings. As of September 2023, the inventory has increased to 364 buildings, containing 3,935 units. Buildings are typically added to the soft-story inventory as a result of building permit application submittal, staff research, or an inquiry submitted to the City by a tenant or property owner. The table below describes the status of the 364 soft story buildings subject to mandatory retrofit as of September 2023.

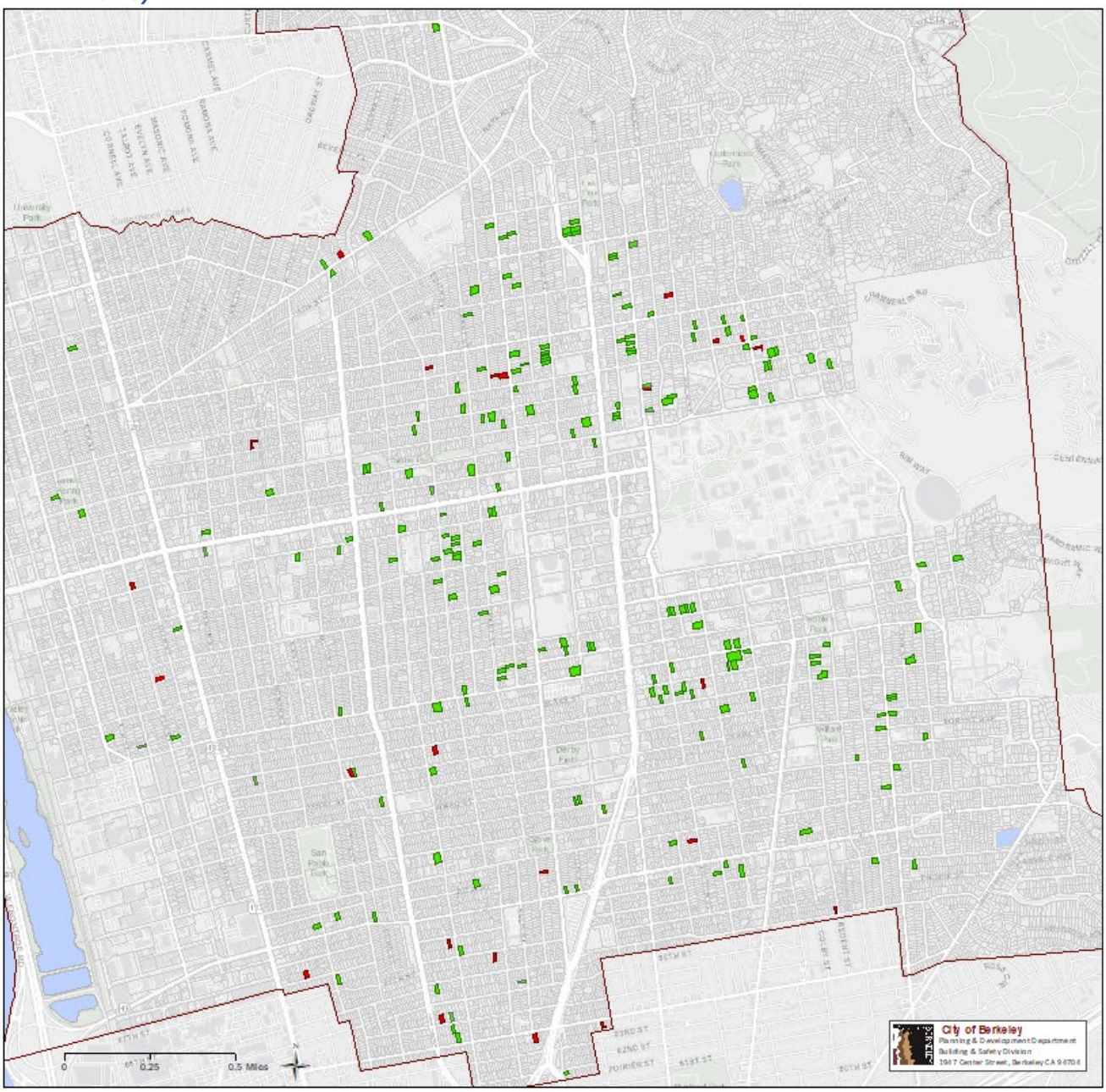
Table 21. *Berkeley Soft-Story Building Status as of September 2023*

Number of buildings	**Percent***	**Status**
278	76	Retrofit Complete
7	2	Permit
12	3	Applied for Permit
5	1	Not Compliant or Newly Added
62	17	Removed from Inventory for Other Reasons
364	*100%*	*Total buildings identified as soft-story*

*Due to rounding, percentages do not add up to 100 percent.

Map 1 below shows the retrofit status of soft story buildings subject to mandatory retrofit, as of September 2023. Green symbols depict parcels with retrofitted buildings, and red symbols shows parcels with buildings either out of compliance with BMC 19.39 or buildings recently added to the soft-story inventory.

Map 39. Status of Soft Story Buildings Subject to Mandatory Retrofit (September 2023)



Unreinforced Masonry (URM) Ordinance

Unreinforced masonry (URM) buildings are generally constructed of brick, block, tile, stone, or other types of masonry, and were built prior to modern earthquake-resistant design. During an earthquake, unreinforced masonry walls that were originally built without adequate reinforcement (from embedded steel bars) are susceptible to collapse. In addition, URM buildings often include unreinforced masonry parapets, chimneys, and high brick veneers that tend to disconnect from the building and fall outward, creating a hazard for people below and in some instances causing the building to collapse. Weak or nonexistent connections between the masonry walls and the floors and roofs place occupants, pedestrians, and adjacent buildings in harm's way.

Unreinforced masonry buildings are no longer constructed today, and existing URM buildings can be retrofitted to reduce risks caused by earthquake activity. If these buildings are not retrofitted and suffer major damage in an earthquake, the costs of repair after the earthquake could be prohibitively high and may result in demolition or loss of use.

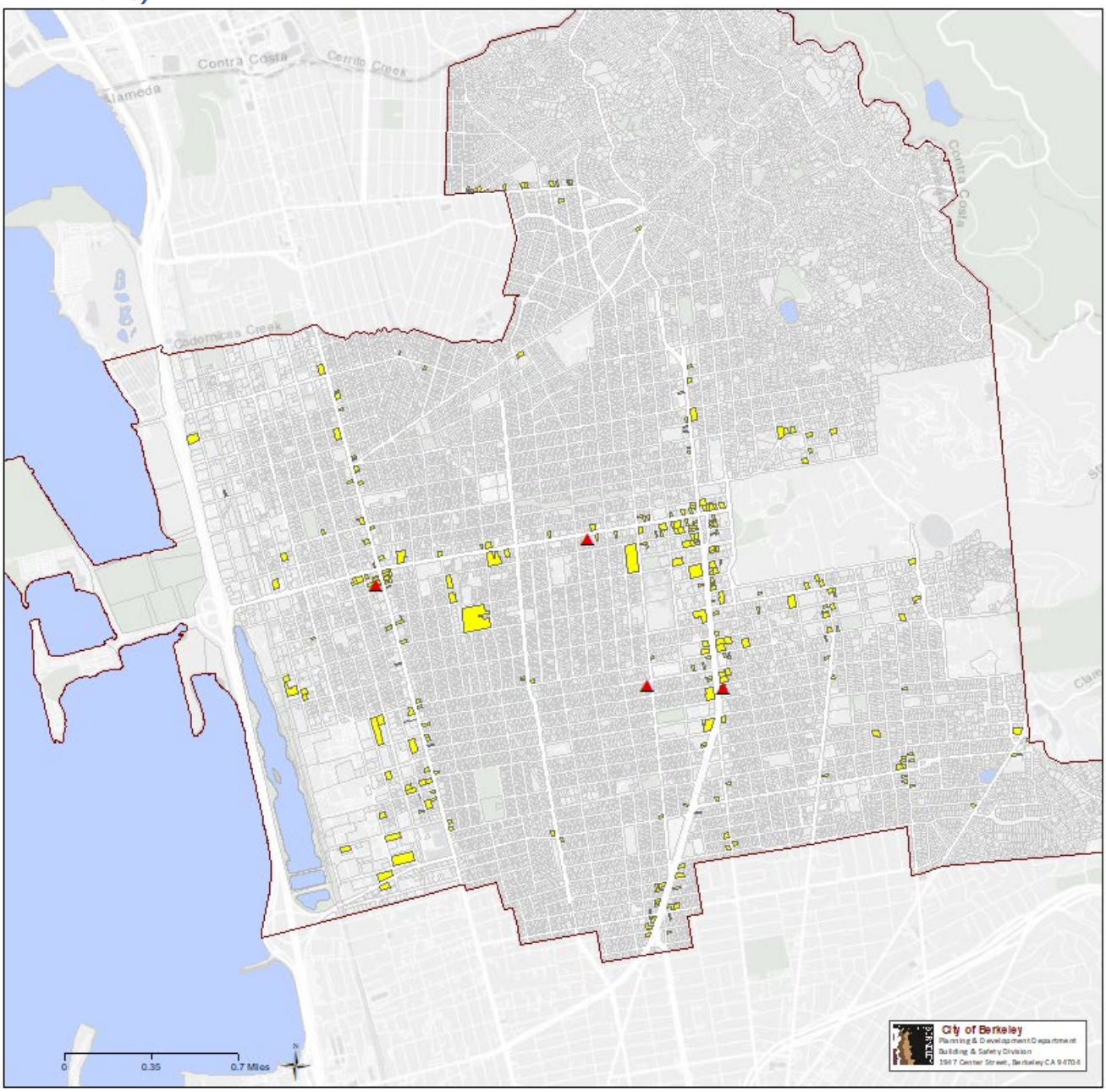
In response to State law, the City of Berkeley compiled an inventory of unreinforced masonry buildings in 1989, identifying approximately 700 residential and commercial URM buildings that were built prior to 1956. In 1991, the City adopted the Unreinforced Masonry Ordinance 6088-N.S. Subsequent amendments to the ordinance required owners of unreinforced masonry buildings to evaluate their buildings, obtain necessary permits and complete seismic retrofits by 2001.

Of the approximately 700 buildings originally included in the City's unreinforced masonry (URM) inventory, hundreds were removed from the list after owners provided evidence the buildings adequately met building standards or that the buildings were not unreinforced masonry structures. Of the original list, roughly 99% have been seismically retrofitted,

demolished or demonstrated to have adequate reinforcement. As of September 2023, four buildings are still required to retrofit in order to avoid further penalties. Two of the four building owners have applied for retrofit permits.

Map 2 shows the unreinforced masonry (URM) inventory as of September 2023. Parcels in yellow contain buildings that are compliant with the Unreinforced Masonry Ordinance 6088-N.S. Red triangular symbols denote unreinforced masonry buildings still subject to mandatory retrofit, including those currently in the permitting process.

Map 40. ***Berkeley Parcels with Unreinforced Masonry Building Types (September 2023)***



C.1.k Financial Incentives for Buildings

Retrofit Grants

In early 2017, the Building and Safety Division developed a new Retrofit Grants program with funding from a Hazard Mitigation Grant from the Federal Emergency Management Agency (FEMA) and the California Governor's Office of Emergency Services (Cal OES).

The groundbreaking program incentivizes both mandatory and voluntary retrofits of seismically vulnerable buildings through disbursement of design and construction grants to qualifying property owners. The Retrofit Grants Program initially focused on potentially hazardous unreinforced masonry buildings and "soft story" buildings with five or more residential units. The program later expanded to include three- and four-unit apartment buildings and non-residential wood-framed buildings with soft story conditions, as well as non-ductile concrete buildings, and rigid wall/flexible diaphragm buildings (including tilt-up buildings).

The Retrofit Grants Program, launched with the Building and Safety Division's first Hazard Mitigation Grant in 2017, led to the strengthening of 61 buildings within the City of Berkeley and disbursal of $1,561,842.78 to individual property owners.

Table 22. *Completed Retrofits by Building Type under 2017 Retrofit Grants Program:*

Building Type	Quantity of Retrofits Completed
Mandatory Soft Story Retrofit	43
Voluntary Soft Story Retrofit	8
Unreinforced Masonry (URM) Retrofit	1
Rigid Wall – Flexible Diaphragm Retrofit	9
TOTAL	61

In 2020, the City was awarded an additional Hazard Mitigation Grant, enabling the Building &

Safety Division to launch a second iteration of the Retrofit Grants Program. Under this new round of the Retrofit Grants Program, the list of building types eligible for grant funding was further expanded to include other wood-framed buildings with seismic deficiencies, including those with inadequate anchorage to foundation and/or inadequate cripple wall bracing, multi-family “weak story” buildings, one-story open-front buildings, and buildings with unique configurations.

As of September 2023, the 2020 Retrofit Grants Program has led to an additional 32 buildings being strengthened, with more retrofits scheduled for completion prior to grant closeout in early 2025.

Although single-family homes and duplexes are not typically eligible for funding under the Retrofit Grants Program, other funding opportunities are available for property owners and are detailed below.

City Transfer Tax Rebate Program

By ordinance, the City created a program to rebate up to one-third of the transfer tax amount for expenses from voluntary seismic upgrades to homes. When the owner wishes to sell the house and the sale amount has been determined, the buyer and seller place a portion of the real estate transfer tax amount in an escrow account to be drawn down after improvements are complete. Since July 2002, the City has distributed over $17 million to homeowners through this program.

Earthquake Brace + Bolt

The City participates in the Earthquake Brace + Bolt (EBB) program, a grant program administered by the California Earthquake Authority, providing grants of up to $3,000 for seismic retrofits of owner-occupied residential buildings with 1-4 dwelling units.

The EBB program provides incentives to homes most vulnerable to severe damage in an earthquake, typically those built before 1979 with raised foundations and unbraced “cripple walls,” the wood-framed walls which surround the crawl space. Bracing the cripple walls with plywood and using anchor bolts to improve the connection between a home’s wood framing and its foundation are seismic improvements that can help reduce potential damage to a home during an earthquake.

The program supplements other programs to subsidize or finance seismic improvements in Berkeley homes; these programs can be used in combination or separately.

Earthquake Soft Story (ESS)

Earthquake Soft-Story (ESS) Retrofit grants, offered by the California Residential Mitigation Program, reimburses owners of single-family houses up to 75% of the total cost of code-compliant seismic retrofits, capped at $13,000, on properties with a “soft story” living space built over a garage.

This new program was launched in spring of 2023 to incentivize homeowners to strengthen houses constructed pre-2000 with seismic vulnerabilities from living space constructed over a garage. The program supplements other programs to subsidize or finance seismic improvements in Berkeley homes; these programs can be used in combination or separately.

C.1.I Expanded Inventory of Seismically Vulnerable Buildings

With the launch of the Retrofit Grants Program, staff conducted extensive research to update and refine the City's inventory of seismically vulnerable buildings. In addition to soft story buildings not currently subject to mandatory retrofit such as those with 3-4 residential units or commercial uses, Berkeley has numerous non-ductile concrete and tilt-up or other rigid wall-flexible diaphragm (RWFD) buildings. These additional building types may also be highly susceptible to adverse effects from earthquakes.

Although no ordinance currently requires property owners of these building types to retrofit, the City of Berkeley has encouraged owners to apply for grant money under the City's Retrofit Grants Program.

Non-Ductile Concrete Buildings

Non-ductile concrete buildings built prior to the mid-1970's and modern seismic code standards have performed very poorly in recent earthquakes, and have resulted in catastrophic collapses. In older concrete buildings, the detailing and construction of the reinforcing steel may be inadequate to safely resist large seismic forces caused by ground motions on these heavy structures. The most vulnerable buildings contain elements like columns, wall piers, and joints of beams and slabs that can fail in an earthquake. These buildings are considered "non-ductile" (i.e. brittle) concrete buildings and pose a high risk during a major earthquake. Retrofits of these buildings can vary widely in terms of scope and level of difficulty, and are often expensive to retrofit or rebuild.

Rigid Wall-Flexible Diaphragm (RWFD) Buildings Including Tilt-Up Buildings

Tilt-up or other rigid wall-flexible diaphragm building types are typically one- or two-story commercial buildings with reinforced concrete or reinforced masonry (brick or concrete block) walls. A "tilt-up" building is a specific type of building with precast concrete walls and is

distinguished by its method of construction. RWFD have “flexible” roof diaphragms that consist of wood or steel beams, trusses, or rafters with wood sheathing or metal decking above. They may also have flexible diaphragms at intermediate floor levels. These buildings commonly include warehouses, manufacturing facilities, large retail stores, and other similar structures. The most common deficiency is an inadequate connection between the rigid walls and the roof (and floors) leading walls to pull away and collapse during ground shaking. Buildings designed under codes that predated the 1998 California Building Code are of primary concern.

Soft Story and Other Wood-Framed Buildings Not Subject to Mandatory Retrofit

Similar to Soft Story buildings subject Berkeley Municipal Code Section 19.39.110, those with only 3-4 unit or commercial uses are also vulnerable to collapse in the event of an earthquake due to weak lateral load resisting systems.

Other wood-framed buildings with seismic deficiencies include those with inadequate cripple wall bracing and anchorage to the foundation and can result in buildings sliding off supporting foundations and cripple wall collapses. Additionally, the lowest story of multi-story buildings (3+ stories) may also be vulnerable to significant damage due to high demand to-capacity ratios and are primarily found to the south of UC Berkeley (Southside) and extending along College Avenue and nearby streets.

Open front one-story buildings common to major commercial corridors, while having less mass to drive seismic response than multi-story buildings, are still anticipated to have very significant torsional response and have potential concerns of partial or complete collapse. Buildings with unique configurations that could potentially be vulnerable to an earthquake have also been observed within the Berkeley building stock. These buildings are anticipated to be of an age that engineering for seismic loading would not have been provided at the time

of construction.

Process for Updating the Inventory of Seismically Vulnerable Buildings

The City has worked diligently to update and broaden its inventory of seismically vulnerable buildings to include potentially non-ductile concrete and rigid wall-flexible diaphragm buildings, and soft story buildings with 3-4 residential units or commercial uses. This effort began with extensive staff research to identify vulnerable buildings using City and other data sources. It was followed by a field study with the Earthquake Engineering Research Institute (EERI) to assess a portion of the newly identified non-ductile concrete and rigid-wall flexible-diaphragm buildings and a "virtual survey" to identify potential soft story buildings. This inventory has been utilized to target outreach efforts for the Retrofit Grants Program and to alert property owners of potential grant funding opportunities. Many of the buildings included in the inventory have not been evaluated by a licensed professional and are therefore viewed as "potentially vulnerable" to seismic activity. Assessment by a structural engineer or other qualified professional is required to determine whether or not seismic deficiencies exist within specific buildings.

Inventory of Potentially Seismically Vulnerable Buildings

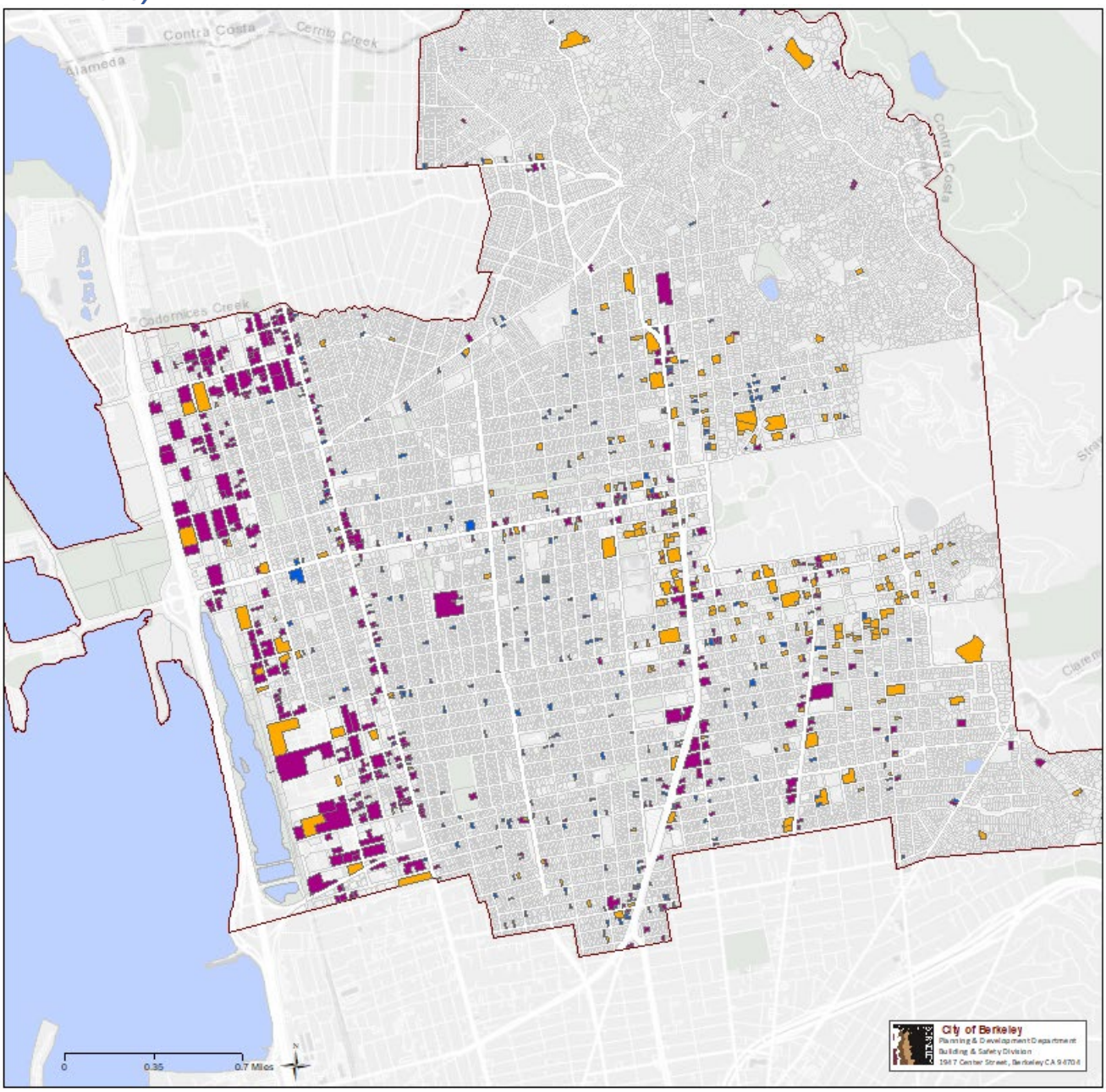
Previously, the City identified 1,047 potentially seismically vulnerable buildings that did not already appear on the soft story or URM inventories, including 230 potentially non-ductile buildings and nearly 550 buildings that may be rigid wall-flexible diaphragm, including tilt-ups. The City also added to the inventory approximately 240 soft story buildings not subject to mandatory retrofit under Chapter 19.39 of the Berkeley Municipal Code. Some of these buildings have now completed retrofits under the City of Berkeley's Retrofit Grants Program.

Map 3 shows Berkeley's Inventory of Potentially Seismically Vulnerable buildings, developed in 2018. Potentially soft, weak or open front (SWOF) buildings are somewhat evenly spread

throughout the City. Potentially non-ductile concrete buildings and rigid wall-flexible diaphragm buildings are more heavily concentrated along commercial corridors and west of San Pablo Avenue. Non-ductile concrete buildings are also clustered in central Berkeley, and near the UC Berkeley Campus. Soft story buildings are depicted in blue, non-ductile concrete buildings in orange, rigid wall-flexible diaphragm buildings in purple, and unreinforced masonry buildings in red.

This map reflects properties that may be eligible for funding under the City of Berkeley Retrofit Grants Program.

Map 41. ***Inventory of Potentially Seismically Vulnerable Buildings (September 2023)***



Parcel with Potentially Non-Ductile Concrete Building
Parcel with Potentially Rigid Wall-Flexible Diaphragm Building (Including Tilt-up)
Parcel with Potentially Soft Weak or Open Front Wood-Framed Building

C.1.m Fire Risk Reduction

The City, working together with key partners, is using a comprehensive strategy to aggressively mitigate Berkeley's wildland-urban interface (WUI) fire hazard. These approaches include prevention through development regulations; natural resource protection through vegetation management; protection of the built environment through defensible space and home hardening; improvement of access and egress routes; and infrastructure maintenance and improvements to support first responders' efforts to reduce fire spread.

Fire Prevention Division

City of Berkeley Fire Departments Fire Prevention Division works to decrease the number and severity of all fires in Berkeley. Mitigation actions include active code-enforcement program, public education activities, and engineering and plan review.

Fire Code

The City of Berkeley adopted the 2022 California Fire Code with Local Amendments. The Fire Code incorporates the latest knowledge and state regulations to protect people and property against known risk in both structural and non-structural building and site components. Mitigation actions including expanding the number of inspected properties and enforcing code requirements that contribute to life safety.

Hazardous Fire Area Zones

The City has established and adjusted fire zones in Berkeley. While the zones were initially established to address urban fire issues, they have evolved to designate the City's WUI fire hazard. Currently, the Berkeley Fire Department has divided the city into Fire Zones 1, 2, and 3, designated in order of ascending fire risk. Fire Zones 2 and 3 are in the hills area of the City. Mitigation actions include maintaining the strictest standards for fire prevention and

vegetation management measures in Fire Zones 2 and 3.

Wildland Urban Interface (WUI) Division

City of Berkeley Fire Department instituted a WUI division in 2021 supported with funding from Measure FF. The WUI Division is primarily responsible for the coordination of wildland mitigation efforts and related inspection activities.

Community Wildfire Protection Plan (CWPP)

In 2023, the City of Berkeley approved its first Community Wildfire Protection Plan (CWPP). The CWPP is a roadmap for fire hazard mitigation and preparedness at both the City and neighborhood levels, identifying ways to mitigate Berkeley's wildfire risk. The CWPP strategy includes goals for improving wildfire response, community preparedness, fuels management, infrastructure, ignition reduction, and home hardening.

Defensible Space and Home Hardening Inspection Program

The WUI Division coordinates defensible space inspections and home hardening assessments of all homes in Fire Zones 2 and 3. Dedicated inspectors from the WUI Division inspect 8,600 parcels on an annual basis, providing mitigation actions to property owners. Inspections provide an opportunity for specific education of property owners regarding steps to mitigate the risk of WUI fire on their properties. Data gathering from these inspections helps the Fire Department to better profile and model the risk of WUI fire to Berkeley.

Resident Assistance Program

The resident assistance program aims to provide financial assistance to residents who demonstrate physical or financial hardship in completing their required prescriptions for defensible space. In 2024 CalFIRE announced that the BFD was awarded a grant to fund its Defensible Space Resident Assistance Program (RAP) in the VHFHSZ over a three-year

period to interrupt the contiguous vegetative fuel in these pathways and inhibit the transmission of wildfires. The RAP will provide financial assistance to Berkeley Hills residents who are low-income, senior citizens 65 years or older, and those with physical disabilities to help achieve defensible space within Zone 0, Zone 1 and Zone 2 on their properties in compliance with State law and best practice.

Vegetation Management Programs

The City also runs a number of vegetation management programs to reduce fuel loads, including:

- The Fire Fuel Chipper Program, a popular yard waste collection service, expanded citywide. It includes free curbside chipping, pickup, and disposal of vegetation materials from residential properties to assist residents in their efforts to create and maintain a defensible space around their home. The expanded program now makes it easier to schedule free chipping and disposal.

- A fire fuel abatement program on public land. This program was maintained in order to reduce fire fuel on public property.

- The Fire Fuel Debris Bin Program is coordinated by the Department of Public Works' Zero Waste Division, which delivers and removes 30-yard roll-off boxes from requesting neighborhoods.

- Additionally, residential and commercial plant debris and commercial food waste is collected each year through weekly curbside collection and converted to compost.

- The Eucalyptus Understory Cleanup is a program that provides a one-time service to bring properties into compliance with best practice hazardous vegetation management practices. Planted in plantations over 100 years ago, eucalyptus groves can produce

between 10 to 30 tons of dry matter per acre per year, increasing the potential to spread a ground fire. Eucalyptus trees can be extremely expensive to remove due to their size and age. Following participation in this program, residents will be required to maintain properties in adherence with the Fire Code.

- Planning for the City of Berkeley Fuel Break Project began in October 2023 and implementation will begin in 2024. Experienced fuel reduction crews, registered professional foresters, and traffic control crews will work to create fuel breaks along 40+ miles of high-traffic areas within Berkeley.

- The Fire Department's WUI Division is also working to develop a comprehensive WUI work plan that will provide strategic guidance for related work for the next five years. Plans are to expand existing programs and extend some services citywide, including fuel reduction on public lands and roadsides, private land incentives, debris bins, and citywide chipping services. Since 2019, Berkeley has removed nearly 300 hazardous trees (mostly eucalyptus and Monterey Pine) from City parks, paths, and street rights-of-way. Another roughly 40 trees have been trimmed or cut back.

Firewise Communities

The Firewise USA® program, led by the National Fire Protection Association (NFPA), offers a structured approach for communities to enhance their wildfire resilience in California. This initiative promotes collaborative efforts among residents, the Fire Departments, and other key stakeholders to bolster the fire resistance of homes and surroundings. Neighborhoods raise awareness, organize at the community level, coordinate work, and take action to create fire-adapted communities through the implementation of defensible space standards. The Berkeley Fire Department staff provide guidance to help interested neighborhoods achieve Firewise recognition. Currently, Berkeley has multiple Firewise communities.

Hills Emergency Forum

The City of Berkeley is a charter member of the Hills Emergency Forum, a consortium of nine agencies working on fire mitigation measures for the East Bay Hills. Future mitigation actions include partnering with the other agencies to reduce collective wildfire risk.

Diablo Firesafe Council

The City is involved with Diablo Fire Safe Council (DFSC), a 501(c)3 nonprofit organization. The Council's role in Alameda and Contra Costa Counties is to serve as a catalyst for bringing together people, agencies, and the means to substantially reduce the impact of wildland fire on our communities.

C.1.n Community Readiness

Outdoor Warning System: Emergency Siren Network

In 2023, the City of Berkeley introduced a new outdoor warning system to alert people outdoors to emergency conditions. The outdoor warning system will broadcast siren tones and spoken life safety instructions over any of 15 sirens to be located on top of buildings throughout Berkeley. The system will be used alongside other alert and warning tools, including AC Alert, Berkeley's Emergency Map, and Wireless Emergency Alerts. Sirens are expected to be fully installed by the end of 2024.

Community Disaster Preparedness Training and the Community Emergency Response Team (CERT) Program

The City of Berkeley offers free disaster readiness classes to Berkeley community members. One curriculum is from the CERT program, which includes disaster preparedness, fire safety,

disaster medical operations, light search and rescue operations, CERT Organization, and continuing education courses.

City staff instructors have developed additional training modules tailored to the Berkeley community, including Improvisational Leadership, fire extinguisher training and hands-only CPR. Staff continues to develop additional courses to reach more community members with disaster readiness education.

Instructors provide community trainings at the Fire Department training facility and City libraries. They also meet community members in their neighborhoods to provide disaster readiness trainings in their communities.

Community Emergency Supply Program (Disaster Caches)

For more than 20 years, the Disaster Cache Program incentivized community-building for disaster readiness. The City has awarded caches of disaster response equipment to neighborhoods, congregations, and UC Berkeley Panhellenic groups that have undertaken disaster readiness activities – chief among them, participation in the CERT program. Civilian CERT instructors also help recipient neighborhoods with “cache checks” to help community members with initial or refresher training on how to use the items in the cache.

A 2024 program assessment by researchers at the UC Berkeley Goldman School for Public Policy identified that the program has connected neighbors around disaster preparedness topics, but also that it has notable gaps in equity, sustainability, and scalability. Staff is considering the findings in this report in an effort to redesign the program to help meet community needs the next 20 years.

Community Resilience Center (CRC) Program

Through the CRC program, the City of Berkeley’s Office of Emergency Services and Public

Health Emergency Preparedness Divisions partner with community organizations serving marginalized community members on disaster readiness topics. The CRC Program's goal is to enhance the resilience of the people of Berkeley by strengthening the organizations they depend on day-to-day and providing disaster preparedness outreach and training through organizations they know and trust. The City selected CRC organizations based on their connection to Berkeley community members who have not been reached by the City's existing preparedness programs. CRC organizations agree to host trainings and participate in disaster preparedness-related events that are customized to fit their audiences. In return for hosting training they receive emergency supplies to help them serve their community following a disaster.

Community Oversight

The Disaster and Fire Safety Commission advises the City Council on all matters affecting fire safety and/or disaster resilience within Berkeley. The Commission also serves as the citizens' oversight committee for expenditure of the proceeds of Measures FF and GG.

C.1.0 State and Federal Programs

Many City ordinances and programs are based on State requirements. The State has numerous laws that regulate issues ranging from hospital seismic safety to coastal development. The table below highlights important State laws related to hazards, and describes how Berkeley complies with these laws.

Table 23. *State Mitigation Requirement and Berkeley Implementation*

Statewide Requirements	**Berkeley Implementation**
Mandatory Building Code. The State requires all communities to enforce the	Berkeley enforces the State building code with additional local provisions for seismic

State- mandated building code. The building code applies to new buildings and additions, renovations and remodeling of existing buildings. The effectiveness of designs based on the code to resist earthquakes has improved incrementally over time. The code is not applied retroactively, meaning that building owners do not have to retrofit existing buildings to improve earthquake, fire or flood resistance unless the work proposed exceeds previously-defined thresholds. Certain types of buildings designed to early codes have characteristics that make them vulnerable to collapse in catastrophic earthquakes.	and fire safety. The City has adopted the 2022 California Building Code and 2022 California Residential Code. Berkeley's application of WUI fire standards exceeds current State requirements.
Essential Services Buildings. State law requires that new essential services buildings, such as police, fire, and emergency operations and communications centers, meet a higher safety standard than other buildings. The standards include backup utilities and design and construction checks by	The Public Safety Building, which houses the 9-1-1 emergency communications center and Emergency Operations Center, along with all seven fire stations, the Fire Warehouse and the Ratcliff building, have all been built or retrofitted to meet essential services requirements.

inspectors following State guidelines.	
Safety Element and General Planning Requirement. State law requires all cities and counties to prepare, adopt and keep current a general plan. Part of the plan is the "Safety Element" which defines the community approach to disaster preparedness and mitigation.	Berkeley completed updates to the General Plan, including the Disaster Preparedness and Safety Element, in 2003. One of the plan's key goals is to make a disaster-resilient community. The Safety Element has a mitigation approach and significant policy and action recommendations. The 2004 mitigation plan built directly from the General Plan, and this 2024 update continues to use the General Plan as a strategic guide. Additionally, as of 2024 the City has begun work on updates to the Disaster Preparedness & Safety Element of the General Plan, as well as a new Environmental Justice Element.
Environmental Review. The California Environmental Quality Act requires that government entities consider the environmental consequences of discretionary decisions having a substantial environmental impact. CEQA guidelines require evaluation of the effect	The City of Berkeley complies with State CEQA requirements.

of hazards on development and the resulting consequences for the environment. On occasion, certain emergency safety projects are exempted from the CEQA process.	
Fault Zones. Alquist-Priolo Earthquake Fault State requirements prohibit construction of public schools and buildings within the designated fault zones. Houses with three or fewer units are exempt from these provisions. Real estate law requires disclosure of the fault zone at the time of sale, and requires zone maps to be available for review by the public.	The California Geological Survey created maps that delineate a ¼-mile-wide fault zone through the east side of the city, where the Hayward Fault is located. The Risk Assessment of this mitigation plan replicates these maps. Because of the well-defined surface expression of fault, it is reasonable to expect ground surface rupture in this area during future earthquakes.
Seismic Hazards Maps. The California Geologic Survey mapped seismic zones where earthquake-induced landslides and liquefaction are likely. The State requires site-specific investigations for new building in these zones.	Seismically-induced landslide risk maps are available in the Risk Assessment of this plan. The City enforces State requirements by requiring site-specific investigations and feasible mitigation measures.

Disclosure of Earthquake Risk. Four State laws work in tandem with State real estate requirements that mandate full disclosure of information pertinent to building purchase decisions. Owners of homes built before 1960 and certain commercial buildings are required to provide information on seismic vulnerability. Sellers must also disclose if the parcel is located in a mapped fault zone or seismic hazard area.	The City of Berkeley complies with this State law.
Bayfront Development. The City of Berkeley abuts San Francisco Bay. All land inundated by the highest tides is within the jurisdiction of the San Francisco Bay Conservation and Development Commission (BCDC).	Developments within the City-owned and -operated Berkeley Marina require a permit from BCDC. The BCDC's Engineering Criteria Review Board subjected the restaurants, harbormaster building and piers to rigorous independent review before construction. Full consideration is given to the effects of deep- saturated, bay mud soils and fill material. All development in this zone must be elevated one foot over flood levels.

Hospital Seismic Safety Act. The Office of Statewide Health Planning and Development (OSHPD) regulates hospital construction and renovation. By 2013, all hospital buildings built before 1973 must be replaced or retrofitted so they can reliably survive earthquakes without collapsing or posing threats of significant loss of life. By 2030, all existing hospitals (including those built after 1973) must be seismically evaluated and retrofitted, if needed, so they are reasonably capable of providing services to the public after disasters.	There is one acute care hospital in Berkeley, Alta Bates, owned and operated by the Sutter Health Corporation. The corporation is planning to close by 2030.
Unreinforced Masonry Building Law. The State required all jurisdictions to identify unreinforced masonry (URM) buildings, to notify owners regarding the expected performance of these buildings, and to adopt a plan to deal with the threat.	Berkeley identified 700 URMs and designated a mandatory retrofit ordinance. Of the original list, roughly 99% have been seismically retrofitted, demolished or demonstrated to have adequate reinforcement.
Emergency Response Plans. In the wake of the 1991 Tunnel Fire, the State requires that all jurisdictions practice the Standardized Emergency Management	The City complies with all State requirements.

System (SEMS), a uniform approach to disaster response based on the fire service's Incident Command System (ICS).	
Field Act. Originally passed in 1933, the Field Act regulates the design, construction and renovation of public school buildings, and the inspection of existing school buildings. Many subsequently adopted State laws, amendments to the Field Act, and supplementary laws, call for additional safety measures for all public K- 12 schools in the state. California has the most stringent safety codes for school buildings in the U.S.	All public schools have been upgraded to the standards of the Field Act and its amendments.
AB1409. Requires that the Safety Element to be reviewed and updated as necessary to identify evacuation locations.	The City of Berkeley is completing this analysis and will include results in the new edition of the General Plan's Disaster Preparedness & Safety Element.

SB99. Requires that the Safety Element shall be reviewed and updated to identify residential developments in any hazard area identified in the Safety Element that do not have at least two evacuation routes.	The City of Berkeley is completing this analysis and will include results in the new edition of the General Plan's Disaster Preparedness & Safety Element.
AB747. Requires that the Safety Element shall identify evacuation routes and their capacity, safety, and viability under a range of emergency scenarios.	The City of Berkeley is completing this analysis and will include results in the new edition of the General Plan's Disaster Preparedness & Safety Element.

C.2 National Flood Insurance Program

Berkeley's creek flooding exposure is assessed through the National Flood Insurance Program (NFIP), which makes federally-backed flood insurance available to homeowners, renters, and business owners in participating communities. Participants in the NFIP must regulate development in floodplain areas in accordance with NFIP criteria.

Berkeley has participated in the NFIP since September 1, 1978 and is currently in good standing with the Program. NFIP compliance is monitored by FEMA regional staff and by the California Department of Water Resources under a contract with FEMA.

As part of Berkeley's effort to comply with the requirements of the NFIP, Berkeley has adopted various floodplain management measures. Thanks to the fact that the City has abided by and enforced federal flood insurance program requirements since the 1970s, flood insurance claims have been extremely low.

Berkeley's Flood Zone Development Ordinance regulates development in areas identified in the Flood Insurance Study and Flood Insurance Rate Maps.

The Current Flood Insurance Rate Map are presented in this Plan's Risk Assessment (Element B.10.b *Location of Floods*)

To file insurance claims with FEMA for flood damage, owners of parcels in this area must have FEMA flood insurance, and comply with the terms and conditions of the insurance. Few Berkeley homeowners are known to carry flood insurance, presumably because of

negligible flood damage in recent decades, so those losses would be borne almost entirely by building owners.

The City last updated Berkeley Municipal Code (BMC) Chapter 17.12: Flood Zone Development Ordinance in September 2009 to maintain Berkeley's continued compliance with FEMA National Flood Insurance Program requirements. The Ordinance regulates all publicly- and privately-owned land within the areas of special flood hazard. BMC 17.12 automatically incorporates new FIRM panels. BMC 17.12 establishes the Director of the Public Works Department as the Floodplain Administrator for the City and addresses standards for construction, utilities, subdivisions, manufactured homes and recreational vehicles.

The City of Berkeley will maintain participation in the National Flood Insurance Program under the Public Works Department's Engineering Division and the Planning and Development Department's Land Use Planning and Building and Safety Divisions. The Supervising Civil Engineer will work with FEMA and other partners to continue to update and revise flood maps for the City, and to continue to incorporate FEMA guidelines and suggested activities into City plans and procedures for managing flood hazards. The Zoning Officer and Building Official are responsible for applying BMC requirements to private property projects.

Implementation of substantial improvement/damage provisions after an event

In the City of Berkeley, implementing the substantial improvement or damage provisions of the floodplain management regulations involves a structured process aimed at ensuring that properties affected by substantial improvement or damage comply with

floodplain regulations.

In the City of Berkeley, the Director of Public Works or their designee is the Floodplain Administrator (FPA), and they coordinate with the Zoning Officer, Building Official, and City Engineer. After an event such as flooding or any other incident causing substantial improvement or damage to properties in flood-prone areas, the Building and Safety Division of the Planning Department assesses the extent of the damage and proposed improvement. This includes checking if the improvements meet the required elevation standards, use of flood-resistant materials, and other relevant criteria.

Applicants are required to provide the following:

1. Plans in duplicate, drawn to scale.
2. Certification from a registered civil engineer or architect that the nonresidential flood proofed building meets the floodproofing criteria.
3. For a crawl-space foundation, location and total new area of foundation openings as required and detailed in FEMA Technical Bulletins 1-93 and 7-93.
4. All appropriate certifications.

The FPA reviews all permits for development that fall within the special flood hazard area (SFHA) and qualify as new construction or substantial improvement to determine whether:

1. The application is complete;

2. The requirements have been satisfied, including determination of substantial improvement and substantial damage of existing structures;

3. All other required state and federal permits have been obtained;

4. The site is reasonably safe from flooding;

5. The proposed development does not adversely affect the carrying capacity of areas where base flood elevations have been determined but a floodway has not been designated. This means that the cumulative effect of the proposed development when combined with all other existing and anticipated development will not increase the water surface elevation of the base flood more than one foot at any point within the City of Berkeley; and

6. All letters of map revision (LOMRs) for flood control projects have been approved prior to the issuance of building permits. Building permits must not be issued based on conditional letters of map revision (CLOMRs). Approved CLOMRs allow construction of the proposed flood control project and land preparation as specified in the "start of construction" definition.

The FPA uses FEMA Publication 213, “Answers to Questions About Substantially Damaged Buildings," to develop detailed procedures for identifying and administering requirements for substantial improvement and substantial damage, to include defining "market value." When base flood elevation data has not been provided in accordance with regulations, the Floodplain Administrator shall obtain, review, and reasonably utilize any base flood elevation and floodway data available from a federal or state agency, or

other source, in order to administer this chapter.

The FPA is responsible for notification of other agencies, including:

1. Notifying adjacent communities and the California Department of Water Resources prior to alteration or relocation;

2. Submitting evidence of such notification to the Federal Emergency Management Agency; and

3. Assuring that the flood carrying capacity within the altered or relocated portion of said watercourse is maintained.

4. If the Base Flood Elevation Changes Due to Physical Alterations, within six months of information becoming available or project completion, whichever comes first, the FPA shall submit or assure that the permit applicant submits technical or scientific data to FEMA for a letter of map revision (LOMR). All LOMRs for flood control projects are approved prior to the issuance of building permits. Building permits must not be issued based on conditional letters of map revision (CLOMRs). Approved CLOMRs allow construction of the proposed flood control project and land preparation as specified in the "start of construction" definition. Such submissions are necessary so that upon confirmation of those physical changes affecting flooding conditions, risk premium rates and floodplain management requirements are based on current data.

5. Notifying FEMA in writing whenever the corporate boundaries have been modified by annexation or other means and include a copy of a map of the community

clearly delineating the new corporate limits.

The Building and Safety Division enforces compliance with floodplain regulations through inspections and monitoring. They ensure that the construction or improvements proceed according to the approved plans and that all regulatory requirements are met. Given that the City of Berkeley participates in the NFIP (National Flood Insurance Program), the FPA coordinates with FEMA to ensure that their implementation of substantial improvement/damage provisions meets federal requirements. This collaboration helps maintain eligibility for NFIP benefits and ensures consistency with national floodplain management standards.

For example, the FPA is responsible for the following:

1. Obtaining and maintaining for public inspection all Documentation of Floodplain Development.

2. Maintaining a record of all variance actions, including justification for their issuance, and report such variances issued in its biennial report submitted to FEMA.

3. Making interpretations where needed, as to the exact location of the boundaries of the areas of special flood hazard, where there appears to be a conflict between a mapped boundary and actual field conditions. The person contesting the location of the boundary shall be given a reasonable opportunity to appeal the interpretation.

4. Taking actions to remedy violations.

5. Completing and submitting a biennial report to FEMA.

6. Assuring the community's General Plan is consistent with floodplain management objectives.

C.3 Disaster Mitigation Goals

Berkeley will focus on five goals to reduce and avoid long-term vulnerabilities to the hazards identified in Element B: *Risk Assessment*

- Reduce the potential for loss of life, injury, and economic damage to Berkeley residents and businesses from earthquakes, wildfires, landslides, floods, tsunamis, climate change, extreme heat, poor air quality, infectious disease, sea level rise, wind, utility disruption and their secondary impacts.

- Increase City government's ability to serve the community during and after hazardous events by mitigating risk to key City functions.

- Protect and enhance quality of life in Berkeley.

- Connect with residents, community-based organizations, institutions, businesses, and essential lifeline systems in order to increase mitigation actions and disaster resilience in the community.

- Co-create mitigation plans, policies, and programs with Berkeley's underserved communities, elevating the voices of these community members and prioritizing their needs to prepare for and adapt to climate change and natural hazards.

C.4 Overview of Actions

This plan identifies and analyzes 33 mitigation actions to reduce the impacts from hazards

described in Element B: *Risk Assessment.* This suite of actions addresses every natural hazard posing a threat to Berkeley, with an emphasis on new and existing buildings and infrastructure. Given the number of new hazards included in the plan, several new actions and proposed activities were considered and added.

Plan actions were developed through a multi-step, broadly-inclusive process. The City convened an interdepartmental planning team, which reviewed the actions identified in the 2019 mitigation plan, as well as Berkeley's progress on these actions since 2019. This Team then revised these actions, identified new actions, and established priorities to guide Berkeley's mitigation strategy for the next five years. Actions with clear funding mechanisms were given greatest consideration. Based on feedback from community members, staff revised actions and incorporated them into this 2024 First Draft Plan. Additional detail on the process used to identify actions is provided in Element A: *Planning Process*.

Tables 4, 5, and 6 below summarize all of the actions. The tables group actions by their priority level (see Element C.5.a for details on prioritization of actions), and identify the hazard(s) that each action addresses.

The 2024 Strategy Actions Spreadsheet in the Appendix includes further detail about each action, including how each action benefits socially vulnerable populations. Actions that were considered but not prioritized are included in the second tab of the Strategy Actions Spreadsheet.

Table 24. *High-Priority Actions in mitigation strategy*

Action	Hazards
Continue appropriate seismic and fire safety analysis based on current and future use for all City-owned facilities and structures.	Multi-hazard
Strengthen or replace City buildings in the identified prioritized order as funding is available.	Multi-hazard
Reduce hazard vulnerabilities for non-City-owned buildings throughout Berkeley.	Multi-hazard
Implementation of the Retrofit Grants Program which helps Berkeley building owners increase safety and mitigate the risk of damage caused by earthquakes	Earthquake
Continue implementation of the Soft Story Retrofit Program, which mandates seismic retrofit of soft story buildings with 5+ residential units.	Earthquake
Complete the ongoing program to retrofit all remaining non-complying Unreinforced Masonry (URM) buildings.	Earthquake
Monitor passage and implementation of mandatory seismic retrofit ordinances for concrete buildings in other jurisdictions to assess best practices.	Earthquake
Reduce fire risk in existing development through fire code updates and enforcement.	Wildland-Urban Interface Fire
Reduce fire risk in existing development through vegetation management.	Wildland-Urban Interface Fire
Manage and promote pedestrian evacuation routes in Fire Zones 2 and 3.	Earthquake Wildland-Urban Interface Fire
Improve responder access and community evacuation in Fire Zones 2 and 3 through roadway maintenance and appropriate parking restrictions.	Earthquake Wildland-Urban Interface Fire
Research, identify, and implement infrastructure improvements to facilitate emergency evacuation.	Wildland-Urban Interface Fire Tsunami
Mitigate wildfire risk to Berkeley's overnight camps	Wildland-Urban Interface Fire

Action	Hazards
Reduce fire risk through utility undergrounding.	Earthquake Wildland-Urban Interface Fire High Winds
Work with EBMUD to ensure an adequate water supply during emergencies and disaster recovery.	Earthquake Wildland-Urban Interface Fire
Reduce Berkeley's vulnerability to extreme heat events and associated hazards.	Extreme Heat Poor Air Quality
Mitigate hazards associated with natural gas usage, including disaster damage and energy service disruption, by minimizing need for energy use and moving toward use of electricity in lieu of natural gas.	Multi-hazard
Mitigate hazardous materials release in Berkeley through inspection and enforcement programs.	Multi-hazard
Maintain City participation in the National Flood Insurance Program.	Floods
Maintain City programs and projects to mitigate the impacts of infectious diseases in Berkeley.	Infectious Disease
Collect, analyze and share information with the Berkeley community about Berkeley hazards and associated risk reduction techniques.	Multi-hazard
Coordinate with and encourage mitigation actions of key City partners.	Multi-hazard
Coordinate regional wildfire mitigation strategies with key partners and stakeholders	Wildland-Urban Interface Fire
Advance equitable community resilience, with a focus on disadvantaged communities.	Multi-hazard

Table 25. *Medium-Priority Actions in mitigation strategy*

Action	Hazards
Reduce Berkeley's vulnerability to severe storms and associated hazards through proactive research and planning, zoning regulations, and improvements to stormwater drainage facilities.	Landslide Floods

Action	Hazards
Reduce Berkeley's vulnerability to extreme heat events and associated hazards.	Extreme Heat Poor Air Quality
Implement energy assurance strategies at critical City facilities.	Multi-hazard Utility Interruption
Implement existing City programs, plans, and projects designed to reduce emissions that contribute to poor air quality.	Poor Air Quality Extreme Heat
Mitigate the impacts of sea level rise in Berkeley.	Sea Level Rise Flood

Table 26. *Low-Priority Actions in mitigation strategy*

Action	Hazards
Mitigate climate change impacts by integrating climate change research and adaptation planning into City operations and services.	Multi-hazard
Collaborate with partners to increase the security of Berkeley's water supply from climate change impacts.	Multi-hazard
Mitigate Berkeley's tsunami hazard.	Tsunami
Give priority to project applications that would rebuild to current standards following disasters.	Multi-hazard

C.5 Action Prioritization

The City's Core Planning Team incorporated eight key factors into the prioritization strategy used for 2024 mitigation actions. These criteria are described below and summarized in the table that follows.

Key Factors

Support of goals and objectives

Actions that support multiple goals and objectives are prioritized.

Cost/benefit relationship

A detailed benefit cost analysis is required for FEMA grant eligibility. A less formal approach is taken here to weigh the relative costs and benefits of various actions. Because some projects may not be implemented for up to 10 years, the associated costs and benefits may change significantly over time. The following parameters were used to establish high, medium and low costs and benefits.

Costs

- *High*: Existing funding will not cover the cost of the project; implementation would require new revenue through an alternative source (for example, bonds, grants, and fee increases).
- *Medium*: The project could be implemented with existing funding but would require a reapportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.
- *Low*: The project could be funded under the existing budget. The project is part of or can be part of an ongoing existing program.

Benefits

- *High*: Project will provide an immediate reduction of risk exposure for life of property.
- *Medium*: Project will have a long-term impact on the reduction of risk exposure for life of property, or project will provide an immediate reduction in the risk exposure for property.
- *Low*: Long-term benefits of the project are difficult to quantify in the short term.
- Using this approach, projects with positive benefit versus cost ratios (such as high over high, high over medium, medium over low, etc.) are considered cost-beneficial and are prioritized accordingly.

Funding availability

Actions with secured funding are prioritized.

Hazards addressed

Actions addressing the Plan's hazards of greatest concern (earthquake and wildland-urban interface fire) are prioritized.

Public and political support

Actions with public and political support are prioritized.

Adverse environmental impact

Actions with low environmental impact are prioritized.

Environmental benefit

Actions that provide an environmental benefit are prioritized.

Benefit for marginalized communities

Actions that serve marginalized populations are prioritized.

Timeline for completion

Actions that are ongoing, or that can be completed in the short-term, are prioritized.

- Ongoing: Currently being funded and implemented under existing programs
- Short-term: To be completed in 1-5 years
- Long-term: To be completed in more than 5 years

The following table summarizes prioritization criteria. Using these factors, mitigation actions have been divided into high, medium, and low priorities. Some actions may not meet all criteria within their prioritization category. In these cases, the City's Core

Planning Team assigned the most suitable category.

Table 27. *2024 Action Prioritization Structure*

Factors	Priority		
	High	Medium	Low
Support of goals and objectives	Supports multiple goals and objectives	Supports goals and objectives	Will mitigate the risk of a hazard
Cost/benefit relationship[1]	Benefits exceed cost	Has benefits that exceed costs	Benefits do not exceed the costs or are difficult to quantify
Funding availability[2]	Funding has not been secured, but the action is grant eligible under identified grant programs	Funding has not been secured, but the action is grant eligible under identified grant programs	Funding has not been secured, and a grant funding source has not been identified
Hazards addressed	Addresses hazards of greatest concern	May not address hazards of greatest concern	Addresses hazards identified in Hazard Analysis
Public and political support	Has public and political support	Has public and political support	May not have public and political support
Adverse environmental impact	No environmental impact	Low environmental impact	May not have a low environmental impact
Environmental benefit	Environmental benefit	No environmental benefit	No environmental benefit
Benefit for marginalized communities	Benefit	Maybe some benefit	No benefit
Timeline for completion	Can be completed in the short term (1 to 5 years) or is ongoing	Can be completed in the short-term, once funding is secured	Timeline for completion is long-term (6-10 years)

[1] Actions that address other hazards, but for which benefits exceed costs, may also be considered high priority.

[2] Medium priority projects will become high priority projects once funding is secured.

C.5 Household Mitigation Actions

The Local Hazard Mitigation Plan is designed to address and recognize how the whole community can and does work together to mitigate Berkeley's natural hazards. The following steps are ways that individual community members and households reduce their own risks and contribute to Berkeley's collective mitigation efforts:

Earthquakes

Secure your home

- Store heavy and breakable objects on low shelves
- Bolt bookshelves and heavy furniture to the wall
- Move or secure hanging objects over beds, sofas, and chairs
- Use quake gel or putty to secure breakable objects in place

For homeowners

- Assess your home by hiring a structural engineer
- Retrofit your home if needed
- Understand available retrofit grants, including the City's Brace and Bolt program
- Consider earthquake insurance

For renters

- Talk to your landlord:
- When was the house built?

- What materials were used?
- Is the building retrofitted?
- Does it require retrofitting?
- Consider earthquake insurance

Prepare to be safe at home

- Store water (enough for 1 gallon per person per day for 3 days)

Practice what to do during an earthquake

- Drop, cover, and hold on
- Do not stand in a doorway, run, or get into the “triangle of life”. The 'Triangle of Life' is a misguided idea about the best location a person should try to occupy during an earthquake. Based on observations of past earthquakes, this idea doesn't apply to buildings constructed within the United States. Please do not consider this as a safe hiding spot.
- Learn how to turn off gas, electricity, and water at your house. If you rent, check in with your landlord.
- If after an earthquake you small gas, contact PG&E and tell them to shut it off or call 9-1-1

Wildland-Urban Interface Fire

Berkeley hills residents (Fire Zone 2 & 3):

- Review home’s Defensible Space Report and follow the instructions on defensible space and home hardening.
- Create Defensible Space: Understand that all of Berkeley is at risk of wildland-urban interface fire. Further, 95% of property in Berkeley is privately owned, meaning that owners have to act to make their properties defensible.
- Defensible space is the area around a home where vegetation has been specifically maintained, and flammable items have been specifically positioned, in

order to reduce the spread of wildfire.

- Keep Zone 0, or the first five feet from your home, clear of combustible materials. Use hardscape like gravel or concrete, remove dead or dying plants, remove branches from chimneys, limit combustible items like patio furniture, relocate firewood, replace any combustible fencing, and consider relocating garbage containers outside this zone.

- In Zone 1, or five to 30 feet around your home, remove all dead plants and dry leaves, and trim trees regularly. Create a separation between items like shrubs and items that catch fire like patio furniture and swing sets.

- In Zone 2, or 30 to 100 feet from your home, reduce potential fuel within 100 feet of the property line. This includes cutting annual grass, creating space between shrubs and trees, removing fallen leaves, and keeping clearance around exposed wood piles.

- Harden your home to decrease the likelihood of fire igniting the structure. The highest priority items are:

    - Install a fire resistive roof

    - Clear and maintain decks and covered porches

    - Regularly clear tree debris

    - Remove large rugs and combustible wood, wicker, or plastic furniture

    - Ensure any small items like cushions are small enough to be moved inside on Red Flag or Extreme Weather days

    - Remove anything stored under the deck or stairs

    - Include a five-foot noncombustible buffer around deck and stairs

    - Install non-combustible gutter guards to keep tree debris out

    - Ensure the vents to your attic, basement, and crawlspace will block wind-blown embers from entering your home. You can install ember-resistant vents or cover Be ready to receive emergency information.

For all Berkeley residents:

- Use the free Berkeley Chipper Day Program for curbside pickup, chipping, and disposal of vegetation material from your residential property.
- Sign up for AC Alert
- Bookmark and get familiar with Berkeley's Emergency Map
- Get familiar with the test and emergency tones from Berkeley's Outdoor Warning System
- Make your household fire weather plan.
- Stay out of the hills during extreme fire weather days.

Extreme Heat

Prepare to be safe at home

- Gather supplies to keep yourself cool, including:
  - Ice – fill up all your ice trays and freeze them and any ice packs overnight
  - Spray bottle – to spray mist on yourself to keep cool
  - Personal fan – fan to point at yourself
  - Towel – to wet and put on your body
- Plan to keep your home cool on hot days without air conditioning, using:
  - A larger fan – to move hot air out of your home
  - An indoor/outdoor thermometer – set this up to know when to let cooler outside air into your home
  - Be ready to block sunlight and heat, using blackout curtains, reflective film, solar blankets or cardboard. Blocking your windows with a light-colored sheet facing out, followed by a dark-colored sheet facing in, can help to reflect light away and keep your home cooler.

- Prepare for potential power outages *(see utility disruption section)*

Make a plan for where to go (and how to get there) if your home gets too hot.

- Consider locations you could visit that have air conditioning, like malls, stores, or community cooling centers.

- Make a transportation plan – consider using friends and family, public transit, carpooling, or using a taxi or rideshare service.

- If you use a wheelchair or other mobility device, you may also consider:

- Pre-scheduling a paratransit trip to a cool location before the hottest hours of the day

- Using Easy Does It for a Rescue Ride or Routine Transportation (BRSD members only)

Buddy up with your friends, family, and neighbors:

- Make a plan to check on friends, family and neighbors at least twice a day during a heat wave. Check to see if people are developing signs of heat exhaustion or heat stroke. Remember that people who live alone are at the greatest risk in a heat wave because no one will notice if they develop heat stroke.

- Think about how to work together to get to a location with air conditioning or a community cooling center if someone's home gets too hot.

Monitor the heat

- The Occupational Health and Safety Administration (OSHA) Heat Safety Tool helps you understand how hot it is where you are located.

During a heat wave

- Get Plenty to Drink: Sweating removes needed salt and minerals from the body. When it is hot, drink more water, juice and sports drinks. Avoid drinks with caffeine (tea, coffee, and cola) and alcohol. Be sure to eat regularly.

- Stay safe in your home:

    - Wear as little clothing as possible when you are at home. Choose

lightweight, loose-fitting clothing.

- Spray yourself with water or make your skin wet with towels, then stand in front of a fan. When the water evaporates it will pull heat away from your body.

- Keep windows open at night to capture the cool air. Closing windows to trap the cool air in the morning can be helpful before the heat of the day comes. If you have an indoor/outdoor thermometer, monitor temperatures inside and outside your home. When it is cooler outside, open windows and doors to let in cool air. When temperatures are equal, close windows and doors to keep cool air in as the outdoors heats up.

- If you must go outside:

  - Choose lightweight, light-colored, loose-fitting clothing. In the hot sun, a wide-brimmed hat will keep the head cool. If you will be in direct sun, use a sunscreen with a sun protection factor (SPF) of 15 or higher and follow package directions. Reapply every 2 hours while in the sun.

  - Schedule Outdoor Activities Carefully: Try to be less active during the hottest part of the day, late afternoon. If you must be out in the heat, plan your activities so that you are outdoors either before noon or in the evening. While outdoors, rest often in a shady area.

- Never leave children or pets in a parked car.

- Pace Yourself: If you are not used to working or exercising in hot weather, start slowly and pick up the pace gradually. Take frequent, regularly scheduled breaks. If activity in the heat makes your heart pound or leaves you gasping for breath, stop activity, get into a cool or shady area, and rest. Especially if you become lightheaded, confused, weak or feel faint.

Poor Air Quality

Get air quality information

- Be familiar with the Air Quality Index

- Bookmark websites with key air quality information:

- Forecasts: AirNow.gov

- Real-time readings: US EPA/US Forest Service Fire and Smoke Map

Prepare your home for poor air quality

- Keep outside pollution outside by replacing or sealing leaky windows and doors. This will also make your home more energy efficient and comfortable.

- People on limited incomes should check out California Weatherization Assistance Program services offered by Spectrum Community Services.

- Purchase equipment to clean the air inside your home, with filters for your HVAC system or portable air cleaners.

- HVAC system filters: If properly configured and maintained, air cleaners and specialized filters designed for use in HVAC systems may have the greatest potential to improve your entire home's air quality because most HVACs circulate very large volumes of filtered air throughout the home.

- Install a high-efficiency filter (MERV 13 rating or higher) with a MERV rating as high as your system can handle, based on manufacturer recommendations.

- Portable air cleaners: These units are usually best for single room use, rather than multiple room or whole-house use, because of their limited capacity to circulate large volumes of filtered air.

- Purchase one or more California Certified Air Cleaners for room(s) in your home. Make sure your cleaner is on this certified list so you can be sure it will not emit harmful ozone when you use it.

- Use the "Clean Air Delivery Rate" (CADR) to calculate the correct size portable air cleaner for the room.

- If an air cleaner is out of your price range, you can construct one with a box fan for a cost of $45-$75.

Key Actions during poor air quality events (see the California Air Resources Board's Smoke Ready California site for details)

- **Stay inside**: The best way to prevent breathing harmful particles is to stay indoors with windows and doors closed.

- If you have a central-ducted heating/air conditioning and heating system, be sure to set the system to “on” to ensure air is being filtered constantly, rather than “auto,” which runs the system intermittently.

- If your system brings fresh air into the home, close the fresh-air intake so that it operates in in recirculation mode to prevent outdoor smoke from getting inside.

- Filter the air: Use a CARB-certified portable air cleaner and run continuously on the highest setting. This can greatly reduce indoor particle levels to further reduce impacts from smoke.

- Gather people in a room with the air purifier. A portable air cleaner will clean the air around it, but cannot is not designed to clean the air in your whole home.

- Do not run whole house fans or swamp coolers.

- Avoid activities that increase indoor pollution, such as burning candles, using gas stoves and vacuuming.

- Use a damp cloth or mop to trap settled dust and particles.

- Stay cool. Run fans, or run air conditioning on “recirculate” setting with a new filter. NOTE: If poor air quality happens at the same time as extreme heat, do whatever you need to stay cool, even if it means opening windows and doors. Heat will kill more quickly than air pollution.

- **If you must go outdoors** for long periods of times in areas of heavy smoke, you may want to wear a NIOSH-certified N95 respirator mask. Those with existing respiratory, lung or heart conditions should limit their exposure by staying indoors. Since wearing a respirator can make it harder to breathe, those with lung or heart conditions should check with their doctor before using one.

- If you purchase N95 masks, make sure they are NIOSH-approved. Choose a size and model that fits your face and has no gaps. Test it by doing a seal check.

- Keep a very close eye on children, who are less likely to notice or report symptoms than adults, even when they are affected.

- Look out for signs that you or those around you need cleaner air. Symptoms can include:

    - Coughing

- Throat irritation
- Pain, burning, or discomfort in the chest when taking a deep breath
- Chest tightness, wheezing, or shortness of breath

High Wind

Keep trees properly maintained.

- City trees:

  City trees grow between the sidewalk and the street, in a street median, in a public park, or on any other property owned by the City of Berkeley. View a map of Berkeley City trees.

- To submit a request for pruning or removal of a City tree, call 311 or email trees@berkeleyca.gov.

Privately owned trees

- All other trees are privately owned, and maintenance is the responsibility of the owner. Similarly, if a private tree or limb falls, cleanup and damages are also the responsibility of the homeowner.
- Get a professional arborist assessment to identify any signs of decay, dead branches, or other structural issues that could lead to problems in the future.

Before a wind event

- Bring any loose outdoor items such as holiday decorations and chairs inside, or securely tie them up. Beside the risk of these items being blown away or damaged, airborne debris can be dangerous.
- Be ready for power outages. In winter months, consider raising the temperature on your thermostat, in case you lose power for a few hours or longer.

During high winds

- If you must be outdoors, keep your distance from trees.

- Avoid driving during the strongest winds, especially in high-profile vehicles. Your vehicle could be blown off the road. Trees could fall in the road ahead of you, which could be hard to see at night until it's right in front of you, or they could fall on your vehicle.

Landslide

Protect your home

- Have flexible pipe fittings installed to avoid gas or water leaks, as flexible fittings are more resistant to breakage. (Note, only PG&E or other professionals should install gas fittings).

- Plant ground cover on slopes and build retaining walls.

- In mudflow areas, build channels or deflection walls to direct the flow around buildings. Remember: If you build walls to divert debris flow and the flow lands on a neighbor's property, you may be liable for damages.

- If you live in an area susceptible to landslide (See Maps 23 and 24), familiarize yourself with Landslide Warning Signs and preparedness/response actions.

- Remember that landslide damage on private property is the homeowner's responsibility. Homeowner's insurance does not typically cover landslide damage. A Difference in Coverage Insurance Policy can help cover this gap, if you live in an area susceptible to landslide.

Tsunami

For all Berkeley residents

- Understand Berkeley's tsunami inundation area (Map 25in the Risk Assessmen) to identify whether you might find yourself in the tsunami inundation zone

- If your home or business is in the tsunami inundation zone, consider purchasing flood insurance.

- Be ready to act on tsunami alerts

- Sign up for AC Alert

- Bookmark and get familiar with Berkeley's Emergency Map
- Get familiar with the test and emergency tones from Berkeley's Outdoor Warning System

If you live in the tsunami inundation zone, make your household evacuation plan for tsunami, including:

  - Where will you go – east, out of the tsunami zone
  - What will you pack
  - How will you get there, using which routes
  - Who can help if you need it

- Know nature's warning signs of a near-source tsunami:
  - Earthquake with strong ground shaking for 20 seconds or more (making it difficult to stand or walk)
  - Loud ocean roar
  - Quickly receding water
  - If you are near the water and see these signs, move inland and to higher ground immediately. If there is time (a distant source tsunami) officials will send out alerts and instructions.

- If a tsunami alert is issued
  - Monitor your phone, the Outdoor Warning System, Berkeley's Emergency Map, and TV and radio for updates
  - Follow evacuation orders – as scientists get more information about what created the tsunami, the area that needs to evacuate will become more clearly defined
  - Do not go towards the tsunami – it makes things harder for first responders and for your fellow residents.

Maritime Community

- The City of Berkeley will evacuate docks and shut them down within 1 hour of a tsunami's estimated arrival.

- Make a plan for your boat

- Should you take your boat OFFSHORE?

- Generally, it is safer to keep your boat docked during a tsunami because most tsunamis are relatively small. On the rare occasion when a larger tsunami is expected (Warning level), you may consider taking your boat offshore. Berkeley's Harbormaster may provide the best advice, considering

- The SIZE of the tsunami,

- How much TIME until it arrives onshore, and

- The PREPAREDNESS of the boat and its captain.

- You may consider hauling your boat out of the water when possible for smaller events. Expect congested boat ramps and remember that you have to get your boat out of the water and to the trailer, and out of the tsunami zone before the tsunami arrives (or before officials close the docks).

- Understand whether or not your boat insurance will cover damage caused by a tsunami. Tsunami coverage is entirely dependent on your policy and how much comprehensive coverage you have purchased.

- Make sure your boat is secured and ready. Keep in mind that the City will shut down the dock 1 hour before the tsunami's anticipated arrival time.

- Secure your boat to the dock and tie down any loose gear.

- Check your dock line condition and replace any worn dock lines.

- Do not install fendering to the dock.

- Remove as much loose boating gear onboard as possible, especially electronics and important documents. Any gear that will remain on your boat should be secured.

- Turn off and disconnect shore power cords, water supply hoses and propane or other gas valves.

- Secure and lock all hatches and port holes. Check for leaks, and seal them as necessary.

- Prepare a go-bag or backpack that you can grab and bring with you if you need to evacuate quickly for a near-source tsunami. Include:

    - Flashlight/headlamp

    - Area map, marked with driving/walking evacuation routes

    - Printed list of phone numbers and email addresses for important contacts

    - Battery-powered radio and extra batteries

    - Prescriptions or critical medications

    - Extra eyeglasses or contact lenses

    - Extra set of keys

    - Cell phone charger

    - Copies of important documents

    - Toiletries and change of clothing

    - Hand sanitizer

    - As you leave, grab your wallet and cell phone

    - Make a list of the other items you will want to bring if you have more time to prepare to evacuate. Consider:

    - Items to be safe and comfortable while you are away

    - Medications, prescriptions, and medical devices

    - Computers, electronics and chargers

- Irreplaceable items (family treasures, art, photo albums)
- Other valuables

Floods

For all Berkeley residents, protect your home and neighborhood

- Flooding often occurs due to storm drain blockage. Protect your neighborhood and keep water flowing by participating in the adopt a drain program.
- Direct water away from your building.
- Routinely clean and maintain gutters, downspouts, and splash blocks so that rainwater from your roof flows easily away from your home.
- During an average rainstorm, watch how water flows or accumulates around your home to identify potential trouble spots. If stormwater does not drain away from the building, change your landscaping to improve runoff. This may include building up any sunken areas around the foundation, digging small depressions to properly channel water, and otherwise improving the yard so that it slopes away from your home.
- If you have a sump pump, make sure it has a battery-operated backup in case of power failure during a rainstorm.

Residents near Berkeley creeks, or who have experienced flooding in the past

- Implement low-cost projects to reduce your flooding risk
- Make your sandbag plan
- Learn how to sandbag and whether sandbags will be protective for your property
- If you are unable to sandbag, connect with neighbors and friends who can assist you in sandbagging to protect your home during severe storms
- Make a plan for where you'll get sandbags in significant storms. The City usually offers sandbags, and they are also available at a low cost from hardware stores.
- Consider flood insurance, since typical homeowners insurance policies do not

cover flooding.

- During heavy rains
    - Elevate important items, if possible, during heavy rains, especially from first floor/garage.
    - Do not walk, swim or drive through flooded waters. Turn around, don't drown.
    - experienced flooding in the past

After a flood

- If your home floods, review this Field Guide for Flooded Home Cleanup.

Utility Interruption

Power Outage

- Know the location of your circuit breakers and/or fuse boxes and how to check them.
- Make sure PG&E can reach you and alert you of an outage by calling 1-800-743-5000 and updating your contact information.
- Make a plan to stay safe and comfortable during power outages.
- First, think about your household's emergency power needs. What will you need to stay warm? To keep food cool? To operate any medical devices?
- Determine the power draw of the devices that you want to keep operating, and how long you want to operate them.
- Consider purchasing a power bank or generator to provide the power you need to stay safe in your home in short-duration outages.
- Make a plan to stay with family, friends, or at a hotel if your home is affected by a long-term power outage.
- When power outages are planned or likely (for example, severe storms or heat

waves are forecast):

- Fully charge your phone and any chargeable devices including battery packs and even electric vehicles.

- Make sure you have flashlights and fresh batteries close at hand.

- Prepare to use your alternate plans for refrigerating medicines or operating power-dependent medical devices.

- When a power outage occurs:

    - Unplug all electric appliances to avoid overloading circuits or damaging devices when the power turns back on.

    - Leave 1 lamp plugged in with the switch “on.” When the lamp turns back on you’ll know your home has power again. Turn your appliances back on one at a time when power is restored.

    - If you encounter a downed power line, always stay away and call 9-1-1 immediately. Do not touch anything that touching the lines or drive over them.

Water Outage

- Each person in your household will need 1-2 gallons of water daily for drinking, washing, and cooking. Store as much water as you can. At minimum, store water for 3 days (3-6 gallons per person).

- Options for storing water include: single gallons of water, water barrels, water cubes, or canned water. When choosing the best option for your household, consider cost, ease of storage, required maintenance, and how easy it will be to access and use during an emergency.

Wastewater Outage

If you don't have water to flush with or your sewage system isn't working:

- Modify your own toilet to collect waste without flushing. Turn the water valve to off. Flush out any water still in the bowl (the toilet shouldn't refill). Put some kitty litter, peat moss, lime, or something similar that will absorb liquid and help reduce odors into the inner bag. Go to the bathroom in the inner bag. You may be able to use the same bag more than once before replacing. Once the inner bag is full or you

feel it needs to be replaced, tie it up. Insert a new inner bag and add absorbent/odor reducer for the next use.

- Use a 5-gallon bucket. You can add a toilet seat and set it up as described above.

- If sewage from plumbing fixtures backs up into your home, avoid contact with the sewage as it may contain harmful pathogens.

Telecommunications Outage

- Establish a backup communication with your family. Choose a meeting place and time in case you can't call each other.

- Keep a battery-powered AM/FM radio handy to receive emergency alerts if internet, phone, and television aren't working.

- Print important documents or save them to a thumb drive in case of internet outage.

- During emergencies or large events, high demand for cellular networks can make it hard to place a call. A text message may go through when voice calls cannot, because text messages require less bandwidth from the cellular network.

- If you lose cellular service completely to your phone but the internet is still working, you can switch your phone's settings to turn on "Wi-Fi" calling to make calls through the internet.

D. Plan Maintenance

D.1 Ongoing Public Participation in the Plan Maintenance Process

The City's Disaster and Fire Safety Commission will serve as the advisory body for implementation of this Plan. This group was created by ordinance to advise the City Council on disaster-related issues. All meetings of this Commission are held in public. Staff will present progress on implementation of mitigation strategy actions as part of program management.

The City will maintain the BerkeleyCA.gov/Mitigation website and the Mitigation@berkeleyca.gov email address. Community members will be able to submit feedback during the implementation of this plan through this website and email address. Community members are able to write and mail or hand-deliver feedback to the City Manager's Office at any time. The City will also use the website to report implementation progress to the community.

As part of the 2024 update to the LHMP, the City created new outreach materials dedicated to teaching the public about mitigation and incorporating their efforts into the mitigation strategy. These materials include videos, guides, and posters that help the community review the LHMP's Risk Assessment data, information, and mitigation actions. These materials also recognize the crucial role community members play in collective hazard mitigation and encourage actions that individuals and households can take to

reduce their risks. The City plans to continue to use these materials to educate the public and receive feedback on the Mitigation Actions. The ultimate goal is to determine how to measure and report the individual and household mitigation actions taken throughout Berkeley that reduce our risks.

The City will offer presentations of these materials as well as post them regular on social media and in public spaces. Examples of these materials are included in Element G: Community Education.

D.2 Plan Monitoring, Evaluating, and Updating

The City of Berkeley will monitor, evaluate, and update the 2024 LHMP's Risk Assessment and Mitigation Strategy throughout the five-year plan cycle. The City will incorporate these efforts into a comprehensive plan evaluation and update for the 2029 LHMP.

Risk Assessment

The City's Office of Emergency Services (OES) monitors newly-emerging information that will inform updates to the Risk Assessment of the LHMP, including:

- Type, location, and extent of all the natural hazards covered in the 2024 LHMP as well as newly-emerging hazards,
- Occurrences of hazards (inside and outside Berkeley) and estimated probabilities

of future hazard events, and

- Hazard impacts and community vulnerabilities

Hazard impacts and community vulnerabilities.

OES staff will continue to monitor relevant hazard occurrences and new scientific discoveries that may impact the 2024 LHMP's Risk Assessment. OES will provide this information to City staff, partners, and the public through the website, social media, and through outreach programs.

Actions in 2024 LHMP's Mitigation Strategy

Each action in the Mitigation Strategy identifies a Department or Division Lead. As part of their day-to-day work, Departments or Divisions will monitor, evaluate, and report on the progress of their assigned LHMP actions at necessary meetings with other staff, community partners, the Disaster Council, relevant City commissions, and the Berkeley City Council.

Annually, the Office of Emergency Services will coordinate a monitoring, evaluation, and reporting effort for the entire LHMP. As part of this effort, OES will collect an updated progress report from each identified Lead for each action. The progress report will:

- Provide qualitative and quantitative evaluation of City progress on activities,
- Identify any necessary changes to the action in order to more effectively achieve stated purpose and goals, and
- Identify new Plan actions to be incorporated into the Strategy

In this way the actions in the plan will be monitored, evaluated, and updated each year

during the five-year cycle. The Office of Emergency Services will maintain this information in order to facilitate the next update of all elements of the LHMP.

Comprehensive Plan Evaluation and Update

A comprehensive plan evaluation update will occur if a disaster occurs, or no later than the 4-year mark of the 2024 plan (late 2028). In either case, OES will reconvene the Core Planning Team to perform a thorough evaluation of the plan, including the ongoing efforts to update the Risk Assessment and mitigation action information.

The evaluation will include examination of:

- Significant developments in or affecting Berkeley, in order to update the Risk Assessment and Mitigation Strategy,
- Current data, scientific discoveries, and recent hazard events since plan adoption, in order to update hazard profiles and vulnerability assessments in the Risk Assessment,
- New policy, priority, and planning changes affecting Berkeley, in order to update the Mitigation Strategy, and
- Progress on actions in the 2024 Plan's mitigation strategy, in order to update plan goals, objectives, and mitigation actions for 2029.

The Core Planning Team, coordinated by the Office of Emergency Services, will use these assessments to create the updated Internal First Draft 2029 LHMP. The Core Planning Team will first share this internal document with City staff, hazard experts, and community partners for review and feedback. Following their review and relevant changes, the Core Planning Team will provide the First Draft 2029 LHMP to the Berkeley community for review. Public feedback, including that of Berkeley Commissions and individual community members, will inform development of the Final Draft 2029 LHMP,

which will be provided for review to the California Governor's Office of Emergency Services, and then to the Federal Emergency Management Agency (FEMA).

Following approval pending adoption from FEMA, the 2029 LHMP will go to the City's Planning Commission and the Disaster and Fire Safety Commission for recommendations to the City Council for adoption. The Berkeley City Council is the governing body that adopts the updates to the City of Berkeley Local Hazard Mitigation Plan.

The table on the following page summarizes the City's approach to monitoring, evaluating, and updating the 2024 LHMP.

	Risk Assessment	Monitoring 2024 Mitigation Strategy	Comprehensive Plan Evaluation and Update
WHO	Office of Emergency Services	Department or Division Leads, with Office of Emergency Services as Coordinator	Core Planning Team, with Office of Emergency Services as Lead
WHEN	Ongoing	Ongoing/annually	After a disaster event, or Comprehensive Evaluation and Update process starts **2 years prior** to plan expiration
HOW	Monitors hazard information Reports information to stakeholders and public through City website and outreach programs	Leads will monitor, evaluate and report on the progress of their assigned LHMP actions through day-to-day work OES collects progress reports annually	Review/revise Plan accounting for: • Development affecting Berkeley • Hazard/vulnerability data and recent hazard events • Policy, priority, and planning changes • Progress on actions in 2024 Mitigation Strategy

D.3 Mitigation Plan Integration

The City of Berkeley develops its updated Local Hazard Mitigation Plan every five years. The planning process brings together staff from every department to develop the risk assessment, mitigation strategy, and report on progress since the last update. After this process, staff continue to work closely together on maintaining the LHMP as well as on new projects. Core Planning Team members bring their knowledge and experience with the LHMP to their respective departments and ensure its integrated into their other ongoing work. For example, the 2019 LHMP was incorporated into the 2023 City's

Housing Element.

The Risk Assessment is crucial to the City's understanding of its hazards, vulnerabilities, and potential losses. It is used to educate City staff, partners, community members, and elected officials about the hazards that can occur in Berkley and what is at risk. The Office of Emergency Services works to maintain the Risk Assessment and ensure that the latest data, science, and information is used and integrated in educational materials and planning processes. For example, the 2019 LHMP Risk Assessment informed the City's Community Wildfire Preparedness Plan (CWPP) as well as Extreme Heat Workshops for the City's Emergency Operations Plan (EOP).

The actions outlined in the Mitigation Strategy are developed and prioritized in collaboration with every Department that is involved in the work. To ensure that the list of actions remains manageable, only actions that have a confirmed clear and viable funding source are included. As a result, the LHMP is closely aligned with the City Budget and Capital Improvement Plan. Each year, the City assesses potential capital improvement projects and available funding as it implements its Five-Year Capital Improvement Plan. Capital improvement actions in the Plan are assessed as part of this annual process.

List of Planning Mechanisms

As with prior LHMP updates, this Plan will be well-integrated into the City's existing and future plans. This list of planning mechanisms where the Plan will be integrated are listed below.

Budget Process

Because the 2024 LHMP will be adopted by the City Council into the General Plan, the data and information from the Risk Analysis as well as the hazard mitigation goals and actions in the Mitigation Strategy will help guide the City's budget process. The budget process assigns resources to address the goals, objectives, and community priorities set by the City Council. The budget process is the final step of assigning resources to implement mitigation actions. The Budget process is described in detail in Element C: Mitigation Strategy.

Community Outreach

Community outreach is a key component of any planning mechanism. The City's Office of Emergency Services has been trying to augment its outreach capacity, in addition to improving the outreach associated with the LHMP. The 2024 LHMP planning process inspired a whole suite of new outreach materials designed to educate community members about hazard risks and the mitigation strategy, including actions they can take to reduce risk. These materials are designed to be relevant and adjustable so that they can be used after the 2024 LHMP is adopted.

LHMP as an Appendix to the General Plan

Upon its adoption by the Berkeley City Council, the 2024 LHMP will be incorporated as an appendix to the Disaster Preparedness and Safety Element of the City's General Plan. The Berkeley General Plan is a comprehensive, and long-range statement of community priorities and values developed to guide public decision-making in future years. The Plan's goals, objectives, and policies serve as a guide for day-to-day decisions that are

essential for responsive government. Decisions made by Berkeley City Council and its advisory boards, and commissions about the physical development of the City should be consistent with the goals, objectives, and policies of the General Plan. The City Council and Planning Commission will use the General Plan when evaluating land use changes and making funding and budget decisions. It will be used by the Zoning Adjustments Board and City staff to help regulate development proposals and make decisions on projects. The policies of the Plan apply to all property, both public and private, within the Berkeley city limits.

Upcoming General Plan Updates and Additions

From 2024-2026 the City will be updating the General Plan's Safety Element, and creating a new Environmental Justice Element. The data and information in the 2024 LHMP's Risk Assessment, as well as the actions in the Mitigation Strategy, will directly inform the updated goals for both of these critical new documents. Many of the 2024 LHMP's Core Planning Team members will continue their collaborative mitigation work by participating in the process to develop the Safety Element updates and new Environmental Justice Element.

Berkeley Climate Equity Collaborative

The City is also working with the Berkeley Climate Equity Collaborative (Collaborative), a group of local community-based organizations representing disadvantaged communities, as community partners in developing the Environmental Justice Element and update to the Safety Element. The LHMP will be used as a resource to inform the Collaborative members of the hazards facing Berkeley, and will ultimately support the Collaborative's

efforts in these General Plan updates.

City of Berkeley Strategic Plan

On January 16, 2018, the City Council adopted the City of Berkeley 2018-2019 Strategic Plan. The City's Office of Emergency Services will be responsible for working with Department leaders to further incorporate actions from this Mitigation Strategy into future Strategic Plan updates. City staff indicated under "Lead Organizations and Staff Leads" will be responsible for further developing the project plans, schedules and budgets outlined for actions in the Mitigation Strategy. Implementation of many of these actions will be dependent on outside funding sources.

Capital Improvement Plan

Each year, the City assesses potential capital improvement projects and available funding as it implements its Five-Year Capital Improvement Plan. Capital improvement actions in this Plan will be assessed as part of this annual process. Many actions presented in the 2024 LHMP Mitigation Strategy are already a part of the City's Five-Year Capital Improvement Plan. Implementation of many of these actions will be dependent on outside funding sources.

Resilience Strategy

In 2014 the City of Berkeley was selected to participate in the 100 Resilient Cities (100RC) Initiative, pioneered by The Rockefeller Foundation. The City conducted extensive research that included community outreach and engagement as well as review of existing plans, including the 2014 LHMP, as it developed its Resilience Strategy, which was

released in April 2016. Building on existing efforts and with guidance from the Mayor, the City Council, and the community, the Berkeley Resilience Strategy identifies six long-term goals and recommends specific short-term actions to help address some of Berkeley's most pressing challenges. One of the goals is to adapt to the changing climate, which integrates information from the LHMP.

The Resilience Strategy is being implemented through projects, programs and plans across the City, and the LHMP will continue to be a key planning document that influences these processes. The City continues to have a Chief Resilience Officer (CRO) and participates in organizations such as the Resilient Cities Network and the Bay Area Climate Adaptation Network (BayCAN). As an example of a current resilience project, the City is working to implement solar photovoltaic arrays and backup batteries at critical municipal facilities to provide clean, reliable energy assurance in the face of a disaster and/or power outage.

Waterfront Specific Plan

The Waterfront Specific Plan is a four-year planning project (formerly "Berkeley Marina Specific Area Plan") that will provide a path for achieving a financially self-sustainable, publicly owned marina that preserves and enhances infrastructure to support current and future community needs, while adapting to climate change and promoting environmental stewardship. Key to this goal is consideration of the waterfront-specific hazards, including sea level rise and flooding. The 2024 LHMP's data, information, and mitigation strategies are being developed hand-in-hand with the Waterfront Specific Plan (WSP), which will designate areas for commercial redevelopment and recreation opportunities and provide

design guidelines for future projects.

Climate Action Plan

The 2019 and 2024 updates to the LHMP support concepts outlined in the Berkeley Climate Action Plan, which was developed through a community-wide process and was adopted by City Council on June 2, 2009. The Climate Action Plan outlines a vision, goals and policies to reduce community-wide greenhouse gas emissions by 33 percent below 2000 levels. Further, in 2018, then-Governor Brown committed California to carbon neutrality by 2045, the Berkeley City Council resolved to become a “Fossil Fuel-Free City,” and the Council declared a Climate Emergency, all steps to signal the urgency of these ambitious goals and the need to act on climate threats in an equitable manner.

Because climate change impacts can cause or exacerbate many of Berkeley’s hazards of concern, in 2014 the LHMP was updated to include climate change as a hazard of concern. Historically, the City of Berkeley has used the Climate Action Plan to present activities to mitigate climate change itself by addressing ways to reduce greenhouse gas emissions, and the LHMP to present climate adaptation actions, which would better prepare the community to adapt to the changes in climate we are already seeing. In this way both plans reflect and support one another. The City continues to implement the initiatives set forth in the Climate Action Plan through other plans such as the Electric Mobility Roadmap (adopted in 2020) and Existing Buildings Electrification Strategy (adopted in 2021), and this and future updates to the LHMP will continue to inform these implementation plans and include actionable climate adaptation strategies. For example, the City is implementing the Pilot Climate Equity Fund and Just Transition Pilot Programs,

both of which address transitioning away from gas in buildings, which can be hazardous as described in the LHMP's Risk Assessment.

In the 2024 LHMP, climate change has been more thoroughly integrated into each hazard of concern rather than as a standalone hazard. As a result, there are more actions in this plan that relate to reducing emissions and mitigating climate change as a way of reducing the impacts of various natural hazards.

E. Plan Update

E.1 Changes in Development

The people and structures in Berkeley are continually changing. Since 2000, the City's population has grown steadily, increasing approximately nine percent each decade. The Department of Finance estimates that the City's population was 122,580 in 2020. Berkeley's population is anticipated to continue to grow steadily between 2020 and 2040 according to the Association of Bay Area Government's Plan Bay Area 2040 projections. The City's population is anticipated to reach about 136,000 by 2030 and 141,000 by 2040.

According to the Department of Finance, there were 51,523 housing units in Berkeley in 2020. This represents a four percent increase from 2010 and a 10 percent increase since 2000. Due to the built-out nature of the city's development pattern, the majority of new units constructed in the last ten years are part of multi-family buildings containing five or more units, and are located on in-fill sites, mostly along existing commercial corridors. Overall, the number of multi-family units in the City increased by seven percent while the number of single-family units increased by less than one percent.

The University of California, Berkeley is expanding its facilities both on and off the campus. UC Berkeley's 2021 Long Range Development Plan projects that the campus population will increase 22% in the next 15 years. To accommodate this growth, UC Berkeley is planning to add over 2 million gross square feet to the campus footprint, an additional 11,000 student housing units, and over 1,000 new parking spaces in the vicinity

of the existing campus, which is located at the eastern portion of the city.

Residents ages 15 to 24 comprise the largest age group in Berkeley, followed by people ages 25 to 34, likely due to the presence of UC Berkeley. The majority of households are renter-occupied (57%), and there is a sizeable proportion of the population residing in group quarters (about 11%) due to dormitories and other student housing associated with the University. The senior population (ages 64 to 84) represents about 12% of the residents in Berkeley, and has increased by 40% since 2010. Overall, 42 percent of Berkeley's households are considered lower income, earning less than 80 percent of the area median income (AMI). Special needs populations in Berkeley include senior-headed households (27% of total households), extremely low-income households earning up to 30% of AMI (21%), seniors living alone (12%), persons with a disability (8%), single-parent households, including those with children (8%), and large family households over five of more persons (4%). Additionally, about 1,100 persons (1%) are experiencing homelessness in Berkeley as of February 2022.

Housing cost burden is a prevalent issue in Berkeley, impacting over half of lower income households, and one third of moderate-income households. As of 2017, about 40 percent of Berkeley households are cost burdened with 23 percent experiencing a severe cost burden. Cost burden is notably more prevalent among renter households, with over half of renter households paying more than 30 percent of their income to housing expenses. Building new housing is one way to reduce housing cost burden in the city. As of December 2023, approximately 4,600 new housing units were in the pipeline for development, representing almost 9% of the existing housing stock in Berkeley. Due in part to the City's inclusionary housing ordinance, approximately 13% (620 units) of those

units are deed-restricted affordable according to federal and State statutory limits on household size and income.

City plans and policies guide decision-making to address the housing needs of Berkeley's residents. City resources should focus on housing affordability for people at the lowest income levels, and maintain and improve existing housing that will prepare buildings for a major seismic event. The City is working to expand the supply of housing for all residents through zoning amendments to increase the production of accessory dwelling units and infill 'middle housing' in high resource neighborhoods. Further, the City is focusing on housing for special needs groups through numerous programs and actions that prevent homelessness, seek solutions for those who are experiencing homelessness, and encouraging housing projects that include affordable units and those suitable for households with children and large families.

Effects on Berkeley's Risks and Vulnerabilities

As more people join the Berkeley community, the city will have more people who are exposed to the area's hazards. Additionally, as density and population increase, the demand for fire and emergency services also increases. For example, 911 calls will increase, with each call having an impact on the system, including the availability of resources. In 2023, the City completed a Standards of Coverage and Community Risk Assessment (SOC) to define appropriate levels of service based on a comprehensive analysis which included the impacts of increased density and vertical growth. The SOC determined that fire and emergency resources need to be enhanced to meet current and future demand.

Since the last plan was approved, because of Berkeley's built-out nature, new development tends not to add new geographic areas of hazard exposure. But with increased density, more people will be exposed to the area's hazards. All of Berkeley is exposed to earthquake shaking. All of Berkeley is exposed to wildland-urban interface fire, but the areas of heightened exposure are in the eastern hills. New state laws are mandating increased density throughout the city, including in the eastern hills, which are more exposed to wildland-urban interface fire and landslides.

The 100 year and 500 years floodplains are concentrated in west Berkeley along the Bay and around the Aquatic Park. These areas haven't changed since the last update, and development in this area of the City is characterized by industrial and heavy commercial uses. Any new development would be required to comply with the applicable regulations to ensure avoidance of and/or adequate mitigation of hazard-induced risk.

The city's western edge is also exposed to tsunami inundation and sea level rise from climate change. The tsunami inundation has increased slightly since the last update to reflect new science and local features. New science has also emerged evaluating the impact of shallow groundwater rising in low-lying coastal areas. Ultimately, low-lying inland areas could flood from below by emergent groundwater long before coastal floodwaters overtop the shoreline. Data shows that Berkeley already faces high groundwater in multiple areas in the west, meaning that the scenarios for sea level rise impacts are likely worse than previously thought. However, the actual areas of sea-level rise exposure, as well as the impacts of sea-level rise on the area's liquefaction and flooding hazards, are not yet clear, as it depends on carbon emissions.

New development in part reduces Berkeley's vulnerability to natural hazards. New construction adheres to modern design codes, including regulations for structural resistance to earthquakes, landslide mitigation efforts, fire-resistant materials, fire mitigation measures, and elevation above flood levels. Replacing or significantly renovating older structures significantly increases the Berkeley community's protection from natural hazards.

E.2 Changes in Priorities and Progress on Local Mitigation Efforts

While the City's goals and objectives have remained very similar to the 2019 plan, the 2024 LHMP reflects thorough revisions from the 2019 document. The 2024 Risk Assessment accounts for newly available science and research and emerging hazards. As a result of significant hazard events since the 2019 update, Poor Air Quality, Infectious Disease, Wind, and Utility Disruption have their own sections in the Risk Assessment. Climate change has been thoroughly integrated into each hazard, instead of having its own section, inspired by community outreach that overwhelming suggested that it shouldn't stand alone. The 2024 mitigation actions account for progress made on mitigation actions since 2019, changes in development in Berkeley, and our new understanding of the hazards we face. There are several new actions related to mitigating the risk of Wildland Urban Interface Fire, resulting from the creation of a new WUI Division in the Fire Department and the development of the Community Wildfire Protection Plan

(CWPP).

There are also new actions associated with mitigating the risks associated with Sea Level Rise and Flooding near the waterfront, especially in light of new data about the risks of rising groundwater.

The Mitigation Strategy also includes new actions associated with abiding by new state laws around evacuation and the upcoming process to update the City's General Plan, Environmental Justice and Safety Element.

For the first time, this Mitigation Strategy highlights the work that community members do to reduce risk in Berkeley. There are Actions listed for individuals and households to take to reduce their risks and contribute to collective mitigation efforts.

Status of 2019 Mitigation Actions

This Plan was last adopted on December 20, 2019. Since that date, Berkeley has made steady progress on implementing 2019 plan actions and supporting activities.

The following categories are used to describe the progress made since 2019:

- Completed: Activity has been completed as written.
- Completed with modifications: Over the course of completing this action, the City modified the activity to better meet the associated objective.
- In Progress: Progress has been made since 2019, but the activity is still ongoing.
- Deferred: Progress has not been made since 2019, but the activity is still relevant.
- Deferred with Modifications: Progress has not been made since 2019, but the activity is still relevant, and the City modified the activity to better meet the

associated objective.

- Deleted: Progress has not been made since 2019, and the activity is no longer relevant.

In Progress activities are incorporated into the 2024 LHMP's mitigation strategy.

The Progress on the 2019 Actions are detailed in the Appendix in Status of 2019 Actions Spreadsheet.

Integration of Information

As with previous updates, the 2019 LHMP was well integrated into other planning mechanisms.

LHMP as an Appendix to the General Plan

Upon its adoption by the Berkeley City Council, the 2019 LHMP was incorporated as an appendix to the Disaster Preparedness and Safety Element of the City's General Plan. The Plan's goals, objectives, and policies serve as a guide for day-to-day decisions that are essential for responsive government. Decisions made by Berkeley City Council and its advisory boards, and commissions about the physical development of the City should be consistent with the goals, objectives, and policies of the General Plan. The City Council and Planning Commission use the General Plan when evaluating land use changes and making funding and budget decisions. It will be used by the Zoning Adjustments Board and City staff to help regulate development proposals and make decisions on projects. The policies of the Plan apply to all property, both public and private, within the Berkeley city limits.

Budget Process

Because the 2019 LHMP was by the City Council into the General Plan, the data and information from the Risk Assessment as well as the hazard mitigation goals and actions in the Mitigation Strategy influenced the City's budget process. The budget process assigns resources to address the goals, objectives, and community priorities set by the City Council. The budget process is the final step of assigning resources to implement mitigation actions.

In 2022 and 2023, the City of Berkeley considered the implication that extreme events, like natural disasters, could have on the City government's financial condition, particularly its reserve levels for the general fund. In this plan for the first time, some hazard sections Risk and Loss Estimates include analysis from the GFOA. The City engaged the GFOA to produce a recommendation to help it decide the appropriate reserve level for the general fund, given the risks from extreme events. GFOA is a non-profit association of more than 23,000 state and local government finance professionals and elected officials from across North America. A key part of GFOA's mission is to promote best practices in public finance, including reserve policies. The analysis by GFOA also shed light on the potential broader economic losses to the community from the risks posed by extreme events and created additional analysis incorporated into the 2024 LHMP.

Community Wildfire Protection Plan

The Community Wildfire Protection Plan approved in 2023 integrates information from the 2019 LHMP, expanding upon the 2019 Hazard Analysis and Mitigation Strategy. The Community Wildfire Protection Plan is a roadmap for fire hazard mitigation and

preparedness at both the City of Berkeley and neighborhood level and offers ways to mitigate the risks posed by wildfires, including goals for improving wildfire response, community preparedness, fuel management, infrastructure, ignition reduction, home hardening, and more. Demonstrating the connection between these documents, the Community Wildfire Protection Plan provided additional data, information, and hazard mitigation goals related to wildland-urban interface fires

Vision 2050

Berkeley's Mayor Arreguin launched Vision 2050, an initiative to encourage long-term planning to meet the serious challenges to our infrastructure, including climate change, inequality, population increases, and obsolescence. The Berkeley community voiced their support for Vision 2050 with the passage of Measure R in the November 2018 election. The Vision 2050 Task Force was formed in Spring 2018 and included over 40 Berkeley community members with technical expertise and in-depth knowledge. The task force was organized into four working groups: quality of life, environment, technology, and finance/ management. The LHMP was one of the key plans reviewed and incorporated into the Vision 2050 Framework, particularly on the topics of earthquakes and landslides.

Housing Element

In 2023, the City of Berkeley adopted a 2023-2031 Housing Element, deemed in compliance with State Housing Element Law by the California Department of Housing and Community Development on February 28, 2023. This Housing Element Update, incorporated into Berkeley's General Plan, contains goals, policies, and programs to guide the City's decision-making around the development and rehabilitation of housing,

to meet the City's Regional Housing Needs Determination target of 8,934 new units of housing, across income levels, in Berkeley over 8 years.

The 2019 LHMP was used as a background document in the development of the 2023-2031 Housing Element and was referenced in regards to environmental constraints to housing production. Specifically, the comprehensive strategy from the 2019 LHMP used to mitigate Berkeley's WUI fire hazard, including annual property inspections, more restrictive local building code amendments, and vegetation management and defensible space, was used to determine safe housing development and rehabilitation in this area within the 2023-2031 Housing Element.

F. Plan Adoption

The public review process is considered a key step in the City Council's adoption of the 2024 Local Hazard Mitigation Plan. To that end, City staff has engaged with City Commissions and the City Council and throughout the process to develop this plan. Two City Commissions play a key role in plan review and adoption:

Disaster and Fire Safety Commission

The Disaster and Fire Safety Commission (DFSC) is made up of nine members appointed by the City Council, per the guidance of a local ordinance. This Commission meets in public monthly, and advises the City Council on all matters affecting fire safety and/or disaster resilience within Berkeley. For this reason, following FEMA's issuance of Approval Pending Adoption for the Final Draft 2024 LHMP, staff will request the Commission's recommendation to Council on the Final Draft 2024 LHMP.

Planning Commission

The Planning Commission oversees and reviews the planning process and planning issues. Revisions to the General Plan come before the Planning Commission, which meets twice each month in public. Because the Local Hazard Mitigation Plan is an appendix to the City of Berkeley's General Plan, following FEMA's issuance of Approval Pending Adoption for the Final Draft 2024 LHMP, staff will request the Commission's recommendation to Council on the Final Draft 2024 LHMP.

Additional Commissions

Concerned citizens staff nearly forty Berkeley commissions, boards and committees addressing a wide range of issues important to the community. All of these commissions meet in public.

Because of the wide scope of issues covered in the mitigation plan, the City invited all Commissions to review the First Draft Plan during the public comment period from May 24 to August 8, 2024.

Following the public feedback deadline, City staff reviewed feedback from Commissions and community members, and incorporated appropriate changes into the Final Draft Plan.

Following FEMA's issuance of approval pending adoption, City staff will bring the Final Draft 2024 LHMP to the City's Disaster and Fire Safety Commission and Planning Commission for their recommendations to City Council to adopt the Final Draft Plan. Following those meetings, staff will bring the Final Draft 2024 LHMP to the Berkeley City Council for adoption.

List of LHMP Commission and Council Meetings

- September 27, 2023: Disaster and Fire Safety Commission to introduce First Draft Plan
- October 4, 2023: Planning Commission to introduce First Draft Plan
- June 5, 2024: Planning Commission to review First Draft Plan
- June 26, 2024: Disaster and Fire Safety Commission to review First Draft Plan

- July 15, 2024: Public Safety Committee (City Council) to review First Draft Plan
- January 2025: Disaster and Fire Safety Commission to review Final Draft Plan and recommend Adoption
- February 2025: Planning Commission to review Final Draft Plan and recommend Adoption
- March 2025: Council for Adoption

G. Community Education

In the 2024 LHMP Planning Process, the City endeavored to make the Risk Assessment more applicable and accessible to individuals and households. First, to help the community understand the hazards and associated risks, the City of Berkeley Office of Emergency Services made videos available on YouTube that describe each hazard in this Plan. The videos also include a list of Community Actions to reduce risk as well as City Actions in the 2024 LHMP Mitigation Strategy. Additional videos related to mitigating wildfire risk are available on www.BerkeleyFire.Com.

Traditionally, this Plan has focused on the Actions that the City takes, with partner support, to mitigate risks. This plan recognizes that individuals and households also take actions to reduce risk and contribute to the community's collective mitigation efforts. To support this work further, the end of Element C: Mitigation Strategy has a list of individual and household actions to reduce risks associate with that hazard. The Appendix also includes the list of Community Actions for individuals and households in a spreadsheet format that also includes how much time, money, and effort each Action might take.

Appendix

Status of 2019 Actions

Action Description	Proposed Activities	Status	Carried Over to Plan Update	Comments
Continue appropriate seismic and fire safety analysis based on current and future use for all City-owned facilities and structures.	Continue analysis of structures supporting critical emergency response and recovery functions, and make recommendations for structural and nonstructural improvements.	In Progress	Yes	The City continues to analyze structures that support critical functions and make recommendations for improvements. The City is about to embark on a Seismic Evaluation of 1947 Center Street.
Continue appropriate seismic and fire safety analysis based on current and future use for all City-owned facilities and structures.	Continue to prioritize analysis of remaining structures based on occupancy and structure type, taking historic significance into consideration. Use analysis to make recommendations for structural and nonstructural improvements.	In Progress	Yes	The City continues to prioritize further analysis on non-critical structures and make recommendations for improvements.
Continue appropriate seismic and fire safety analysis based on current and future use for all City-owned facilities and structures.	Continue to integrate unsafe structures into a prioritized program for retrofit or replacement.	In Progress	Yes	The City continues to integrate unsafe structures into a prioritized program for retrofit or replacement.
Strengthen or replace City buildings in the identified prioritized order as funding is available.	Retrofit North Berkeley Senior Center	Completed	No	This retrofit was completed in 2022.
Strengthen or replace City buildings in the identified prioritized order as funding is available.	West Berkeley Service Center	In Progress	Yes	The West Berkeley Service Center is being strengthened with minor improvements and is currently in the design process.

Action Description	Proposed Activities	Status	Carried Over to Plan Update	Comments
Strengthen or replace City buildings in the identified prioritized order as funding is available.	Old City Hall	In Progress	Yes	The City has completed Phase 1 of the Civic Center Vision Plan, which would re-envision Old City Hall and make it safe to use. Phase 2 starts in Summer 2023 to select a design and funding plan.
Strengthen or replace City buildings in the identified prioritized order as funding is available.	Veterans Memorial Building	In Progress	Yes	The City has completed Phase 1 of the Civic Center Vision Plan, which would re-envision Veterans Memorial Building and make it safe to use. Phase 2 starts in Summer 2023 to select a design and funding plan.
Strengthen or replace City buildings in the identified prioritized order as funding is available.	Live Oak Community Center	Completed	No	This retrofit was completed in 2021.
Strengthen or replace City buildings in the identified prioritized order as funding is available.	Seek funding to seismically strengthen or replace additional City buildings in a prioritized order.	In Progress	Yes	The City continuously looks for funding opportunities to strengthen or replace City buildings.
Reduce hazard vulnerabilities for non-City-owned buildings throughout Berkeley.	Periodically update and adopt the California Building Standards Code with local amendments to incorporate the latest knowledge and design standards to protect people and property against known seismic, fire, flood and landslide risks in both structural and non-structural building and site components.	Ongoing	Yes	The City continues to update and adopt California Building Standards Code with local amendments every 18 months.
Reduce hazard vulnerabilities for non-City-owned buildings throughout Berkeley.	Explain requirements and provide guidance to owners of potentially hazardous structures to facilitate retrofit, including owners participating in the Earthquake Brace and Bolt program and those applying for Transfer Tax rebates.	Ongoing	Yes	The City continues to explain requirements and provide guidance to owners to facilitate retrofits. This action has changed slightly to add the Earthquake Soft Story (ESS) Program launched in April 2023 by the California Residential Mitigation Program.

Action Description	Proposed Activities	Status	Carried Over to Plan Update	Comments
Implement the Retrofit Grants Program, which helps Berkeley building owners increase safety and mitigate the risk of damage caused by earthquakes.	Assist participating property owners with the grant process, including dissemination of program rules and guidelines.	In Progress	Yes	Current federal funding for the Retrofits Grant Program participants is available through late 2025. City staff continue to seek additional grant funding to implement future rounds of the program.
Implement the Retrofit Grants Program, which helps Berkeley building owners increase safety and mitigate the risk of damage caused by earthquakes.	Project Manager will: a. Respond to inquiries from owners, tenants, engineers and contractors about the grant program, including FEMA compliance procedures and requirements b. Environmental and Historic Preservation Reviews (EHP) for specified projects c. Review plan submittals for compliance with City guidelines and FEMA requirements d. If more funding is secured, conduct outreach to property owners to offer additional Retrofit Grants to increase tenant safety	In Progress	Yes	The City continues to implement the Retrofit Grants Program, following the activities listed. As of 8/2/2023, 63 design grants and 75 construction grants have been disbursed to Berkeley property owners under the Retrofit Grants Program.
Continued Implementation of the Soft Story Retrofit Program, which mandates seismic retrofit of soft story buildings with 5+ residential units.	Continue to inform impacted property owners of the requirement to seismically retrofit their buildings.	In Progress	Yes	The City continues to inform impacted property owners of requirements.

Action Description	Proposed Activities	Status	Carried Over to Plan Update	Comments
Continued Implementation of the Soft Story Retrofit Program, which mandates seismic retrofit of soft story buildings with 5+ residential units.	Designated project manager will: a. Respond to inquiries from owners, tenants, engineers, contractors and realtors about the mandatory program, compliance procedures and requirements b. Review plan submittals for soft-story seismic retrofits c. Issue permits and perform field inspections d. Remove retrofitted buildings from the Soft-Story Inventory e. Review appeals to accommodate unique circumstances preventing owners from meeting program requirements; consider time extensions, etc. f. Enforce soft story ordinance; issue citations to owners who are out of compliance.	In Progress	Yes	The City continues to implement the program, following the listed activities. As of July 2023, 277 buildings have completed their retrofit, 26 buildings still need to be retrofitted, and 61 buildings were removed from the inventory for other reasons. These reasons include: the building was determined to have fewer than 5-units or that a soft story condition was not present.
Complete the ongoing program to retrofit all remaining non-complying Unreinforced Masonry (URM) buildings.	Work with owners of remaining potentially hazardous URM buildings to obtain structural analyses of their buildings and to undertake corrective mitigation measures to improve seismic resistance or to remove the buildings and replace them with safer buildings.	In Progress	Yes	The City continues to work with owners of remaining potentially hazardous URM buildings. As of July 2023, four buildings still need to be retrofitted.
Complete the ongoing program to retrofit all remaining non-complying Unreinforced Masonry (URM) buildings.	Apply available legal remedies, including but not limited to citations, to owners who fail to comply with the URM ordinance.	In Progress	Yes	The City continues to apply available legal remedies to owners who fail to comply with ordinance.

Action Description	Proposed Activities	Status	Carried Over to Plan Update	Comments
Monitor passage and implementation of mandatory seismic retrofit ordinances for concrete buildings in other jurisdictions to assess best practices.	Monitor mandatory seismic retrofit ordinances for concrete buildings passed by other municipalities for effectiveness and best practices	In Progress	Yes	The City continues to monitor mandatory seismic retrofit ordinates for concrete buildings.
Monitor passage and implementation of mandatory seismic retrofit ordinances for concrete buildings in other jurisdictions to assess best practices.	Communicate and collaborate with other cities and Structural Engineers Association of California (SEAOC) regarding implementation challenges and successes.	In Progress	Yes	The City continues to communicate and collaborate with other cities and SEAOC on implementation. The City is newly exploring the possibility of developing retrofit ordinances for rigid wall-flexible diaphragm and non-ductile concrete buildings.
Improve the disaster-resistance of the natural gas delivery system to increase public safety and to minimize damage and service disruption following a disaster.	Maintain a program to provide free automatic gas shutoff valves to community members who attend disaster readiness training. Provide subsidized permit fee waivers for low-income homeowners.	Completed with Modifications	No	The City completed the pilot gas valve shutoff incentive program. The City determined not to make program permanent due to extraordinarily high staff time requirements to manage program, along with low community participation and benefit.

Action Description	Proposed Activities	Status	Carried Over to Plan Update	Comments
Improve the disaster-resistance of the natural gas delivery system to increase public safety and to minimize damage and service disruption following a disaster.	Promote electrification of buildings, both existing buildings and new construction, to mitigate hazards associated with natural gas usage and the impacts of damage to infrastructure after a hazard occurs.	In Progress	Yes with updates	Berkeley City Council adopted a Prohibition of Natural Gas Infrastructure in New Construction Ordinance (2019) and the Berkeley Existing Building Electrification Strategy (2021) to support and guide this work. The Berkeley Emissions Saving Ordinance (BESO) was amended in 2020 to include building electrification assessments when buildings are sold, and upgrade requirements are being evaluated. The City continues to promote the benefits of building electrification, including the health and safety benefits. For example, through the City's Pilot Climate Equity Fund, the City is working with a group of community organizations representing disadvantaged communities to provide education and resilience benefits including around building electrification and is using the Fund to install building electrification features in the homes of low-income residents. The City is also partnering with local trades and workforce groups to promote and advance building electrification and high road jobs for contractors.
Reduce fire risk in existing development through fire code updates and enforcement.	Periodically update the Berkeley Fire Code and adopt the California Fire Code with local amendments to incorporate the latest knowledge and State regulations to protect people and property against known risks in both structural and non- structural building and site components.	Ongoing	Yes	Berkeley Fire Code was adopted with local amendment in 2023. The City will continue to monitor and update the Fire Code to incorporate the latest knowledge and State regulations.
Reduce fire risk in existing development through fire code updates and enforcement.	Evaluate Fire Prevention Division staffing necessary to adequately perform and enforce required inspections for both Annual and HFA inspections.	In Progress	No	The City has taken serveral action steps to improve staffing, increasing inspection staff in the Fire Prevention Division and creating the WUI Division. The WUI Division has an internship program to help with defensible space inspections.

Action Description	Proposed Activities	Status	Carried Over to Plan Update	Comments
Reduce fire risk in existing development through fire code updates and enforcement.	Consider expansion of the number of properties to be included in the Hazardous Fire Area inspection program.	Completed with Modifications	No	The concept of the Hazardous Fire Area has been replaced by the expanded WUI Enforcement Program, which includes Fire Zones 2 and 3 and 8,600 properties (many of which are multi-parcel).
Reduce fire risk in existing development through fire code updates and enforcement.	Explore possibility of a program to inspect vacant lots throughout the city.	Completed with Modifications	No	The City now will do vacant lot inspections as part of the WUI Enforcement Program in Fire Zones 2 and 3 annually. For Zone 1, inspections will be done on a complaint driven basis.
Reduce fire risk in existing development through fire code updates and enforcement.	Maintain Fire Department efforts to reduce fire risk through inspections: annual building inspections in all Fire Zones, Hazardous Fire Area Inspections, Multi-unit-residential building inspections in all Fire Zones.	Ongoing	Yes with updates	The Fire Department has replaced Hazardous Fire Area inspections with annual Defensible Space inspections in Zone 2 and 3. This includes home hardening evaluations and education.
Reduce fire risk in existing development through fire code updates and enforcement.	Evaluate inspection procedures and adjust inspection cycle annually based on changing climatic conditions.	Ongoing	Yes	The WUI Division has created 9 zones that include a hazards and climatic conditions analysis. The schedule of inspections is based on the climate and needs of each of the zones. This is revisited annually adjust for changing conditions. The work to enforce this is ongoing.
Reduce fire risk in existing development through fire code updates and enforcement.	Develop and enforce Fire Code requirement for fire fuel clearance on public roadways.	In Progress	Yes with updates	Developed the Fire Code requirement in July 2022. Enforcement is ongoing in Fire Zones 2 and 3. The City has applied for a grant to do more enforcement.
Reduce fire risk in existing development through fire code updates and enforcement.	Create a standard for written vegetation management plans for major construction projects in Fire Zones 2 and 3.	Completed with Modifications	No	The Plan Check Division has an initial draft completed. Since this work cannot be completed until there is guidance from the State Board of Forestry on Zone 0, this Action is considered completed with modifications for now.

Action Description	Proposed Activities	Status	Carried Over to Plan Update	Comments
Reduce fire risk in existing development through vegetation management.	Maintain Fire Fuel Chipper Program.	Ongoing	Yes with updates	As a result of the passage of Measure FF, a new brush chipping program started in the summer of 2023. The program is called Chipper Days and is now under the leadership of the Berkeley Fire Department.
Reduce fire risk in existing development through vegetation management.	Maintain Fire Fuel Abatement Program on Public Land	In Progress	Yes	The City continues to maintain this program in order to reduce fire fuel on public property. From May to mid-August each year, an average of 125 tons of debris are removed from approximately 98 public sites, including parks, roadways, and landscaped medians.
Reduce fire risk in existing development through vegetation management.	Maintain Fire Fuel Debris Bin Program	In Progress	Yes	The Fire Fuel Debris Bin Program is coordinated by the Department of Public Works' Zero Waste Division, which delivers and removes 30-yard roll-off boxes from requesting neighborhoods. This effort yields an average of 132 tons of plant debris per year.
Reduce fire risk in existing development through vegetation management.	Maintain Weekly Curbside Plant Debris Collection	In Progress	Yes	30,000 tons of residential and commercial plant debris and commercial food waste is collected each year through weekly curbside collection and converted to compost.
Reduce fire risk in existing development through vegetation management.	Pursue external funding to increase education and awareness of vegetation management standards for fire fuel reduction.	Ongoing	Yes with updates	The City continues to pursue external funding to increase education and awareness of vegetation management standards. The City has applied for multiple grants to support public education around Grizzly Peak as well as funding to clean up private parcels in Cerrito Canyon. In 2024 Plan, this Action is combined with related Action in row 38.
Reduce fire risk in existing development through vegetation management.	Work with partners and stakeholders to identify fire fuel reduction zones and to promote and facilitate removal of vegetation in those zones to mitigate fire spread.	Completed	No	The Community Wildfire Protection Plan identifies the fire fuel reduction zones and describe how the City will promote and facilitate removal of vegetation in those zones. The City will continue to evaluate these zones and the CWPP on an annual basis.

Action Description	Proposed Activities	Status	Carried Over to Plan Update	Comments
Reduce fire risk in existing development through vegetation management.	Pursue external funding to perform vegetation management on public and private property.	In Progress	Yes with updates	The City has applied for multiple grants to fund this work. In the 2024 Plan, this Action is combined with related Action in row 36.
Reduce fire risk in existing development through vegetation management.	Develop and enforce Fire Code requirement for fire fuel clearance on public roadways (see Fire Code action for details)	In Progress	Yes	Developed the Fire Code requirement in July 2022. Enforcement is ongoing in Fire Zones 2 and 3. The City has applied for a grant to do more enforcement.
Manage and promote pedestrian evacuation routes in Fire Zones 2 and 3.	Public Works Staff will maintain paths on an as-needed basis, and will coordinate with the Berkeley Path Wanderers to maintain public pathways to provide safe pedestrian evacuation routes from the hill areas.	Ongoing	Yes	Public Works Staff continues to maintain paths on an as needed basis coordinating with the Berkeley Pathwanderers.
Manage and promote pedestrian evacuation routes in Fire Zones 2 and 3.	Maintain signage for public pathways to identify safe and accessible pedestrian evacuation routes from the hill areas.	Ongoing	Yes	Public Works Staff continue to maintain signage for public pathways.
Manage and promote pedestrian evacuation routes in Fire Zones 2 and 3.	Update City maps of all emergency access and evacuation routes to include pedestrian pathways.	Completed	No	The City has worked with the Berkeley Path Wanderers to create a GIS map of Berkeley's pedestrian pathways. This map was included in the 2019 LHMP and the GIS layer remains available for use.
Manage and promote pedestrian evacuation routes in Fire Zones 2 and 3.	Publicize up-to-date maps of all emergency access and evacuation routes.	In Progress	Yes	The CWPP has up to date maps of emergency access and evacuation routes. The City continuously updates these maps and publishes them on the City website. The City also uses real-time evacuation maps with Zonehaven.

Action Description	Proposed Activities	Status	Carried Over to Plan Update	Comments
Improve responder access and community evacuation in Fire Zones 2 and 3 through roadway maintenance and appropriate parking restrictions.	Maintain and improve roadways in Fire Zones 2 and 3.	Ongoing	Yes	The City continues to maintain and improve roadways in Fire Zones 2 and 3. From 2019-2022 the City completed 3.78 miles in Zones 2 and 3. By the end of 2023, the City will complete 1.52 miles in Zone 2. The City plans to complete 11.64 miles in Zone 2 from 2024-2028.
Improve responder access and community evacuation in Fire Zones 2 and 3 through roadway maintenance and appropriate parking restrictions.	Maintain community-driven process to identify and consider areas for parking restrictions and red curbing.	Completed with Modifications	No	The City has contracted to complete an Evacuation Time Study, which includes a robust public outreach process, to understand what restrictions may promote a safer and more efficient evacuation of residents during unsafe fire conditions. The results of the study will inform what actions are taken next such as parking restrictions, so this action is considered completed for now.
Improve responder access and community evacuation in Fire Zones 2 and 3 through roadway maintenance and appropriate parking restrictions.	Explore options for comprehensive parking restrictions in Fire Zones 2 and 3 during Red Flag and/or Extreme Fire Weather conditions.	In Progress	Yes	The City has contracted to complete an Evacuation Time Study, which includes a robust public outreach process, to understand what restrictions may promote a safer and more efficient evacuation of residents during unsafe fire conditions. The wording of this action has been updated for 2024.
Improve responder access and community evacuation in Fire Zones 2 and 3 through roadway maintenance and appropriate parking restrictions.	Develop and enforce Fire Code requirement for fire fuel clearance on public roadways (see Fire Code action for details)	In Progress	Yes with updates	Developed the Fire Code requirement in July 2022. Enforcement is ongoing in Fire Zones 2 and 3. The City has applied for a grant to do more enforcement.
Reduce the potential threat of overhead utility wires in the Berkeley Hills.	Construction of undergrounding in the Berkeley Hills within UUD No. 48 (portions of Grizzly Peak Blvd., Summit Rd., Avenida Dr., Fairlawn Dr., and Senior Ave.)	In Progress	Yes	This undergrounding project is under construction, estimated to be completed in three years.
Reduce the potential threat of overhead utility wires in the Berkeley Hills.	Construction of undergrounding of overhead utility wires within UUD No. 35A (Vistamont Ave., Rochdale Way, and Rosemont Ave from Woodmont Ave. to Vistamont Ave.)	Deleted	No	Due to lack of funding, there has been no progress on this action since 2019. However, the City continues to explore funding options for additional undergrounding projects.

Action Description	Proposed Activities	Status	Carried Over to Plan Update	Comments
Reduce the potential threat of overhead utility wires in the Berkeley Hills.	Construction of undergrounding of overhead utility wires on Bayview Place	Deleted	No	Due to lack of funding, there has been no progress on this action since 2019. However, the City continues to explore funding options for additional undergrounding projects.
Reduce the potential threat of overhead utility wires in the Berkeley Hills.	Complete the Phase 3 undergrounding study spearheaded by the Undergrounding Subcommittee in collaboration with Public Works Department, Fire Department, and Public Works Commission. This is a citywide study to underground overhead wires on arterial and collector streets as a component of maintaining ingress and egress on roads during a major disaster.	Completed	No	The City completed the Phase 3 Undergrounding Study in February 2020.
Reduce the potential threat of overhead utility wires in the Berkeley Hills.	Explore other strategies, including funding mechanisms, for reducing the potential threats of overhead utility wires	In Progress	Yes	The City continues to explore other strategies, funding and otherwise, to reduce the thread of overhead utilities.
Work with EBMUD to ensure an adequate water supply during emergencies and disaster recovery.	Coordinate with EBMUD regarding plans to install a new 48-inch aqueduct by 2020 to be able to continue potable and firefighting water supply following a seismic event.	Completed	No	The major portion of the Wildcat Aqueduct project is complete in Berkeley. In winter 2023-2024 EBMUD will be installing a valve and pipe at Colusa and Marin, which is the second and final phase.
Work with EBMUD to ensure an adequate water supply during emergencies and disaster recovery.	Explore project approaches with EBMUD to expedite replacement of problem pipelines in Berkeley neighborhoods exposed to wildland-urban interface fire and seismic ground failure.	Completed	No	EBMUD has a process in place to prioritize and replace pipelines.

Action Description	Proposed Activities	Status	Carried Over to Plan Update	Comments
Work with EBMUD to ensure an adequate water supply during emergencies and disaster recovery.	Coordinate with EBMUD to ensure that pipeline replacement projects and upgrades are coordinated with the City's five-year street paving program and other City programs.	Completed	No	The City meets with EBMUD quarterly to ensure coordination on pipeline replacement projects and upgrades are in alignment with the City's programs.
Reduce Berkeley's vulnerability to extreme heat events and associated hazards.	Monitor and support regional and State-level efforts to forecast the impact of climate change on temperatures and incidence of extreme heat events in Berkeley and the region, and integrate extreme heat event readiness, focusing on the most vulnerable populations impacted and improving access to resources, into City operations and services.	In Progress	Yes	The City has been monitoring the latest science related to extreme heat, including studies conducted by Alameda County. The City of Berkeley has been coordinating both internally within multiple departments, as well as externally with regional, national and international entities to learn and develop effective extreme heat planning measures, focusing on the most vulnerable populations. The City is participating in a regional extreme heat planning group being coordinated by UC Berkeley.
Reduce Berkeley's vulnerability to extreme heat events and associated hazards.	Continue to create and maintain shading by maintaining the health of existing trees and sustaining municipal tree planting with a focus on efforts in areas where there are fewer trees.	Ongoing	Yes	The City has secured state grants to expand tree planting in lower canopied areas while still planting trees elsewhere. The City continues the effort to plant the right tree for the location in order to provide maximum environmental and social benefits while limiting negative impacts to the surrounding infrastructure and existing trees. This includes tree placement in relation to inhabited structures, shade and wind breaks around recreational areas, and adjacent to paved roads and parking lots.
Reduce Berkeley's vulnerability to extreme heat events and associated hazards.	Continue to implement energy efficiency ordinances for existing residential and commercial buildings to improve building comfort, including in extreme weather conditions, and to reduce energy use.	Ongoing	Yes	The City continues to promote and implement energy efficiency in buildings including assuring compliance with Berkeley's Energy and Green Building Codes (adopted in 2022). Energy efficiency measures will also be incorporated in low-income homes that are part of the City's Climate Equity Fund and Just Transition Residential Electrification Pilot Programs.

Action Description	Proposed Activities	Status	Carried Over to Plan Update	Comments
Reduce Berkeley's vulnerability to extreme heat events and associated hazards.	Encourage cooling strategies for the built environment through voluntary programs to mitigate the urban heat island effect. This can include strategies like green roofs, cool roofs, and cool pavements, increased vegetation, as well as electric heat pumps and natural ventilation which can provide cooling to buildings in an extreme heat event.	Ongoing	Yes with updates	The spirit of this action continues in three new actions in the 2024 document.
Mitigate hazardous materials release in Berkeley through inspection and enforcement programs.	Implement the following programs: ~Hazardous Materials Release Response Plans and Inventories (HMRRP) Program ~Implement California Accidental Release Prevention (CalARP) Program ~Underground Storage Tank (UST) Program Aboveground Petroleum Storage Act Requirement for Spill Prevention ~Hazardous Waste Generator and Onsite Hazardous Waste Treatment Programs ~Implement Hazardous Materials Management Plans (HMMP) and Hazardous Materials Inventory Statements per California Fire Code	Ongoing	Yes	The Toxic Management Division continues to maintain these inspection and enforcement programs to mitigate hazardous materials release in Berkeley.
Mitigate hazardous materials release in Berkeley through inspection and enforcement programs.	Enforce California Fire Code for Hazardous Materials Compliance (See Fire Code Action)	Ongoing	Yes	Improved Fire Prevention staffing level is improving ability to review and enforce hazardous materials storage and use conditions. New staff also includes individuals that have hazardous materials enforcement experience.

Action Description	Proposed Activities	Status	Carried Over to Plan Update	Comments
Define clean air standards for buildings during poor air quality events and use those standards to assess facilities for the Berkeley community.	Participate in regional efforts to define standards and tools to predict buildings' ability to deliver clean air to occupants during poor air quality events.	Completed with Modifications	No	Air Quality Index levels of health concern have been established byt the Bay Area Air Quality Management District.
Define clean air standards for buildings during poor air quality events and use those standards to assess facilities for the Berkeley community.	Apply standards and tools to assess City facilities' ability to provide clean air to occupants during poor air quality events.	Completed with Modifications	No	Since 2019, air filters have been installed into HVAC systems at many City sites, and portable air filters have been distributed to many other sites.
Define clean air standards for buildings during poor air quality events and use those standards to assess facilities for the Berkeley community.	Coordinate with willing Berkeley partners to apply standards and tools to partner facilities.	Completed with Modifications	No	Using a grant from the Bay Area Air Quality Management District, the City received and distributed air cleaners to City libraries and recreation centers for use during poor air quality days.
Define clean air standards for buildings during poor air quality events and use those standards to assess facilities for the Berkeley community.	Use findings to develop a list of potential clean air facilities (City-run and partner-run) to the community.	Completed with Modifications	No	Designated sites are communicated during poor air quality events.
Maintain City participation in the National Flood Insurance Program.	Continue to use the most current FEMA information defining flood areas.	Ongoing	Yes	The City keeps the Berkeley Municipal Code Chapter 17.12: Flood Zone Development Ordinance consistent with the FEMA National Flood Insurance Program requirements.
Maintain City participation in the National Flood Insurance Program.	Continue to incorporate FEMA guidelines and suggested activities into City plans and procedures for managing flood hazards.	Ongoing	Yes	The City performs the suggested actions by keeping the Berkeley Municipal Code Chapter 17.12: Flood Zone Development Ordinance consistent with FEMA National Flood Insurance Program requirements.

Action Description	Proposed Activities	Status	Carried Over to Plan Update	Comments
Collect, analyze and share information with the Berkeley community about Berkeley hazards and associated risk reduction techniques.	Track changes in hazard risk using the best-available information and tools.	Ongoing	Yes	The Office of Emergency Services continues to trck changes in hazard risk by conducting research and consulting with subject matter experts.
Collect, analyze and share information with the Berkeley community about Berkeley hazards and associated risk reduction techniques.	Collect and share up-to-date hazard maps identifying areas subject to heightened risk from hazards.	Ongoing	Yes	The Office of Emergency Services continues to provide updated hazard maps online and in the Local Hazard Mitigation Plan.
Collect, analyze and share information with the Berkeley community about Berkeley hazards and associated risk reduction techniques.	Publicize financial and technical assistance resources for risk reduction.	Ongoing	Yes	The Office of Emergency Services and other City Departments publicize technical assistance resources on the City website as its available.
Coordinate with and encourage mitigation actions of key City partners.	Coordinate with and encourage mitigation actions of: • Institutions serving the Berkeley community • Berkeley organizations and nonprofits • Other partners whose actions affect the Berkeley community	Ongoing	Yes	City staff connect and collaborate with a variety of nonprofits to encourage and support both ongoing preparedness and mitigation actions. Through the Community Resilience Center Program and Apartment Resilience Center Program, City staff maintain connections with organizations serving marginalized populations in Berkeley. The City regularly shares information about upcoming mitigation opportunities with participating organizations.
Reduce Berkeley's vulnerability to severe storms and associated hazards through proactive research and planning, zoning regulations, and improvements to stormwater drainage facilities.	Use development standards to ensure that new development does not contribute to an increase in flood potential.	Ongoing	Yes	Land Use Planning Division, Building and Safety Division, Office of Energy and Sustainable Development, and Department of Public Works coordinate efforts to ensure stormwater management best practices are followed.

Action Description	Proposed Activities	Status	Carried Over to Plan Update	Comments
Reduce Berkeley's vulnerability to severe storms and associated hazards through proactive research and planning, zoning regulations, and improvements to stormwater drainage facilities.	Complete the Watershed Management Plan to recommend improvements to problem areas in individual watersheds. Develop a Stormwater Master Plan to perform hydraulic analysis and condition assessment, and identify flow capacity and flooding issues as basis for the Watershed Management Plan.	In Progress	Yes with updates	The City has begun development of the Stormwater Master Plan, to be completed at the end of 2025. The Stormwater Master Plan will identify deficiencies in the City's stormwater system, prioritize capital improvement projects, identify funding needs, develop City specific drainage design standards, and update maintenance and inspection plans for stormwater facilities. The Stormwater Master Plan is a new assessment that will provide an updated assessment of the Potter and Codornices Watersheds, as well as the other watersheds not included in the 2011 Watershed Management Plan.
Reduce Berkeley's vulnerability to severe storms and associated hazards through proactive research and planning, zoning regulations, and improvements to stormwater drainage facilities.	Design public improvements such as streets, parks and plazas, for retention and infiltration of stormwater by diverting urban runoff to bio- filtration systems.	Ongoing	Yes	The City has installed Green Infrastructure facilities at five locations. The City is also in the process of daylighting Codornices Creek at Kains Avenue to increase channel volume, in order to minimize potential flooding.
Implement energy assurance strategies at critical facilities.	Identify potential actions to mitigate energy assurance vulnerabilities at critical City facilities during planning/conceptual design of both retrofits and new construction.	In Progress	Yes	The City continues to identify ways to mitigate energy assurance vulnerabilities. Currently, the City is exploring solar and battery-operated energy systems.
Implement energy assurance strategies at critical facilities.	Provide guidance to help the City consider opportunities to design, finance and implement clean energy assurance strategies (e.g., photovoltaic-supplemented generation, energy efficiency activities, and/or mobile charging stations).	In Progress	Yes	The City is currently in the process of contracting with East Bay Community Energy (EBCE) to install solar + storage at several critical municipal facilities, as well as several electric vehicle DC Fast Chargers for public charging. The City is also in process of installing EV charging stations for City fleet vehicles.

Action Description	Proposed Activities	Status	Carried Over to Plan Update	Comments
Implement energy assurance strategies at critical facilities.	Work with partners to identify additional non-City critical facilities and develop strategies to provide clean backup power at these sites.	In Progress	Yes	The City of Berkeley is working through its Community Resilience Center (CRC) program to understand backup power needs at critical community sites. The Office of Energy and Sustainable Development is evaluating funding opportunities that could support clean backup power at CRCs and/or other critical community sites.
Mitigate climate change impacts by integrating climate change research and adaptation planning into City operations and services.	Determine staffing needs to monitor research and oversee integration of climate change adaptation into City operations and services	Completed	No	Staff is working within current staffing capacity to advance integration of climate change adaptation into City operations and services.
Mitigate climate change impacts by integrating climate change research and adaptation planning into City operations and services.	Develop and implement a process to integrate adaptation planning into City operations including ways to address potential climate impacts in municipal capital and land use planning.	In Progress	Yes with updates	Training on climate change was provided to City staff. The City is including climate change considerations in its municipal capital projects (such as T1 bond), and included climate change considerations in its Housing Element update. The City will also be including climate change considerations in its forthcoming General Plan Safety Element Update and new Environmental Justice Element.
Mitigate the impacts of sea level rise in Berkeley.	Monitor and participate in regional and State-level research on projected sea-level rise in Berkeley and the region.	Completed	No	The City has conducted a sea level rise study for the Marina area, and continues to stay apprised of regional and state-level research on sea-level rise, including as a member of the Bay Area Climate Adaptation Network.
Mitigate the impacts of sea level rise in Berkeley.	Develop guidelines, regulations, and review development standards to ensure new and existing public and private developments and infrastructure are protected from floods due to sea-level rise.	Ongoing	Yes with updates	The Land Use Division of the Planning Department manages the permitting process for new development and conditions projects to ensure that it does not contribute to an increase in flood potential due to sea-level rise.

Action Description	Proposed Activities	Status	Carried Over to Plan Update	Comments
Collaborate with partners to increase the security of Berkeley's water supply from climate change impacts.	Partner with East Bay Municipal Utility District (EBMUD) to provide and market incentives for residents, businesses and institutions to conserve water.	Completed	No	The City has promoted and will continue to promote EBMUD incentives.
Collaborate with partners to increase the security of Berkeley's water supply from climate change impacts.	Partner with agencies such as EBMUD and StopWaste to encourage private property owners and public agencies (including the City government) to use sustainable landscaping techniques that require less water and energy to maintain.	Ongoing	Yes	The City continues to implement the State of California's Water Efficient Landscaping Ordinance (WELO) in partnership with relevant agencies such as EBMUD and StopWaste.
Collaborate with partners to increase the security of Berkeley's water supply from climate change impacts.	Encourage water efficiency and conservation in existing buildings, such as incorporating water assessments into existing policies or creating a compliance program for SB407.	Ongoing	Yes	The City continues to encourage water efficiency and conservation in buildings, through requiring a certificate of compliance that water-conserving plumbing fixtures have installed when a property is undergoing additions, alterations, or improvements. Additional opportunities for promoting or requiring water, and energy, efficiency in existing are being monitored.
Mitigate Berkeley's tsunami hazard.	Continue to fund and replace damaged finger docks.	In Progress	Yes	The City continues to fund and replace damaged finger docks on an going basis as needed. Since 2019, the City has used City funds and grant funds in total of $1.2 million to replace damaged finger docks.
Mitigate Berkeley's tsunami hazard.	Secure funding for replacement of D and E docks; begin the permitting process once funding is secure	In Progress	Yes	PRW received approval for a loan from the General Fund to replace D and E docks. The project is scheduled to break ground in 2024-2025.
Mitigate Berkeley's tsunami hazard.	Begin the permitting process for piling replacement.	Completed	No	Compromised pilings throughout the Marina have been replaced.
Mitigate Berkeley's tsunami hazard.	Repair University Avenue, Marina Boulevard, and Spinnaker Way in order to mitigate tsunami vulnerabilities.	Completed with Modifications	No	Roads have been rebuilt to modern-day standards and are now more likely to withstand tsunami impacts than before.

Action Description	Proposed Activities	Status	Carried Over to Plan Update	Comments
Mitigate Berkeley's tsunami hazard.	Collaborate with the California Office of Emergency Services, the California Geological Survey, and the Federal Emergency Management Agency to document and explore additional tsunami hazard mitigation measures for Berkeley's maritime communities.	Ongoing	Yes	The City regularly collaborates with external partners to explore additional tsunami mitigation measures.
Streamline the zoning permitting process to rebuild residential and commercial structures following disasters.	Explore a Zoning Amendment to BMC 23C.04.100 that streamlines the Zoning permitting process to allow damaged industrial and commercial buildings, and dwelling units to rebuild by right following disasters.	Deleted	No	Due to limited capacity, no progress has been made since 2019, but the activity is still relevant. The City has updated the language of this Action for the 2024 LHMP to clarify next steps.
Streamline the zoning permitting process to rebuild residential and commercial structures following disasters.	Consider different treatment for buildings in high-risk areas.	Deleted	No	Due to limited capacity, no progress has been made since 2019, but the activity is still relevant. The City has updated the language of this Action for the 2024 LHMP to clarify next steps.
Streamline the zoning permitting process to rebuild residential and commercial structures following disasters.	Define the standard for documentation of current conditions for residential and commercial property owners to rebuild by right (in conformity with current applicable codes, specifications and standards) following disasters.	Deleted	No	Due to limited capacity, no progress has been made since 2019, but the activity is still relevant. The City has updated the language of this Action for the 2024 LHMP to clarify next steps.
Streamline the zoning permitting process to rebuild residential and commercial structures following disasters.	Define the process for the City to accept and file this documentation.	Deleted	No	Due to limited capacity, no progress has been made since 2019, but the activity is still relevant. The City has updated the language of this Action for the 2024 LHMP to clarify next steps.
Streamline the zoning permitting process to rebuild residential and commercial structures following disasters.	Outreach to property owners about this documentation process.	Deleted	No	Due to limited capacity, no progress has been made since 2019, but the activity is still relevant. The City has updated the language of this Action for the 2024 LHMP to clarif next steps.

Action Description	Proposed Activities	Status	Carried Over to Plan Update	Comments
Streamline the zoning permitting process to rebuild residential and commercial structures following disasters.	Evaluate location of essential public facilities prior to rebuild in order to prioritize development outside high-risk areas when feasible.	Deleted	No	Due to limited capacity, no progress has been made since 2019, but the activity is still relevant. The City has updated the language of this Action for the 2024 LHMP to clarify next steps.
Streamline the zoning permitting process to rebuild residential and commercial structures following disasters.	Explore how other cities provide protections for people that may be vulnerable during the rebuilding process.	Deleted	No	Due to limited capacity, no progress has been made since 2019, but the activity is still relevant. The City has updated the language of this Action for the 2024 LHMP to clarify next steps.

2024 Mitigation Strategy Actions

Action Description	Proposed Activities	Priority Level	Related Natural Hazard(s)	How would this benefit underserved communities and socially vulnerable populations?	Lead Office, Division, or Department	Funding Sources	Timeline
Advance equitable community resilience, with a focus on disadvantaged communities.	Work with community partners to co-create solutions to improve community resilience, including through the Climate Equity Collaborative.	High	Multi-hazard	The Climate Equity Collaborative represents underserved communities, and will directly benefit these communities through meaningful involvement to identify needs and priorities.	Planning Department: Office of Energy and Sustainable Development	Seed funding secured through the Climate Equity Fund Pilot ($100,000 for the Climate Equity Collaborative)	Ongoing
Advance equitable community resilience, with a focus on disadvantaged communities.	Develop General Plan Environmental Justice Element and update the existing Safety Element, with community-identified priorities related to climate adaptation.	High	Multi-hazard	Direct benefit through involvement to identify needs/solutions	Planning Department: Land Use Division Planning Department: Office of Energy and Sustainable Development	Funding obtained through a $497,042 Adaptation Planning Grant Program from the CA Governor's Office of Planning and Research. City General Fund and Enterprise Fund.	Short term (1-5 years)

Action Description	Proposed Activities	Priority Level	Related Natural Hazard(s)	How would this benefit underserved communities and socially vulnerable populations?	Lead Office, Division, or Department	Funding Sources	Timeline
Collaborate with partners to increase the security of Berkeley's water supply from climate change impacts.	Support EBMUD through the design and environmental review process to expand recycled water pipelines in Berkeley and increase the security of the water supply.	Low	Multi-hazard	Water security and efficiency will have financial benefits in addition to environmental benefits, especially for disadvantaged and/or low-income communities.	Public Works Department Planning Department: Office of Energy and Sustainable Development	Federal funding from Water Resources Development Act and EBMUD	Long term (5-10 years)
Collaborate with partners to increase the security of Berkeley's water supply from climate change impacts.	Continue to partner with agencies such as EBMUD and StopWaste to encourage private property owners and public agencies (including the City government) to use sustainable landscaping techniques that require less water and energy to maintain.	Low	Multi-hazard	Underserved communities are most impacted by climate change.	Planning Department: Office of Energy and Sustainable Development	City General Fund City Permit Service Center Fund City Enterprise Fund	Ongoing
Collaborate with partners to increase the security of Berkeley's water supply from climate change impacts.	Encourage water efficiency and conservation in existing buildings.	Low	Multi-hazard	Water efficiency and conservation will have financial benefits in addition to environmental benefits, especially for disadvantaged and/or low-income communities.	Planning Department: Office of Energy and Sustainable Development	City General Fund	Ongoing
Collect and share information with the Berkeley community about hazards and associated risk reduction techniques.	Create new formats and user-friendly guidance to educate the public, especially underserved populations, on Berkeley hazards.	High	Multi-hazard	Ensure that underserved communities have access to hazard information and materials.	Fire Department - Office of Emergency Services	City General Fund	Ongoing
Collect and share information with the Berkeley community about hazards and associated risk reduction techniques.	Provide key hazard information and best practices to Berkeley's business and arts community through established networks, for example by exploring opportunities for local business to share best practices and	High	Multi-hazard	Small businesses, arts organizations, and nonprofits often serve socially vulnerable populations. Small businesses and cultural institutions themselves run on small margins and are especially vulnerable to shocks and stresses.	City Manager's Office - Office of Economic Development	City General Fund	Ongoing

Action Description	Proposed Activities	Priority Level	Related Natural Hazard(s)	How would this benefit underserved communities and socially vulnerable populations?	Lead Office, Division, or Department	Funding Sources	Timeline
	resources during utility interruptions.						
Complete the ongoing program to retrofit all remaining non-complying Unreinforced Masonry (URM) buildings.	Continue to work with owners of remaining potentially hazardous URM buildings.	High	Earthquake	Multi-unit housing is more affordable and serves a large percentage of socially vulnerable and underserved communities. Inspections help to ensure the safety of this housing stock.	Planning Department: Building and Safety Division	Hazard Mitigation Grant Program (HMGP)	Ongoing
Continue appropriate seismic and fire safety analysis based on current and future use for all City-owned facilities and structures.	Continue analysis of structures supporting critical emergency response and recovery functions, and make recommendations for structural and nonstructural improvements.	High	Multi-hazard	City facilities and structures serve socially vulnerable populations day to day and during emergencies.	Public Works Department: Supervising Civil Engineer for Facilities	City General Fund T1 Bond	Ongoing
Continue implementation of the Soft Story Retrofit Program, which mandates seismic retrofit of soft story buildings with 5+ residential units.	Continue to inform impacted property owners of the requirement to seismically retrofit their buildings, including newly added properties to the soft story inventory.	High	Earthquake	Multi-unit housing is more affordable and serves a large percentage of socially vulnerable and underserved communities. Inspections help to ensure the safety of this housing stock.	Planning Department: Building and Safety Division	Hazard Mitigation Grant Program (HMGP)	Ongoing
Continue to implement the Retrofit Grants Program, which helps Berkeley building owners increase safety and mitigate the risk of damage caused by earthquakes.	Assist participating property owners with the grant process, including dissemination of program rules and guidelines and approving design and disbursement construction grants.	High	Earthquake	Multi-unit housing is more affordable and serves a large percentage of socially vulnerable and underserved communities. Inspections help to ensure the safety of this housing stock.	Planning Department: Building and Safety Division	Hazard Mitigation Grant Program (HMGP)	Ongoing

Action Description	Proposed Activities	Priority Level	Related Natural Hazard(s)	How would this benefit underserved communities and socially vulnerable populations?	Lead Office, Division, or Department	Funding Sources	Timeline
Continue to monitor passage and implementation of mandatory seismic retrofit ordinances for concrete buildings in other jurisdictions to assess best practices.	Continue to monitor mandatory seismic retrofit ordinances for concrete buildings passed by other municipalities for effectiveness and best practices. Communicate and collaborate with other cities and Structural Engineers Association of California (SEAOC) regarding implementation challenges and successes.	High	Earthquake	Multi-unit housing is more affordable and serves a large percentage of socially vulnerable and underserved communities. Inspections help to ensure the safety of this housing stock.	Planning: Building and Safety Program and Administration Manager	City General Fund	Ongoing
Coordinate regional wildfire mitigation strategies with key partners and stakeholders	Coordinate local fire mitigation, prevention, and funding strategies with the East Bay Hills Wildfire Prevention Coordination Group	High	WUI Fire	Wildfires disproportionately impacts people with access and functional needs and collaborating with local partners helps reduce wildfire risks.	Fire Department - WUI Division	City General Fund Measure FF	Ongoing
Coordinate regional wildfire mitigation strategies with key partners and stakeholders	Coordinate regional efforts to mitigate wildfire risk in the Oakland - Berkeley hills through the Hills Emergency Forum	High	WUI Fire	Wildfires disproportionately impacts people with access and functional needs and collaborating with local partners helps reduce wildfire risks.	Fire Department - WUI Division	City General Fund Measure FF	Ongoing
Coordinate with and encourage mitigation actions of key City partners.	Coordinate with and encourage mitigation actions of institutions serving the Berkeley community.	High	Multi-hazard	Benefits institutions serving the Berkeley community.	Fire Department: Office of Emergency Services	City General Fund Measure GG	Ongoing

Action Description	Proposed Activities	Priority Level	Related Natural Hazard(s)	How would this benefit underserved communities and socially vulnerable populations?	Lead Office, Division, or Department	Funding Sources	Timeline
Implement energy assurance strategies at critical facilities.	Identify potential actions to mitigate energy assurance vulnerabilities at critical City facilities during planning/conceptual design of both retrofits and new construction.	Medium	Multi-hazard Utility Interruption	City facilities and structures serve socially vulnerable populations day to day and during emergencies.	Public Works Department: Supervising Civil Engineer (Facilities)	CIty General Fund T1 Bond Measure GG Ratepayer funds from PG&E East Bay Community Energy Grants from Energy Foundation Urban Sustainability Directors Network California Energy Commission California Air Resources Board	Ongoing
Implement energy assurance strategies at critical facilities.	Provide guidance to help the City consider opportunities to design, finance and implement clean energy assurance strategies (e.g., photovoltaic-supplemented generation, energy efficiency activities, and/or mobile charging stations).	Medium	Multi-hazard Utility Interruption	Clean energy assurance solutions could provide backup and critical power benefit underserved communities who wouldn't otherwise have access to power during an emergency.	Planning Department: Office of Energy and Sustainable Development	City General Fund	Ongoing
Implement energy assurance strategies at critical facilities.	Work with partners to identify additional non-City critical facilities and develop strategies to provide clean backup power at these sites.	Medium	Multi-hazard Utility Interruption	By working with organizations serving disadvantaged communities to help advance their energy assurance, this would directly benefit both underserved organizations and community members served by these organizations.	Planning Department: Office of Energy and Sustainable Development	City General Fund	Ongoing
Implement existing City programs, plans, and projects designed to reduce emissions that contribute to poor air quality.	Continue to implement the traffic safety capital construction projects identified and prioritized in the Berkeley Pedestrian Plan (2021), Berkeley Bicycle Plan (2017), Berkeley Vision Zero Action Plan (2020), and Berkeley Transit-First Implementation Plan; these projects are	Medium	Extreme Heat Poor Air Quality	Poor air quality disproportionately impacts communities of color, and South and West Berkeley.	Public Works Department - Transportation Division	City General Fund County Transportation Sales Tax	Ongoing

Action Description	Proposed Activities	Priority Level	Related Natural Hazard(s)	How would this benefit underserved communities and socially vulnerable populations?	Lead Office, Division, or Department	Funding Sources	Timeline
	intended to encourage non-driving modes						
Implement existing City programs, plans, and projects designed to reduce emissions that contribute to poor air quality.	Continue to implement the City's Electric Mobility Road Map which includes electric shared mobility (bikes and scooters) as well as electric and hybrid car-sharing, and the installation of public charging stations.	Medium	Extreme Heat Poor Air Quality	Poor air quality disproportionately impacts communities of color, and South and West Berkeley.	Public Works Department - Transportation Division	City General Fund County Transportation Sales Tax	Ongoing
Implement existing City programs, plans, and projects designed to reduce emissions that contribute to poor air quality.	Transportation program coordination with transit providers, Berkeley Unified School District (Safe Routes to Schools), Berkeley Police Department (Vision Zero), and others, to promote transit efficiency and traffic safety for non-driving modes.	Medium	Extreme Heat Poor Air Quality	Poor air quality disproportionately impacts communities of color, and South and West Berkeley.	Public Works Department - Transportation Division	City General Fund County Transportation Sales Tax	Ongoing
Improve responder access and community evacuation in Fire Zones 2 and 3 through roadway maintenance and appropriate parking restrictions.	Continue to enforce Fire Code requirement for fire fuel clearance on public roadways.	High	WUI Fire	Wildfires disproportionately impact people with access and functional needs and enforcing the Fire Code reduces risks.	Fire Department: WUI Division	Measure FF	Ongoing
Improve responder access and community evacuation in Fire Zones 2 and 3 through roadway maintenance and appropriate parking restrictions.	With multiple agency partners, clear hazardous vegetation along 45 roadways in Fire Zone 2 protecting evacuation routes.	High	WUI Fire	Evacuation is more difficult for people with disabilities and people with access and functional needs.	Fire Department: WUI Division	Measure FF Cal Fire Grant	Ongoing

Action Description	Proposed Activities	Priority Level	Related Natural Hazard(s)	How would this benefit underserved communities and socially vulnerable populations?	Lead Office, Division, or Department	Funding Sources	Timeline
Improve responder access and community evacuation in Fire Zones 2 and 3 through roadway maintenance and appropriate parking restrictions.	Develop process to increase parking enforcement in fire-vulnerable areas during fire weather.	High	WUI Fire	Evacuation is more difficult for people with disabilities and people with access and functional needs.	Fire Department: Office of the Fire Chief Public Works Department: Transportation Division Police Department: Traffic Division	Measure FF	Ongoing
Improve responder access and community evacuation in Fire Zones 2 and 3 through roadway maintenance and appropriate parking restrictions.	Maintain and improve roadways in Fire Zones 2 and 3.	High	WUI Fire	Evacuation is more difficult for people with disabilities and people with access and functional needs.	Public Works Department: Supervising Civil Engineer	City General Fund	Ongoing
Maintain City participation in the National Flood Insurance Program.	Continue to use the most current FEMA information defining flood areas.	High	Flood	Flooding disproportionally impacts in South and West Berkeley.	Public Works Department: Manager of Engineering	City General Fund Permit Service Center Enterprise Fund Measure M Bond Funds Building Resilient Infrastructure and Communities (BRIC) Grant Program Hazard Mitigation Grant Program (HMGP)	Ongoing
Maintain City participation in the National Flood Insurance Program.	Continue to incorporate FEMA guidelines and suggested activities into City plans and procedures for managing flood hazards.	High	Flood	Flooding disproportionally impacts in South and West Berkeley.	Planning Department: Land Use Division	City General Fund Permit Service Center Enterprise Fund Measure M Bond Funds Building Resilient Infrastructure and Communities (BRIC) Grant Program Hazard Mitigation Grant Program (HMGP)	Ongoing

Action Description	Proposed Activities	Priority Level	Related Natural Hazard(s)	How would this benefit underserved communities and socially vulnerable populations?	Lead Office, Division, or Department	Funding Sources	Timeline
Maintain City programs and projects to mitigate the impacts of infectious diseases in Berkeley.	Continue surveillance and epidemiology, which is the ongoing collection, analysis, interpretation, and sharing of data in order to prevent and control disease.	High	Infectious Disease	In Alameda County, communities of color face inequitable conditions that increase the risk of chronic diseases	Health, Housing & Community Services Department, Public Health Officer Unit, Public Health Division	Public Health Emergency Preparedness Grants Future of Public Health Grant City General Fund	Ongoing
Maintain City programs and projects to mitigate the impacts of infectious diseases in Berkeley.	Implement non-pharmaceutical interventions, like personal protective measures such as masks and communitywide measures such quarantining, aimed at reducing exposure.	High	Infectious Disease	In Alameda County, communities of color face inequitable conditions that increase the risk of chronic diseases	Health, Housing & Community Services Department, Public Health Officer Unit, Public Health Division	Public Health Emergency Preparedness Grants	Ongoing
Manage and promote pedestrian evacuation routes in Fire Zones 2 and 3.	Publicize up-to-date maps of all emergency access and evacuation routes.	High	WUI Fire	Evacuation is more difficult for people with disabilities and people with access and functional needs.	Department of Information Technology: GIS Division- GIS Coordinator Fire: OES- Emergency Services Coordinator	City General Fund	Ongoing
Manage and promote pedestrian evacuation routes in Fire Zones 2 and 3.	Maintain signage for public pathways to identify safe and accessible pedestrian evacuation routes from the hill areas.	High	WUI Fire	Evacuation is more difficult for people with disabilities and people with access and functional needs.	Public Works Department: City Traffic Engineer	City General Fund	Ongoing
Manage and promote pedestrian evacuation routes in Fire Zones 2 and 3.	Public Works Staff will maintain paths on an as-needed basis, and will coordinate with the Berkeley Path Wanderers to maintain public pathways to provide safe pedestrian evacuation routes from the hill areas.	High	WUI Fire	Ensure that people with access and functional needs can use the pedestrian paths.	Public Works Department: Assistant Public Works Engineer	City General Fund	Ongoing
Manage and promote pedestrian evacuation routes in Fire Zones 2 and 3.	Install handrails on all public pathways, prioritizing areas with high usage and steep inclines to increase pedestrian safety and accessibility.	High	WUI Fire	Ensure that people with access and functional needs can use the pedestrian paths.	Public Works Department - Traffic Engineering	City General Fund	Short term (1-5 years)

Action Description	Proposed Activities	Priority Level	Related Natural Hazard(s)	How would this benefit underserved communities and socially vulnerable populations?	Lead Office, Division, or Department	Funding Sources	Timeline
Mitigate Berkeley's tsunami hazard at the Berkeley Marina.	Continue to repair and replace damaged finger docks at the Berkeley Marina. Complete the demolition and replacement of D&E docks. Consider reconstruction or repair to J docks as funding becomes available.	Low	Tsunami	10% of Marina boaters have a permit to live aboard their vessels. Many of these boaters are low-income.	Parks, Recreation, and Waterfront Department: Waterfront Division	T1 State Coastal Conservancy City General Fund Marina Fund Building Resilient Infrastructure and Communities (BRIC) Grant Program Hazard Mitigation Grant Program (HMGP) City General Fund City-Issued Bonds	Ongoing
Mitigate Berkeley's tsunami hazard at the Berkeley Marina.	Collaborate with the California Office of Emergency Services, the California Geological Survey, and the Federal Emergency Management Agency to document and explore additional tsunami hazard mitigation measures for Berkeley's maritime communities.	Low	Tsunami	10% of Marina boaters have a permit to live aboard their vessels. Many of these boaters are low-income.	Fire Department: Office of Emergency Services Parks, Recreation, and Waterfront Department: Waterfront Division	Building Resilient Infrastructure and Communities (BRIC) Grant Program Hazard Mitigation Grant Program (HMGP) City General Fund City-Issued Bonds	Ongoing
Mitigate climate change impacts by integrating climate change research and adaptation planning into City operations and services.	Develop and implement a process to integrate adaptation planning into City operations, including ways to address climate impacts in municipal capital and land use planning.	Low	Multi-hazard	Underserved communities are most impacted by climate change.	Planning Department: Office of Energy and Sustainable Development	City General Fund	Ongoing

Action Description	Proposed Activities	Priority Level	Related Natural Hazard(s)	How would this benefit underserved communities and socially vulnerable populations?	Lead Office, Division, or Department	Funding Sources	Timeline
Mitigate hazardous materials release in Berkeley through inspection and enforcement programs.	Implement the following programs: ~Hazardous Materials Release Response Plans and Inventories (HMRRP) Program ~Implement California Accidental Release Prevention (CalARP) Program ~Underground Storage Tank (UST) Program Aboveground Petroleum Storage Act Requirement for Spill Prevention ~Hazardous Waste Generator and Onsite Hazardous Waste Treatment Programs ~Implement Hazardous Materials Management Plans (HMMP) and Hazardous Materials Inventory Statements per California Fire Code	High	Multi-hazard Hazardous Materials Release	Hazardous materials are located in south and west Berkeley.	Planning Department: Toxics Division	City General Fund	Ongoing
Mitigate hazardous materials release in Berkeley through inspection and enforcement programs.	Enforce California Fire Code for Hazardous Materials Compliance (See Fire Code Action)	High	Multi-hazard Hazardous Materials Release	Hazardous materials are located in south and west Berkeley.	Fire Department: Fire Prevention Division	City General Fund	Ongoing
Mitigate hazards associated with natural gas usage, including disaster damage and energy service disruption, by minimizing need for energy use and moving toward use of electricity in lieu of natural gas.	Promote energy efficiency and electrification of buildings, both existing buildings and new construction.	High	Multi-hazard	City funds are targeted at underserved populations.	Planning Department: Office of Energy and Sustainable Development	City General Fund	Ongoing

Action Description	Proposed Activities	Priority Level	Related Natural Hazard(s)	How would this benefit underserved communities and socially vulnerable populations?	Lead Office, Division, or Department	Funding Sources	Timeline
Mitigate impacts of sea level rise	Continue to ensure new and existing public and private developments and infrastructure are protected from floods due to sea-level rise through the permitting process for new development and conditions.	Medium	Sea Level Rise	Waterfront provides many free and low-cost recreational amenities for the community and is adjacent to lower-income communities in South and West Berkeley, which historically had fewer parks and less green space.	Planning Department: Land Use Division	City General Fund	Ongoing
Mitigate impacts of sea level rise	Identify funding and nature-based solutions to adapt to sea level rise at Berkeley Waterfront areas at risk of future inundation at the shoreline at the north segment of Marina Blvd between the Virginia Street Extension and the entrance to Cesar Chavez Park.	Medium	Sea Level Rise	Waterfront provides many free and low-cost recreational amenities for the community and is adjacent to lower-income communities in South and West Berkeley, which historically had fewer parks and less green space.	Parks, Recreation, and Waterfront Department	State Coastal Conservancy Grant	Short term (1-5 years)
Mitigate impacts of sea level rise	Identify funding and nature-based solutions to adapt to sea level rise at Berkeley Waterfront areas at risk of future inundation at the shoreline to the south of University Avenue between West Frontage Road and Marina Blvd.	Medium	Sea Level Rise	Waterfront provides many free and low-cost recreational amenities for the community and is adjacent to lower-income communities in South and West Berkeley, which tend to have fewer parks and green space.	Parks, Recreation, and Waterfront Department	FHWA PROTECT Discretionary Grant Program	Short term (1-5 years) (if FHWA grant received)
Mitigate impacts of sea level rise	Identify funding and nature-based solutions to adapt to sea level rise at Berkeley Waterfront areas at risk of future inundation at the northeast corner of the inner harbor of the Marina.	Medium	Sea Level Rise	Waterfront provides many free and low-cost recreational amenities for the community and is adjacent to lower-income communities in South and West Berkeley, which tend to have fewer parks and green space.	Parks, Recreation, and Waterfront Department	Adapting to Rising Tides, San Francisco Bay Conservation & Development Commission, National Oceanic & Atmospheric Administration, Urban Sustainability Director's Network, or Resource Legacy Fund	Long term (5-10 years)

Action Description	Proposed Activities	Priority Level	Related Natural Hazard(s)	How would this benefit underserved communities and socially vulnerable populations?	Lead Office, Division, or Department	Funding Sources	Timeline
Mitigate impacts of sea level rise	Conduct a groundwater study on impacts of groundwater rise combined with sea level rise on underground toxic materials	Medium	Sea Level Rise	There is a risk of underground toxic materials shifting as groundwater and sea level rise, impacting those nearby. This study will shed light on potential impacts, on places such as West Berkeley which has s a history of industrial use and environmental pollution, and is also where many low-income and disadvantaged communities live.	Planning Department: Office of Energy and Sustainable Development	This work is included in the funding obtained through a $497,042 Adaptation Planning Grant Program from the CA Governor's Office of Planning and Research	Short term (1-5 years)
Mitigate wildfire risk to Berkeley's overnight camps.	Analyze fire risk at overnight camps and identify appropriate mitigation actions.	Medium	WUI Fire	The Berkeley overnight camps offer opportunities for recreations for people with access and functional needs and people with low incomes.	Fire Department - WUI Division Parks, Recreation, and Waterfront Department	Measure FF	Short term (1-5 years)
Reduce Berkeley’s vulnerability to extreme heat events and associated hazards.	Continue to seek out funding to use cool paving materials on streets when feasible to reduce urban heat island impacts.	Medium	Extreme heat	Urban heat island effects are more prominent in the Berkeley flats, which are more paved and less vegetated, and which is where more underserved communities live.	Planning Department: Office of Energy and Sustainable Development	State grants from Office of Planning and Research	Ongoing
Reduce Berkeley’s vulnerability to extreme heat events and associated hazards.	Continue to implement energy efficiency ordinances for existing residential and commercial buildings to improve building comfort, including in extreme weather conditions, and to reduce energy use.	Medium	Extreme heat	Extreme heat in places with bad ventilation or uncomfortable conditions impact the health and wellbeing of elderly and disabled populations.	Planning Department: Office of Energy and Sustainable Development	City General Fund	Ongoing

Action Description	Proposed Activities	Priority Level	Related Natural Hazard(s)	How would this benefit underserved communities and socially vulnerable populations?	Lead Office, Division, or Department	Funding Sources	Timeline
Reduce Berkeley's vulnerability to extreme heat events and associated hazards.	Encourage passive and energy-efficient strategies to cool buildings such as natural ventilation, shading, insulation, cool roofs, whole-house fans, and heat pump HVAC systems.	Medium	Extreme heat	Extreme heat in places with bad ventilation or uncomfortable conditions impact the health and wellbeing of elderly and disabled populations.	Planning Department: Office of Energy and Sustainable Development	City General Fund	Ongoing
Reduce Berkeley's vulnerability to extreme heat events and associated hazards.	Monitor and support regional and State-level efforts to forecast the impact of climate change on temperatures and incidence of extreme heat events in Berkeley and the region, and integrate extreme heat event readiness, focusing on the most vulnerable populations impacted and improving access to resources, into City operations and services.	Medium	Extreme Heat	Low income populations have less access to resources and readiness. Extreme heat impacts the flats due to urban heat island effect, and there is a large low-income population living in the flats.	Fire Department: Office of Emergency Services Planning Department: Office of Energy and Sustainable Development	City General Fund	Ongoing
Reduce Berkeley's vulnerability to extreme heat events and associated hazards.	Continue Urban Forestry Unit's tree maintenance and planting programs to increase canopy coverage for extreme heat events to provide shade and mitigate impacts from poor air quality.	Medium	Extreme Heat Poor Air Quality	Reduces heat island effect, mitigates through carbon sequestration	Parks, Recreation, and Waterfront Department - Parks Division - Urban Forestry Unit	Parks Tax State of CA Environmental Enhancement and Mitigation Project Grant State of CA Urban Greening Grant Urban and Community Forestry Grants through the Inflation Reduction Act	Short term (grant-funded efforts will be completed by end of FY27) and ongoing
Reduce Berkeley's vulnerability to severe storms and associated hazards through proactive research and planning, zoning regulations, and improvements	Use development standards to ensure that new development does not contribute to an increase in flood potential.	Medium	Flood	Flooding disproportionally impacts in South and West Berkeley.	Planning Department: Land Use Division	City General Fund	Ongoing

Action Description	Proposed Activities	Priority Level	Related Natural Hazard(s)	How would this benefit underserved communities and socially vulnerable populations?	Lead Office, Division, or Department	Funding Sources	Timeline
to stormwater drainage facilities.							
Reduce Berkeley's vulnerability to severe storms and associated hazards through proactive research and planning, zoning regulations, and improvements to stormwater drainage facilities.	Design public improvements such as streets, parks and plazas, for retention and infiltration of stormwater by diverting urban runoff to bio-filtration systems.	Medium	Flood	Flooding disproportionally impacts in South and West Berkeley.	Public Works: Engineering	City General Fund Permit Service Center Enterprise Fund Measure M Bond Funds Building Resilient Infrastructure and Communities (BRIC) Grant Program Hazard Mitigation Grant Program (HMGP)	Ongoing
Reduce Berkeley's vulnerability to severe storms and associated hazards through proactive research and planning, zoning regulations, and improvements to stormwater drainage facilities.	Renovate all eight tide tubes that remove storm water from Berkeley Aquatic Park and Potter Street to the Bay.	Medium	Flood	Flooding disproportionally impacts in South and West Berkeley.	Parks, Recreation, and Waterfront Department	Promoting Resilient Operations for Transformative, Efficient, and Cost-saving Transportation Program (PROTECT) Grant Parks Tax	Medium Term (3-5 years)
Reduce Berkeley's vulnerability to severe storms and associated hazards through proactive research and planning, zoning regulations, and improvements to stormwater drainage facilities.	Complete a Stormwater Master Plan for all City stormwater infrastructure, to identify system deficiencies, establish a capital stormwater improvement plan, and identify funding mechanisms.	Medium	Flood	Flooding disproportionally impacts in South and West Berkeley.	Public Works: Engineering	City Stormwater Fund ($1.5M) City General Fund ($400k)	Short term (1-5 years)
Reduce fire risk in existing development through fire code updates and enforcement.	Continue to evaluate inspection procedures and adjust inspection cycle annually based on changing climatic conditions.	High	WUI Fire	Wildfires disproportionately impact people with access and functional needs and ensuring inspections are up to date reduces risk.	Fire Department - WUI Division	Measure FF	Ongoing
Reduce fire risk in existing development through fire code updates and enforcement.	Maintain Fire Department efforts to reduce fire risk through inspections through annual building inspections in all Fire Zones, including Multi-	High	WUI Fire	Multi-unit housing is more affordable and serves a large percentage of socially vulnerable and underserved communities. Inspections help to ensure the safety of this housing stock.	Fire Department: Fire Prevention Division	City General Fund UC Settlement Fund	Ongoing

Action Description	Proposed Activities	Priority Level	Related Natural Hazard(s)	How would this benefit underserved communities and socially vulnerable populations?	Lead Office, Division, or Department	Funding Sources	Timeline
	unit-residential building inspections.						
Reduce fire risk in existing development through fire code updates and enforcement.	Maintain Fire Department efforts to reduce fire risk through Defensible Space Inspections in Fire Zones 2 and 3.	High	WUI Fire	Provides career and workforce development in public safety for local youth.	Fire Department: WUI Division	Measure FF YouthWorks Program funds	Ongoing
Reduce fire risk in existing development through fire code updates and enforcement.	Continue YouthWorks pilot program to staff expansion of Defensible Space inspections in Fire Zones 2 and 3.	High	WUI Fire	Provides career and workforce development in public safety for local youth.	Fire Department - WUI Division	Measure FF Youth Works Program funds	Ongoing
Reduce fire risk in existing development through fire code updates and enforcement.	Continue to periodically update the Berkeley Fire Code and adopt the California Fire Code with local amendments to incorporate the latest knowledge and State regulations to protect people and property against known risks in both structural and non-structural building and site components.	High	WUI Fire	The Fire Code incorporates the latest knowledge in protecting the diverse buildings that house the Berkeley community.	Fire Department: Fire Prevention Division	City General Fund UC Settlement Fund Permit Service Center Enterprise Fund	Ongoing
Reduce fire risk in existing development through vegetation management.	Explore additional options to provide collaborative, citywide vegetation management on private and public property.	High	WUI Fire	Expand access to vegetation management.	Fire Department - WUI Division	Measure FF	Short term (1-5 years)
Reduce fire risk in existing development through vegetation management.	Maintain Weekly Curbside Plant Debris Collection	High	WUI Fire	Expand access to vegetation management.	Public Works Department: Zero Waste Division	City General Fund Refuse Fee	Ongoing

Action Description	Proposed Activities	Priority Level	Related Natural Hazard(s)	How would this benefit underserved communities and socially vulnerable populations?	Lead Office, Division, or Department	Funding Sources	Timeline
Reduce fire risk in existing development through vegetation management.	Pursue external funding to perform vegetation management on public and private property and to increase education and awareness of vegetation management standards for fire fuel reduction, home hardening, and ignition controls.	High	WUI Fire	Expand access to vegetation management.	Fire Department - WUI Division	Measure FF City General Fund	Ongoing
Reduce fire risk in existing development through vegetation management.	Maintain Fire Fuel Debris Bin Program	High	WUI Fire	Expand access to vegetation management.	Public Works Department: Zero Waste Division	City General Fund Refuse Fee	Ongoing
Reduce fire risk in existing development through vegetation management.	Maintain Fire Fuel Abatement Program on Public Land with technical assistance from WUI Division	High	WUI Fire	Expand access to vegetation management.	PRW: Senior Landscape Supervisor WUI Division	City General Fund Refuse Fee Measure FF	Ongoing
Reduce fire risk in existing development through vegetation management.	Continue to allocate UC Settlement Funding to do vegetation management projects on UC Berkeley properties.	High	WUI Fire	Expand access to vegetation management.	Fire Department - WUI Division	UC Settlement Fund	Ongoing
Reduce fire risk in existing development through vegetation management.	Maintain redesigned and expanded citywide fire fuel chipper program to provide curbside pickup, chipping, and disposal of vegetation material from residential properties.	High	WUI Fire	Expanded program provides access to vegetation management support to all City residents and is no longer limited.	Fire Department - WUI Division	Measure FF	Ongoing
Reduce fire risk in existing development through vegetation management.	Manage the Eucalyptus Understory Cleanup Program	High	WUI Fire	Expand access to vegetation management.	Fire Department - WUI Division	Measure FF	Short term (1-5 years)

Action Description	Proposed Activities	Priority Level	Related Natural Hazard(s)	How would this benefit underserved communities and socially vulnerable populations?	Lead Office, Division, or Department	Funding Sources	Timeline
Reduce fire risk through residential assistance program.	Continue to implement Resident Assistant Program pilot to provide home hardening materials and defensible space materials and instructions to low income residents in targeted high fire risk areas.	High	WUI Fire	Provides subsidized materials to residents at greatest risk of WUI fire.	Fire Department - WUI Division	Measure FF	Short term (1-5 years)
Reduce fire risk through utility undergrounding.	Urge PG&E to perform utility undergrounding in Berkeley's Very High Fire Hazard Severity Zone (VHFHSZ) to mitigate wildfire risk and limit evacuation and ingress obstruction. Coordinate efforts with the State of CA Public Utilities Commission, and elected officials.	High	WUI Fire Earthquake High Wind	Berkeley's Very High Fire Severity Zone has residents with access and functional needs that may have trouble evacuating in a wildfire.	Berkeley City Council	City General Fund	Short term (1-5 years)
Reduce hazard vulnerabilities for non-City-owned buildings throughout Berkeley.	Continue to periodically update and adopt the California Building Standards Code with local amendments to incorporate the latest knowledge and design standards to protect people and property against known seismic, fire, flood and landslide risks in both structural and non-structural building and site components.	High	Multi-hazard	Underserved communities live in old housing stock and multi-family buildings.	Planning Department: Building and Safety Division	City General Fund	Ongoing
Reduce hazard vulnerabilities for non-City-owned buildings throughout Berkeley.	Explain requirements and provide guidance to owners of potentially hazardous structures to facilitate retrofit, including owners participating in the Earthquake Brace and Bolt program, Earthquake Soft Story Program, and those applying for Transfer Tax rebates.	High	Multi-hazard	Underserved communities live in old housing stock and multi-family buildings.	Planning Department: Building and Safety Division Finance Department (for Transfer Tax applications and disbursement)	City General Fund	Ongoing

Action Description	Proposed Activities	Priority Level	Related Natural Hazard(s)	How would this benefit underserved communities and socially vulnerable populations?	Lead Office, Division, or Department	Funding Sources	Timeline
Reduce wildfire risk throughout Berkeley by implementing the Action Plan identified in the Community Wildfire Protection Plan (CWPP).	Implement the Action Plan in the CWPP.	High	WUI Fire	The CWPP has identified actions that support low income residents in conducting home hardening and vegetation management.	Fire Department: WUI Division	Measure FF Cal Fire Grants	Ongoing
Research, identify, and implement infrastructure improvements to facilitate emergency evacuation.	Complete implementation of the Evacuation and Response Time Study to identify necessary roadway safety improvements, along with prioritized roadways, to facilitate safe evacuation during emergency scenarios.	High	Multi-hazard	Evacuation is more difficult for people with disabilities and people with access and functional needs.	Fire Department	Measure FF	Short term (1-5 years)
Research, identify, and implement infrastructure improvements to facilitate emergency evacuation.	Complete evacuation analysis required by new State evacuation laws under SB99, AB747, and AB1409. Incorporate findings into the updated Safety Element of the General Plan.	High	Multi-hazard	Evacuation is more difficult for people with disabilities and people with access and functional needs.	Fire Department: Office of Emergency Services	Measure FF	Short term (1-5 years)
Streamline the zoning permitting process to rebuild residential and commercial structures following disasters.	Give priority to project applications that would rebuild to current standards following disasters.	Low	Multi-hazard	This makes it easier to rebuild post disaster, hopefully allowing for diverse populations to stay in Berkeley.	Planning Department: Land Use Division	City General Fund	Short term (1-5 years)
Strengthen or replace City buildings in the identified prioritized order as funding is available.	West Berkeley Service Center Old City Hall Veterans Memorial Building	High	Multi-hazard	City facilities and structures serve socially vulnerable populations day to day and during emergencies.	Public Works Department: Supervising Civil Engineer for Facilities	Building Resilient Infrastructure and Communities (BRIC) Grant Program Hazard Mitigation Grant Program (HMGP) City General Fund T1 Bond	Ongoing
Strengthen or replace City buildings in the identified prioritized order as funding is available.	Continue to seek funding to seismically strengthen or replace additional City buildings in a prioritized order.	High	Multi-hazard	City facilities and structures serve socially vulnerable populations day to day and during emergencies.	Public Works Department: Supervising Civil Engineer for Facilities	Building Resilient Infrastructure and Communities (BRIC) Grant Program Hazard Mitigation Grant Program (HMGP) City General Fund T1 Bond	Ongoing

Action Description	Proposed Activities	Priority Level	Related Natural Hazard(s)	How would this benefit underserved communities and socially vulnerable populations?	Lead Office, Division, or Department	Funding Sources	Timeline
Strengthen or replace City buildings in the identified prioritized order as funding is available.	MLK Junior Youth Services Center, Williard Clubhouse, African American Holistic Resource Center.	High	Multi-hazard	The Center operates a lot of free programs for the Berkeley community.	Parks, Recreation, and Waterfront Department	City General Fund T1 Bond Parks Tax	Short term (1-5 years)
Evaluate potential land use controls impacts on emergency services	Ensure that Fire Department staff have the opportunity to review any proposed revisions to land use controls that would increase allowed densities, evaluate how the revised land use controls could impact the provision of emergency services, and convey that information to City Council prior to final action.	High	Multi-hazard	Ensure that the provision of emergency services to underserved and socially vulnerable populations doesn't decline.	Fire Department Planning Department: Land Use Planning	City General Fund	Ongoing

Other Actions Considered

Action Description	Proposed Activities	Priority Level	Related Natural Hazard(s)	How would this benefit underserved communities and socially vulnerable populations?	Lead Office, Division, or Department	Funding Sources	Timeline	Notes
Reduce fire risk in existing development through vegetation management.	Explore options for developing a City-run hand crew to implement vegetation management projects on public and private property.	High	WUI Fire	Expand access to vegetation management. Potential workforce development opportunity people who were formerly incarcerated.	Fire Department - WUI Division	Measure FF	Long Term	Action considered but for longer time than in the next five years.
Reduce fire risk through community-focused education, training, and fire code updates.	Conduct multi-unit-residential building inspections in all Fire Zones.	High	WUI Fire	Lower income people live in multi-residential-unit housing.	Fire Department - Fire Prevention	General Fund	Ongoing	Goal, but need more capacity

Action Description	Proposed Activities	Priority Level	Related Natural Hazard(s)	How would this benefit underserved communities and socially vulnerable populations?	Lead Office, Division, or Department	Funding Sources	Timeline	Notes
Reduce fire risk through community-focused education, training, and fire code updates.	Using community volunteers, through WUI Ambassador Program, to educate people city-wide on vegetation management, home hardening, and defensible space.	High	WUI Fire	Expand access to educational programs and reach people who would not otherwise receive information.	Fire Department - WUI Division	Measure FF	Short term (1-5 years)	Pilot program in 2023-24, need to evaluate what next steps might be
Reduce fire risk through community-focused education, training, and fire code updates.	Conduct annual building inspections in all Fire Zones.	High	WUI Fire		Fire Department - Fire Prevention	General Fund	Ongoing	Goal, but need more capacity
Advance opportunities for water reuse.	Research and support opportunities to advance purple pipe implementation.	Medium	Multi-hazard	Increases the security of Berkeley's water supplies from climate change impacts for all residents	Planning and Public Works	EBMUD is expected to fund	2024-2030 (estimated)	Goal, but not the top of the priority list
Reduce Berkeley's vulnerability to extreme heat events and associated hazards.	Tree planting/urban forestry program	High	Poor Air Quality, Extreme Heat	Reduces heat island effect, mitigates through carbon sequestration	Parks and Rec	In progress; needs PRW vetting and input	In progress; needs PRW vetting and input	Some new actions included around urban forestry, but room to build out more capacity in the future
Reduce flood risk	Nature based solutions at shoreline	Medium	Flooding	Underserved communities are most likely to live in/near areas that would be impacted	Public Works and Parks	Needs PRW/PW vetting and input	Needs PRW/PW vetting and input	Some new actions included around nature-based solutions on the shoreline, but room to build out more capacity in the future
Implement existing City programs, plans, and projects designed to reduce emissions that contribute to poor air quality.	Continue to manage on-street parking and maintain City parking garages to reduce emissions by making it easier to find a parking space more quickly (reducing the time spent circling around looking for parking).	Air Quality	Extreme Heat, Poor Air Quality	Poor air quality disproportionately impacts communities of color, and South and West Berkeley.	Public Works Department - Transportation Division	City funds, County Transportation Sales Tax, and Grant Funding	Ongoing	This is something that the City does and has infrastructure for, but not entirely sure the research is there that it helps reduce emissions. Further work to expand air quality mitigation measures for next round

Action Description	Proposed Activities	Priority Level	Related Natural Hazard(s)	How would this benefit underserved communities and socially vulnerable populations?	Lead Office, Division, or Department	Funding Sources	Timeline	Notes
Strengthen or replace City buildings in the identified prioritized order as funding is available.	South Berkeley Senior Center	High	Multihazard	The South Berkeley Senior Center serves South Berkeley, the area of Berkeley with higher numbers of people of color and low income residents.	Parks, Recreation, and Waterfront Department	CRC grant	Short term (1-5 years)	The City applied for a CRC grant to fund this effort, but was not awarded. New funding must be identified.

2024 Community Actions

Hazard	Action Type	Action	Cost	Time Commitment	Resources
Air Quality	Home Improvement	Replace or seal leaky windows and doors	High	High	https://www.csd.ca.gov/Pages/Low-Income-Weatherization-Program.aspx
Air Quality	Buy	Purchase equipment to clean air inside your home	Medium	Low	https://ww2.arb.ca.gov/list-carb-certified-air-cleaning-devices
Air Quality	Buy	Construct an air cleaner with a box fan and a filter	Low	Low	https://ww2.arb.ca.gov/resources/fact-sheets/indoor-air-cleaners-and-wildfire-smoke-faq-0
Air Quality	Stay updated	Be familiar with the Air Quality Index	None	Low	https://www.airnow.gov/aqi/aqi-basics/
Air Quality	Stay updated	Bookmark sites with key information, like AirNow.gov and Fire.AirNow.gov	None	Low	
Air Quality	Protect Yourself and Others	When there is poor air, stay indoors with the windows and doors closed	None	Low	
Air Quality	Learn	Know the signs that you or those around you need clean air	None	Low	https://www.epa.gov/ozone-pollution-and-your-patients-health/patient-exposure-and-air-quality-index
Earthquake	Home Improvement	Secure your home by storing heavy and breakable objects on low shelves	None	Low	

Hazard	Action Type	Action	Cost	Time Commitment	Resources
Earthquake	Home Improvement	Secure your home by securing bookshelves to the wall	Low	Low	
Earthquake	Home Improvement	Move beds and sitting areas away from windows	None	Low	
Earthquake	Home Improvement	Move or secure hanging objects away fro beds, sofas, and chairs	Low	Low	
Earthquake	Home Improvement	Use quake gel to secure breakable items in place	Low	Low	
Earthquake	Home Improvement	Assess your home by hiring an engineer and checking building permits	Medium	Medium	
Earthquake	Home Improvement	Retrofit your home if needed	High	High	
Earthquake	Home Improvement	Understand available grants for seismic retrofits	None	Low	https://berkeleyca.gov/construction-development/seismic-safety/funding-seismic-retrofits
Earthquake	Buy	Consider purchasing earthquake insurance	High	Low	
Earthquake	Buy	Store water for a week (7 gallons per person)	Medium	Low	
Earthquake	Learn	Practice what to do in an earthquake (drop, cover, and hold on)	None	Low	
Earthquake	Learn	Learn how to turn off gas, electricity, and water at your house.	None	Low	
Extreme Heat	Buy	Gather supplies to keep yourself cool, including ice, spray bottle, and personal fan.	Low	Low	
Extreme Heat	Home Improvement	Plan to keep your home cool on days without air conditioning.	Medium	Low	https://www.youtube.com/watch?v=4BLfYtE4Kow
Extreme Heat	Make a Plan	Decide where you will go and how you will get there if it gets too hot.	None	Low	Malls, stores, and community cooling centers usually have air conditioning.
Extreme Heat	Volunteer	Check on friends, family, and neighbors.	None	Medium	
Flood	Protect Yourself and Others	During a heat wave, drink plenty of water, wear loose, lightweight clothing, spray yourself with water	Low	Medium	
Flood	Volunteer	Protect your neighborhood and keep water flowing by	None	Medium	https://berkeleyca.gov/community-recreation/volunteering/adopt-drain

Hazard	Action Type	Action	Cost	Time Commitment	Resources
		participating in the adopt a drain program			
Flood	Home Improvement	Routinely clean and maintain gutters, downspouts, and splash blocks.	Medium	Medium	
Flood	Home Improvement	If stormwater does not drain away from building, change landscaping to improve runoff.	Medium	Medium	
Flood	Home Improvement	Implement lower cost projects to reduce your flooding risk	Medium	Medium	https://www.fema.gov/sites/default/files/documents/fema_protect-your-home-from-flooding-brochure_2020.pdf
Flood	Home Improvement	Elevate important items	None	Low	
Flood	Learn	How to sandbag and whether sandbags will be protective for your property	Low	Medium	https://www.cityofmadison.com/flooding/during-a-flood/how-to-sandbag
Flood	Protect Yourself and Others	Do not walk, swim, or drive through flood waters	None	Low	
High Wind	Home Improvement	Keep trees near your home properly maintained.	Medium	Medium	
High Wind	Home Improvement	Bring in or secure any loose outdoor items, such as holiday decorations an chairs.	None	Low	
High Wind	Protect Yourself and Others	During high winds, if you must be outdoors, keep your distance from trees	None	Low	
High Wind	Protect Yourself and Others	During high winds, avoid driving, especially in high profile vehicles.	None	Low	
Landslides	Home Improvement	Have flexible pipe fittings installed to avoid gas or water leaks, as flexible fittings are more resistant to breakage.	Medium	Medium	Note, only PG&E or other professionals should install gas fittings
Landslides	Learn	If you learn you're in an area susceptible to landslides (Berkeley hills generally), familiarize yourself with landslide warning signs.	None	Low	https://www.usgs.gov/programs/landslide-hazards/landslide-preparedness#:~:text=assistance%20to%20evacuate.-,Evacuate.,if%20escape%20is%20not%20possible
Landslides	Buy	Consider a "Difference in Coverage" Insurance Policy to cover the gap in typical homeowner's insurance.	High	Low	

Hazard	Action Type	Action	Cost	Time Commitment	Resources
Tsunami	Learn	Understand Berkeley's tsunami inundation area to identify whether you might find yourself in the tsunami inundation zone	None	Low	
Tsunami	Learn	Know nature's warning signs of a near source tsunami	None	Low	Earthquake with ground shaking, loud ocean roar, quickly receding water
Tsunami	Stay updated	Be ready to act on tsunami alerts by signing up for AC Alert	None	Low	https://member.everbridge.net/453003085612570/login
Tsunami	Stay updated	Bookmark and get familiar with Berkeley's Emergency Map	None	Low	https://protect.genasys.com/search?z=15.664002727664615&latlon=37.867534308013134%2C-122.2869101
Tsunami	Stay updated	Get familiar with the test and emergency tones from Berkeley's Outdoor Warning System	None	Low	https://berkeleyca.gov/your-government/our-work/capital-projects/outdoor-warning-system-emergency-siren-network
Tsunami	Make a Plan	If you live in the inundation zone, make your household evacuation plan for tsunami.	None	Medium	Decide where you will go, what you will pack, how you will get there, and who can help
Tsunami	Make a Plan	If you are part of the maritime community, plan for your boat.	None	Medium	
Tsunami	Protect Yourself and Others	If you are part of the maritime community, prepare a go bag or backpack if you need to evacuate quickly.	Medium	Medium	
Tsunami	Protect Yourself and Others	If a tsunami alert is issued, monitor your phone, follow evacuation orders, and do not go towards the tsunami.	None	Low	
Utility Disruption	Buy	Have an emergency supply kit that includes water, food, medications, flashlights, batteries, important documents, and cash.	Medium	Medium	
Utility Disruption	Buy	Consider having a battery-powered portable charger	Varies	Medium	Depends on what kind of water you buy - some vessels are expensive, but last longer.
Utility Disruption	Buy	Store water for a week (7 gallons per person)	Medium	Low	
Utility Disruption	Make a Plan	Make a plan to stay safe and comfortable during power outages	Medium	High	

Hazard	Action Type	Action	Cost	Time Commitment	Resources
Utility Disruption	Make a Plan	Explore alternative sources of information and entertainment when internet access is unavailable	None	Medium	
Utility Disruption	Make a Plan	Make a backup communications plan with your family. Choose a meeting a place if you can't reach each other.	None	Medium	
Utility Disruption	Make a Plan	Make sure PG&E can reach you and alert you to an outage by calling 1-800-743-5000 and updating your contact information.			
Utility Disruption	Home Improvement	Modify your toilet to collect waste without flushing or use a five-gallon bucket	Medium	Medium	
Utility Disruption	Protect Yourself and Others	Know the location of your circuit breakers and fuse boxes and how to check them	None	Low	
Wildfire	Home Improvement	If you're in Fire Zones 2 or 3, review your home's Defensible Space Report and follow the instructions on defensible space and home hardening.	Varies	Varies	
Wildfire	Home Improvement	Use the Free Chipper Day program to remove vegetation material from your property	None	Medium	https://www.chipperday.com/berkeley/
Wildfire	Home Improvement	Use guidance on BerkeleyFire.Com to harden your home and create defensible space	Varies	Varies	
Wildfire	Make a Plan	Make your household fire weather plan	None	High	https://berkeleyca.gov/sites/default/files/2022-02/berkeley-fire-weather-planning-tool.pdf
Wildfire	Protect Yourself and Others	Stay out of the hills on extreme fire weather days	Varies	Varies	https://berkeleyca.gov/sites/default/files/2022-02/berkeley-fire-weather-planning-tool.pdf
Wildfire	Protect Yourself and Others	Sign up for AC Alert to receive evacuation and other emergency notifications	None	Low	https://member.everbridge.net/453003085612570/login
Wildfire	Protect Yourself and Others	Bookmark the Berkeley Emergency Map	None	Low	https://protect.genasys.com/search?z=15.664002727664615&latlon=37.867534308013134%2C-122.2869101

Attachment 1: Documentation for State and Federal Reviewers

Documentation includes the following in this order in the PDF:

1. List of Core Project Team, City Staff, and Stakeholders
2. Core Project Team Meetings
    a. June 20, 2024
    b. August 2
        i. Slides
        ii. Attendance Photo
    c. August 29
        i. Slides
    d. September 12
        i. Slides
    e. November 6
        i. Notes
        ii. Attendance Photo
    f. February 8
        i. Notes
        ii. Attendance Photo
3. Public Engagement in the Planning Process
    a. Photos of the following events
        i. National Night Out
            1. Event photos
            2. Hazards of Concern Posters
        ii. Winter Weather Workshop
            1. Photos
            2. Slides
        iii. Tsunami Waterfront Event
            1. Photos
            2. Slides
    b. Stakeholder Engagement
        i. Emails
    c. Hazard Expert Engagement
        i. Emails
4. Key Commission and Council Presentations
    a. Disaster and Fire Safety Commission – September 27 (Plan is coming)
        i. Minutes
        ii. Presentation
    b. Planning Commission – October 4 (Plan is coming)
        i. Minutes
        ii. Presentation
    c. Planning Commission – June 5 (First Draft
        i. Minutes
        ii. Presentation
    d. Disaster and Fire Safety Commission – June 26 (First Draft)
        i. Minutes
        ii. Presentation
    e. Public Safety Committee – July 15 (First Draft)
        i. Minutes
        ii. Presentation

5. Public Review of First Draft Plan
    a. Website Screenshot
    b. City Newsletter
    c. Berkeley Ready Newsletter
    d. Social media
    e. News and media coverage
    f. City Manager Memos to Commission and City Council
    g. Stakeholder Engagement
        i. Emails for public comment
        ii. Received comments on First Draft Plan
    h. Public Review Workshops
        i. Photos of workshop
        ii. Poster boards from workshop
    i. YouTube Videos
        i. Slides
6. Summary of changes to First Draft Plan

List of people that were contacted to help draft the plan

City Staff

- Daniel Akagi, Supervising Civil Engineer, Public Works Department
- Joy Brown, Operations Manager, Public Works Department
- Jamie Cooney, Hazardous Materials Specialist, Planning Department
- Sean Crothers, Waterfront Supervisor, Parks, Recreation, and Waterfront Division
- Thomas Dodge, Forestry Technician, Parks, Recreation, and Waterfront Division
- Ali Endress, Waterfront Manager, Parks, Recreation, and Waterfront Division
- Makinde Falade, GIS Coordinator, Information Technology Department
- Lam Inthavong, Hazardous Materials Manager, Planning Department
- Leticia Jauregui, Solid Waste and Recycling Manager, Public Works Department
- Elmar Kapfer, Supervising Civil Engineer, Public Works Department
- David Lopez, Building Official, Building and Safety Division
- Jenny McNulty, Resilient buildings Program Manager, Building and Safety Division
- Rebecca Milliken, Sustainability Outreach Specialist, Office of Energy and Sustainable Development
- Hamid Mostowfi, Supervising Traffic Engineer, Public Works Department
- Srinivas Muktevi, Supervising Civil Engineer, Public Works Department
- Ron Nevels, Supervising Civil Engineer, Public Works Department
- Alene Pearson, Deputy Director of Planning and Development, Planning Department
- Ruth Raisner, Health Services Program Specialist, Public Health Emergency Preparedness and Immunization Program
- Billi Romain, Manager, Office of Energy and Sustainable Development
- Marna Schwartz, Sustainability Coordinator, Office of Energy and Sustainable Development
- Alisa Shen, Principal Planner, Planning Department
- Katharine Sullivan, COVID-19 Response Coordinator, Health, Housing, and Community Services
- Ron Torres, Division Manager, Environmental Health
- Katie Van Dyke, Chief Resilience Officer, Office of Energy and Sustainable Development

External Hazard Experts

- Jackie Bott, Engineering Geologist, California Geological Survey
- Sarah Church, Sustainability Project Manager, County of Alameda
- Brian Garcia, Warning Coordination Meteorologist, National Weather Service
- Eric Geist, Research Geophysicist, United States Geological Survey
- Nick Graehl, Engineering Geologist, California Geological Survey
- Anne Wein, Operations Research Analyst, United States Geological Survey
- Rick Wilson, Senior Engineering Geologist, California Geological Survey

Community Partners

- Ed Roberts Campus: a nonprofit formed by disability organizations that share a common history in the Independent Living Movement of People with Disabilities.

- Berkeley Youth Alternatives: a community-based organization dedicated to providing a secure and nurturing environment for children, you, and families.
- McGee Baptist Church
- La Peña Cultural Center: a place for Latinx, Caribbean, and Indigenous diasporic communities of the Bay Area to preserve and celebrate cultural traditions.
- YMCA Head Start Preschool
- Harriet Tubman Terrace Apartments
- Easy Does It: a non-profit that provides seniors and people with disabilities non-medical emergency services and other essential support to enable and enhance independent living.
- Oregon Park Senior Apartments
- Ecology Center
- Berkeley Humane
- Multicultural Institute: is a vibrant and diverse institution dedicated to promoting cultural understanding and appreciation in the community.
- Berkeley Pathwanderers: dedicated to the creation, preservation and restoration of public paths, steps and walkways in Berkeley for the use and enjoyment of all.
- Berkeley City College
- Bay Area Rapid Transit
- City of Oakland
- Alameda County Sheriff's Office - Office of Homeland Security and Emergency Services
- Lawrence Berkeley National Lab
- Kinder Morgan Corporation
- East Bay Municipal Utility District
- Union Pacific Railroad
- UC Berkeley
- Bayer
- Caltrans
- City of Albany
- City of Emeryville
- Union Pacific Railroad
- East Bay Regional Parks District
- Kensington Fire
- PG&E

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Local Hazard Mitigation Plan

Core Planning Team Meeting # 1
June 20, 2023

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Agenda

- Introductions
- What is Mitigation?
- What is the LHMP?
- Review and provide input on plan:
  - Hazards of concern
  - Goals
  - Mitigation Strategy – 2019 Actions and 2024 Actions
- Homework and Next Steps

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What is Mitigation?

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What is Mitigation?

- Two ways to deal with hazards:
  - Increase emergency *response* capability
  - **Increase actions taken to *reduce or eliminate the impacts* of future incidents**

- Mitigation is sustained actions:
  - To **reduce or eliminate long-term risks** to people and property from hazards and their effects
  - That provide **passive protection** at the time of disaster impact

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What is Mitigation?

- Mitigation is:
  - Strengthening structures
  - Making land use decisions that will minimize damage
  - Reducing vegetation in high-fire areas
  - Strapping down water heaters

- Mitigation is <u>not</u>:
  - Purchasing equipment to use in emergency response
  - Conducting drills
  - Disaster awareness programs
  - Storage of disaster supplies for post-disaster relief

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Local Hazard Mitigation Plan

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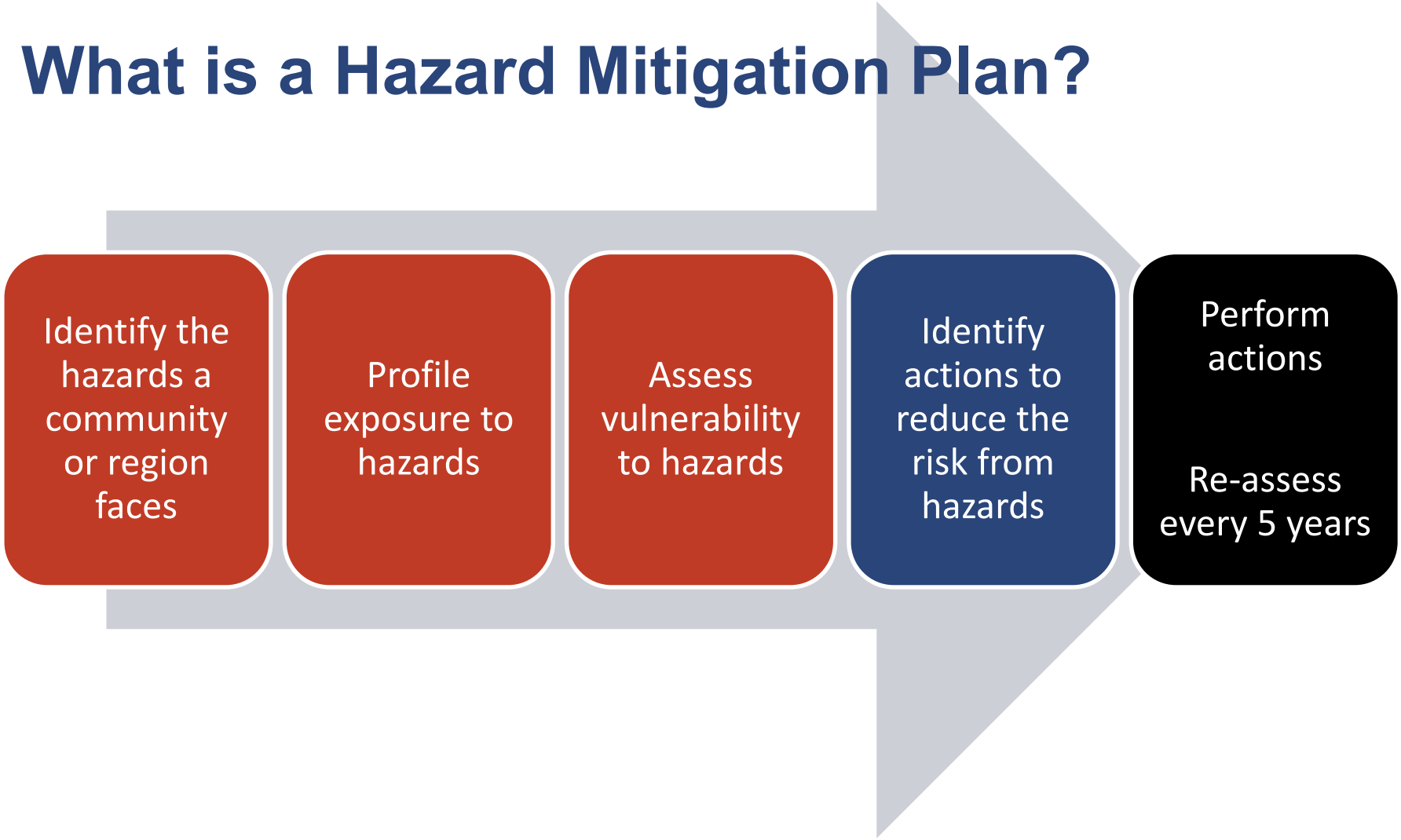
What is a Hazard Mitigation Plan?



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Why does this plan matter to Berkeley?

- Now: FEMA Grant Funding
  - Pre- and post-disaster
  - City has grant-funded projects completed, underway, and proposed

- In the next disaster: may reduce Berkeley's disaster recovery costs
  - Can eliminate the 6.25% local match requirement for the City of Berkeley to receive post-disaster public assistance from FEMA

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Activity	Timeline
Review and update Plan Seek input from public, key partners, stakeholders Produce *First Draft Plan*	*June – October 2023*
Seek input from public and Commissions Hold Council Work Session Present First Draft Plan to Disaster and Fire Safety Commission and Planning Commission (1st Public Hearing) Public Comment Period Open October - February	*October 2023 – January 2024*
Consider feedback and update plan as appropriate Produce *Final Draft Plan*	*February 2024 – April 2024*
Submit plan to Cal EMA/FEMA for review, comment and preliminary approval (est 5 months)	*April – August 2024*
Seek Adoption of approved *Final Draft Plan* by City Council (Plan's 2nd Public Hearing)	*November 2024*
Seek Final FEMA approval	*December 2024*

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Hazards of Concern

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Hazards of Concern (2019)

- Earthquake
- Wildland-Urban Interface (WUI) Fire
- Flood
- Landslide
- Tsunami
- Extreme Heat
- Hazardous Materials Release
- Climate Change
- (Terrorism)

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New Hazards of Concern in 2024?

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Mitigation Goals

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2019 LHMP

A. Reduce the potential for loss of life, injury and economic damage to Berkeley residents and businesses from earthquakes, wildfires, landslides, floods, tsunamis, climate change, extreme heat, and their secondary impacts.
B. Increase City government's ability to serve the community during and after hazardous events by mitigating risk to key City functions.
C. Connect with residents, community-based organizations, institutions, businesses, and essential lifeline systems in order to increase mitigation actions and disaster resilience in the community.
D. Preserve Berkeley's unique character and values from being compromised by hazardous events.
E. Protect Berkeley's historically underserved populations from the impacts of hazardous events by applying an equity lens, including equal access to mitigation efforts.

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Mitigation Strategy

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Mitigation Strategy Update Process

- OES will reach out to Department contacts to update status of 2019 mitigation actions, copying in you (spreadsheet)
  - Describe progress on actions
  - Remove completed or unworkable actions
- OES will circle back with you if we need help getting responses
- Next steps
  - Propose new actions for the 2024 Mitigation Strategy (July)
  - Prioritize actions in 2024 Mitigation Strategy (August)
  - Following initial public outreach process, re-prioritize actions as appropriate (September/October)

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Homework and Next Steps

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Homework and Next Steps

- Work with your Department Contacts to update current status of **2019 Actions**
- Work with your Department to Brainstorm new **Actions** for **2024 Mitigation Strategy.** Try to consider actions that benefit underserved communities. (Tab in the spreadsheet)
- ***Be Prepared to come to the July meeting ready to share at least 3 new Actions.***
- **Hazard Analysis Follow Up Meetings for:**
  - Building and Safety (Earthquake)
  - Office of Energy and Sustainability (Climate Change and Extreme Heat)
  - Public Works (Flooding)
  - Parks, Rec, and Waterfront (Tsunami)
  - Fire (Wildland-Urban Interface)

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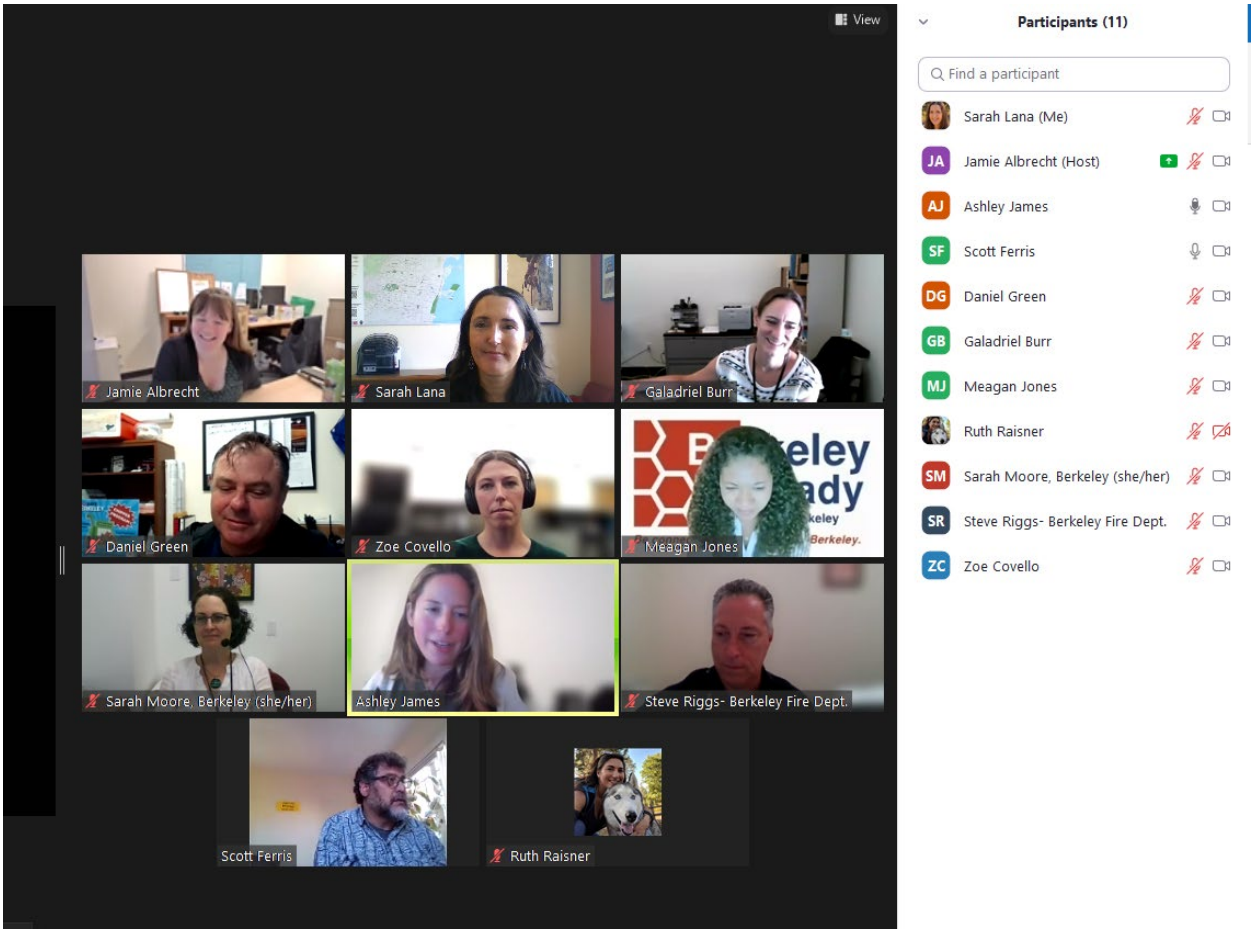
Upcoming Meetings

- Individual Department Hazard Analysis Meeting (June/July)
- July Core Team meeting
  - Confirm new hazards to include in the Plan
  - Mitigation Strategy
    - Propose new actions for 2019
  - Public Process
    - Overview and Planning
- Core Team meetings in August, September, and October

June 20, 2023 LHMP Core Team Screenshot

Attendees



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Local Hazard Mitigation Plan

Core Planning Team Meeting
August 2, 2023

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Agenda

- Mitigation Strategy
  - Finalize 2024 Goals and Objectives
  - Review 2019 actions
    - Celebrate completed actions
    - In progress actions become 2024 actions
  - Review what information we still need
- Public Process
  - Overview and Planning
- Hazard Analysis Updates and Review
- Homework and Next Steps

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Mitigation Goals (Second Draft)

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2024 Draft Mitigation Goals

A. Reduce the potential for loss of life, injury, environmental and economic damage to Berkeley residents and businesses from earthquakes, wildfires, landslides, floods, tsunamis, climate change, heat waves, poor air quality, infectious disease, utility disruption, and their secondary impacts.

B. Increase City government's ability to serve the community during and after hazard events by mitigating risk to key City functions.

C. Preserve Berkeley's unique character and values from being compromised by hazard events.

D. Connect with residents, community-based organizations, institutions, businesses, and essential lifeline systems in order to increase mitigation actions and disaster resilience in the community.

E. Protect Berkeley's historically underserved populations from the impacts of hazardous events by applying an equity focus to mitigation efforts.

   A. Protect Berkeley's underserved communities from the impacts of climate change and natural hazards by incorporating their needs and voices into mitigation planning and decision-making.

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Completed Mitigation Actions

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2019 Completed Actions

Mitigation Action	Activity	Related Hazards	Lead	Comments
Strengthen or replace City buildings in the identified prioritized order as funding is available.	Retrofit North Berkeley Senior Center	All	PW	This retrofit was completed in 2022.
Strengthen or replace City buildings in the identified prioritized order as funding is available.	Live Oak Community Center	All	PRW	This retrofit was completed in 2021.

2019 Completed Action

Mitigation Action	Activity	Related Hazards	Lead	Comments
Improve the disaster-resistance of the natural gas delivery system to increase public safety and to minimize damage and service disruption following a disaster.	Maintain a program to provide free automatic gas shutoff valves to community members who attend disaster readiness training. Provide subsidized permit fee waivers for low-income homeowners.	Earthquake	OES	The free automatic gas shutoff program ran as a pilot program and has concluded as of 2023.

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2019 Completed Actions

Mitigation Action	Activity	Related Hazards	Lead	Comments
Reduce fire risk in existing development through fire code updates and enforcement.	Consider expansion of the number of properties to be included in the Hazardous Fire Area inspection program.	WUI	Fire Department	The concept of the Hazardous Fire Area has been replaced by the expanded WUI Enforcement Program, which includes Fire Zones 2 and 3 and 8,600 properties (many of which are multi-parcel).
Reduce fire risk in existing development through fire code updates and enforcement.	Explore possibility of a program to inspect vacant lots throughout the city.	WUI	Fire Department	The City now will do vacant lot inspections as part of the WUI Enforcement Program in Fire Zones 2 and 3 annually. For Zone 1, inspections will be done on a complaint driven basis.

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2019 Completed Actions

Mitigation Action	Activity	Related Hazards	Lead	Comments
Reduce fire risk in existing development through vegetation management.	Maintain Fire Fuel Chipper Program.	WUI	PRW	As a result of the passage of Measure FF, a new brush chipping program started in the summer of 2023. The program is called Chipper Days and is now under the leadership of the Berkeley Fire Department.
Reduce fire risk in existing development through vegetation management.	Work with partners and stakeholders to identify fire fuel reduction zones and to promote and facilitate removal of vegetation.	WUI	Fire Department	The Community Wildfire Protection Plan identifies the fire fuel reduction zones and describes how the City will promote and facilitate removal of vegetation in those zones. The City will continue to evaluate these zones and the CWPP on an annual basis.
Reduce fire risk in existing development through fire code updates and enforcement.	Evaluate inspection procedures and adjust inspection cycle annually.	WUI	Fire Department	The WUI Division has created 9 zones that include a hazards and climatic conditions analysis. The schedule of inspections is based on the climate and needs of each of the zones. This is revisited annually adjust for changing conditions. The work to enforce this is ongoing.

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2019 Completed Actions

Mitigation Action	Activity	Related Hazards	Lead	Comments
Work with EBMUD to ensure an adequate water supply during emergencies and disaster recovery.	Explore project approaches with EBMUD to expedite replacement of problem pipelines.	WUI and EQ	PW	EBMUD has a process in place to prioritize and replace pipelines.
	Coordinate with EBMUD regarding plans to install a new 48-inch aqueduct by 2020 to be able to continue potable and firefighting water supply following a seismic event.	EQ and WUI	PW	The major portion of the Wildcat Aqueduct project is complete in Berkeley. In winter 2023-2024 EBMUD will be installing a valve and pipe at Colusa and Marin, which is the second and final phase.

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2019 Completed Actions

Mitigation Action	Activity	Related Hazards	Lead	Comments
Mitigate Berkeley's tsunami hazard.	Begin the permitting process for piling replacement.	Tsunami	PRW	Permitting and engineering process is complete and construction is underway. This project is scheduled to be finished in Fall 2023.
Mitigate Berkeley's tsunami hazard.	Repair University Avenue, Marina Boulevard, and Spinnaker Way in order to mitigate tsunami vulnerabilities.	Tsunami	PRW	Roads, including bioswales, bio retention have been repaired and rebuilt. Spinnaker Way has true grid permeable gravel parking to mitigate tsunami risk.

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In Progress Mitigation Actions

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2019 In Progress Actions

Mitigation Action	Activity	Related Hazards	Lead	Comments
Continue appropriate seismic and fire safety analysis based on current and future use for all City-owned facilities and structures.	Continue analysis of structures supporting critical emergency response and recovery functions, and make recommendations for structural and nonstructural improvements.	All	PW	The City continues to analyze structures that support critical functions and make recommendations for improvements. The City is about to embark on an Seismic Evaluation of 1947 Center Street.
	Continue to prioritize analysis of remaining structures based on occupancy and structure type, taking historic significance into consideration. Use analysis to make recommendations for structural and nonstructural improvements.	All	PW	The City continues to prioritize further analysis on non critical structures and make recommendations for improvements.
	Continue to integrate unsafe structures into a prioritized program for retrofit or replacement.	All	PW	The City continues to integrate unsafe structures into a prioritized program for retrofit or replacement.

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2019 In Progress Actions

Mitigation Action	Activity	Related Hazards	Lead	Comments
Strengthen or replace City buildings in the identified prioritized order as funding is available.	West Berkeley Service Center	All	PW	The West Berkeley Service Center is being strengthened with minor improvements and is currently in the design process.
	Old City Hall	All	PW	The City has completed Phase 1 of the Civic Center Vision Plan, which would re-envision Old City Hall and make it safe to use. Phase 2 starts in Summer 2023 to select a design and funding plan.
	Veterans Memorial Building	All	PW	The City has completed Phase 1 of the Civic Center Vision Plan, which would re-envision Veterans Memorial Building and make it safe to use. Phase 2 starts in Summer 2023 to select a design and funding plan.
	Seek funding to seismically strengthen or replace additional buildings.	All	PW	The City continuously looks for funding opportunities to strengthen or replace City buildings.

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2019 In Progress Actions

Mitigation Action	Activity	Related Hazards	Lead	Comments
Reduce hazard vulnerabilities for non-City-owned buildings throughout Berkeley.	Periodically update and adopt the California Building Standards Code with local amendments	All	Planning: Building and Safety	The City continues to update and adopt California Building Standards Code with local amendments every 18 months.
	Explain requirements and provide guidance to owners of potentially hazardous structures to facilitate retrofit, including owners participating in the Earthquake Brace and Bolt program, the Earthquake Soft Story (ESS) Program, and those applying for Transfer Tax rebates.	All	Planning: Building and Safety	The City continues to explain requirements and provide guidance to owners to facilitate retrofits. This action has changed slightly to add the Earthquake Soft Story (ESS) Program launched in April 2023 by the California Residential Mitigation Program.

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2019 In Progress Actions

Mitigation Action	Activity	Related Hazards	Lead	Comments
Implementation of the Retrofit Grants Program which helps Berkeley building owners increase safety and mitigate the risk of damage caused by earthquakes	Assist participating property owners with the grant process, including dissemination of program rules and guidelines.	All	Planning: Building and Safety	Current federal funding for the Retrofits Grant Program participants is available through late 2025. City staff continue to seek additional grant funding to implement future rounds of the program.
	Project Manager will: a. Respond to inquiries from owners, tenants, engineers and contractors about the grant program. b. Environmental and Historic Preservation Reviews (EHP) for specified projects. c. Review plan submittals for compliance. d. If more funding is secured, conduct outreach to property owners to offer additional Retrofit Grants to increase tenant safety.	All	Planning: Building and Safety	The City continues to implement the Retrofit Grants Program, following the activities listed.

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2019 ?Actions

Mitigation Action	Activity	Related Hazards	Lead	Comments
Continued Implementation of the Soft Story Retrofit Program, which mandates seismic retrofit of soft story buildings with 5+ residential units.	Continue to inform impacted property owners of the requirement to seismically retrofit their building	Earthquake	Planning: Building and Safety	The City continues to inform impacted property owners of requirements.
	Project manager will: a. Respond to inquiries from owners, tenants, engineers, contractors and realtors about the mandatory program, compliance procedures and requirements b. Review plan submittals for soft-story seismic retrofits c. Issue permits and perform field inspections d. Remove retrofitted buildings from the Soft-Story Inventory e. Review appeals to accommodate unique circumstances f. Enforce soft story ordinance.	Earthquake	Planning: Building and Safety	The City continues to implement the program, following the listed activities. As of July 2023, 277 buildings have completed their retrofit, 26 buildings still need to be retrofitted, and 61 buildings were removed from the inventory for other reasons. These reasons include: the building was determined to have fewer than 5-units or that a soft story condition was not present.

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2019 ?Actions

Mitigation Action	Activity	Related Hazards	Lead	Comments
Complete the ongoing program to retrofit all remaining non-complying Unreinforced Masonry (URM) buildings.	Work with owners of remaining potentially hazardous URM buildings to obtain structural analyses of their buildings and to undertake corrective mitigation measures to improve seismic resistance or to remove the buildings and replace them with safer buildings.	Earthquake	Planning: Building and Safety	The City continues to work with owners of remaining potentially hazardous URM buildings. As of July 2023, four buildings still need to be retrofitted.
	Apply available legal remedies, including but not limited to citations, to owners who fail to comply with the URM ordinance.	Earthquake	Planning: Building and Safety Program Manager	The City continues to apply available legal remedies to owners who fail to comply with ordinance.

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2019 ? Actions

Mitigation Action	Activity	Related Hazards	Lead	Comments
Monitor passage and implementation of mandatory seismic retrofit ordinances for concrete buildings in other jurisdictions to assess best practices..	Monitor mandatory seismic retrofit ordinances for concrete buildings passed by other municipalities for effectiveness and best practices	Earthquake	Planning: Building and Safety	The City continues to monitor mandatory seismic retrofit ordinates for concrete buildings. The City is newly exploring the possibility of developing retrofit ordinances for rigid wall-flexible diaphragm and non-ductile concrete buildings.
	Communicate and collaborate with other cities and Structural Engineers Association of California (SEAOC) regarding implementation challenges and successes	Earthquake	Planning: Building and Safety	The City continues to communicate and collaborate with other cities and SEAOC on implementation.

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2019 In Progress Actions

Mitigation Action	Activity	Related Hazards	Lead	Comments
Reduce fire risk in existing development through fire code updates and enforcement.	Periodically Update Fire Code	WUI	Fire Dept	Berkeley Fire Code was adopted with local amendment in 2023. The City will continue to monitor and update the Fire Code to incorporate the latest knowledge and State regulations.
	Evaluate Fire Prevention Division staffing.	WUI	Fire Dept	The City has taken several action steps to improve staffing, including the split of Fire Prevention and the creation of the WUI Division. The City has increased inspection staff for both, but there are still some open positions to fill. The new Volunteer Ambassador and Paid Internship Programs are designed to support inspection capacity.
	Maintain Fire Department efforts to reduce fire risk through inspections.	WUI	Fire Dept	The Fire Department has replaced Hazardous Fire Area inspections with annual Defensible Space inspections in Zone 2 and 3. This includes home hardening evaluations and education.

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2019 In Progress Actions

Mitigation Action	Activity	Related Hazards	Lead	Comments
Reduce fire risk in existing development through fire code updates and enforcement.	Develop and enforce Fire Code requirement for fuel clearance on public roadways.	WUI	Fire Dept	The City developed the Fire Code requirement in July 2022 and enforcement is in progress in Fire Zones 2 and 3. The City has applied for a grant to do more enforcement.
	Create a standard for written vegetation management plans for major construction projects in Fire Zones 2 and 3.	WUI	Fire Dept	The Plan Check Division has an initial draft completed. It is anticipated that it will need to be modified for Zone 0 compliance, pending Board of Forestry guidance.

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2019 In Progress Actions

Mitigation Action	Activity	Related Hazards	Lead	Comments
Reduce fire risk in existing development through vegetation management	Maintain Fire Fuel Abatement Program on Public Land	WUI		The City continues to maintain the Fire Fuel Abatement Program.
	Maintain Fire Fuel Debris Bin Program	WUI	PW	The City continues to maintain the Fire Fuel Debris Program.
	Maintain weekly Curbside Plan Debris Collection	WUI	PW	The City continues to maintain the weekly Curbside Plan Debris Collection.

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2019 In Progress Actions

Mitigation Action	Activity	Related Hazards	Lead	Comments
Reduce fire risk in existing development through vegetation management	Pursue external funding to increase education and awareness of vegetation management standards for fire fuel reduction	WUI	Fire Dept	The City continues to pursue external funding to increase education and awareness of vegetation management standards. The City has applied for multiple grants to support public education around Grizzly Peak as well as funding to clean up private parcels in Cerrito Canyon.
	Pursue external funding to perform vegetation management on public and private property	WUI	Fire Dept	The City has and will continue to apply for multiple grants to fund this work.

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2019 In Progress Actions

Mitigation Action	Activity	Related Hazards	Lead	Comments
Manage and promote pedestrian evacuation routes in Fire Zones 2 and 3.	Public Works Staff will maintain paths on an as-needed basis, and will coordinate with the Berkeley Path Wanderers to maintain public pathways to provide safe pedestrian evacuation routes from the hill areas.	WUI	PW	Public Works Staff continues to maintain paths on an as needed basis coordinating with the Berkeley Path wanderers.
	Maintain signage for public pathways to identify safe and accessible pedestrian evacuation routes from the hill areas.	WUI	PW	Public Works Staff continue to maintain signage for public pathways.
	Publicize up-to-date maps of all emergency access and evacuation routes.	WUI	Fire Dept	The CWPP has up to date maps of emergency access and evacuation routes. The City continuously updates these maps and publishes them on the City website. The City also uses real-time evacuation maps with Zonehaven.

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2019 In Progress Actions

Mitigation Action	Activity	Related Hazards	Lead	Comments
Improve responder access and community evacuation in Fire Zones 2 and 3 through roadway maintenance and appropriate parking restrictions.	Maintain and improve roadways in Fire Zones 2 and 3.	WUI	PW	The City continues to maintain and improve roadways in Fire Zones 2 and 3. From 2019-2022 the City completed 3.78 miles in Zones 2 and 3. By the end of 2023, the City will complete 1.52 miles in Zone 2. The City plans to complete 11.64 miles in Zone 2 from 2024-2028.
	Maintain community-driven process to identify and consider areas for parking restrictions and red curbing.	WUI	PW/Fire	The City has contracted an Evacuation Time Study, which includes a robust public outreach process, to understand what restrictions may promote a safer and more efficient evacuation of residents during unsafe fire conditions.
	Explore options for comprehensive parking restrictions in Fire Zones 2 and 3.	WUI	Fire Dept	The City has contracted an Evacuation Time Study to understand what restrictions may promote a safer and more efficient evacuation of residents during unsafe fire conditions.

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2019 In Progress Actions

Mitigation Action	Activity	Related Hazards	Lead	Comments
Reduce the potential threat of overhead utility wires in the Berkeley Hills.	Construction of undergrounding in the Berkeley Hills within UUD No. 48 (portions of Grizzly Peak Blvd., Summit Rd., Avenida Dr., Fairlawn Dr., and Senior Ave.)	WUI	PW	This undergrounding project is under construction, estimated to be completed in three years.
	Explore other strategies for reducing the potential threats of overhead utility wires	WUI	PW	The City continues to explore other strategies, funding and otherwise, to reduce the thread of overhead utilities.

2019 In Progress Actions

Mitigation Action	Activity	Related Hazards	Lead	Comments
Work with EBMUD to ensure an adequate water supply during emergencies and disaster recovery.	Coordinate with EBMUD to ensure that pipeline replacement projects and upgrades are coordinated with the City's five-year street paving program and other City programs	All	PW	The City meets with EBMUD quarterly to ensure that projects and upgrades are aligned with the City's programs.

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2019 In Progress Actions

Mitigation Action	Activity	Related Hazards	Lead	Comments
Mitigate hazardous materials release in Berkeley through inspection and enforcement programs.	Implement Hazardous Materials Release Response Plans and Inventories (HMRRP) Program	All	Planning: Hazardous Materials	The Toxic Management Division continues to maintain these inspection and enforcement programs to mitigate hazardous materials release in Berkeley.
	Implement California Accidental Release Prevention (CalARP) Program	All	Planning: Hazardous Materials	
	Implement Underground Storage Tank (UST) Program	All	Planning: Hazardous Materials	
	Implement Aboveground Petroleum Storage Act Requirement for Spill Prevention	All	Planning: Hazardous Materials	

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2019 In Progress Actions

Mitigation Action	Activity	Related Hazards	Lead	Comments
Mitigate hazardous materials release in Berkeley through inspection and enforcement programs.	Implement Hazardous Waste Generator and Onsite Hazardous Waste Treatment Programs	All	Planning: Hazardous Materials	The Toxic Management Division continues to maintain these inspection and enforcement programs to mitigate hazardous materials release in Berkeley.
	Implement Hazardous Materials Management Plans (HMMP) and Hazardous Materials Inventory Statements per California Fire Code	All	Fire Dept	Improved Fire Prevention staffing level is improving ability to review and enforce hazardous materials storage and use conditions. New staff also includes individuals that have hazardous materials enforcement experience.

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2019 In Progress Actions

Mitigation Action	Activity	Related Hazards	Lead	Comments
Maintain City participation in the National Flood Insurance Program.	Continue to use the most current FEMA information defining flood areas.	Flood	PW	The City keeps the Berkeley Municipal Code Chapter 17.12: Flood Zone Development Ordinance consistent with the FEMA National Flood Insurance Program requirements.
	Continue to incorporate FEMA guidelines and suggested activities into City plans and procedures for managing flood hazards.	Flood	Planning: Land Use	The Land Use Division continues to ensure that City plans and procedures consider FEMA guidelines and suggestions.

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2019 In Progress Actions

Mitigation Action	Activity	Related Hazards	Lead	Comments
Collect, analyze and share information with the Berkeley community about Berkeley hazards and associated risk reduction techniques.	Track changes in hazard risk using the best-available information and tools.	All	OES	The Office of Emergency Services continues to track changes in hazard risk by conducting research and consulting with subject matter experts.
	Collect and share up-to-date hazard maps identifying areas subject to heightened risk from hazards.	All	OES	The Office of Emergency Services continues to provide updated hazard maps online and in the Local Hazard Mitigation Plan.
	Publicize financial and technical assistance resources for risk reduction.	All	OES	The Office of Emergency Services and other City Departments publicize technical assistance resources on the City website as its available.

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2019 In Progress Actions

Mitigation Action	Activity	Related Hazards	Lead	Comments
Coordinate with and encourage mitigation actions of key City partners.	Coordinate with and encourage mitigation actions of: •Institutions serving the Berkeley community •Berkeley organizations and nonprofits •Other partners whose actions affect the Berkeley community	All	OES	The City works with partners to encourage mitigation actions as well as coordinates on collaborative efforts to mitigate risks.

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2019 In Progress Actions

Mitigation Action	Activity	Related Hazards	Lead	Comments
Reduce Berkeley's vulnerability to severe storms and associated hazards through proactive research and planning, zoning regulations, and improvements to stormwater drainage facilities.	Use development standards to ensure that new development does not contribute to an increase in flood potential.	Flood	Planning: Land Use	The Land Use Division of the Planning Department manages the permitting process for new development and conditions the project to ensure that it does not contribute to an increase in flood potential.
	Complete the Watershed Management Plan to recommend improvements to problem areas in individual watersheds, and develop a Stormwater Master Plan.	Flood	PW	The City is in the process of hiring a consultant to complete the Stormwater Management Plan over the course of the next two years.
	Design public improvements such as streets, parks and plazas, for retention and infiltration of stormwater by diverting urban runoff to bio- filtration systems.	Flood	PW	The City has installed Green Infrastructure facilities at five locations. The City is also in the process of daylighting the Codornices Creek at Kains Avenue to increase channel volume, in order to minimize potential flooding.

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2019 In Progress Actions

Mitigation Action	Activity	Related Hazards	Lead	Comments
Implement energy assurance strategies at critical facilities.	Identify potential actions to mitigate energy assurance vulnerabilities at critical City facilities during planning/conceptual design of both retrofits and new construction.	All	PW	The City continues to identify ways to mitigate energy assurance vulnerabilities. Currently, the City is exploring solar and battery operated energy systems.

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2019 In Progress Actions

Mitigation Action	Activity	Related Hazards	Lead	Comments
Mitigate the impacts of sea level rise in Berkeley.	~~Develop guidelines, regulations, and review~~ Use development standards to ensure new and existing public and private developments and infrastructure are protected from floods due to sea-level rise.	Climate Change, flood	OESD	The Land Use Division of the Planning Department manages the permitting process for new development and conditions projects to ensure that it does not contribute to an increase in flood potential due to sea-level rise.

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2019 In Progress Actions

Mitigation Action	Activity	Related Hazards	Lead	Comments
Mitigate Berkeley's tsunami hazard.	Fund and replace damaged finger docks.	Tsunami	PRW	The City continues to fund and replace damaged finger docks on an going basis as needed. Since 2019, the City has used City funds and grant funds in total of $885,000 to replace damaged finger docks.
	Secure funding for replacement of D and E docks; begin the permitting process once funding is secure	Tsunami	PRW	The City is exploring a loan from the General Fund in place of California Division of Boating and Waterways loan. If approved, drawings are at 90% and ready to move forward.
	Collaborate with the California Office of Emergency Services, the California Geological Survey, and the Federal Emergency Management Agency to document and explore additional tsunami hazard mitigation measures.	Tsunami	OES	The City regularly collaborates with external partners to explore additional tsunami mitigation measures.

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? Action – Air Quality

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2019 ? Action

Mitigation Action	Activity	Related Hazards	Lead	Comments
Define clean air standards for buildings during poor air quality events and use those standards to assess facilities for the Berkeley community.	Participate in regional efforts to define standards and tools to predict buildings' ability to deliver clean air to occupants during poor air quality events.	WUI and Poor Air		
	Apply standards and tools to assess City facilities' ability to provide clean air to occupants during poor air quality events.	WUI and Poor Air		
	Coordinate with willing Berkeley partners to apply standards and tools to partner facilities.	WUI and Poor Air		
	Use findings to develop a list of potential clean air facilities (City-run and partner-run) to the community.	WUI and Poor Air		

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Public Process

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Public Outreach Activities and Timeline

August through October

- Surveys and short conversations at in-person popular events (National Night Out, Solano Stroll, 1923 Fire Anniversary, Farmer's Markets, etc.).
- Short online survey, distributed via flyers, social media, website.
- Presentations and conversations with neighborhood groups

October – February (around/post First Draft Plan release)

- Presentations at Planning and Disaster and Fire Safety Commissions.
- Council Work Session
- Continued presentations and conversations with neighborhood groups, or hosted by local partners
- Short online videos that explore the Plan in bite sized chunks and provide a way for people to comment.
- Open email address for people to write in comments
- Drafts at each Library
- Flyers and social media encouraging responses

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Hazard Analysis

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Hazard Analysis Updates and Review

Previous Plan

- Earthquake
- Wildland-Urban Interface Fire
- Rainfall-Triggered Landslide
- Tsunami
- Flood
- Extreme Heat
- Climate Change
- Hazardous Materials Release

New this year

- Poor Air Quality
- Utility Disruption
- Infectious Disease
- Wind?
- Cyber attacks/IT?

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Homework and Next Steps

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Homework and Next Steps

- Finalize current status of 2019 **Actions (if you haven't finished yet)**
- Continue to brainstorm and send Jamie new **Actions** for 2024 **Mitigation Strategy**
  - Make sure to consider new Hazards included in this year's plan.
  - New actions will be the focus of the next meeting!
- Work with Jamie on the Hazard Analysis (varies by Department/Division)

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Actions that need status updates (depts still working on them)

2019 ? Actions

Mitigation Action	Activity	Related Hazards	Lead	Comments
Improve the disaster-resistance of the natural gas delivery system to increase public safety and to minimize damage and service disruption following a disaster.	Promote electrification of buildings, both existing buildings and new construction, to mitigate hazards associated with natural gas usage and the impacts of damage to infrastructure after a hazard occurs.	All	OESD	

2019 ? Actions

Mitigation Action	Activity	Related Hazards	Lead	Comments
Reduce the potential threat of overhead utility wires in the Berkeley Hills.	Construction of undergrounding of overhead utility wires within UUD No. 35A (Vistamont Ave., Rochdale Way, and Rosemont Ave from Woodmont Ave. to Vistamont Ave.)	WUI		
	Construction of undergrounding of overhead utility wires on Bayview Place	WUI		
	Complete the Phase 3 undergrounding study spearheaded by the Undergrounding Subcommittee in collaboration with Public Works Department, Fire Department, and Public Works Commission.	WUI		

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2019 ? Actions

Mitigation Action	Activity	Related Hazards	Lead	Comments
Reduce Berkeley's vulnerability to extreme heat events and associated hazards.	Monitor and support regional and State-level efforts to forecast the impact of climate change on temperatures and incidence of extreme heat events in Berkeley and the region, and integrate extreme heat event readiness.	Extreme heat	OESD	
	Continue to create and maintain shading by maintaining the health of existing trees and sustaining municipal tree planting with a focus on efforts in areas where there are fewer trees.	Extreme heat	PRW	
	Encourage cooling strategies for the built environment through voluntary programs to mitigate the urban heat island effect.	Extreme heat	OESD	

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2019 ?Actions

Mitigation Action	Activity	Related Hazards	Lead	Comments
Implement energy assurance strategies at critical facilities.	Provide guidance to help the City consider opportunities to design, finance and implement clean energy assurance strategies (e.g., photovoltaic-supplemented generation, energy efficiency activities, and/or mobile charging stations).	All	OESD	
	Work with partners to identify additional non-City critical facilities and develop strategies to provide clean backup power at these sites.	All	OESD	

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2019 ? Actions

Mitigation Action	Activity	Related Hazards	Lead	Comments
Mitigate climate change impacts by integrating climate change research and adaptation planning into City operations and services.	Determine staffing needs to monitor research and oversee integration of climate change adaptation into City operations and services	All, Climate Change	OESD	
	Develop and implement a process to integrate adaptation planning into City operations. Activities include: Train City staff on the basic science and impacts of climate change and on climate adaptation strategies and develop policy and programs to address potential climate impacts in municipal capital and land use planning	All, Climate Change	OESD	

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2019 ? Actions

Mitigation Action	Activity	Related Hazards	Lead	Comments
Mitigate the impacts of sea level rise in Berkeley.	Determine staffing needs to monitor research and oversee integration of climate change adaptation into City operations and services	Climate Change	OESD	

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2019 ? Actions

Mitigation Action	Activity	Related Hazards	Lead	Comments
Collaborate with partners to increase the security of Berkeley's water supply from climate change impacts.	Partner with East Bay Municipal Utility District (EBMUD) to provide and market incentives for residents, businesses and institutions to conserve water.	Climate Change	OESD	
	Partner with agencies such as EBMUD and StopWaste to encourage private property owners and public agencies (including the City government) to use sustainable landscaping techniques that require less water and energy to maintain.	Climate Change	OESD	
	Encourage water efficiency and conservation in existing buildings, such as incorporating water assessments into existing policies or creating a compliance program for SB407.	Climate Change	OESD	

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2019 ? Actions

Mitigation Action	Activity	Related Hazards	Lead	Comments
Streamline the zoning permitting process to rebuild residential and commercial structures following disasters.	Explore a Zoning Amendment to BMC 23C.04.100 that streamlines the Zoning permitting process to allow damaged industrial and commercial buildings, and dwelling units to rebuild by right following disasters.	All	Planning: Land Use	
	Consider different treatment for buildings in high-risk areas.	All	Planning: Land Use	
	Define the process for the City to accept and file this documentation..	All	Planning: Land Use	

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2019 ? Actions

Mitigation Action	Activity	Related Hazards	Lead	Comments
Streamline the zoning permitting process to rebuild residential and commercial structures following disasters.	Outreach to property owners about this documentation process.	All	Planning: Land Use	
	Evaluate location of essential public facilities prior to rebuild in order to prioritize development outside high risk areas when feasible.	All	Planning: Land Use	
	Explore how other cities provide protections for people that may be vulnerable during the rebuilding process	All	Planning: Land Use	

Zoom Meeting
You are viewing Jamie Albrecht's screen
View Options
gov
Sign in
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Agenda

- Mitigation Strategy
  - Finalize 2024 Goals and Objectives
  - Review 2019 actions
    - Celebrate completed actions
    - In progress actions become 2024 actions
  - Review what information we still need
- Public Process
  - Overview and Planning
- Hazard Analysis Updates and Review
- Homework and Next Steps

Jamie Albrecht
Sarah Lana - City of Ber...
Zoe Covello
Sarah Moore, City of Be...
Steve Riggs- Berkeley Fi...
Ashley James
Galadriel Burr, City of Be...
Meagan Jones
Meagan Jones
Dan Green
Dan Green
Frederick Ferris
Frederick Ferris

Unmute
Stop Video
Participants 10
Chat
Share Screen
Record
Show Captions
Reactions
Apps
Leave

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Local Hazard Mitigation Plan

Core Planning Team Meeting
August 29, 2023

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Agenda

- Mitigation Strategy
  - Finalize 2024 Goals and Objectives
  - Review Proposed New Action for 2024
- Next Steps

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Mitigation Goals (Third Draft)

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2024 Draft Mitigation Goals

A. Reduce the potential for loss of life, injury, environmental and economic damage to Berkeley residents and businesses from earthquakes, wildfires, landslides, floods, tsunamis, climate change, heat waves, poor air quality, infectious disease, sea level rise, wind, utility disruption, and their secondary impacts.

B. Increase City government's ability to serve the community during and after hazard events by mitigating risk to key City functions.

C. Protect and enhance quality of life in Berkeley.

D. Connect with residents, community-based organizations, institutions, businesses, and essential lifeline systems in order to increase mitigation actions and disaster resilience in the community.

E. Protect Berkeley's historically underserved populations from the impacts of hazardous events by applying an equity focus to mitigation efforts.

- Co-create mitigation plans, policies, and programs with Berkeley's underserved communities, elevating the voices of these community members and prioritizing their needs to prepare for and adapt to climate change and natural hazards.

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Proposed New Actions by Hazard

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Priority Levels

Factors	High	Medium	Low
Support of goals and objectives	Supports multiple goals	Support goals and objectives	Will mitigate the risk
Cost/benefit	Benefits exceed cost	Has benefits that exceed costs	Benefits do not exceed cost
Funding availability	Funding is secured	Funding not secured by identified	Funding not secured or identified
Hazards addressed	Addresses hazards of greatest concern and or multiple hazards	Addresses hazards of concern	Does not address identified hazard
Support	Political and public support	Has support	Mixed or no support
Environmental impact	None	Low	Has more environmental impact
Environmental benefit	Benefit	Unsure/or some	None
Timeline	Short term	Maybe short term depending on funding	Long term (6-10 years)
Benefits underserved communities	Benefits underserved communities	Might benefit underserved	Does not benefit underserved

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Multi-hazard

Mitigation Action	Activity	Lead	Funding	Timeline	Priority
Collect and share information with the Berkeley community about hazards and associated risk reduction techniques.	Creating new formats and user friendly guidance to educate the public, especially underserved populations, on the hazards in Berkeley. Provide key information, best practices, and information to Berkeley businesses through cultivated networks.	Office of Emergency Services Office of Economic Development	General Fund General Fund	Short term (1-5 years) Ongoing	High High
Advance equitable community resilience, with a focus on disadvantaged communities.	Work with community partners to co-create solutions to improve community resilience, including through the Climate Equity Collaborative. Develop Environmental Justice Element and update the existing Safety Element, with community-identified priorities related to climate adaptation.	Office of Energy and Sustainable Development	Climate Equity Fund Pilot Adaptation Planning Grant from CA OPR	Short term (1-5 years)	High

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Multi-hazard

Mitigation Action	Activity	Lead	Funding	Timeline	Priority
Improve emergency access to the Berkeley waterfront.	Implementation of the Berkeley Pier with Ferry Access project.	Parks, Recreation, and Waterfront	WETA, Grants, maybe Marina Fund	Short term (1-5 years)	High
Collaborate with partners to increase the security of Berkeley's water supply from climate change impacts.	Research and support opportunities to advance purple pipe implementation [need more detail on what this means and how it contributes to mitigation efforts]	Public Works and Planning Departments	[need more information on PW, Cal Trans, EBMUD, etc]	Long term (5-10 years)	Medium

This is what I have on #2 from Sarah M and team: EMBUD interest and investment -- their East Bayshore Recycled Water Project (EBRWP) is planned to provide recycled water from the East Bayshore Recycled Water Facility (EBRWF) at the East Bay Municipal Utility District (EBMUD) Main Wastewater Treatment Plant (MWWTP or SD-1) to portions of Oakland, Emeryville, Berkeley, Albany, and Alameda. Expansion of the EBRWF is planned to include an Emeryville-Albany and UC Berkeley expansion, both of which would serve users in Berkeley. Coordination with the City will be required.

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Wildland Urban Interface Fire

Mitigation Action	Activity	Lead	Funding	Timeline	Priority
Reduce fire risk through home hardening.	Implement program to provide home hardening materials and instructions to residents in high risk fire areas.	Fire Department – WUI Division	Measure FF	Ongoing	High
Reduce fire risk through defensible space.	Implement Resident Assistance Program to help cover the costs to remove vegetation and meet requirements.	Fire Department – WUI Division	Measure FF	Ongoing	High
Reduce fire risk in existing development through vegetation management.	Explore additional options to support vegetation management on private property.	Fire Department – WUI Division	Measure FF	Ongoing Ongoing	High High

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Wildland Urban Interface Fire

Mitigation Action	Activity	Lead	Funding	Timeline	Priority
Reduce fire risk in existing development through vegetation management.	Explore options for developing city run hand crew to implement vegetation management projects on public and private property. Continue to allocate UC Settlement Funding to do vegetation management projects on UC Berkeley properties.	Fire Department – WUI Division Fire Department – WUI Division	Measure FF UC Settlement Fund	Short term (1-5 years) Ongoing	High High

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Wildland Urban Interface Fire

Mitigation Action	Activity	Lead	Funding	Timeline	Priority
Reduce fire risk in existing development through fire code updates and enforcement.	Implement Fire Internship Program to provide local youth with career development opportunities and to increase inspection capacity in Fire Zones 2 and 3.	Fire Department – WUI Division	Measure FF and Youth Works Program	Ongoing	High
Maintain redesigned and expanded city wide fire fuel chipper program.	Provide curbside pickup, chipping, and disposal of vegetation material from residential properties.	Fire Department – WUI Division	Measure FF	Ongoing	High

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Wildland Urban Interface Fire

Mitigation Action	Activity	Lead	Funding	Timeline	Priority
Educate people city-wide on vegetation management, home hardening, and defensible space to reduce fire risk.	Continue to implement the WUI Ambassador Program, which trains volunteers to educate residents.	Fire Department – WUI Division	Measure FF	Ongoing	High
Manage and promote pedestrian evacuation routes in Fire Zones 2 and 3.	Install handrails on all public pathways, prioritizing areas with high usage and steep inclines to increase pedestrian safety and accessibility.	Public Works: Traffic Engineering	General Fund and T1	Short term (1-5 years)	High
Mitigate wildfire risk to Berkeley overnight camps.	Analyze fire risk at overnight camps and identify appropriate mitigation actions.	Fire Department and Parks Rec and Waterfront	General Fund	Short Term (1-5 years)	High

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Earthquake

Mitigation Action	Activity	Lead	Funding	Timeline	Priority
Strengthen or replace City buildings in the identified prioritized order as funding is available.	Retrofit and or strengthen South Berkeley Senior Center	Health, Housing, and Community Services Department	Grant	Short term (1-5 years)	High
	MLK Junior Youth Services Center	Parks, Recreation, and Waterfront	Grant	Short term (1-5 years)	High

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Extreme Heat/Poor Air Quality

Mitigation Action	Activity	Lead	Funding	Timeline	Priority
Reduce Berkeley's vulnerability to extreme heat events and associated hazards.	Implementing new requirement for new construction and development to have larger spaces for trees to be planted where there is available space, especially to increase the number of trees being planted in industrial areas.	Parks, Recreation, and Waterfront Department		Ongoing	High
	Expanding Urban Forestry Staff to plant and maintain more trees, especially in West Berkeley.	Parks, Recreation, and Waterfront Department		Short Term (1-5 years)	High

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Poor Air Quality

Mitigation Action	Activity	Lead	Funding	Timeline	Priority
Implement existing City programs and projects to reduce emissions that contribute to poor air quality.	Implement the traffic safety capital construction projects identified and prioritized in the Berkeley Pedestrian Plan (2021), Berkeley Bicycle Plan (2017), Berkeley Vision Zero Action Plan (2020), and Berkeley Transit-First Implementation Plan; these projects are intended to encourage non-driving modes Implementing the City's Electric Mobility Road Map which includes electric shared mobility (bikes and scooters) as well as electric and hybrid car-sharing, and the installation of public charging stations Manage on-street parking and maintain parking garages to reduce emissions by making it easier to find a parking space more quickly (and thus reduce the time spent circling around looking for parking)	Public Works: Transportation Division			High High High

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Sea Level Rise

Mitigation Action	Activity	Lead	Funding	Timeline	Priority
Mitigate the impacts of sea level rise in Berkeley.	Implement project to protect low spots on Virginia Street, in collaboration with East Bay Regional Parks.	Parks, Recreation, an d Waterfront Division	Grants, Parks Tax	Short Term (1-5 years)	Low
	Identify funding and nature based solutions to adapt to sea level rise between Caesar Chavez Park, the Marina, all the way to University Avenue in collaboration with East Bay Regional Park.			Long term (5-10 years)	Low
	Implement project to protect low spots near Seabreeze Market and incorporate the turn on University Avenue.			Short term (1-5 years)	Low
	Identify funding and potential solutions to protect low spots in back of Doubletree Hotel.			Ongoing	Low
	Conduct a groundwater study on impacts of groundwater rise combined with sea level rise on underground toxic materials	Office of Energy and Sustainable Development	Adaptation Planning Grant from CA OPR	Short term (1-5 years)	Low

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Flood (Tsunami and Sea Level Rise)

Mitigation Action	Activity	Lead	Funding	Timeline	Priority
Reduce Berkeley's vulnerability to severe storms and associated hazards through proactive research and planning, zoning regulations, and improvements to stormwater drainage facilities.	Repair and improve the six tide tubes that remove storm water from Berkeley Aquatic Park into the Bay.	Parks, Recreation, and Waterfront Division	Grants, Parks Tax		Medium

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Utility Disruption

Mitigation Action	Activity	Lead	Funding	Timeline	Priority
Support energy assurance strategies at non City facilities.	Explore opportunities for local business to share best practices and resources during utility interruptions.	Office of Economic Development	General Fund	Short-Term (1-5 years)	High

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Infectious Disease

Mitigation Action	Activity	Lead	Funding	Timeline	Priority
Mitigate impacts of infectious diseases in Berkeley.	*Surveillance / Epidemiology* *Non-pharmaceutical Interventions (NPIs)* ***Infrastructure***	Public Health	General Fund	Ongoing	High

Wind actions?

Mitigation Action	Activity	Lead	Funding	Timeline	Priority
Something from parks and rec on tree maintenance? Other work					

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Other actions?

Mitigation Action	Activity	Lead	Funding	Timeline	Priority

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Next Steps

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Next Steps

- Finalize any New Actions discussed today for your Department or Division
- Support OES in collecting any missing information for previous Actions
- Support OES with remaining hazard analysis or content needed for the Plan
  - B&S: reviewing earthquake section
  - Land Use: need your help with the “changes in development” section
  - OESD: supporting Sea Level Rise, Extreme Heat, Utility Disruption

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Local Hazard Mitigation Plan

Core Planning Team Meeting
September 13, 2023

Agenda

- Public outreach strategy
- Follow ups on new actions from last meeting
- Final wrap up with Jamie
- Next Steps

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Public Outreach Strategy (First Draft Plan- Est Fall 2023)

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Public Outreach

1. Community presentations on specific hazards in accessible locations, like libraries, community centers, senior centers, Berkeley Bowl, Northbrae Community Church, etc.
2. Record videos on specific hazards and post to website.
3. Two presentations at Disaster and Fire Safety Commission
4. Two presentations at Planning Commission
5. Briefings with individual councilmembers
6. Letters to Council
7. Letters to all other Commissions
8. Posting to City website, Berkeleyfire.com
9. Social Media
10. Copies at local libraries? (Planning, is this a requirement?)
11. Open for public comment for two months (multiple ways to send in feedback)

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Public Outreach Strategy (Final Draft Plan – Est Fall 2024)

Public Outreach

1. Presentation at Disaster and Fire Safety Commission
2. Presentation at Planning Commission (public hearing)
3. Council adoption meeting

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Next Steps

Next Steps

- Finalize the hazard analysis sections
  - Sarah might reach out for additional support on finishing up some sections, but they are pretty close to being done
- Finalize new actions
  - Sarah maybe reaching out to confirm language
- Support with public outreach

Core Project Team Meeting 5

November 6 2023

Attendees:

Meagan Jones

Leah Greenbaum

Galadriel Burr

Sarah Moore

Zoe Covello

Ruth Raisner

Agenda

1. Review project schedule
2. Review Presentation schedule and plan

Core Project Team Meeting 6

February 8 2024

Attendees:

Meagan Jones

Sarah Lana

Galadriel Burr

Sarah Moore

Zoe Covello

Ruth Raisner

Steven Riggs

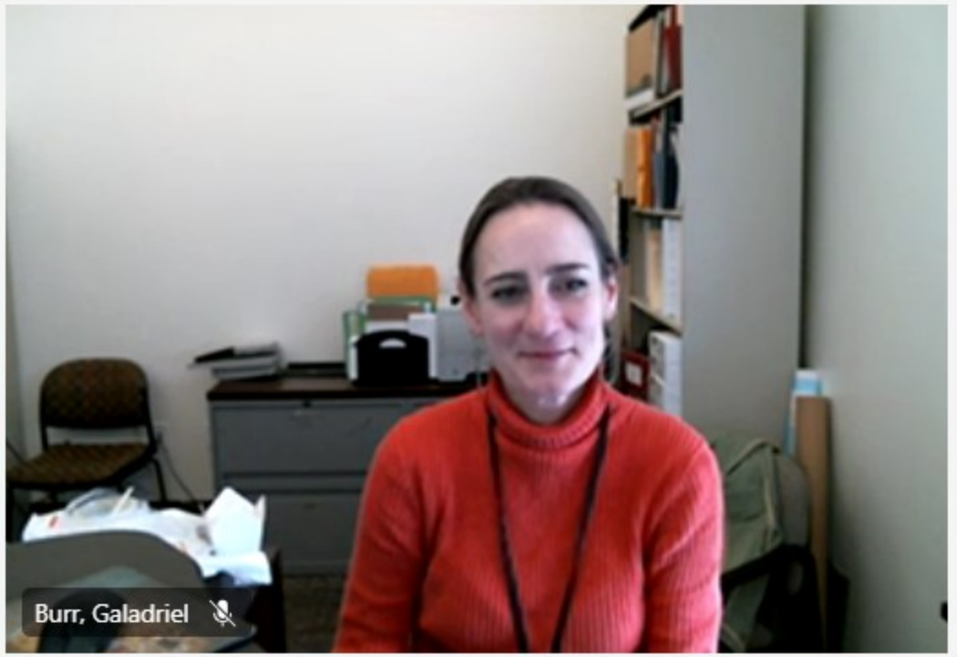
Scott Ferris

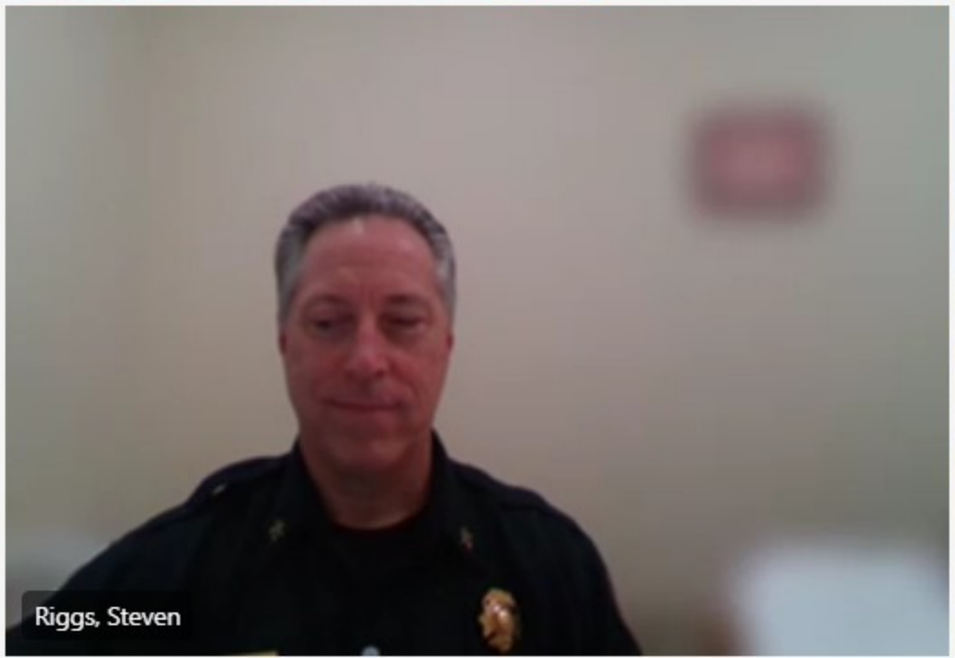
Agenda

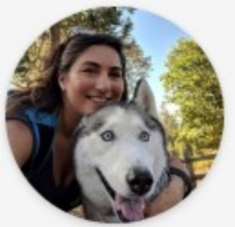
1. Review project schedule
2. Review Draft Mitigation Strategy
3. Review action prioritization structure
4. Review outreach strategy

LHMP Core Planning Team Meeting #10 ··· City of Berkeley SL

15:35 Chat People 8 Raise React View More Camera Mic Share Leave



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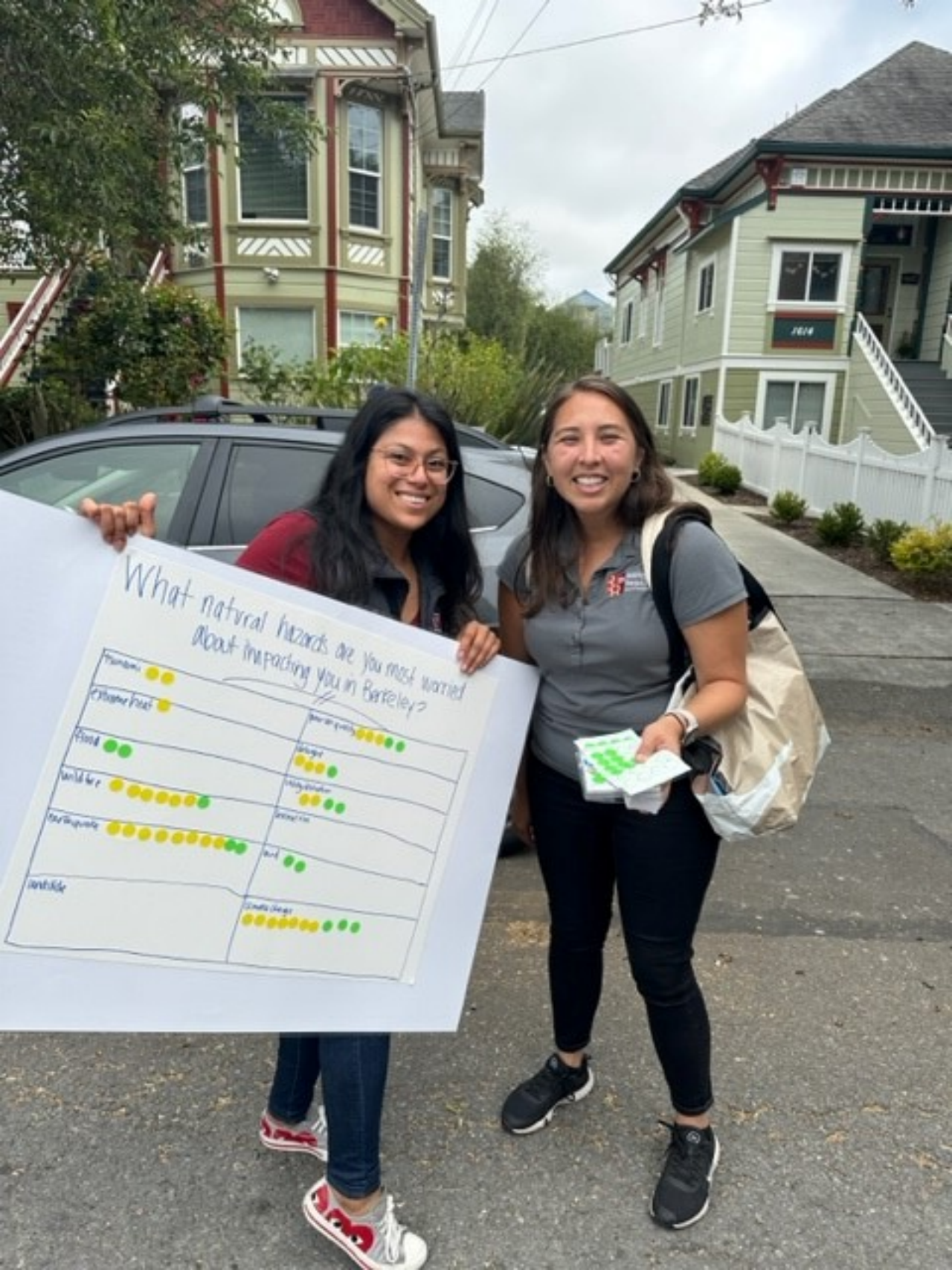
BERKELEY
POLICE

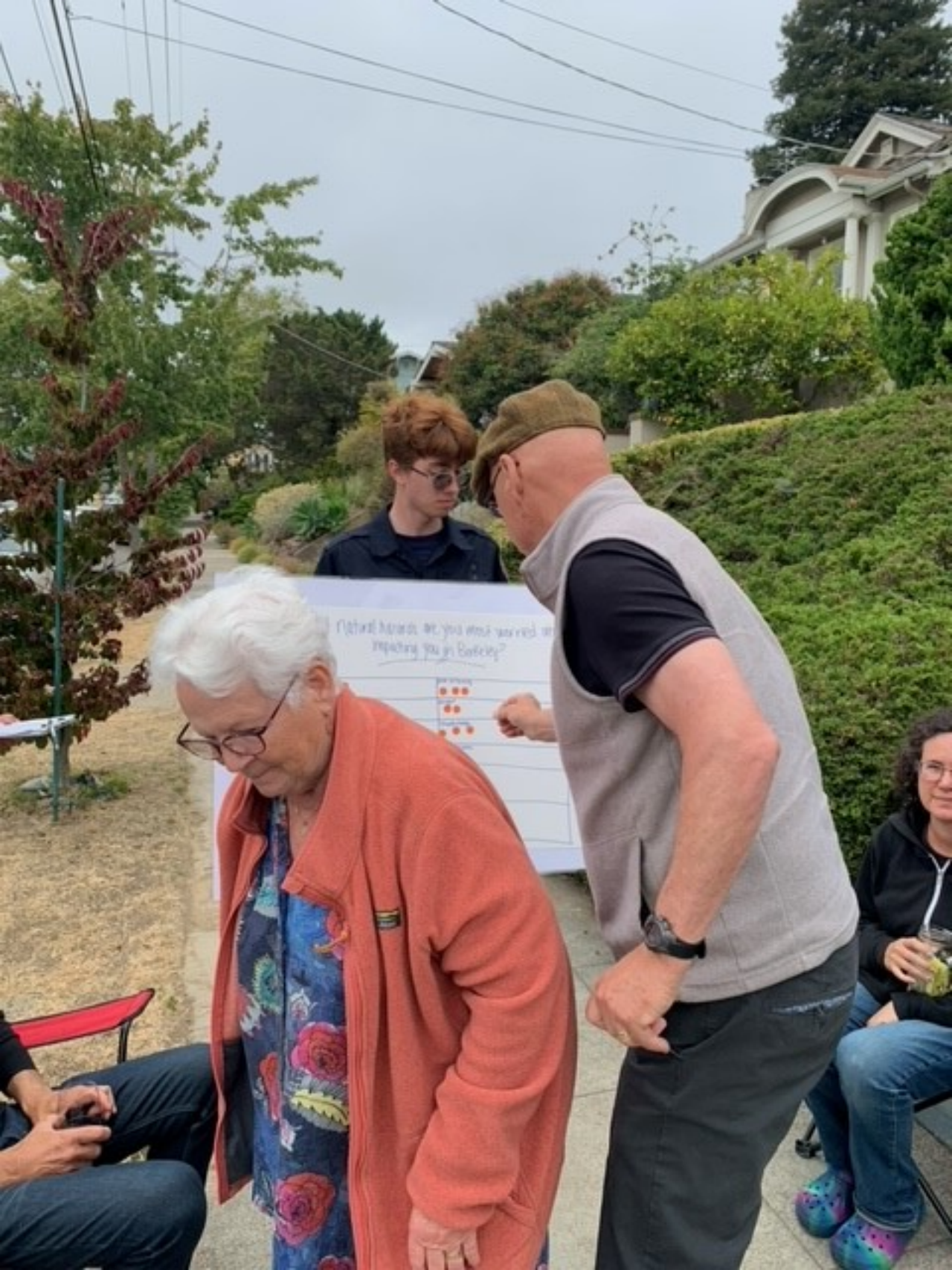
BERKELEY
POLICE


What natural hazards are you most worried about impacting you in Berkeley?

I can
I am

Aug 1, 2023, 6:03 PM

RIDE YOUR
BIKE



Parks Make Life Better!

Kawasa

Parks
Make
Life
Better!

What natural hazards are you most worried about impacting you in Berkeley?
BERKELEY FIRE DEPT.

HARBOR PATROL
Make Life Better!
BERKELEY
FIRE

OES2

What natural hazards are you most worried about impacting you in Berkeley?

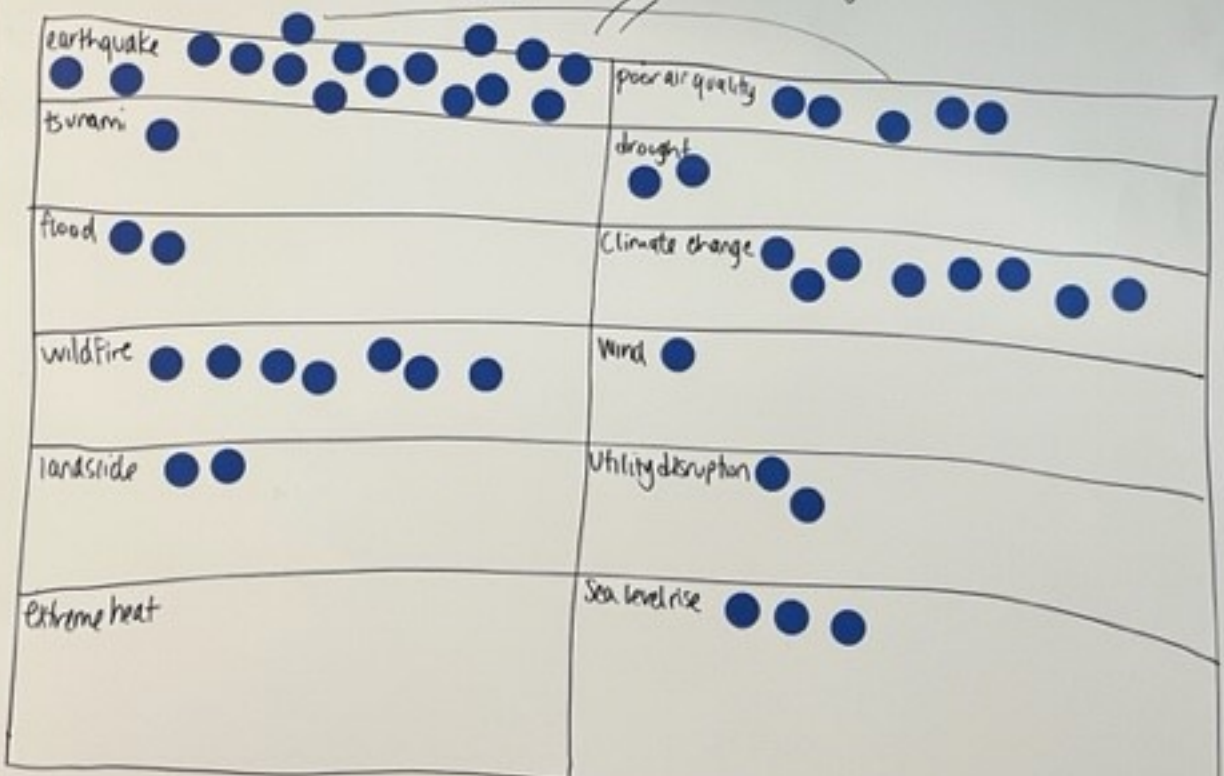
Deer
Crows
Raccoons

wildfire	poor air quality
flood	drought
landslide	climate change
extreme heat	utility disruption
earthquake	sea level rise
tsunami	wind

What natural hazards are you most worried about impacting you in Berkeley?

What natural hazards are you most worried about impacting you in Berkeley?

What natural hazards are you most worried about impacting you in Berkeley?



Before you leave
Sign up for
Bookmark Berkeley
Emergency Map
Draw your Home
Vote on your favorite
Community Readiness Steps

Community Readiness Steps
NATURAL
OFFICIAL
Before you leave
Sign up for AC Alert
Bookmark Berkeley Emergency Plan
Post on your Home hold Tsunami Plan
Vote on your favorite mitigation action
Which Mitigation
Continue to repair and replace
Your idea for tsunami navigation...

Before you leave
Sign up for AC Alert
Bookmark Berkeley Emergency Plan
Discuss your Household Tsunami Plan
Vote on your favorite mitigation action
Which Mitigation
Your ideas for tsunami mitigation...
Berkeley Ready
Community Readiness Steps
NATURAL
Tsunami Warning Signs
OFFICIAL
Tsunami Warnings
Radio
Outdoor Sirens
TV
Telephone Notifications
tsunami.gov

Berkeley Ready
Community Readiness Steps
NATURAL
OFFICIAL
Tsunami Warnings
Before you leave
Sign up for AC Alert
Bookmark Berkeley Emergency Map
Draft your Household Tsunami Plan
Vote on your favorite mitigation action
Which Mitigation
Your ideas for tsunami mitigation...

EXIT
Community Readiness Steps

2331
CA EXEMPT
1623332

WELCOME TO YOUR PARK

- Open 6 am to 10 pm SMC 6.32.220
- Dogs Must Be on Six-Foot Leash Dog Litter Must Be Removed SMC 10.04.120, 10.04.200
- No Unattended Property or Objects 10 sq. Ft. or More Without Permit SMC 6.32.210
- No Smoking, Alcoholic Beverages, Littering, Motorized Vehicles, or Overnight Camping SMC CC 7.92.010, 10.04.010, 12.40.060, 6.32.060, 6.32.020
- No Feeding Wildlife SMC 6.32.030

Enjoy a Clean and Healthy Park

LOST

808 722 9921

SK3X48

CA 162

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City of Berkeley
Be Connected. Be Prepared. Be Berkeley.
CITY OF BERKELEY
Public Works
American Red Cross
Installing
FREE
Smoke Alarms
in your neighborhood
Let us make your home safer today!
RedCross.org/SmokeAlarmInstallNorCal

Public Works
CITY OF BERKELEY
red. Be Berkeley.
Be Connected. Be Prepared. Be Berkeley.
STRIDER

Public Wo

Be Connected. Be Prepared. Be Berkeley.

Residents near Berkeley creeks, or who have experienced flooding in the past

How to reduce risks from high winds?

Before a wind event

Keep trees maintained

City trees vs Privately owned trees

Secure outdoor items

Be ready for power outages

During high winds

- If you must be outdoors, keep your distance from trees
- Avoid driving

After a wind event

- Stay in a safe space until it's safe to come out
- Report downed power lines
- Stay away from downed power lines
- Do not walk under trees

Berkeley Creeks

Berkeley Floodplains

WELCOME TO YOUR PARK
Open 6 am to 10 pm
Dogs Must Be on Six-Foot Leash
Dog Litter Must Be Removed
No Unattended Property or Objects 10 sq. ft. or More Without Permit
No Smoking, Alcoholic Beverages, Littering, Motorized Vehicles, or Overnight Camping
No Feeding Wildlife
Enjoy a Clean and Healthy Park
LOST
808 722 9921
BENTLEY
2039
DEERE

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Hello Winter Weather!

Flooding and High Winds:

The hazards, the City's work, and steps to stay safe

December 9, 2023

Berkeley Ready
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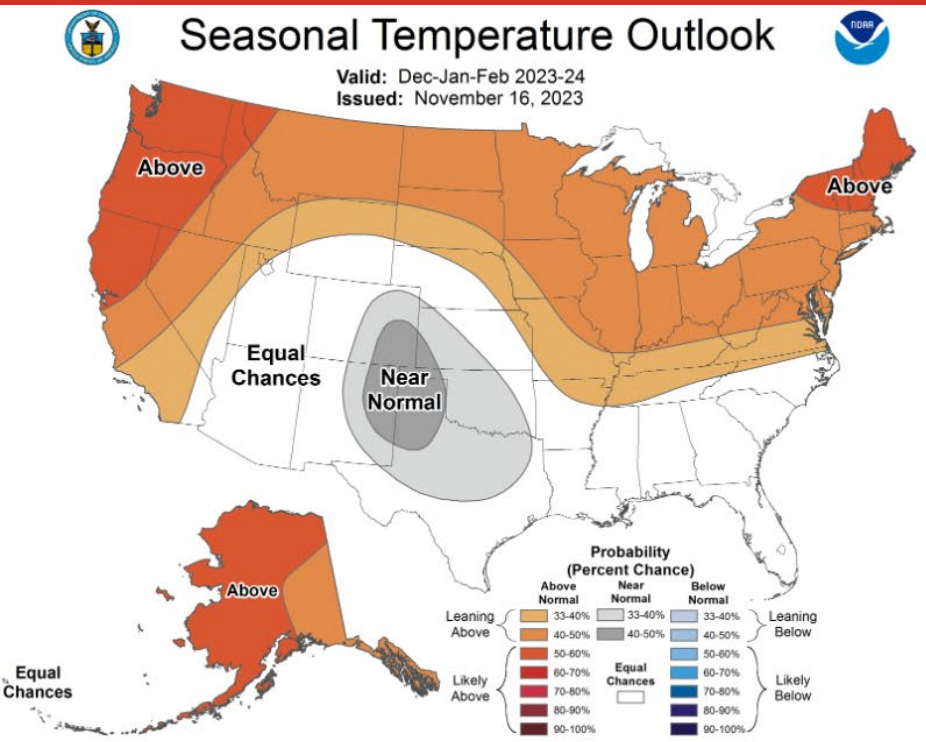
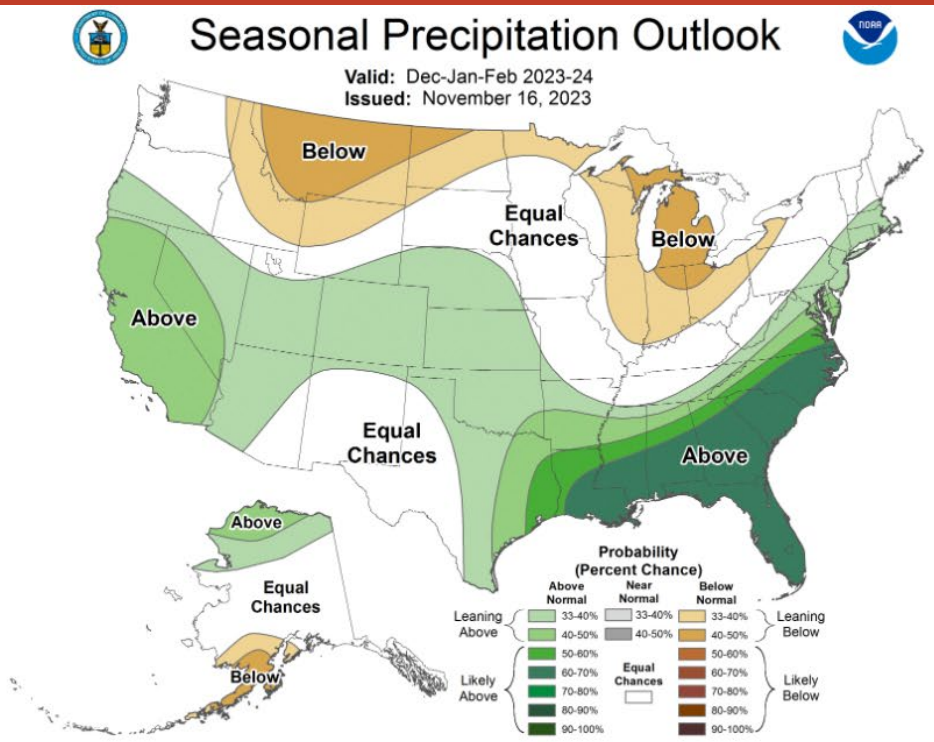
Winter Weather Outlook

Berkeley Ready
City of Berkeley

NOAA predicts “strong” El Niño conditions





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Flooding

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City of Berkeley

What is flooding?

Flooding on Parker Street near Longfellow School. Photo: Mark Coplan

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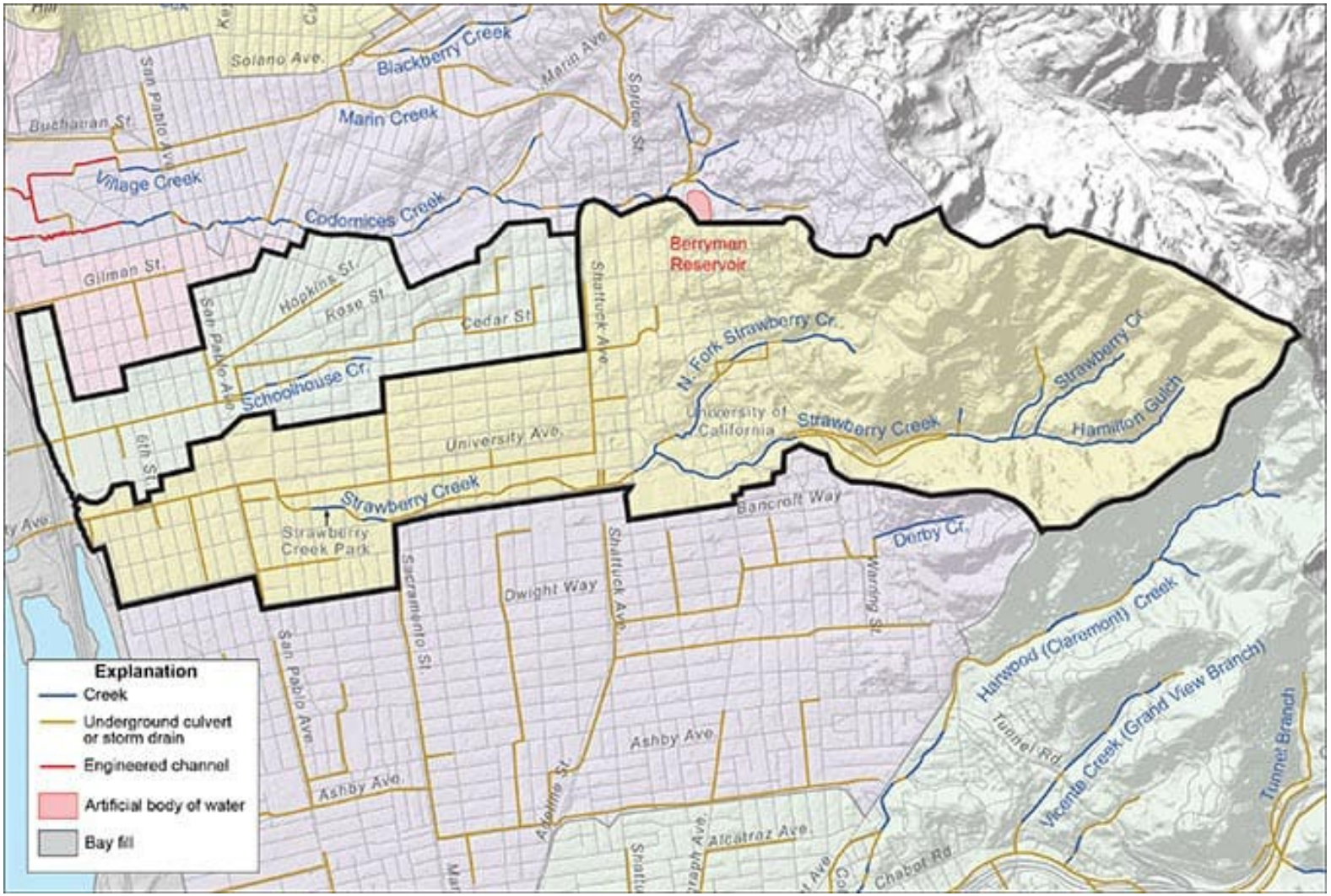
Creek Flooding

Berkeley Ready
City of Berkeley

Creeks & Berkeley



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What is Creek Flooding?

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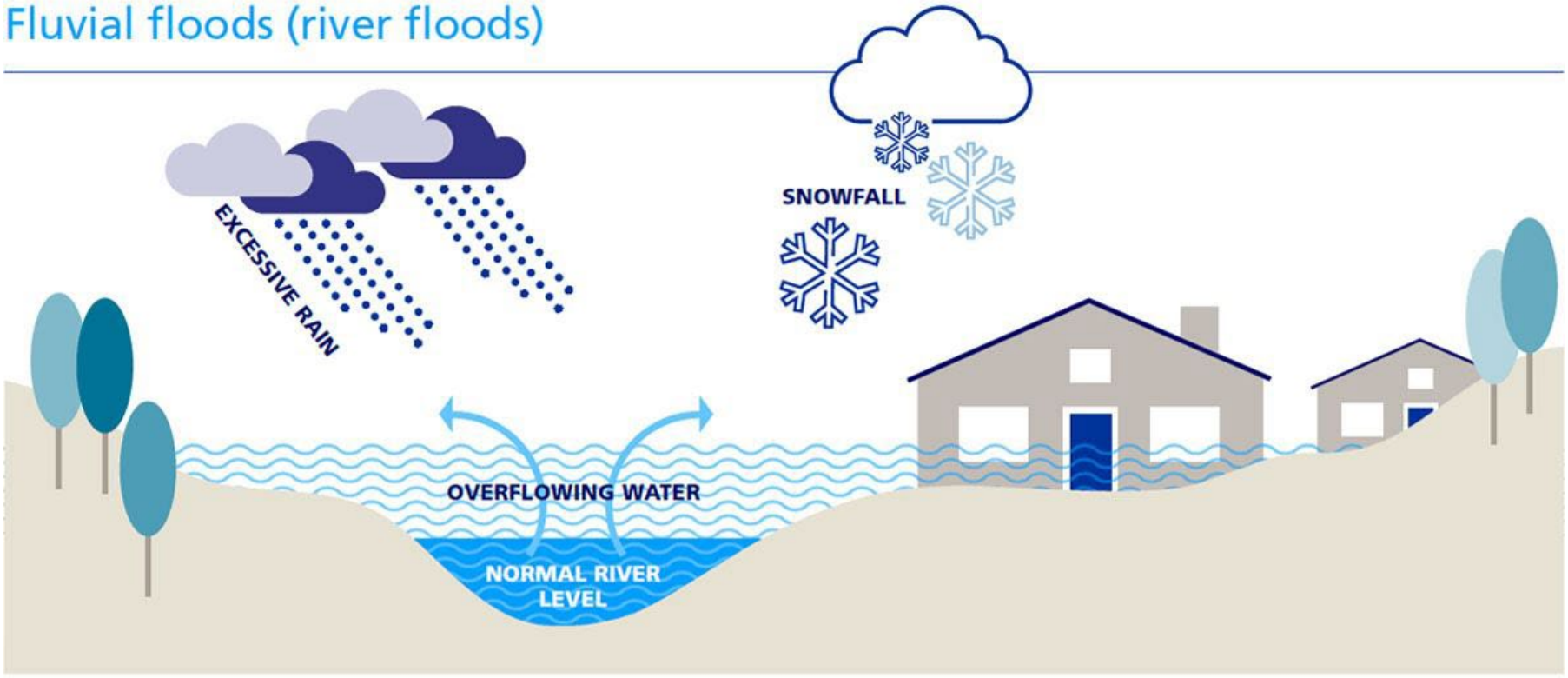
What is Creek Flooding?



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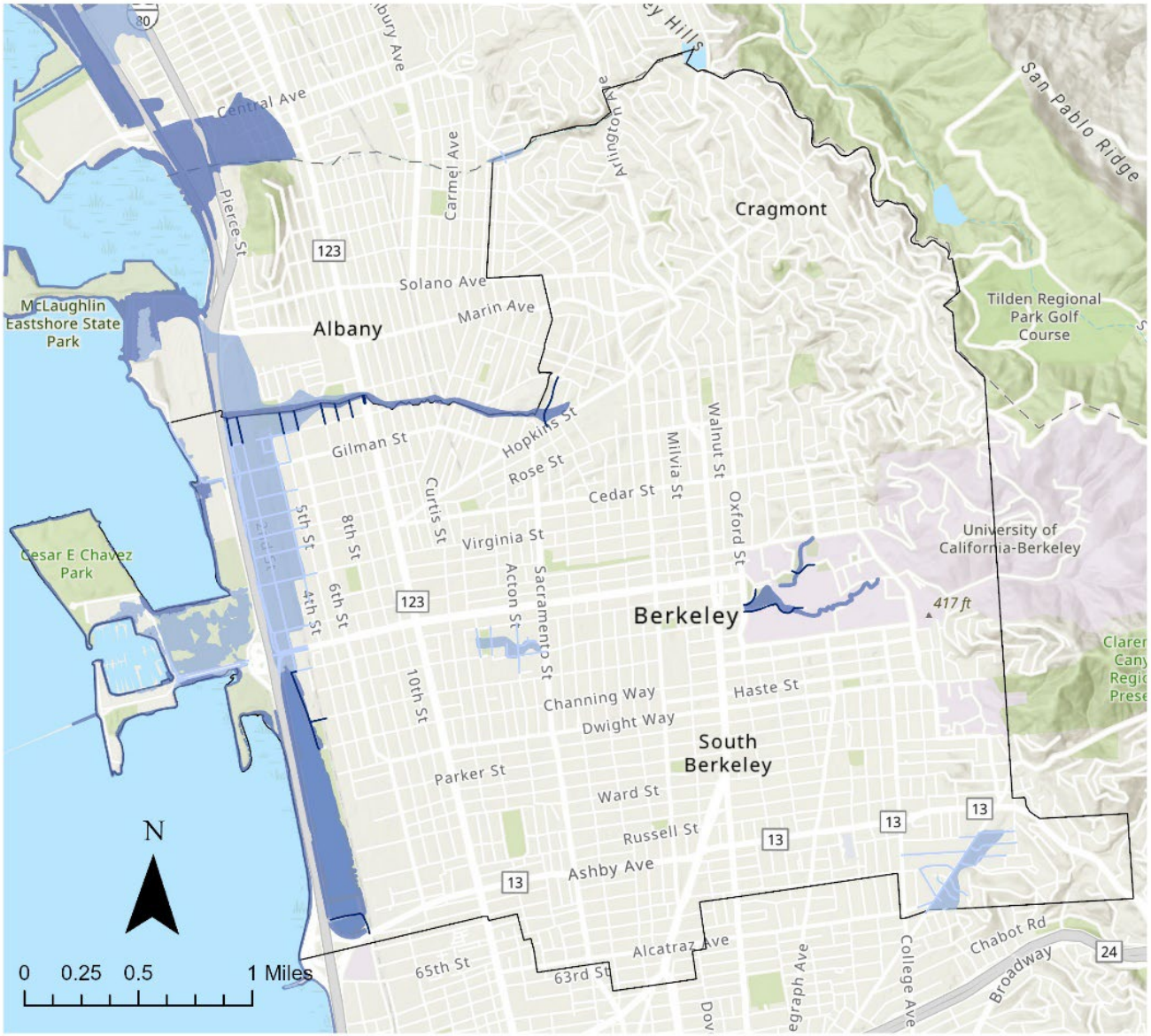
Berkeley Floodplains



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Storm Drain Overflow

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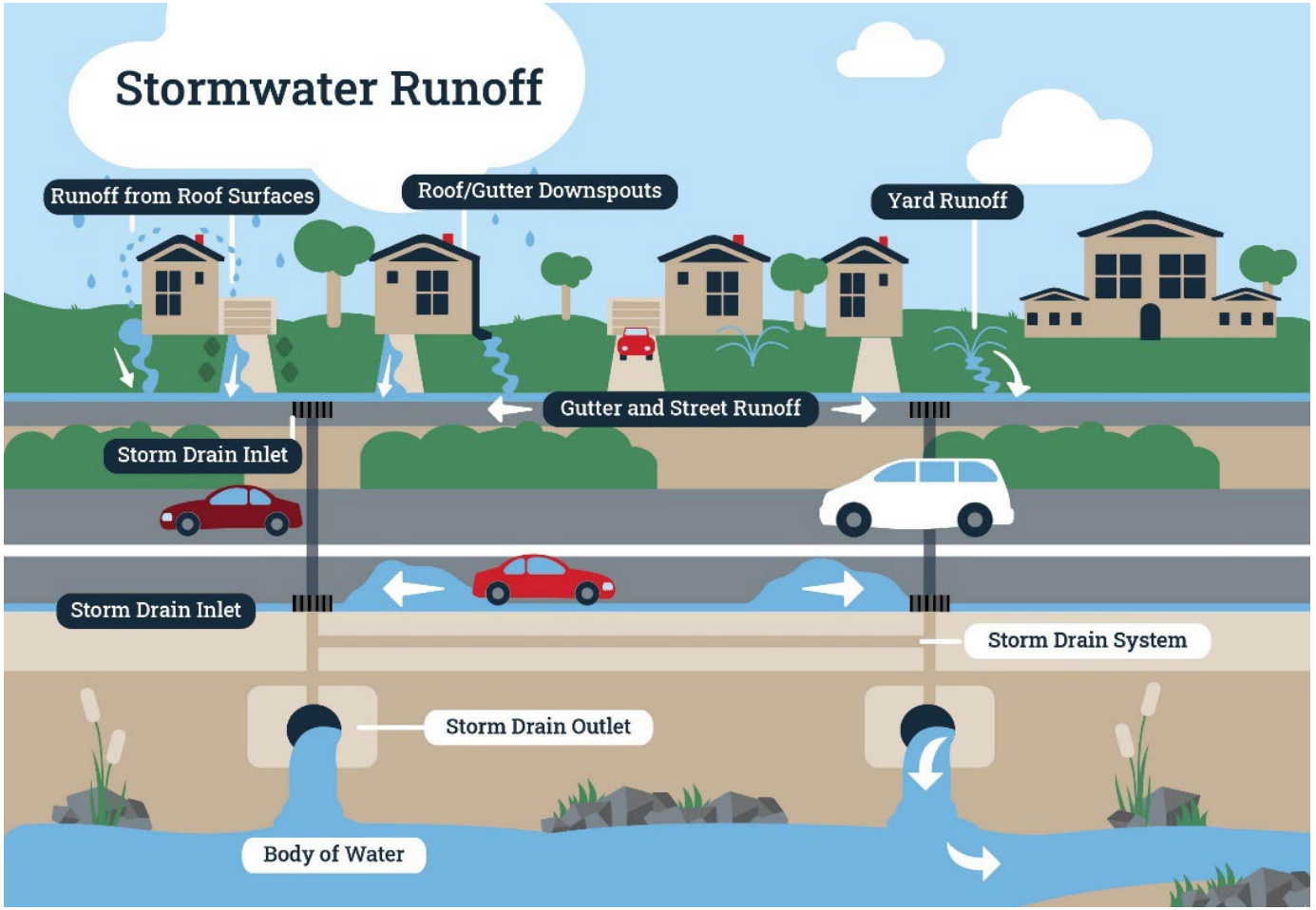
What is Storm Drain Overflow?



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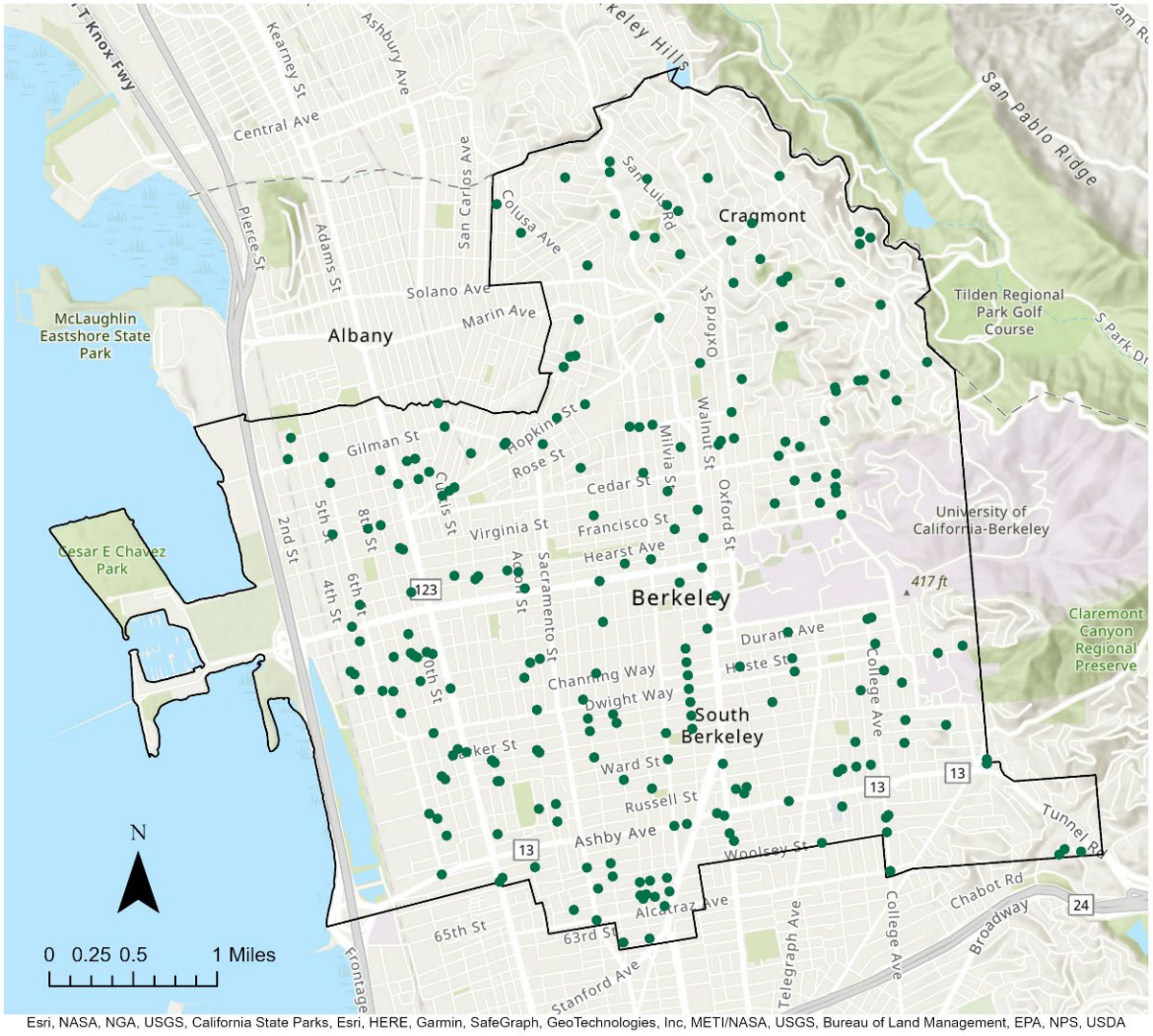
Storm Drain Infrastructure

- Designed to handle 2 inches in 6 hours
- Some components of Berkeley's storm drain infrastructure are over 90 years old

Flooding in Southwest Berkeley during last October's record-breaking storm.
Credit: Guillaume Pierre

Storm Drain Issues



Esri, NASA, NGA, USGS, California State Parks, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA

Storm Drain System Issues, Jan-June 2023

- Areas of Observed Storm Drain Overflow

2024 Draft Mitigation Plan: Flooding Strategy

Maintain City participation in the National Flood Insurance Program.

- Use updated FEMA maps
- Incorporate FEMA guidance into City plans and procedures

Development Standards

- Use development standards to ensure that new development does not contribute to an increase in flood potential.

Stormwater Master Plan

Complete a Stormwater Master Plan for all City stormwater infrastructure, to:

- Identify system deficiencies
- Establish a capital stormwater improvement plan, and
- Identify funding mechanisms.

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Tide Tubes

- Renovate the tide tubes that remove storm water from Berkeley Aquatic Park and Potter Street to the Bay.

Designing Public Improvements

- Design public improvements such as streets, parks and plazas, for retention and infiltration of stormwater by diverting urban runoff to bio-filtration systems.

Bioswale at Rose and Hopkins

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What can you do about flooding?

Protect your neighborhood

- Flooding often occurs due to storm drain blockage. Keep water flowing by participating in the adopt a drain program.

Protect your home

- Direct water away from your building.
- Watch how water flows or accumulates around your home to identify potential trouble spots.

Flood Insurance

- Consider **flood insurance,** since typical homeowners insurance policies do not cover flooding.

FEMA

NATIONAL FLOOD INSURANCE PROGRAM

Are sandbags right for you?

Do you live near a Berkeley creek?

Have you experienced flooding in the past?

- Learn how to sandbag
- Learn whether sandbags will be protective for your property

Make your sandbag plan

- If you are unable to sandbag, connect with neighbors and friends who can assist you in sandbagging to protect your home during severe storms
- Make a plan for where you'll get sandbags in significant storms.

Where to get sandbags?

- Local hardware stores
- City's Corporation Yard
  - 10 free bags during storm season
  - Monday-Friday, 8 am - 4 pm
  - Berkeley residents and businesses only; bring ID or a business card).

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During heavy rains

- Elevate important items, if possible, especially from first floor/garage.
- Do not walk, swim or drive through flooded waters. Turn around, don’t drown.
- Be ready for power/internet outage
- If your home floods, be ready for cleanup.

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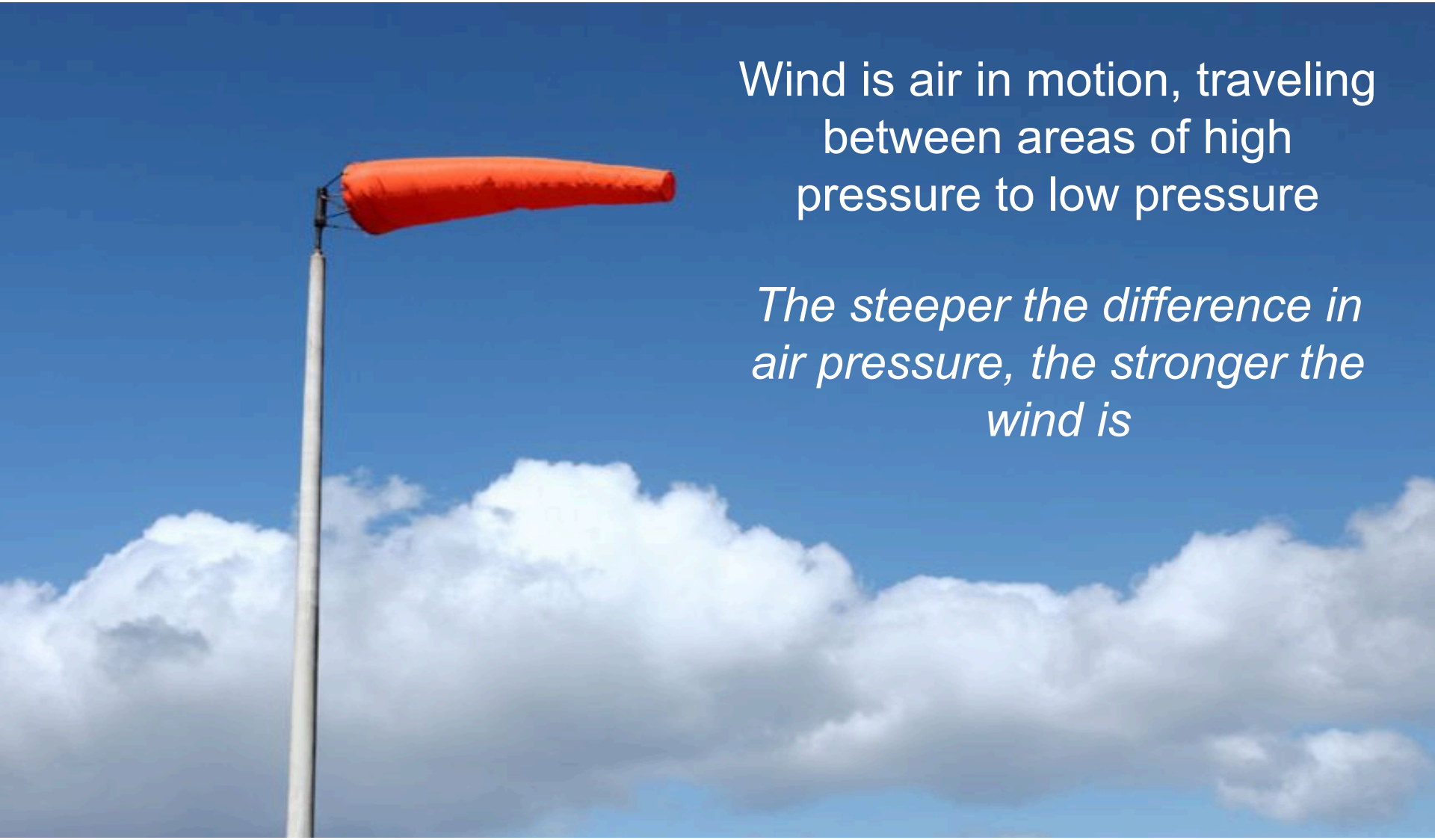
High Wind Events

How is Wind formed?



Wind is air in motion, traveling between areas of high pressure to low pressure

The steeper the difference in air pressure, the stronger the wind is

Wind in Berkeley

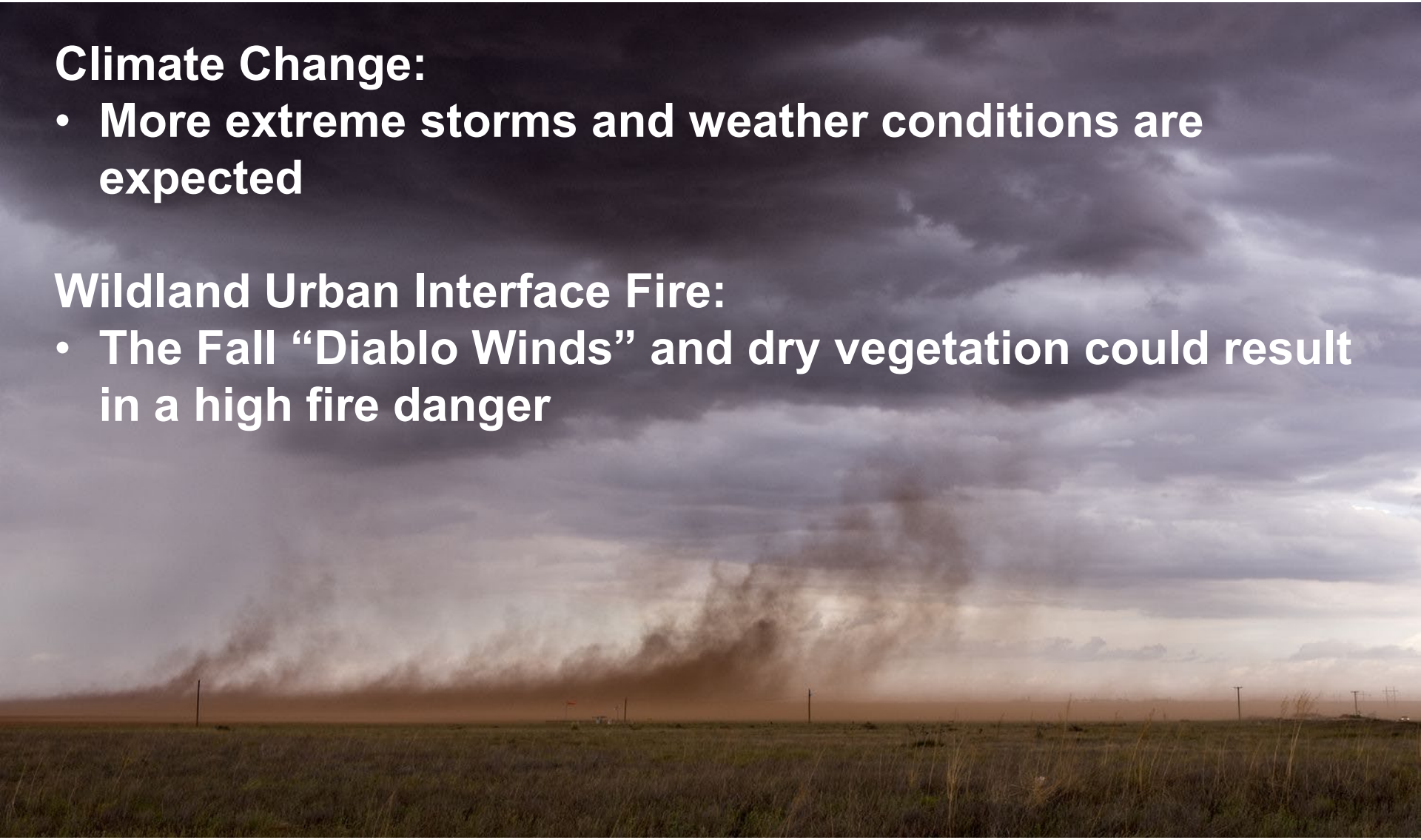
In Berkeley, high wind events are associated with the seasons

- **Winter**: weather systems and cold fronts

- **Summer**: temperature and pressure differences between the Pacific Ocean and the interior valleys to the east create strong winds from the west

- **Spring & Fall**: warm, dry offshore winds from the northeast, known as “Diablo Winds”

Related Hazards



Climate Change:

- More extreme storms and weather conditions are expected

Wildland Urban Interface Fire:

- The Fall “Diablo Winds” and dry vegetation could result in a high fire danger

What is “high wind”?

- ***Sustained wind*** *of 40 mph or more, lasting for 1 hour or more*

or

- ***Wind gust*** *(usually 20-30 seconds) of 58 mph or higher*

Vulnerabilities

Direct

- Trees
- Utility lines
- Heavy objects
- High-profile vehicles and RVs

Indirect

- People

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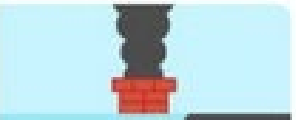
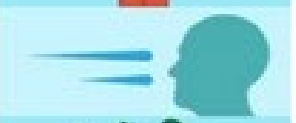
Beaufort Wind Scale

< 1 mph	Calm	Smoke rises vertically	
1-3 mph	Light air	Direction shown by smoke drift	
4-7 mph	Light breeze	Wind felt on face	
8-12 mph	Gentle breeze	Leaves and small twigs in constant motion	
13-18 mph	Moderate breeze	Raises dust and loose paper	
19-24 mph	Fresh breeze	Small trees and leafs begin to sway	
25-31 mph	Strong breeze	Large branches in motion	
32-38 mph	High wind, moderate gale, near gale	Whole trees in motion	
39-46 mph	Gale, fresh gale	Twigs break off trees	
47-54 mph	Strong/severe gale	Slight structural damage	
55-63 mph	Storm, whole gale	Trees uprooted, considerable structural damage	
64-72 mph	Violent storm	Widespread damage	
>73 mph	Hurricane force	Devastation	

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What can you do about high winds?

Keep Trees Maintained

City trees

Call 311

Email

trees@berkleyca.gov

Private trees

Trim, prune and talk to arborist

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Before a wind event…

Secure outdoor items

Be ready for power outages

During high winds…

Stay inside if you can

Stay away from trees

If you see a downed power line, call 9-1-1

Credit: Berkeleyside, Benji Friedman, March 2023 at Berkeley Marina

During high winds…

If you see a downed power line, stay away and call 9-1-1

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Recap & Next Steps

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Recap

- **Creek flooding** and **storm drain issues** cause most flooding in Berkeley
- Infrastructure improvements can reduce risks
- Residents can protect their neighborhoods and homes
- **High winds** can create dangerous situations – get ready and then stay out of the way if you can!

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Next Steps Today!

- Mitigation plan:
  - Share your top mitigation actions and other ideas
  - Full draft plan available in 2024
  - Mitigation@BerkeleyCA.gov

- Learn more at today's event!
  - Adopt a storm drain
  - Learn how to sandbag and if it will protect your property

Berkeley Ready
Maintain City participation in the National Flood Insurance Program.
• Use updated FEMA maps
• Incorporate FEMA guidance into City plans and procedures
FEMA
MEETINGS
ALL MEETINGS MUST BE SCHEDULED THROUGH THE CORPORATION YARD MANAGEMENT OFFICE- 10 OPERATIONS 981-6620
NO MEETINGS SHALL BE HELD BETWEEN 11:30 a.m. to 100 p.m.
PLEASE REMOVE ALL CHART PAPER AND ERASE BLACKBOARD
DO NOT ATTEMPT TO INFLUG VENDING MACHINES
LEAVE AREA CLEAN AND DOORS CLOSED
Thank you
EXIT
Which action do you prefer?
READY RESILIENT

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Tsunami

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Agenda

- Tsunami Information
  - What is a tsunami?
  - Where is it in Berkeley?
  - What could be affected by a tsunami?
- Mitigation Strategy Actions
- Community Readiness Steps

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What is a Tsunami?

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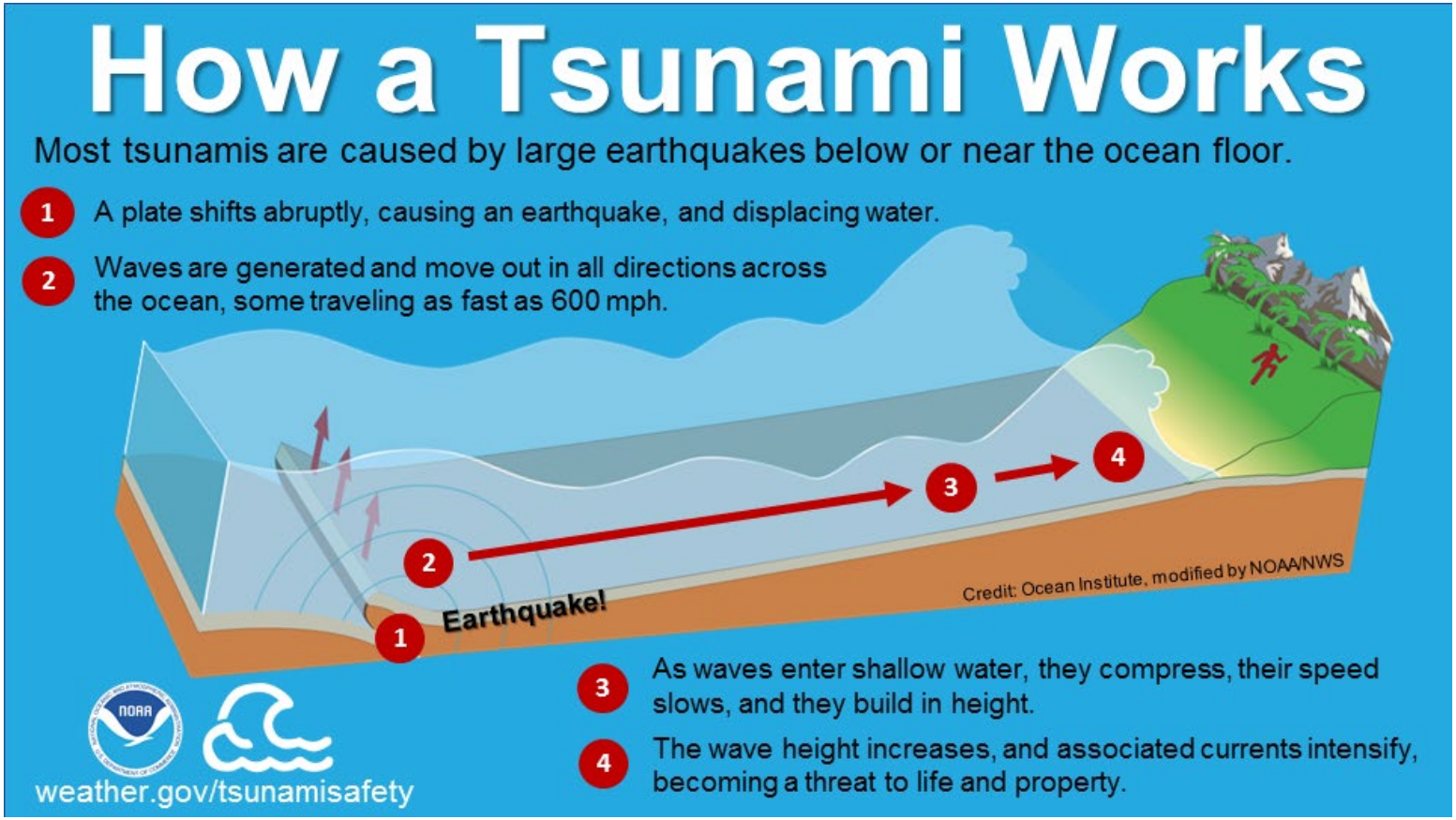
What is a Tsunami?



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Berkeley Marina Tsunami

Yachtblackgold
1 subscriber
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11
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https://www.youtube.com/watch?v=r_Z07BOolmc

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Tonga tsunami surge into the Berkeley Marina

Berkeleyside
739 subscribers
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5
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https://www.youtube.com/watch?v=hdANpkJ_Xzc&t=17s

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Tsunami Wrecks Marina in Santa Cruz California

WDEF News 12
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https://www.youtube.com/watch?v=C0Afa4pjWg4

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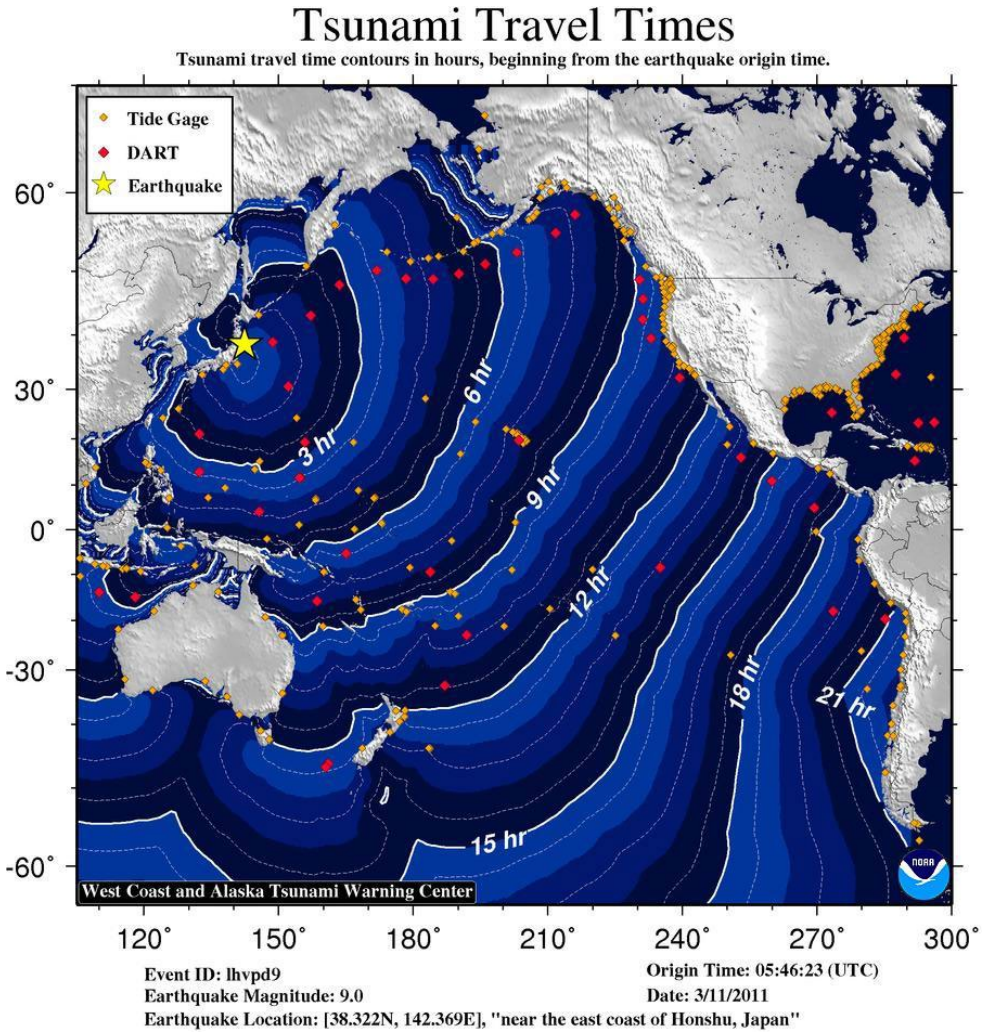
What is a Tsunami?

- Tsunamis affecting the Bay Area can result from **offshore earthquakes within the Bay Area, or from very distant events.**
- Tsunamis impacting the Bay Area are usually generated by faults in Washington and Alaska.



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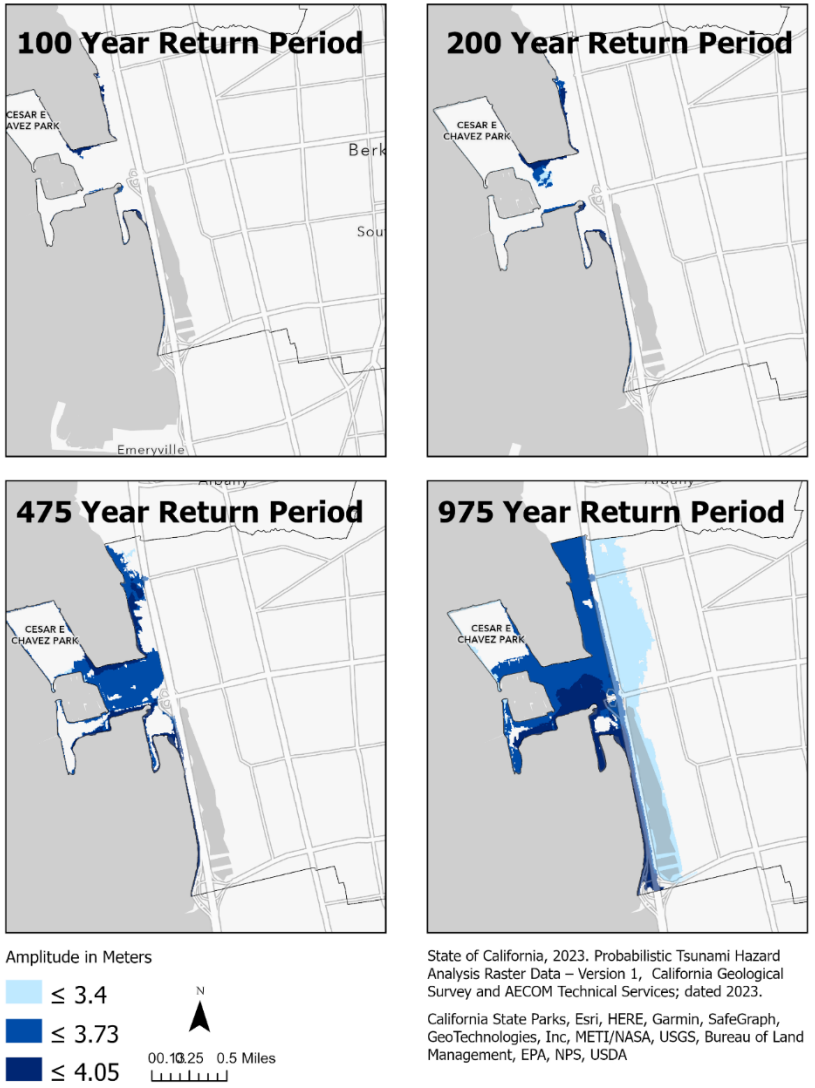
Where is it in Berkeley?

Tsunamis would mostly impact the areas of Berkeley near the Bay. From the coast to about sixth street is considered the tsunami zone. The area that we watch the most is the marina and the maritime community.



State of California, 2023. Probabilistic Tsunami Hazard Analysis Raster Data – Version 1, California Geological Survey and AECOM Technical Services; dated 2023.

California State Parks, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA

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Draft 2024 Mitigation Strategy Tsunami Actions

Mitigate the tsunami hazard at the Berkeley Marina

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Mitigation Strategy Actions

- Continue to repair and replace damaged finger docks.
  - Complete the demolition and replacement of D&E docks.
  - Consider reconstruction or repairs to J L M N and O docks as funding becomes available.

A look back: A broken dock in the marina after the March 11, 2011, tsunami entered the bay. Credit: Betsy Dorsett

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Mitigation Strategy Actions

- Collaborate with the California Office of Emergency Services, the California Geological Survey, and the Federal Emergency Management Agency to **document and explore additional tsunami hazard mitigation measures for Berkeley's maritime communities.**

FEMA

Cal OES
GOVERNOR'S OFFICE
OF EMERGENCY SERVICES

California
Department of
Conservation

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Community Readiness Steps

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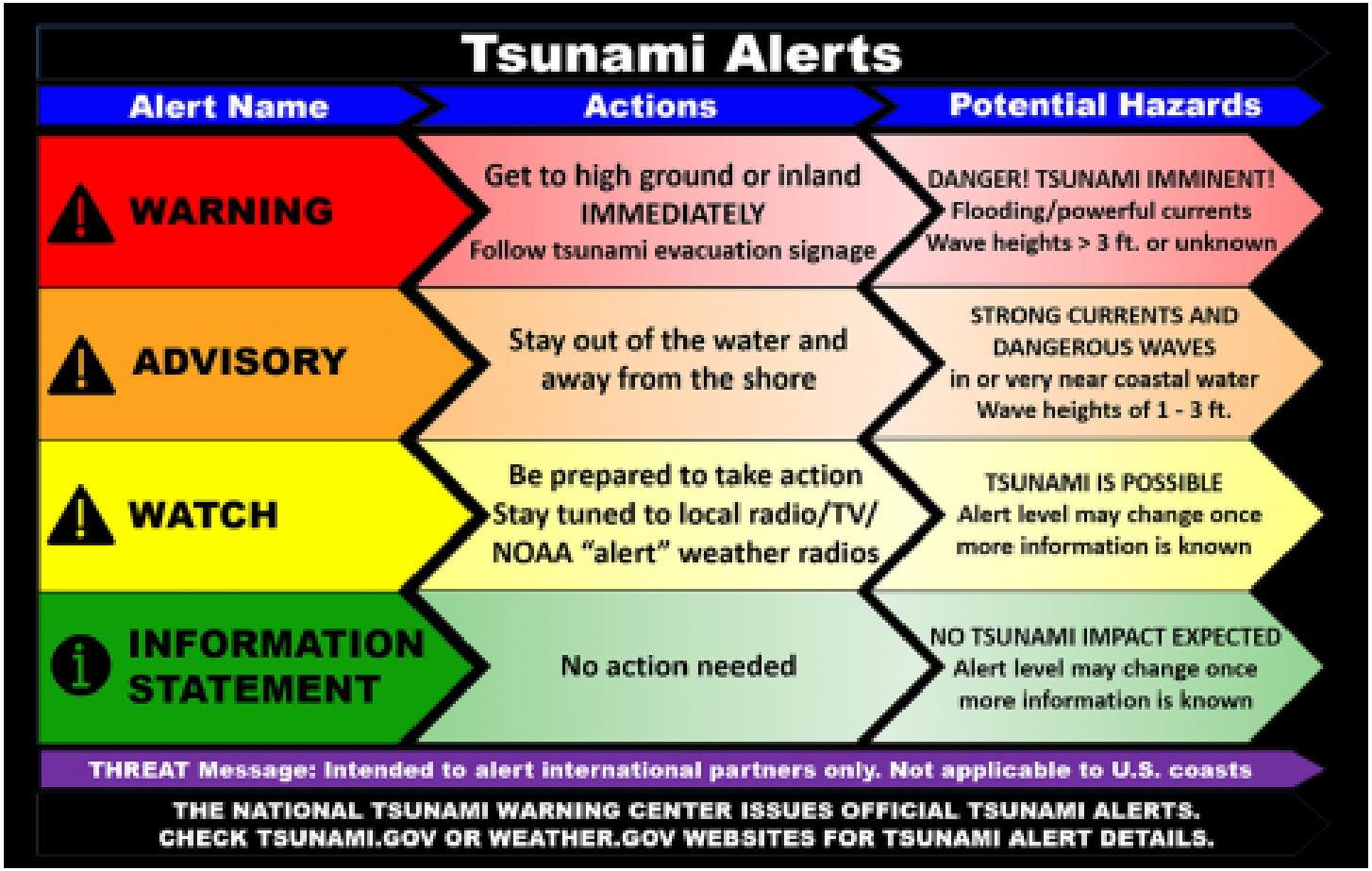
Community Readiness Steps



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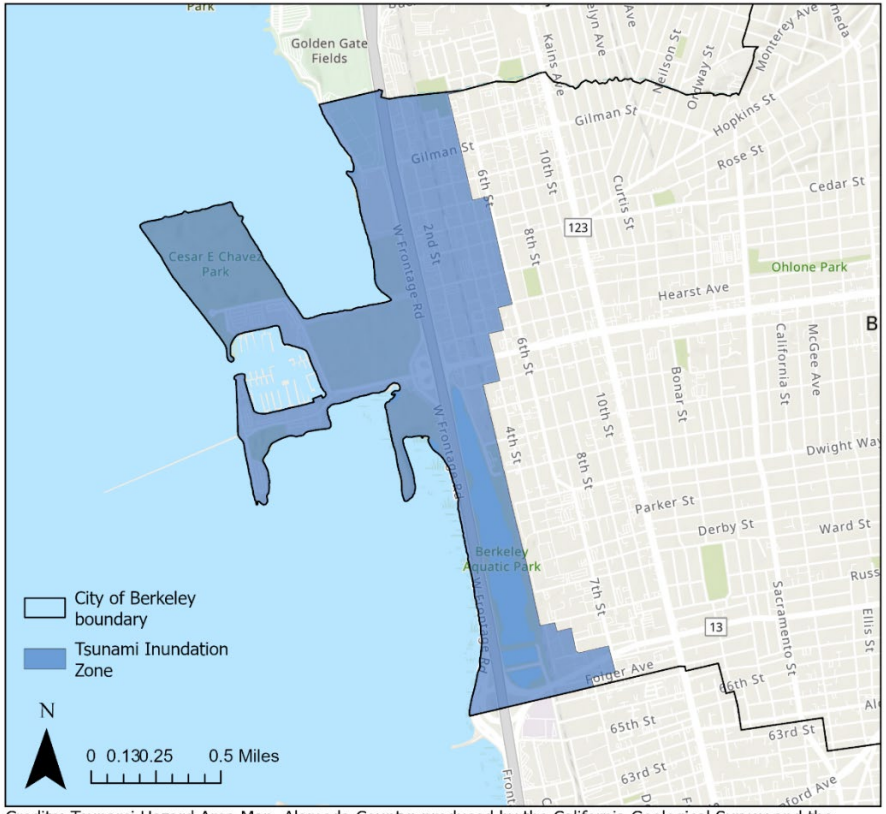

Credits: Tsunami Hazard Area Map, Alameda County; produced by the California Geological Survey and the California Governor's Office of Emergency Services; 2021, mapped at multiple scales.

California State Parks, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, US Census Bureau, USDA, Esri, NASA, NGA, USGS, FEMA

Community Readiness Steps

- Understand Berkeley's tsunami inundation area to **identify whether you might find yourself in the tsunami inundation zone**

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Community Readiness Steps

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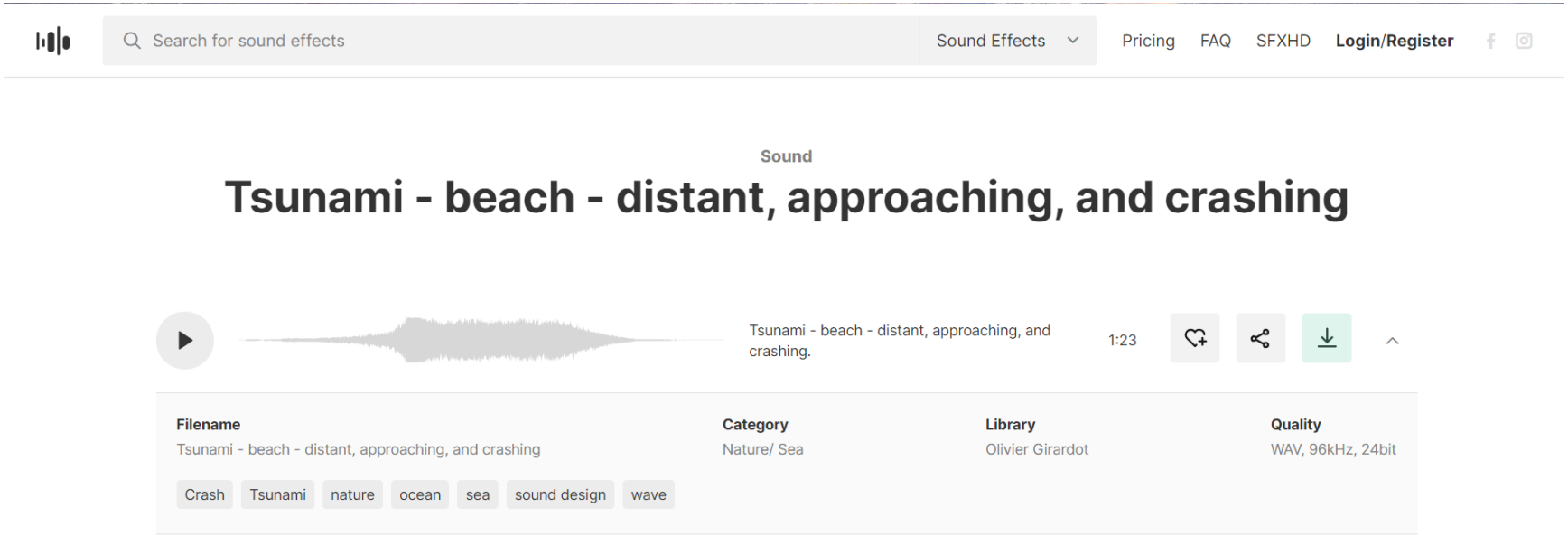
Know the Roar



https://www.soundsnap.com/tsunami_beach_distant_approaching_and_crashing_0

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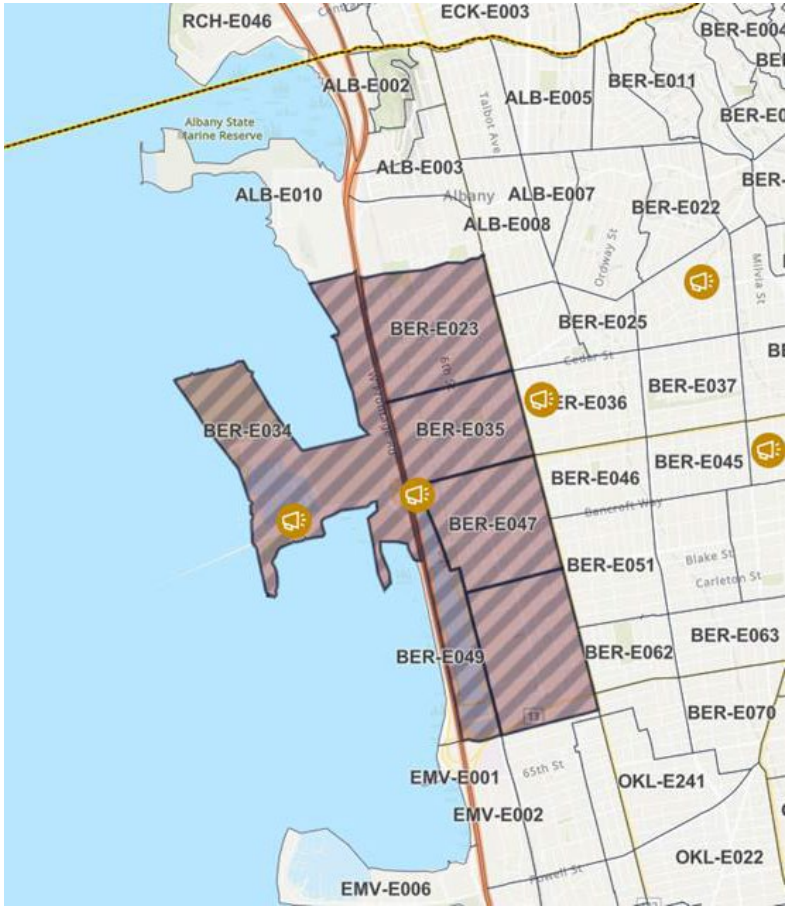
Community Readiness Steps

- Bookmark and get familiar with **Berkeley's Emergency Map**



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Community Readiness Steps

- **Personal Preparedness**
  - Sign up for **AC Alert**
  - Visit Berkeley Ready Table afterward if you are not already signed up

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Community Readiness Steps

- **Personal Preparedness**
  - Get familiar with the emergency tones from **Berkeley's Outdoor Warning System.**
  - Test Message
  - Tsunami Advisory

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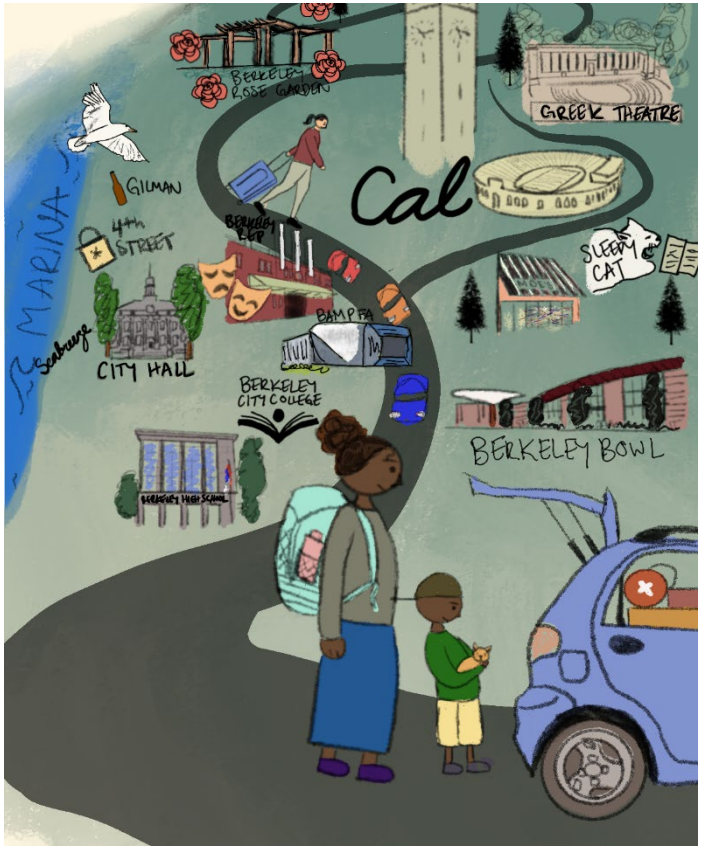
Community Readiness Steps

- If you live in the tsunami inundation zone**, make your household evacuation plan for tsunami**, including:
  - Where will you go – east, out of the tsunami zone
  - How will you get there, using which routes
  - Who can help if you need it
  - What will you pack



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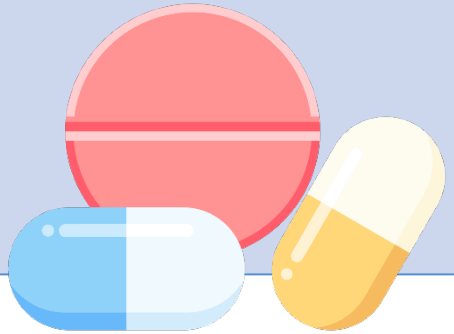
My household will pack…

Distant Source Tsunami

- Items to be safe and comfortable while you are away
- Medications, prescriptions, and medical devices
- Computers, electronics & chargers
- Irreplaceable items (family treasures, art, photo albums)
- Other Valuables



Near Source Tsunami

- **Go-bag (backpack)** with basic items:
  - Flashlight/headlamp
  - Area map, marked with driving/ walking evacuation routes
  - Printed list of phone numbers and email addresses for important contacts
  - Battery-powered radio and extra batteries
  - Prescriptions or critical medications
  - Extra eyeglasses or contact lenses
  - Extra set of keys
  - Cell phone charger
  - Copies of important documents
  - Toiletries and change of clothing
  - Hand sanitizer
- **As you leave, grab**: Wallet, cell phone

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Maritime Community

Berkeley Ready
City of Berkeley

Keep Your Boat Tsunami Ready!

Make sure your boat is secured and ready. Keep in mind that the City will shut down the dock 1 hour before the tsunami's anticipated arrival time.

- Secure your boat to the dock and tie down any loose gear.
- Check your dock line condition and replace any worn dock lines.
- Remove as much loose boating gear onboard as possible, especially electronics and important documents. Any gear that will remain on your boat should be secured.
- Turn off and disconnect shore power cords, water supply hoses and propane or other gas valves.
- Secure and lock all hatches and port holes. Check for leaks, and seal them as necessary.

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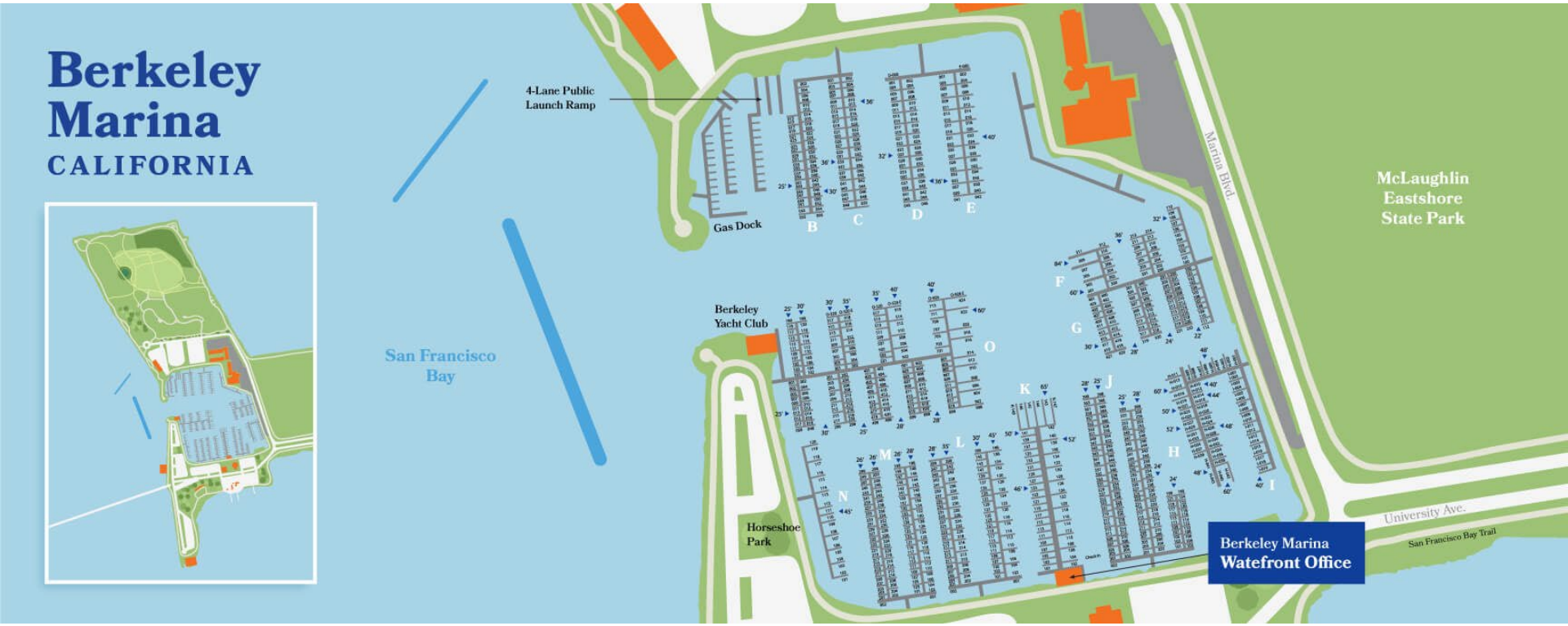
Maritime Community

The City of Berkeley will evacuate docks and shut them down within 1 hour of a tsunami's estimated arrival.



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Activity: Household Tsunami Evacuation Planning

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Next Steps

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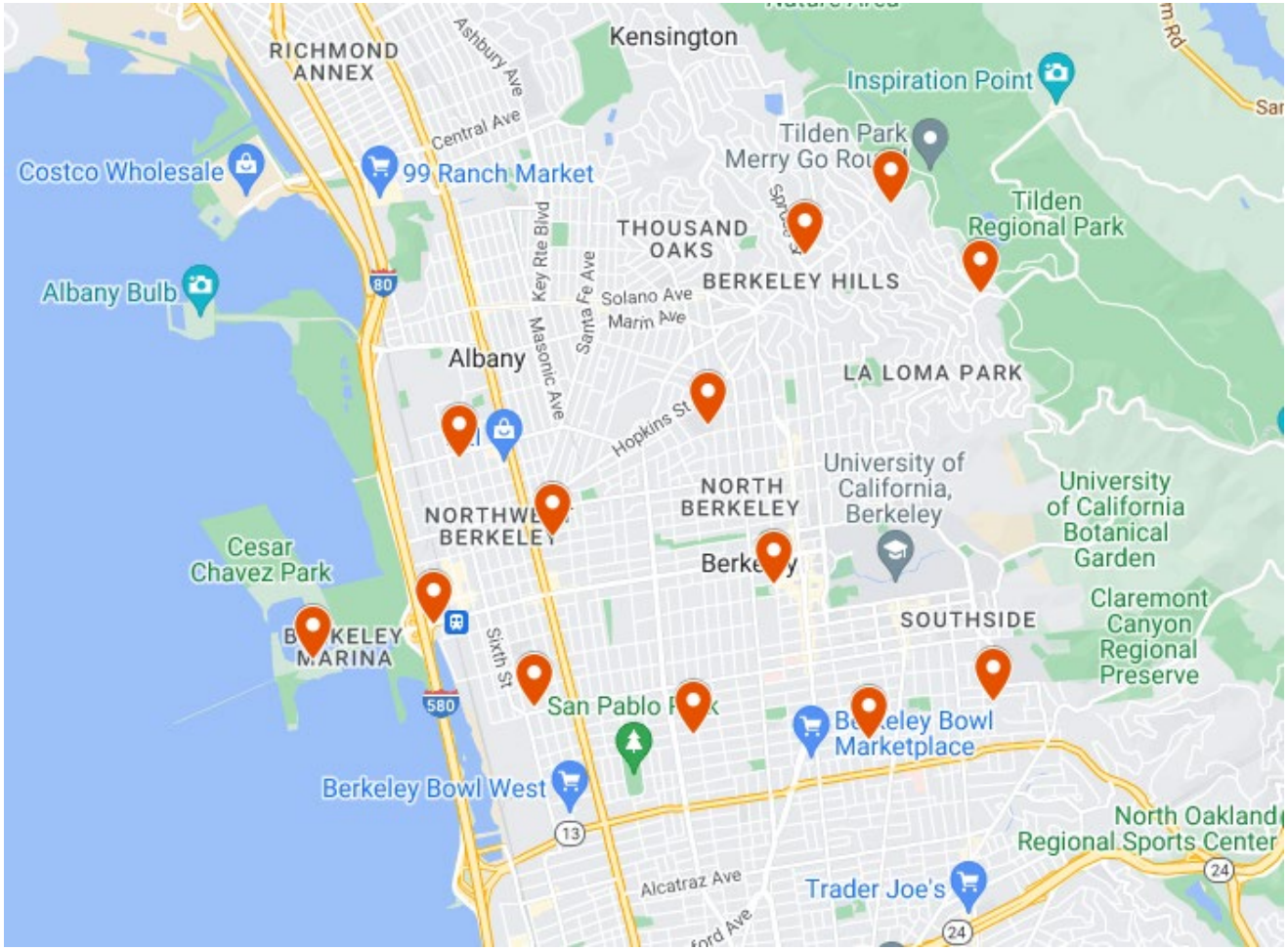
Outdoor Warning System Locations



List of people that were contacted to help draft the plan

City Staff

- Daniel Akagi, Supervising Civil Engineer, Public Works Department
- Joy Brown, Operations Manager, Public Works Department
- Jamie Cooney, Hazardous Materials Specialist, Planning Department
- Sean Crothers, Waterfront Supervisor, Parks, Recreation, and Waterfront Division
- Thomas Dodge, Forestry Technician, Parks, Recreation, and Waterfront Division
- Ali Endress, Waterfront Manager, Parks, Recreation, and Waterfront Division
- Makinde Falade, GIS Coordinator, Information Technology Department
- Lam Inthavong, Hazardous Materials Manager, Planning Department
- Leticia Jauregui, Solid Waste and Recycling Manager, Public Works Department
- Elmar Kapfer, Supervising Civil Engineer, Public Works Department
- David Lopez, Building Official, Building and Safety Division
- Jenny McNulty, Resilient buildings Program Manager, Building and Safety Division
- Rebecca Milliken, Sustainability Outreach Specialist, Office of Energy and Sustainable Development
- Hamid Mostowfi, Supervising Traffic Engineer, Public Works Department
- Srinivas Muktevi, Supervising Civil Engineer, Public Works Department
- Ron Nevels, Supervising Civil Engineer, Public Works Department
- Alene Pearson, Deputy Director of Planning and Development, Planning Department
- Ruth Raisner, Health Services Program Specialist, Public Health Emergency Preparedness and Immunization Program
- Billi Romain, Manager, Office of Energy and Sustainable Development
- Marna Schwartz, Sustainability Coordinator, Office of Energy and Sustainable Development
- Alisa Shen, Principal Planner, Planning Department
- Katharine Sullivan, COVID-19 Response Coordinator, Health, Housing, and Community Services
- Ron Torres, Division Manager, Environmental Health
- Katie Van Dyke, Chief Resilience Officer, Office of Energy and Sustainable Development

External Hazard Experts

- Jackie Bott, Engineering Geologist, California Geological Survey
- Sarah Church, Sustainability Project Manager, County of Alameda
- Brian Garcia, Warning Coordination Meteorologist, National Weather Service
- Eric Geist, Research Geophysicist, United States Geological Survey
- Nick Graehl, Engineering Geologist, California Geological Survey
- Anne Wein, Operations Research Analyst, United States Geological Survey
- Rick Wilson, Senior Engineering Geologist, California Geological Survey

Community Partners

- Ed Roberts Campus
- Berkeley Youth Alternatives
- McGee Baptist Church

- La Peña
- YMCA Head Start Preschool
- Harriet Tubman Terrace Apartments
- Easy Does It
- Oregon Park Senior Apartments
- Ecology Center
- Berkeley Humane
- Multicultural Institute
- Berkeley Pathwanderers
- Berkeley City College
- Bay Area Rapid Transit
- City of Oakland
- Alameda County Sheriff's Office - Office of Homeland Security and Emergency Services
- Lawrence Berkeley National Lab
- Kinder Morgan Corporation
- East Bay Municipal Utility District
- Union Pacific Railroad
- UC Berkeley
- Bayer
- Caltrans
- City of Albany
- City of Emeryville
- Union Pacific Railroad
- East Bay Regional Parks District
- Kensington Fire
- PG&E

From: Mitigation
To: "jfeil@oaklandca.gov"
Subject: Berkeley Mitigation Plan - Invitation to Participate
Date: Thursday, September 7, 2023 10:26:00 AM

Dear Jessica,

My name is Jamie Albrecht, and I am an Emergency Services Coordinator with the City of Berkeley. It's really nice to meet you! It would be awesome to connect more as Emergency Managers in East Bay when you have the time.

I am reaching out because we're beginning the process to update our 2024 Local Hazard Mitigation Plan. As our lovely neighbor, we're reaching out for any insights or ideas you might want to share as we embark on the planning processs:

1. Any key vulnerabilities or concerns you have related to natural hazards that impact Berkeley and Oakland. In the 2024 update to the LHMP, we are considering the following natural hazards: earthquake, wildfire, tsunami, landslide, poor air quality, extreme heat, utility disruption, sea level rise, high wind events, and flooding.
2. What actions do you recommend the City take to reduce disaster risk? Any potential mitigation actions between our two jurisdictions?
3. Do you want to highlight any work you all have done to reduce risk that is also relevant to Berkeley?
4. Is there anything you want to share or make sure we're also looking into?

I know you must have a million things on your to do list, so thank you in advance for taking the time to read this and consider offering feedback. If you can, **please provide your feedback before September 18.** I will follow up a few times between now and then to provide a reminder. Please let me know if you have any questions or want to hop on a call.

Thank you again! And hope to meet you soon!

Warmly,
Jamie

Jamie Albrecht
she/her/hers
Emergency Services Coordinator
City of Berkeley Office of Emergency Services
e | jalbrecht@cityofberkeley.info p | (510) 981-5577

From: Mitigation
To: "phess@acgov.org"
Subject: Berkeley Mitigation Plan - Invitation to Participate
Date: Thursday, September 7, 2023 10:28:00 AM

Dear Paul,

My name is Jamie Albrecht, and I am an Emergency Services Coordinator with the City of Berkeley. It's really nice to meet you! It would be awesome to connect more as Emergency Managers in East Bay when you have the time.

I am reaching out because we're beginning the process to update our 2024 Local Hazard Mitigation Plan. Since you have the county-wide perspective, we're reaching out for any insights or ideas you might want to share as we embark on the planning process:

1. Any key vulnerabilities or concerns you have related to natural hazards that impact Berkeley and Alameda County in general. In the 2024 update to the LHMP, we are considering the following natural hazards: earthquake, wildfire, tsunami, landslide, poor air quality, extreme heat, utility disruption, sea level rise, high wind events, and flooding.
2. What actions do you recommend the City take to reduce disaster risk? Any potential mitigation actions you want to note between jurisdictions or areas for potential collaboration?
3. Do you want to highlight any work you all have done to reduce risk that is also relevant to Berkeley?
4. Is there anything you want to share or make sure we're also looking into?

I know you must have a million things on your to do list, so thank you in advance for taking the time to read this and consider offering feedback. If you can, **please provide your feedback before September 18.** I will follow up a few times between now and then to provide a reminder. Please let me know if you have any questions or want to hop on a call.

Thank you again! And hope to meet you soon!

Warmly,
Jamie

Jamie Albrecht
she/her/hers
Emergency Services Coordinator
City of Berkeley Office of Emergency Services
e | jalbrecht@cityofberkeley.info p | (510) 981-5577

From: Mitigation
To: "jvalenzuela@kensingtonfire.org"; "mmayorga@kensingtonfire.org"
Subject: Berkeley Mitigation Plan - Invitation to Participate
Date: Thursday, September 7, 2023 10:35:00 AM

Dear Mary and Johnny,

My name is Jamie Albrecht, and I am an Emergency Services Coordinator with the City of Berkeley. It's really nice to meet you! It would be awesome to connect more as Emergency Managers in East Bay when you have the time.

I am reaching out because we're beginning the process to update our 2024 Local Hazard Mitigation Plan. As our lovely neighbor, we're reaching out for any insights or ideas you might want to share as we embark on the planning process:

1. Any key vulnerabilities or concerns you have related to natural hazards that impact Berkeley and Kensington. In the 2024 update to the LHMP, we are considering the following natural hazards: earthquake, wildfire, tsunami, landslide, poor air quality, extreme heat, utility disruption, sea level rise, high wind events, and flooding.
2. What actions do you recommend the City take to reduce disaster risk? Any potential mitigation actions between our two jurisdictions?
3. Do you want to highlight any work you all have done to reduce risk that is also relevant to Berkeley?
4. Is there anything you want to share or make sure we're also looking into?

I know you must have a million things on your to do list, so thank you in advance for taking the time to read this and consider offering feedback. If you can, **please provide your feedback before September 18.** I will follow up a few times between now and then to provide a reminder. Please let me know if you have any questions or want to hop on a call.

Thank you again! And hope to meet you soon!

Warmly,
Jamie

Jamie Albrecht
she/her/hers
Emergency Services Coordinator
City of Berkeley Office of Emergency Services
e | jalbrecht@cityofberkeley.info p | (510) 981-5577

From: Mitigation
To: "lelefant@emeryville.org"
Subject: Berkeley Mitigation Plan - Invitation to Participate
Date: Thursday, September 7, 2023 10:39:00 AM

Dear Lori

My name is Jamie Albrecht, and I am an Emergency Services Coordinator with the City of Berkeley. It's really nice to meet you! It would be awesome to connect more as Emergency Managers in East Bay when you have the time.

I am reaching out because we're beginning the process to update our 2024 Local Hazard Mitigation Plan. As our lovely neighbor, we're reaching out for any insights or ideas you might want to share as we embark on the planning process:

1. Any key vulnerabilities or concerns you have related to natural hazards that impact Berkeley and Emeryville. In the 2024 update to the LHMP, we are considering the following natural hazards: earthquake, wildfire, tsunami, landslide, poor air quality, extreme heat, utility disruption, sea level rise, high wind events, and flooding.
2. What actions do you recommend the City take to reduce disaster risk? Any potential mitigation actions between our two jurisdictions?
3. Do you want to highlight any work you all have done to reduce risk that is also relevant to Berkeley?
4. Is there anything you want to share or make sure we're also looking into?

I know you must have a million things on your to do list, so thank you in advance for taking the time to read this and consider offering feedback. If you can, **please provide your feedback before September 18.** I will follow up a few times between now and then to provide a reminder. Please let me know if you have any questions or want to hop on a call.

Thank you again! And hope to meet you soon!

Warmly,
Jamie

Jamie Albrecht
she/her/hers
Emergency Services Coordinator
City of Berkeley Office of Emergency Services
e | jalbrecht@cityofberkeley.info p | (510) 981-5577

From: Mitigation
To: "jenn.cogley@bayer.com"
Subject: Berkeley Mitigation Plan - Invitation to Participate
Date: Thursday, September 7, 2023 10:01:00 AM

Dear Jenn,

My name is Jamie Albrecht, and I am an Emergency Services Coordinator with the City of Berkeley. First, I want to thank you for all that you do to serve the Berkeley community. Second, I'd like to invite you to contribute to our 2024 Local Hazard Mitigation Plan.

The City of Berkeley is currently updating its 2024 Local Hazard Mitigation Plan. The LHMP is a public document that addresses Berkeley's natural hazards and establishes a 5-year mitigation strategy to better protect the community in the next disaster. As a key partner to the City of Berkeley, you are invited to participate in the plan development process.

We're interested in hearing from you:

1. Description of your main functions and any disaster related work your organization does
2. Any key vulnerabilities or concerns you have related to natural hazards in Berkeley. In the 2024 update to the LHMP, we are considering the following natural hazards: earthquake, wildfire, tsunami, landslide, poor air quality, extreme heat, utility disruption, sea level rise, high wind events, and flooding.
3. What actions do you recommend the City take to reduce disaster risk?
4. What work in reducing disaster risk in Berkeley does your organization want to highlight or share from the last five years?

We hope you will take this as a great opportunity to inform the community about your concerns and all your hard work to keep Berkeley safe. With this information, we can take better and more informed actions as City and as a Berkeley community.

Please provide your feedback before September 18. I will follow up a few times between now and then to provide a reminder. Please let me know if you have any questions or want to hop on a call.

Thank you again for your help with this Plan and for all that you do for Berkeley!

Warmly,

Jamie

Jamie Albrecht
she/her/hers
Emergency Services Coordinator
City of Berkeley Office of Emergency Services
e | jalbrecht@cityofberkeley.info p | (510) 981-5577

From: Albrecht, Jamie
To: "Wittenbergd@kindermorgan.com"
Subject: FW: Berkeley Mitigation Plan – Invitation to Participate
Date: Wednesday, September 6, 2023 5:41:00 PM

Not sure if this is the right email address. Learned your name from Scott's out of office.

From: Albrecht, Jamie
Sent: Wednesday, September 6, 2023 5:38 PM
To: manleys@kindermorgan.com
Subject: FW: Berkeley Mitigation Plan – Invitation to Participate

Forwarding this to you per Nicole's out of office! Please do let me know if I should send to someone else.

Thank you,
Jamie

From: Mitigation
Sent: Friday, September 1, 2023 10:53 AM
To: nicole_stewart@kindermorgan.com
Subject: Berkeley Mitigation Plan – Invitation to Participate

Dear Nicole,

My name is Jamie Albrecht, and I am an Emergency Services Coordinator with the City of Berkeley. First, I want to thank you for all that you do to serve the Berkeley community. Second, I'd like to invite you to contribute to our 2024 Local Hazard Mitigation Plan.

The City of Berkeley is currently updating its 2024 Local Hazard Mitigation Plan. The LHMP is a public document that addresses Berkeley's natural hazards and establishes a 5-year mitigation strategy to better protect the community in the next disaster. As a key partner to the City of Berkeley, you are invited to participate in the plan development process.

We're interested in hearing from you:

1. Description of your main functions and any disaster related work your organization does
2. Any key vulnerabilities or concerns you have related to natural hazards in Berkeley. In the 2024 update to the LHMP, we are considering the following natural hazards: earthquake, wildfire, tsunami, landslide, poor air quality, extreme heat, utility disruption, sea level rise, high wind events, and flooding.
3. What actions do you recommend the City take to reduce disaster risk?
4. What work in reducing disaster risk in Berkeley does your organization want to highlight or share from the last five years?

We hope you will take this as a great opportunity to inform the community about your concerns and

all your hard work to keep Berkeley safe. With this information, we can take better and more informed actions as City and as a Berkeley community.

Please provide your feedback before September 12. I will follow up a few times between now and then to provide a reminder. Please let me know if you have any questions or want to hop on a call.

Thank you again for your help with this Plan and for all that you do for Berkeley!

Warmly,

Jamie

Jamie Albrecht
she/her/hers
Emergency Services Coordinator
City of Berkeley Office of Emergency Services
e | jalbrecht@cityofberkeley.info p | (510) 981-5577

From:	Albrecht, Jamie
To:	James Nunez
Cc:	Mitigation; August Harless; Ian Servin
Subject:	RE: Berkeley Mitigation Plan – Invitation to Participate
Date:	Friday, September 8, 2023 1:06:00 PM

Yes, of course – take a few extra days! Thank you so much for taking the time to provide us with your insights. Super appreciate it.

_____

Jamie Albrecht
she/her/hers
Emergency Services Coordinator
City of Berkeley Office of Emergency Services
e | jalbrecht@cityofberkeley.info p | (510) 981-5577

From: James Nunez <jnunez@lbl.gov>
Sent: Thursday, September 7, 2023 8:10 PM
To: Albrecht, Jamie <JAlbrecht@berkeleyca.gov>
Cc: Mitigation <Mitigation@berkeleyca.gov>; August Harless <AHarless@lbl.gov>; Ian Servin <iservin@lbl.gov>
Subject: Re: Berkeley Mitigation Plan – Invitation to Participate

WARNING: This is not a City of Berkeley email. Do not click links or attachments unless you trust the sender and know the content is safe.

Hi Jamie,

Apologies for the late reply. Several of us have been out of the office and scattered to the wind for training! It's been great to meet you and I hope you're getting settled on the team.

I'm putting two of my best and brightest on this effort. I've cc'd Ian and August on this email. Would it be possible to get a few extra days to work on this past the 13th? We are happy to support your effort and would like a little more time to give you quality input.

V/r,

James

James Nunez
Department Head, Emergency Services
Security & Emergency Services Division
Lawrence Berkeley National Laboratory
510.833.3989 (m) acta non verba

On Fri, Sep 1, 2023 at 11:51 AM Albrecht, Jamie <JAlbrecht@berkeleyca.gov> wrote:

> Dear James,
>
> Hope you're having a good week and that you have a relaxing long weekend ahead of you! It's been nice to get to know you a little bit on our bi-monthly calls. I am looking forward to continuing to work together.
>
> I am reaching out because I am leading the City's effort to update the 2024 Local Hazard Mitigation Plan. One thing we always do in our plan development stage is to reach out the City partners and offer them an opportunity to add to the Plan. Here's what we're hoping to capture:
>
> 1. Short description of the Lab and the work you all do related to disasters/emergency management
> 2. What concerns or vulnerabilities related to natural hazards do you have for the Lab that you think are worth mentioning in our Plan? In the 2024 update to the LHMP, we are considering the following natural hazards: earthquake, wildfire, tsunami, landslide, poor air quality, extreme heat, utility disruption, sea level rise, high wind events, and flooding.
> 3. What actions do you think the City should take to reduce risk? Are there future mitigation areas where you would like to see the Lab and the City work together?
> 4. What work in mitigating disaster risk does the Lab want to highlight or share from the last five years?
> 5. Anything else related to disaster mitigation that you want to include on behalf of the Lab, please let me know
>
> I am hoping this is information you might already have and hopefully this won't be too much work for you! I just want to make sure I am including you all and doing so with accurate and updated information. If you could send it to me before September 13, that would be much appreciated. I can send a few reminders along the way, too.
>
> I so appreciate your help with this! Let me know if you have any questions or would rather jump on the phone and chat through it.
>
> Warmly,
> Jamie
>
> ---
>
> **Jamie Albrecht**
> she/her/hers
> Emergency Services Coordinator
> City of Berkeley Office of Emergency Services
> e | jalbrecht@cityofberkeley.info p | (510) 981-5577

From:	Mitigation
To:	Trevor Jacobson; Bruce Curtis
Cc:	Mitigation
Subject:	RE: Berkeley Mitigation Plan – Invitation to Participate
Date:	Wednesday, September 6, 2023 5:38:00 PM
Attachments:	image002.png

Thanks so much!!

From: Trevor Jacobson <trevor@easydoesitservices.org>
Sent: Tuesday, September 5, 2023 10:27 AM
To: Albrecht, Jamie <JAlbrecht@berkeleyca.gov>; Bruce Curtis <bruce@easydoesitservices.org>
Cc: Mitigation <Mitigation@berkeleyca.gov>
Subject: RE: Berkeley Mitigation Plan – Invitation to Participate

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Hey Jamie,

Thanks, and likewise! I appreciate the opportunity to contribute to the 2024 Local Hazard Mitigation Plan. I'll be sure to send our feedback by the 12th.

Thank again,

Easy Does It
emergency services

Trevor Jacobson (he/him/his)
Outreach Coordinator

Phone (510) 438-1647 Fax (510) 845-2115
Web easydoesitservices.org Email trevor@easydoesitservices.org
PO Box 3365 Berkeley, CA 94703-2480
Follow Us, Facebook | Instagram | Twitter

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From: Albrecht, Jamie <JAlbrecht@berkeleyca.gov>
Sent: Wednesday, August 30, 2023 1:51 PM
To: Trevor Jacobson <trevor@easydoesitservices.org>; Bruce Curtis <bruce@easydoesitservices.org>
Cc: Mitigation <Mitigation@berkeleyca.gov>
Subject: Berkeley Mitigation Plan – Invitation to Participate

Hi Trevor and Bruce,

I hope that you both have been doing well! It's been nice to get to know you both a little bit more through the luncheon and the recent meetings. I wanted to reach out about something a bit different that I am currently working on, which is updating our 2024 Local Hazard Mitigation Plan. The linked website has the 2019 Plan.

The Local Hazard Mitigation Plan is a big, public document with strict requirements provided by the Federal Emergency Management Agency that addresses Berkeley's natural hazards, like earthquakes, extreme heat, and wildfires. It also establishes a 5-year mitigation strategy to better protect the community in the next disaster, focused on actions that reduce risk before a disaster happens, like retrofitting buildings. As a key part of the Berkeley Community and partner to the City, I hope you will considering contributing to the plan development process by sharing the following:

1. Your role in the Berkeley community, and any functions you have before, during, or after a disaster
2. Any key vulnerabilities or concerns you have related to natural hazards in Berkeley. In the 2024 update to the LHMP, we are considering the following natural hazards: earthquake, wildfire, tsunami, landslide, poor air quality, extreme heat, utility disruption, sea level rise, high wind events, and flooding.
3. What actions do you recommend the City take to reduce disaster risk?
4. What work in reducing disaster risk does your organization want to highlight or share from the last five years?

We hope you will take this as a great opportunity to share your concerns as well all that you do to keep Berkeley safe. With this information, we can take better and more informed actions as City and as a Berkeley community.

Please provide your feedback by replying to this email before September 12. I will follow up a few times between now and then to provide a reminder. Please let me know if you have any questions or want to hop on a call.

Thank you again for your help with this Plan and for all that you do for Berkeley!

Warmly,
Jamie

Jamie Albrecht
she/her/hers
Emergency Services Coordinator
City of Berkeley Office of Emergency Services
e | jalbrecht@cityofberkeley.info p | (510) 981-5577

From: Mitigation
To: "atheile@ebparks.org"
Subject: Berkeley Mitigation Plan – Invitation to Participate
Date: Friday, September 1, 2023 11:29:00 AM

Dear Aileen,

My name is Jamie Albrecht, and I am an Emergency Services Coordinator with the City of Berkeley. First, I want to thank you for all that you do to serve the Berkeley community (I personally benefit so much from our regional parks, so thank you thank you!). Second, I'd like to invite you to contribute to our 2024 Local Hazard Mitigation Plan.

The City of Berkeley is currently updating its 2024 Local Hazard Mitigation Plan. The LHMP is a public document that addresses Berkeley's natural hazards and establishes a 5-year mitigation strategy to better protect the community in the next disaster. As a key partner to the City of Berkeley, you are invited to participate in the plan development process.

We like to include the following information from key partners in our plan:

1. Description of your main functions and any disaster related work you do
2. Any key vulnerabilities or concerns you have related to natural hazards in Berkeley. In the 2024 update to the LHMP, we are including sections on the following hazards: earthquake, wildfire, tsunami, landslide, poor air quality, extreme heat, utility disruption, sea level rise, high wind events, and flooding.
3. Any actions you recommend the City take to reduce disaster risk? Or actions you want to or are currently working on with the City on to reduce risk? (I know you're collaborating quite a bit with our Parks, Recreation, and Waterfront Department on some exciting grant opportunities, so we will definitely be highlight those, but feel free to share anything you want related to that work!)
4. What work in reducing disaster risk in Berkeley does PG&E want to highlight or share from the last five years?

We hope you will take this as a great opportunity to inform the community about your concerns and all your hard work to keep Berkeley safe. With this information, we can take better and more informed actions as City and as a Berkeley community.

Please provide your feedback before September 12. I will follow up a few times between now and then to provide a reminder. Please let me know if you have any questions or want to hop on a call.

Thank you again for your help with this Plan and for all that you do for Berkeley!

Warmly,
Jamie

Jamie Albrecht
she/her/hers

Emergency Services Coordinator
City of Berkeley Office of Emergency Services
e | jalbrecht@cityofberkeley.info p | (510) 981-5577

From: Mitigation
To: "mblagg@bart.gov"
Subject: Berkeley Mitigation Plan – Invitation to Participate - BART
Date: Friday, September 1, 2023 10:52:00 AM

Dear Marla,

My name is Jamie Albrecht, and I am an Emergency Services Coordinator with the City of Berkeley. First, I want to thank you for all that you do to serve the Berkeley community. Second, I'd like to invite you to contribute to our 2024 Local Hazard Mitigation Plan.

The City of Berkeley is currently updating its 2024 Local Hazard Mitigation Plan. The LHMP is a public document that addresses Berkeley's natural hazards and establishes a 5-year mitigation strategy to better protect the community in the next disaster. As a key partner to the City of Berkeley, you are invited to participate in the plan development process.

We're interested in hearing from you:

1. Description of your main functions and any disaster related work your agency does
2. Any key vulnerabilities or concerns you have related to natural hazards in Berkeley. In the 2024 update to the LHMP, we are considering the following natural hazards: earthquake, wildfire, tsunami, landslide, poor air quality, extreme heat, utility disruption, sea level rise, high wind events, and flooding.
3. What actions do you recommend the City take to reduce disaster risk?
4. What work in reducing disaster risk in Berkeley does your organization want to highlight or share from the last five years?

We hope you will take this as a great opportunity to inform the community about your concerns and all your hard work to keep Berkeley safe. With this information, we can take better and more informed actions as City and as a Berkeley community.

Please provide your feedback before September 12. I will follow up a few times between now and then to provide a reminder. Please let me know if you have any questions or want to hop on a call.

Thank you again for your help with this Plan and for all that you do for Berkeley!

Warmly,

Jamie

Jamie Albrecht
she/her/hers
Emergency Services Coordinator
City of Berkeley Office of Emergency Services
e | jalbrecht@cityofberkeley.info p | (510) 981-5577

From: Mitigation
To: "sslaughter@peralta.edu"
Subject: Berkeley Mitigation Plan – Invitation to Participate - Berkeley City College
Date: Friday, September 1, 2023 10:42:00 AM

Dear Shirley,

My name is Jamie Albrecht, and I am an Emergency Services Coordinator with the City of Berkeley. First, I want to thank you for all that you do to serve the Berkeley community. Second, I'd like to invite you to contribute to our 2024 Local Hazard Mitigation Plan.

The City of Berkeley is currently updating its 2024 Local Hazard Mitigation Plan. The LHMP is a public document that addresses Berkeley's natural hazards and establishes a 5-year mitigation strategy to better protect the community in the next disaster. As a key partner to the City of Berkeley, you are invited to participate in the plan development process.

We're interested in hearing from you:

1. Description of your main functions and any disaster related work you do
2. Any key vulnerabilities or concerns you have related to natural hazards in Berkeley. In the 2024 update to the LHMP, we are considering the following natural hazards: earthquake, wildfire, tsunami, landslide, poor air quality, extreme heat, utility disruption, sea level rise, high wind events, and flooding.
3. What actions do you recommend the City take to reduce disaster risk?
4. What work in reducing disaster risk does your organization want to highlight or share from the last five years?

We hope you will take this as a great opportunity to inform the community about your concerns and all your hard work to keep Berkeley safe. With this information, we can take better and more informed actions as City and as a Berkeley community.

Please provide your feedback before September 12. I will follow up a few times between now and then to provide a reminder. Please let me know if you have any questions or want to hop on a call.

Thank you again for your help with this Plan and for all that you do for Berkeley!

Warmly,

Jamie

Jamie Albrecht
she/her/hers
Emergency Services Coordinator
City of Berkeley Office of Emergency Services
e | jalbrecht@cityofberkeley.info p | (510) 981-5577

From: Mitigation
To: "kwilliams@byaonline.org"
Subject: Berkeley Mitigation Plan – Invitation to Participate
Date: Friday, September 1, 2023 10:37:00 AM

Dear Kevin,

My name is Jamie Albrecht, and I am an Emergency Services Coordinator with the City of Berkeley. We've been on some emails together, but haven't had a chance to really meet yet. First, I want to thank you for all that you do to serve the Berkeley community. Second, I wanted to share with you a project that I am working on and hope you will consider offering your insights!

The City of Berkeley is currently updating its 2024 Local Hazard Mitigation Plan. The LHMP is a public document that addresses Berkeley's natural hazards and establishes a 5-year mitigation strategy to better protect the community in the next disaster. As a key partner to the City of Berkeley, you are invited to participate in the plan development process.

I'd love to include the following information from you:

1. Your role in the Berkeley community, and any functions you have before, during, or after a disaster
2. Any key vulnerabilities or concerns you have related to natural hazards in Berkeley. In the 2024 update to the LHMP, we are considering the following natural hazards: earthquake, wildfire, tsunami, landslide, poor air quality, extreme heat, utility disruption, sea level rise, high wind events, and flooding.
3. What actions do you recommend the City take to reduce disaster risk?
4. What work in reducing disaster risk does your organization want to highlight or share from the last five years?

We hope you will take this as a great opportunity to share your concerns as well all that you do to keep Berkeley safe. With this information, we can take better and more informed actions as City and as a Berkeley community.

Please provide your feedback by replying to this email before September 12. I will follow up a few times between now and then to provide a reminder. Please let me know if you have any questions or want to hop on a call.

Thank you again for your help with this Plan and for all that you do for Berkeley!

Warmly,
Jamie

Jamie Albrecht
she/her/hers
Emergency Services Coordinator

City of Berkeley Office of Emergency Services
e | jalbrecht@cityofberkeley.info p | (510) 981-5577

From: Mitigation
To: Jane Andersen
Cc: Mitigation
Subject: Berkeley Mitigation Plan – Invitation to Participate
Date: Wednesday, August 30, 2023 2:02:00 PM

Hi Jane,

It's been too long! I hope you've been well since we last spoke. It would be great to catch up soon, if you have the time! You might remember from when we met that I described my major project being the 2024 update to the Local Hazard Mitigation Plan. It's been taking up so much of my time that I am sorry I haven't been more in touch.

Anyways, I am reaching out because it's always been super important to the Plan to include updates from key City partners. I'd love to include the following from the Pathwanderers, if you wouldn't mind sharing:

1. Brief description of the organization and what you do
2. Any key vulnerabilities or concerns you have related to natural hazards in Berkeley. In the 2024 update to the LHMP, we are considering the following natural hazards: earthquake, wildfire, tsunami, landslide, poor air quality, extreme heat, utility disruption, sea level rise, high wind events, and flooding.
3. What actions do you recommend the City take to reduce disaster risk?
4. What mitigation actions or successes does your organization want to highlight from the last five years?

We hope you will take this as a great opportunity to inform the community about your concerns and all your hard work to keep Berkeley safe. **If you could please provide your feedback before September 12, I would super appreciate it.** I will follow up a few times between now and then to provide a reminder. Please let me know if you have any questions or want to hop on a call.

Thank you again for your help with this Plan and for all that you do for Berkeley!

Warmly,
Jamie

Jamie Albrecht
she/her/hers
Emergency Services Coordinator
City of Berkeley Office of Emergency Services
e | jalbrecht@cityofberkeley.info p | (510) 981-5577

From: Mitigation
To: "deborah@ecologycenter.org"
Subject: Berkeley Mitigation Plan – Invitation to Participate
Date: Wednesday, August 30, 2023 1:56:00 PM

Dear Debbie,

My name is Jamie Albrecht, and I am an Emergency Services Coordinator with the City of Berkeley. First, I want to thank you for all that you do to serve the Berkeley community. Second, I'd like to invite you to contribute to our 2024 Local Hazard Mitigation Plan.

The Plan is a public document that addresses Berkeley's natural hazards, like earthquakes, extreme heat, and wildfires, and establishes a 5-year mitigation strategy to better protect the community in the next disaster. As a key part of the Berkeley Community and partner to the City, I hope you will considering contributing to the plan development process.

We'd love to include the following information from you:

1. Your role in the Berkeley community, and any functions you have before, during, or after a disaster
2. Any key vulnerabilities or concerns you have related to natural hazards in Berkeley. In the 2024 update to the LHMP, we are considering the following natural hazards: earthquake, wildfire, tsunami, landslide, poor air quality, extreme heat, utility disruption, sea level rise, high wind events, and flooding.
3. What actions do you recommend the City take to reduce disaster risk?
4. What work in reducing disaster risk does your organization want to highlight or share from the last five years?

We hope you will take this as a great opportunity to share your concerns as well all that you do to keep Berkeley safe. With this information, we can take better and more informed actions as City and as a Berkeley community.

Please provide your feedback by replying to this email before September 12. I will follow up a few times between now and then to provide a reminder. Please let me know if you have any questions or want to hop on a call.

Thank you again for your help with this Plan and for all that you do for Berkeley!

Warmly,
Jamie

Jamie Albrecht
she/her/hers
Emergency Services Coordinator

City of Berkeley Office of Emergency Services
e | jalbrecht@cityofberkeley.info p | (510) 981-5577

From: Mitigation
To: "jzerwekh@berkeleyhumane.org"
Subject: Berkeley Mitigation Plan – Invitation to Participate
Date: Wednesday, August 30, 2023 1:53:00 PM

Dear Jeffery,

My name is Jamie Albrecht, and I am an Emergency Services Coordinator with the City of Berkeley. First, I want to thank you for all that you do to serve the Berkeley community. Second, I'd like to invite you to contribute to our 2024 Local Hazard Mitigation Plan.

The Plan is a public document that addresses Berkeley's natural hazards, like earthquakes, extreme heat, and wildfires, and establishes a 5-year mitigation strategy to better protect the community in the next disaster. As a key part of the Berkeley Community and partner to the City, I hope you will considering contributing to the plan development process.

We'd love to include the following information from you:

1. Your role in the Berkeley community, and any functions you have before, during, or after a disaster
2. Any key vulnerabilities or concerns you have related to natural hazards in Berkeley. In the 2024 update to the LHMP, we are considering the following natural hazards: earthquake, wildfire, tsunami, landslide, poor air quality, extreme heat, utility disruption, sea level rise, high wind events, and flooding.
3. What actions do you recommend the City take to reduce disaster risk?
4. What work in reducing disaster risk does your organization want to highlight or share from the last five years?

We hope you will take this as a great opportunity to share your concerns as well all that you do to keep Berkeley safe. With this information, we can take better and more informed actions as City and as a Berkeley community.

Please provide your feedback by replying to this email before September 12. I will follow up a few times between now and then to provide a reminder. Please let me know if you have any questions or want to hop on a call.

Thank you again for your help with this Plan and for all that you do for Berkeley!

Warmly,
Jamie

Jamie Albrecht
she/her/hers
Emergency Services Coordinator
City of Berkeley Office of Emergency Services

e | jalbrecht@cityofberkeley.info p | (510) 981-5577

From: Mitigation
To: "ajafasah@gmail.com"
Subject: Berkeley Mitigation Plan – Invitation to Participate
Date: Wednesday, August 30, 2023 1:52:00 PM

Dear Aja,

My name is Jamie Albrecht, and I am an Emergency Services Coordinator with the City of Berkeley. First, I want to thank you for all that you do to serve the Berkeley community. Second, I'd like to invite you to contribute to our 2024 Local Hazard Mitigation Plan.

The Plan is a public document that addresses Berkeley's natural hazards, like earthquakes, extreme heat, and wildfires, and establishes a 5-year mitigation strategy to better protect the community in the next disaster. As a key part of the Berkeley Community and partner to the City, I hope you will considering contributing to the plan development process.

We'd love to include the following information from you:

1. Your role in the Berkeley community, and any functions you have before, during, or after a disaster
2. Any key vulnerabilities or concerns you have related to natural hazards in Berkeley. In the 2024 update to the LHMP, we are considering the following natural hazards: earthquake, wildfire, tsunami, landslide, poor air quality, extreme heat, utility disruption, sea level rise, high wind events, and flooding.
3. What actions do you recommend the City take to reduce disaster risk?
4. What work in reducing disaster risk does your organization want to highlight or share from the last five years?

We hope you will take this as a great opportunity to share your concerns as well all that you do to keep Berkeley safe. With this information, we can take better and more informed actions as City and as a Berkeley community.

Please provide your feedback by replying to this email before September 12. I will follow up a few times between now and then to provide a reminder. Please let me know if you have any questions or want to hop on a call.

Thank you again for your help with this Plan and for all that you do for Berkeley!

Warmly,
Jamie

Jamie Albrecht
she/her/hers
Emergency Services Coordinator
City of Berkeley Office of Emergency Services

e | jalbrecht@cityofberkeley.info p | (510) 981-5577

From: Mitigation
To: "httmgr@amcllc.net"
Subject: Berkeley Mitigation Plan – Invitation to Participate
Date: Wednesday, August 30, 2023 1:41:00 PM

Dear Salvador,

My name is Jamie Albrecht, and I am an Emergency Services Coordinator with the City of Berkeley. First, I want to thank you for all that you do to serve the Berkeley community. Second, I'd like to invite you to contribute to our 2024 Local Hazard Mitigation Plan.

The Plan is a public document that addresses Berkeley's natural hazards, like earthquakes, extreme heat, and wildfires, and establishes a 5-year mitigation strategy to better protect the community in the next disaster. As a key part of the Berkeley Community and partner to the City, I hope you will considering contributing to the plan development process.

We'd love to include the following information from you:

1. Your role in the Berkeley community, and any functions you have before, during, or after a disaster
2. Any key vulnerabilities or concerns you have related to natural hazards in Berkeley. In the 2024 update to the LHMP, we are considering the following natural hazards: earthquake, wildfire, tsunami, landslide, poor air quality, extreme heat, utility disruption, sea level rise, high wind events, and flooding.
3. What actions do you recommend the City take to reduce disaster risk?
4. What work in reducing disaster risk does your organization want to highlight or share from the last five years?

We hope you will take this as a great opportunity to share your concerns as well all that you do to keep Berkeley safe. With this information, we can take better and more informed actions as City and as a Berkeley community.

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Thank you again for your help with this Plan and for all that you do for Berkeley!

Warmly,
Jamie

Jamie Albrecht
she/her/hers
Emergency Services Coordinator
City of Berkeley Office of Emergency Services

e | jalbrecht@cityofberkeley.info p | (510) 981-5577

From: Mitigation
To: "lbranford@ymcaeastbay.org"
Subject: Berkeley Mitigation Plan – Invitation to Participate
Date: Wednesday, August 30, 2023 1:40:00 PM

Dear Liz,

My name is Jamie Albrecht, and I am an Emergency Services Coordinator with the City of Berkeley. First, I want to thank you for all that you do to serve the Berkeley community. Second, I'd like to invite you to contribute to our 2024 Local Hazard Mitigation Plan.

The Plan is a public document that addresses Berkeley's natural hazards, like earthquakes, extreme heat, and wildfires, and establishes a 5-year mitigation strategy to better protect the community in the next disaster. As a key part of the Berkeley Community and partner to the City, I hope you will considering contributing to the plan development process.

We'd love to include the following information from you:

1. Your role in the Berkeley community, and any functions you have before, during, or after a disaster
2. Any key vulnerabilities or concerns you have related to natural hazards in Berkeley. In the 2024 update to the LHMP, we are considering the following natural hazards: earthquake, wildfire, tsunami, landslide, poor air quality, extreme heat, utility disruption, sea level rise, high wind events, and flooding.
3. What actions do you recommend the City take to reduce disaster risk?
4. What work in reducing disaster risk does your organization want to highlight or share from the last five years?

We hope you will take this as a great opportunity to share your concerns as well all that you do to keep Berkeley safe. With this information, we can take better and more informed actions as City and as a Berkeley community.

Please provide your feedback by replying to this email before September 12. I will follow up a few times between now and then to provide a reminder. Please let me know if you have any questions or want to hop on a call.

Thank you again for your help with this Plan and for all that you do for Berkeley!

Warmly,
Jamie

Jamie Albrecht
she/her/hers
Emergency Services Coordinator
City of Berkeley Office of Emergency Services

e | jalbrecht@cityofberkeley.info p | (510) 981-5577

From: Mitigation
To: "frostiesmith73@gmail.com"
Subject: Berkeley Mitigation Plan – Invitation to Participate
Date: Wednesday, August 30, 2023 1:38:00 PM

Dear Pastor Mike,

My name is Jamie Albrecht, and I am an Emergency Services Coordinator with the City of Berkeley. First, I want to thank you for all that you do to serve the Berkeley community. Second, I'd like to invite you to contribute to our 2024 Local Hazard Mitigation Plan.

The Plan is a public document that addresses Berkeley's natural hazards, like earthquakes, extreme heat, and wildfires, and establishes a 5-year mitigation strategy to better protect the community in the next disaster. As a key part of the Berkeley Community and partner to the City, I hope you will considering contributing to the plan development process.

We'd love to include the following information from you:

1. Your role in Berkeley community, and any functions you have before, during, or after a disaster
2. Any key vulnerabilities or concerns you have related to natural hazards in Berkeley. In the 2024 update to the LHMP, we are considering the following natural hazards: earthquake, wildfire, tsunami, landslide, poor air quality, extreme heat, utility disruption, sea level rise, high wind events, and flooding.
3. What actions do you recommend the City take to reduce disaster risk?
4. What actions or successes in reducing disaster risk does your organization want to share from the last five years?

We hope you will take this as a great opportunity to share your concerns as well all that you do to keep Berkeley safe. With this information, we can take better and more informed actions as City and as a Berkeley community.

Please provide your feedback by replying to this email before September 12. I will follow up a few times between now and then to provide a reminder. Please let me know if you have any questions or want to hop on a call.

Thank you again for your help with this Plan and for all that you do for Berkeley!

Warmly,
Jamie

Jamie Albrecht
she/her/hers
Emergency Services Coordinator
City of Berkeley Office of Emergency Services

e | jalbrecht@cityofberkeley.info p | (510) 981-5577

From: Mitigation
To: "jgriffith@edrobertscampus.org"
Subject: Berkeley Mitigation Plan – Invitation to Participate
Date: Wednesday, August 30, 2023 1:36:00 PM

Dear Josh,

My name is Jamie Albrecht, and I am an Emergency Services Coordinator with the City of Berkeley. First, I want to thank you for all that you do to serve the Berkeley community. Second, I'd like to invite you to contribute to our 2024 Local Hazard Mitigation Plan.

The Plan is a public document that addresses Berkeley's natural hazards, like earthquakes, extreme heat, and wildfires, and establishes a 5-year mitigation strategy to better protect the community in the next disaster. As a key part of the Berkeley Community and partner to the City, I hope you will considering contributing to the plan development process.

We'd love to include the following information from you:

1. Your role in Berkeley community, and any functions you have before, during, or after a disaster
2. Any key vulnerabilities or concerns you have related to natural hazards in Berkeley. In the 2024 update to the LHMP, we are considering the following natural hazards: earthquake, wildfire, tsunami, landslide, poor air quality, extreme heat, utility disruption, sea level rise, high wind events, and flooding.
3. What actions do you recommend the City take to reduce disaster risk?
4. What actions or successes in reducing disaster risk does your organization want to share from the last five years?

We hope you will take this as a great opportunity to share your concerns as well all that you do to keep Berkeley safe. With this information, we can take better and more informed actions as City and as a Berkeley community.

Please provide your feedback by replying to this email before September 12. I will follow up a few times between now and then to provide a reminder. Please let me know if you have any questions or want to hop on a call.

Thank you again for your help with this Plan and for all that you do for Berkeley!

Warmly,
Jamie

Jamie Albrecht
she/her/hers
Emergency Services Coordinator
City of Berkeley Office of Emergency Services
e | jalbrecht@cityofberkeley.info p | (510) 981-5577

From: Mitigation
To: "natalia@lapena.org"
Subject: Berkeley Mitigation Plan – Invitation to Participate
Date: Friday, September 1, 2023 11:59:00 AM

Dear Natalia,

My name is Jamie Albrecht, and I am an Emergency Services Coordinator with the City of Berkeley's Office of Emergency Services. I believe we've been on some emails together, but haven't had a chance to really meet yet. I have had the chance to meet some of your amazing staff, however!

First, I want to thank you for all that you do to serve the Berkeley community. Second, I wanted to share with you a project that I am working on and hope you will consider offering your insights!

The City of Berkeley is currently updating its 2024 Local Hazard Mitigation Plan. The LHMP is a public document that addresses Berkeley's natural hazards and establishes a 5-year mitigation strategy to better protect the community in the next disaster. As a key partner to the City of Berkeley, I wanted to invite you to participate in the plan development process.

We're hoping to include the following information from community partners in the Plan:

1. Your role in the Berkeley community, and any functions you have/take on related to disasters
2. What vulnerabilities or concerns do you have for Berkeley related to natural hazards? In the 2024 update to the LHMP, we are considering the following natural hazards: earthquake, wildfire, tsunami, landslide, poor air quality, extreme heat, utility disruption, sea level rise, high wind events, and flooding.
3. What actions do you want the City to take to reduce disaster risk?
4. What work in reducing disaster risk does your organization want to highlight or share from the last five years?

We hope you will take this as a great opportunity to share your concerns as well all that you do to keep Berkeley safe. With this information, we can take better and more informed actions as City and as a Berkeley community.

Please provide your feedback by replying to this email before September 12. I will follow up a few times between now and then to provide a reminder. Please let me know if you have any questions or want to hop on a call.

Thank you again for your help with this Plan and for all that you do for Berkeley!

Warmly,
Jamie

Jamie Albrecht
she/her/hers

Emergency Services Coordinator
City of Berkeley Office of Emergency Services
e | jalbrecht@cityofberkeley.info p | (510) 981-5577

From: Albrecht, Jamie
To: "Seamus Wilmot"
Subject: RE: Berkeley Mitigation Plan – Invitation to Participate
Date: Friday, September 1, 2023 3:46:00 PM

Appreciate you! Have a great weekend!

_____

Jamie Albrecht
she/her/hers
Emergency Services Coordinator
City of Berkeley Office of Emergency Services
e | jalbrecht@cityofberkeley.info p | (510) 981-5577

From: Seamus Wilmot <swilmot@berkeley.edu>
Sent: Friday, September 1, 2023 1:13 PM
To: Albrecht, Jamie <JAlbrecht@berkeleyca.gov>
Subject: Re: Berkeley Mitigation Plan – Invitation to Participate

WARNING: This is not a City of Berkeley email. Do not click links or attachments unless you trust the sender and know the content is safe.

Thanks Jamie,

I will get something back to you before the 13th.

Have a great weekend,

Thanks,
Seamus

Seamus Wilmot
Assistant Vice Chancellor and
Executive Director Business Operations
UC Berkeley

swilmot@berkeley.edu
(510) 643-7700

1995 University Ave, Ste 325
Berkeley, CA 94704-5746

https://regionalservices.berkeley.edu/
https://pt.berkeley.edu/
https://mailservices.berkeley.edu/
https://oem.berkeley.edu/

On Fri, Sep 1, 2023 at 11:48 AM Albrecht, Jamie <JAlbrecht@berkeleyca.gov> wrote:

> Dear Seamus,
>
> Hope you're having a good week and that you have a relaxing long weekend ahead of you! It's been nice to get to know you a little bit on our bi-monthly calls. I am looking forward to continuing to work together.
>
> I am reaching out because I am leading the City's effort to update the 2024 Local Hazard Mitigation Plan. One thing we always do in our plan development stage is to reach out the City partners and offer them an opportunity to add to the Plan. Here's what we're hoping to capture:
>
> 1. Short description of UC Berkeley and the work you all do before, during, and after a disaster
> 2. What concerns or vulnerabilities related to natural hazards do you have for UC Berkeley that you think are worth mentioning in our Plan? In the 2024 update to the LHMP, we are considering the following natural hazards: earthquake, wildfire, tsunami, landslide, poor air quality, extreme heat, utility disruption, sea level rise, high wind events, and flooding.
> 3. What actions do you think the City should take to reduce risk? Are there areas where you would like to see UC and the City work on together?
> 4. What work in reducing disaster risk does UC want to highlight or share from the last five years?
> 5. Anything else related to disaster mitigation that you want to include, please let me know
>
> I am hoping this is information you might already have and hopefully this won't be too much work for you! I just want to make sure I am including you all and doing so with accurate and updated information. If you could send it to me before September 13, that would be much appreciated. I can send a few reminders along the way, too.
>
> I so appreciate your help with this! Let me know if you have any questions or would rather jump on the phone and chat through it.
>
> Warmly,
> Jamie
>
> ---
>
> **Jamie Albrecht**
> she/her/hers
> Emergency Services Coordinator
> City of Berkeley Office of Emergency Services
> e | jalbrecht@cityofberkeley.info p | (510) 981-5577

DISASTER AND FIRE SAFETY COMMISSION
REGULAR MEETING

September 27, 2023
7:00 PM

Fire Department Division of Training Classroom – 997 Cedar Street

Present: Mike Wilson, Andy Katz, Weldon Bradstreet, Shirley Dean, Robert Kinosian, Theo Gordon, Greg Murphy, Harrison Raine
Absent: Todd Darling
Staff: Keith May, Leah Greenbaum, Sarah Lana
Public: 9 attendees

AGENDA

Preliminary Matters
Call to Order

Meeting called to order at 7:06 pm

Approval of the Agenda
Motion to approve minutes: G. Murphy
Second: T. Gordon
Vote: 5 Ayes: M. Wilson, A. Katz, W. Bradstreet, S. Dean, R. Kinosian, T. Gordon, G. Murphy, H. Raine; 0 Noes; 1 Absent: T. Darling; 0 Abstain

Raine arrived at 7:09 pm

Public Comment on Non-Agenda Matters
Public comment: 1

1. Chairperson's Report

2. Fire Department Staff Report*

Consent Items

3. Minutes of August 2, 2023*
   From: Commission Secretary
   Recommendation: Approve the draft minutes of the August 2, 2023 Regular Meeting.

   Motion to approve minutes: S. Dean
   Second: G. Murphy
   Vote: 5 Ayes: M. Wilson, A. Katz, W. Bradstreet, S. Dean, R. Kinosian, T. Gordon, G. Murphy, H. Raine; 0 Noes; 1 Absent: T. Darling; 0 Abstain

4. Minutes of September 6, 2023*
   From: Commission Secretary
   Recommendation: Approve the draft minutes of the September 6, 2023 Special Meeting.

   Motion to approve minutes: S. Dean
   Second: T. Gordon
   Vote: 5 Ayes: M. Wilson, A. Katz, W. Bradstreet, S. Dean, R. Kinosian, T. Gordon, G. Murphy, H. Raine; 0 Noes; 1 Absent: T. Darling; 0 Abstain

Action Items

5. Request that the Commission forward the Janice Thomas' August 27, 2023 letter "RE: State Fire Marshal's Recommendation For Panoramic Hill" to City Council, UC Berkeley President, and the UC President and Board * (Dean)
   Public comments: 2

   After discussion, Dean pulled this item from the action calendar and will draft a letter of support for the Commission to consider at the next meeting.

   At the meeting, Ms. Thomas distributed printed materials to commissioners. Those materials were added to the online agenda packet after the meeting.

Discussion Items

6. Staff presentation on 2024 Local Hazard Mitigation Plan update process* (Staff)
   Public comments: 3

7. Discussion on impact of increased density due to new developments along Shattuck/Adeline (Darling)

   Chair moved this item to next meeting.

8. Discussion on biolabs and other large facilities, hazardous materials contained therein, and potential emergency response impacts and challenges (Dean)

   Dean pulled item and requested Commission consider it as an action item at the next meeting. Dean will draft attachment for consideration at the next meeting.

9. Discussion to write a Commendation to Chief Sprague for the Master Facilities Plan (Dean)

   Dean pulled item and requested Commission consider it as an action item at the next meeting. Dean will draft attachment for consideration at the next meeting.

10. Update on the City's progress of evaluating and regulating non-ductile concrete structures* (Murphy)

    This item was not discussed at the meeting, but Commissioner Murphy offered a written report.

Work Group Reports

- Plan & Budget Oversight
- Home Hardening
- Wildland Urban Interface
- Safe Passages
- Community Outreach

No workgroup report outs—pushed to next meeting due to time.

11. Future Agenda Items and Next Steps
    - Discussion regarding concerns about the recent State Housing and Community Development ruling which would increase density in Fire Zones 2 and 3 (Dean)
    - Discussion on impact of increased density due to new developments along Shattuck/Adeline (Darling)

- Request that the Commission forward the Janice Thomas' August 27, 2023 letter "RE: State Fire Marshal's Recommendation For Panoramic Hill" to City Council, UC Berkeley President, and the UC President, City of Oakland, and Board of Forestry with a letter of support from the Commission (Dean)
- Discussion on biolabs and other large facilities, hazardous materials contained therein, and potential emergency response impacts and challenges (Dean)
- Discussion to write a Commendation to Chief Sprague for the Master Facilities Plan (Dean)

Adjournment

Meeting adjourned at 9:05pm

Motion to adjourn: G. Murphy
Second: S. Dean
Vote: 5 Ayes: M. Wilson, A. Katz, W. Bradstreet, S. Dean, R. Kinosian, T. Gordon, G. Murphy, H. Raine. 0 Noes; 1 Absent: T. Darling; 0 Abstain

~~~~~~

This meeting will be conducted in accordance with the Brown Act, Government Code Section 54953. Any member of the public may attend this meeting. Questions regarding this matter may be addressed to Keith May, kmay@berkeleyca.gov 510-981-5508.

Communications to Berkeley boards, commissions or committees are public record and will become part of the City's electronic records, which are accessible through the City's website. Please note: E-mail addresses, names, addresses, and other contact information are not required but, if included in any communication to a City board, commission, or committee, will become part of the public record. If you do not want your e-mail address or any other contact information to be made public, you may deliver communications via U.S. Postal Service or in person to the secretary of the relevant board, commission, or committee. If you do not want your contact information included in the public record, please do not include that information in your communication. Please contact the secretary to the relevant board, commission, or committee for further information.

Any writings or documents provided to a majority of the commission regarding any item on this agenda will be made available for public inspection at Berkeley Fire Department located at 2100 Martin Luther King Jr. Way Berkeley, CA.

COMMUNICATION ACCESS INFORMATION:

This meeting is being held in a wheelchair-accessible location. To request a disability-related accommodation(s) to participate in the meeting, including auxiliary aids or services, please contact the Disability Services specialist at 981-6418 (V) or 981-6347 (TDD) at least three business days before the meeting date. Please refrain from wearing scented products to this meeting.

~~~~~~

I hereby certify that the agenda for this regular/special meeting of the Berkeley City's Disaster and Fire Safety Commission was posted at the front of the Division of Training, 997 Cedar Street, as well as on the City's website, three days prior to the scheduled Commission meeting.

SECRETARY SIGNATURE Keith May 10/26/2023

Local Hazard Mitigation Plan (LHMP) Update Process

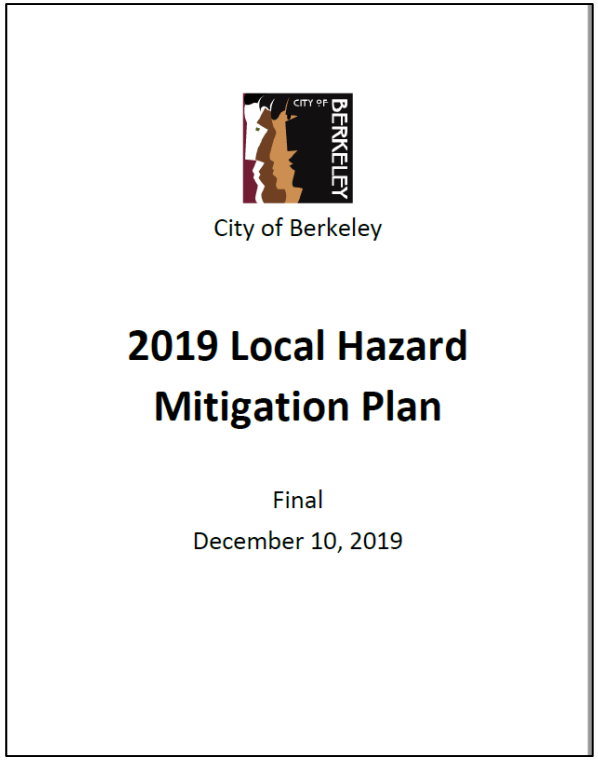
Disaster and Fire Safety Commission

September 27, 2023

Agenda

- Local Hazard Mitigation Plan (LHMP) Elements
- 2024 Updates
- DFSC Role in 2024 Plan Update Process
- Community Outreach Plan
- Plan Review and Approvals Process

Local Hazard Mitigation Plan



- Appendix to City's General Plan
- Adopted 2004, 2014, 2019
- Required by the Federal Emergency Management Agency every 5 years to **remain eligible for post-disaster recovery money and hazard mitigation funds**

- Collects and presents:
  - City's funded activities
  - Proposed activities that require additional funding

Mitigation + Preparedness = Readiness

- Mitigation: Reduce or eliminate disaster impacts
- Preparedness: Increase emergency response capability

Mitigation + Preparedness = Readiness

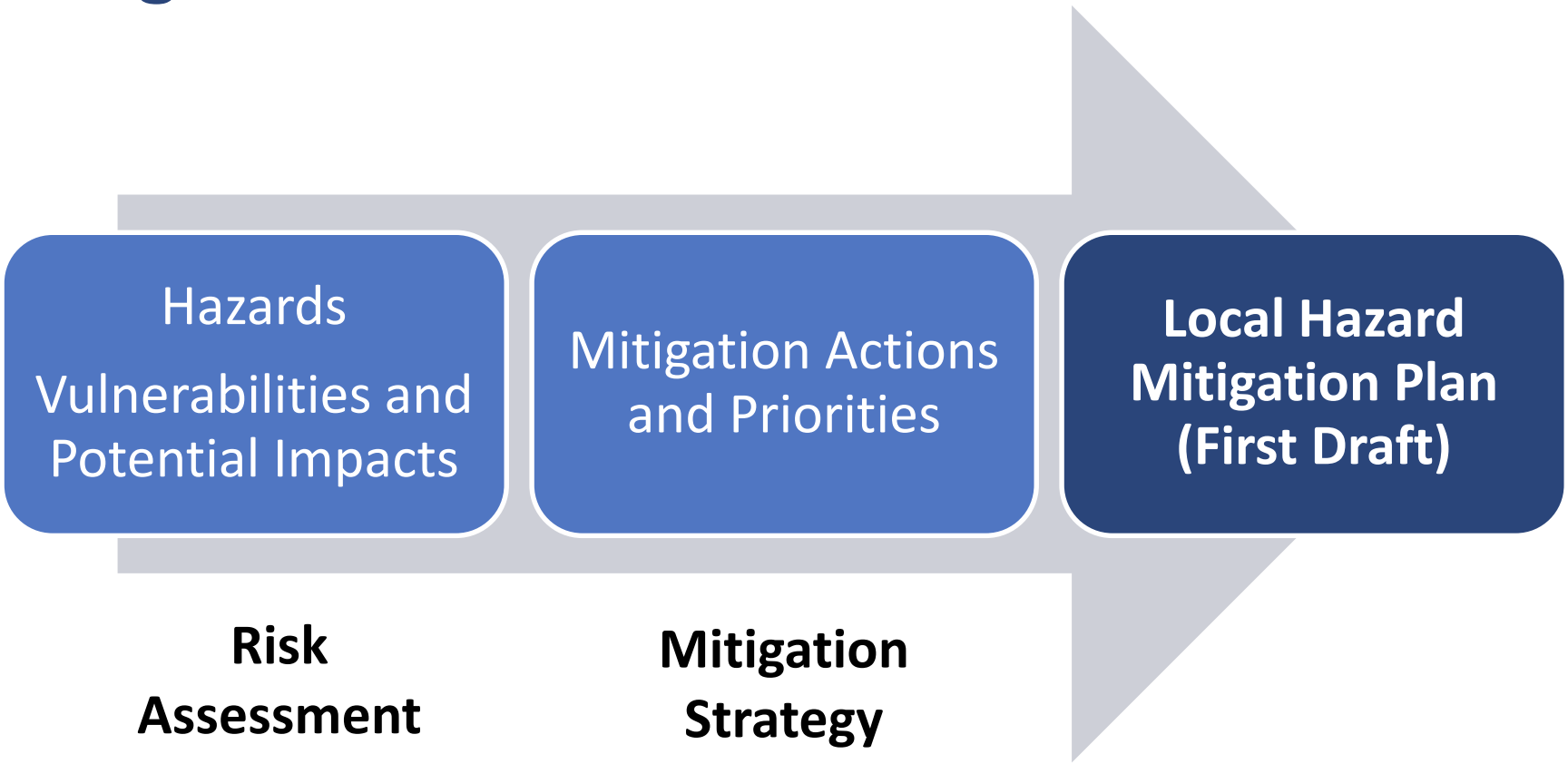
Mitigation:

- Strengthening structures
- Making land use decisions that will minimize damage
- Vegetation management and home hardening in fire-risk areas
- Strapping down water heaters

Preparedness:

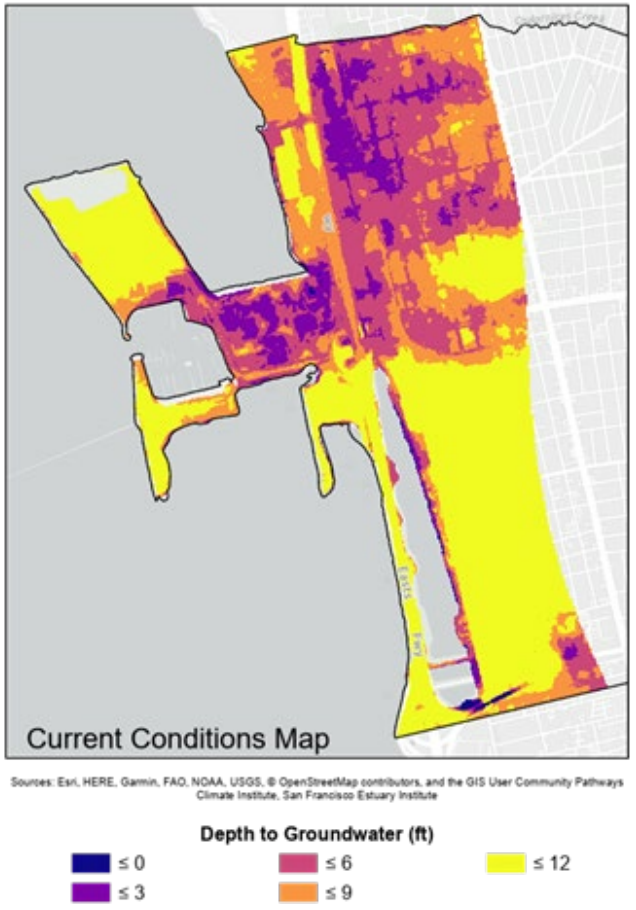
- Purchasing equipment to use in emergency response
- Conducting disaster response drills
- Storing disaster supplies

Mitigation Plan Elements



2024 Risk Assessment: Key Updates

- Updated hazard science
- New mapping and analysis
- Integrated climate change and environmental justice concerns throughout
- 5 new hazards of concern



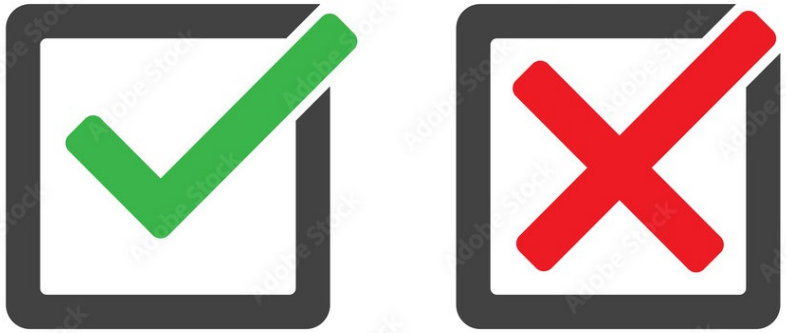
Risk Assessment: Hazards of concern

2019	2024
Earthquake	Earthquake
Wildland-Urban Interface Fire	Wildland-Urban Interface Fire
Landslide	Landslide
Flood	Flood
Tsunami	Tsunami
Climate change	~~Climate change~~*
Extreme heat	Extreme heat
Hazardous materials release	Hazardous materials release
	Sea level rise and Shallow Groundwater Rise
	Poor Air Quality
	Wind
	Utility Disruption
	Infectious Disease

*2024: climate change will be integrated into every hazard and in the plan's overarching framing

2024 Mitigation Strategy: Key Updates

- Progress on 2019 actions
- New actions
- Re-prioritize actions



New in 2024: Evacuation Analysis

- Included to meet new State requirements
  - SB 99: Residential developments with 1 way out
  - AB 747: Evacuation routes, capacities, safety, viability
  - AB 1409: Evacuation locations

- Will include **preliminary analysis** from Evacuation Time Study

DFSC Roles & Responsibilities

- "Advise the City Council on all matters affecting fire safety and/or disaster resilience within Berkeley"
- Timeline: Winter 2023 through Fall 2024

- Host 2 public meetings (along with Planning Commission)
  - **Meeting 1**: First Draft LHMP (Dec 2023 or Jan 2024)
    - Action (optional): Commission feedback on Mitigation Strategy
  - **Meeting 2**: Final Draft (est. Oct 2024)
    - Action: Recommend Final Draft Plan adoption by Council

DFSC Engagement

Sept 2023:
Plan Introduction

Dec 2023/ Jan 2024:
Present First Draft Plan

Oct 2024 (est):
Present Final Draft (State/federally approved) plan

Request DFSC Commission Recommendation to Council

Community Outreach Plan

- Post Plan to website; physical copies at City Hall
- Staff presentations at DFSC and Planning Commission
- Accessible, hazard-specific education
  - Community meetings
  - Online videos
- Receive feedback
  - In-person meetings
  - Online (feedback collection tool; Mitigation@BerkeleyCA.gov)
  - Postal mail/comment drop-off at Public Safety Building

LHMP Review and Approvals Process

Planning Commission

FINAL MINUTES OF THE REGULAR PLANNING COMMISSION MEETING
October 4, 2023

The meeting was called to order at 5:33 p.m.

Location: North Berkeley Senior Center, 1901 Hearst Avenue, Berkeley, CA 94709

1. **ROLL CALL:**
   Commissioners Present: Blaine Merker, Jeff Vincent, John E. Moore, Christina Oatfield, Emily Marthinsen, Elisa Mikiten, Alfred Twu, Savlan Hauser, and Barnali Ghosh.

   Commissioner Absent: None.

   Staff Present: Secretary Alisa Shen, Clerk Zoe Covello, Grace Wu, Justin Horner, Sarah Lana, and Eleanor Hollander.

2. **LAND ACKNOWLEDGEMENT.**

   Commissioner Ghosh shared that Indigenous Peoples Day Powwow and Indian Market will be held at Civic Center Park on Saturday, October 7th from 10am to 6pm.

   The City of Berkeley recognizes that the community we live in was built on the territory of xučyun (Huchiun (Hooch-yoon)), the ancestral and unceded land of the Chochenyo (Cho-chen-yo)-speaking Ohlone (Oh-low-nee) people, the ancestors and descendants of the sovereign Verona Band of Alameda County. This land was and continues to be of great importance to all of the Ohlone Tribes and descendants of the Verona Band. As we begin our meeting tonight, we acknowledge and honor the original inhabitants of Berkeley, the documented 5,000-year history of a vibrant community at the West Berkeley Shellmound, and the Ohlone people who continue to reside in the East Bay. We recognize that Berkeley's residents have and continue to benefit from the use and occupation of this unceded stolen land since the City of Berkeley's incorporation in 1878. As stewards of the laws regulating the City of Berkeley, it is not only vital that we recognize the history of this land, but also recognize that the Ohlone people are present members of Berkeley and other East Bay communities today. The City of Berkeley will continue to build relationships with the Lisjan Tribe and to create meaningful actions that uphold the intention of this land acknowledgement.

3. **ORDER OF AGENDA:** No changes.

4. **PUBLIC COMMENT PERIOD:** 0.

5. **PLANNING STAFF REPORT:**

- On Tuesday, October 3rd, City Council adopted the first reading of the City's new ADU ordinance.
- The City of Berkeley and North Berkeley Housing Partners held a North Berkeley BART Community Meeting and Open House on September 11th
    - City presented draft Objective Design Standards (ODS) and the North Berkeley Housing Partners presented a preliminary development concept
    - Staff is intending to bring this item to the Planning Commission in a special meeting on October 18th
- A public draft of the Waterfront Specific Plan is available for review and comments are currently being accepted - https://berkeleyca.gov/your-government/our-work/capital-projects/waterfront-specific-plan
    - A City Council worksession is planned to be held on Thursday, November 2nd
- On Tuesday November 14th, the Southside Zoning amendments going to City Council for a first reading

Information Items: None.

Communications:

- General.

Late Communications: *See agenda for links.*

- Supplemental Packet One.

6. CHAIR REPORT:

- Chair Vincent shared that there was a celebration of life for Gene Poschman published in Berkeleyside recently. Mr. Poschman served as the Chair of the Planning Commission when Chair Vincent started, as well as on the Zoning Adjustments Board and many other commissions.

7. COMMITTEE REPORT: Reports by Commission committees or liaisons. In addition to the items below, additional matters may be reported at the meeting.

- None.

8. APPROVAL OF MINUTES:

Motion/Second/Carried (Twu/Vincent) to approve the Planning Commission Meeting Minutes from September 6, 2023. Ayes: Merker, Vincent, Moore, Oatfield, Mikiten, Marthinsen, Twu, Hauser. Noes: None. Abstain: Ghosh. Absent: None. (8-0-1-0)

9. OTHER PLANNING RELATED EVENTS:

- Chair Vincent shared that PC may agendize changing the start time of the Planning Commission at either the 10/18 or 11/1 meeting.

AGENDA ITEMS

10. Discussion: Local Hazard Mitigation Plan Presentation

Manager of OES Sarah Lana presented on the Local Hazard Mitigation Plan.

Public Comments: 0

11. Action: Public Hearing: Berkeley Business Amendments

Associate planner Justin Horner presented the proposed zoning ordinance amendments. Public comment was taken, draft amendments were discussed, and a recommendation to City Council was made.

Motion/Second/Carried (Vincent/Ghosh) to close the public hearing at 6:43pm. Ayes: Merker, Vincent, Moore, Oatfield, Mikiten, Marthinsen, Twu, Hauser, Ghosh. Noes: None. Abstain: None. Absent: None. (9-0-0-0)

Public Comments: 2

Motion/Second/Carried (Mikiten/Moore) to recommend staff's proposed amendments with the modification to match the "Health and Fitness Facility, 7,500 sf or larger" row in Table 23.204-1 with the permits required for "Group Instruction 3,000 sf or larger" row for each district at 7:25pm Ayes: Merker, Vincent, Moore, Oatfield, Mikiten, Marthinsen, Twu, Hauser, Ghosh. Noes: None. Abstain: None. Absent: None. (9-0-0-0)

Motion/Second/Carried (Oatfield/Mikiten) to adjourn the meeting at 7:39pm. Ayes: Merker, Vincent, Moore, Oatfield, Mikiten, Marthinsen, Twu, Hauser, Ghosh. Noes: None. Abstain: None. Absent: None. (9-0-0-0)

Members in the public in attendance: 3
Public Speakers: 2
Length of the meeting: 2 hr 6 minutes

Alisa Shen
Planning Commission Secretary

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City of Berkeley

Local Hazard Mitigation Plan (LHMP) Update Process

Planning Commission

October 4, 2023

Berkeley Ready
City of Berkeley

Agenda

- Local Hazard Mitigation Plan & Safety Element
- Berkeley Hazards and Mitigation
- Mitigation Plan Elements
- Planning Commission Role & Engagement
- Community Outreach Plan
- Approvals Process

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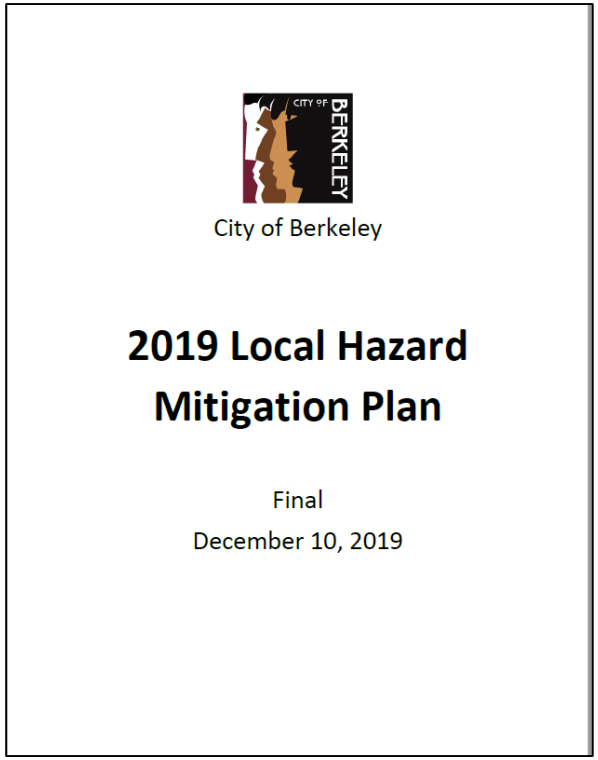
Local Hazard Mitigation Plan



- Appendix to General Plan
- Collects and presents:
  - Updated hazard information
  - Mitigation activities – planned/funded and other proposals that require additional funding
- Adopted 2004, 2014, 2019
- Update required by December 2024 to maintain eligibility for post-disaster recovery money and hazard mitigation funding

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LHMP & General Plan Safety Element

2024 Local Hazard Mitigation Plan	Safety Element Update
Identify latest hazard information	Identify hazard information consistent with LHMP
Compile City's mitigation efforts into a 5-year mitigation strategy	Establish citywide goals, policies, actions: • Reduce risk from hazards • Address climate adaptation, resilience and equity
Provide analysis to meet new State evacuation planning requirements	Integrate evacuation analysis into Citywide goals, policies and actions
Updated every 5 years	Updated every 8 years

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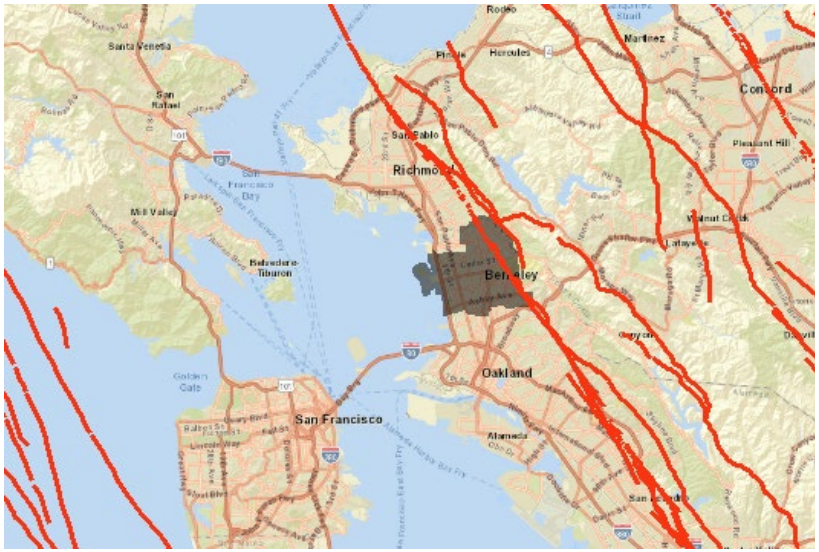
Hazards in Berkeley

- Earthquake
- Wildland-Urban Interface Fire
- Landslide
- Flood
- Tsunami
- Extreme Heat
- Hazardous Materials Release
- Sea Level Rise/Shallow Groundwater Rise
- Poor Air Quality
- Wind
- Utility Disruption
- Infectious Disease



Berkeley Ready
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Readiness = Mitigation + Preparedness

- Mitigation: Reduce or eliminate disaster impacts
- Preparedness: Increase emergency response capability

Berkeley Ready
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Readiness = Mitigation + Preparedness

Mitigation:

- Strengthening structures
- Making land use decisions that will minimize damage
- Reducing vegetation in high-fire areas
- Strapping down water heaters

Preparedness:

- Purchasing equipment to use in emergency response
- Conducting disaster response drills
- Storage of disaster supplies

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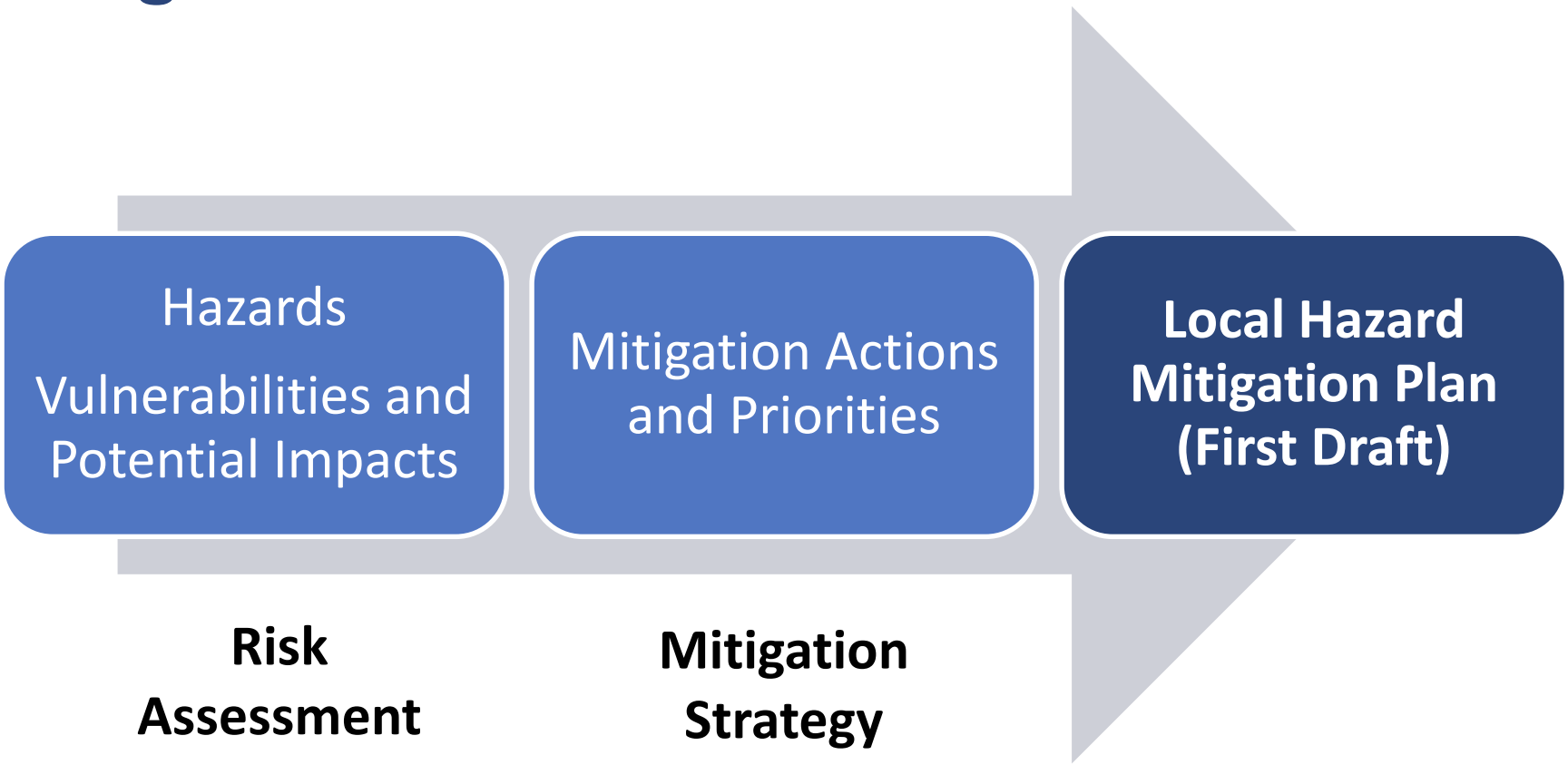
Mitigation Plan Elements



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New in 2024: Evacuation Analysis

- Included to meet new State requirements
  - SB 99: Residential developments with 1 way out
  - AB 747: Evacuation routes, capacities, safety, viability
  - AB 1409: Evacuation locations

- Will include **preliminary analysis** from Evacuation Time Study

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Planning Commission Role

- Timeline: Winter 2023 through Fall 2024
- Planning Commission Focus
  - Ensure consistency with the General Plan and process
  - Specific review of land use planning actions in Mitigation Strategy

- Host 2 public meetings (along with Disaster & Fire Safety Commission)
  - **Meeting 1**: First Draft LHMP (Dec 2023 or Jan 2024)
    - Action (optional): Commission feedback on Mitigation Strategy
  - **Meeting 2**: Final Draft (est. Oct 2024) ***First Public Hearing***
    - Action: Recommend Final Draft Plan adoption by Council

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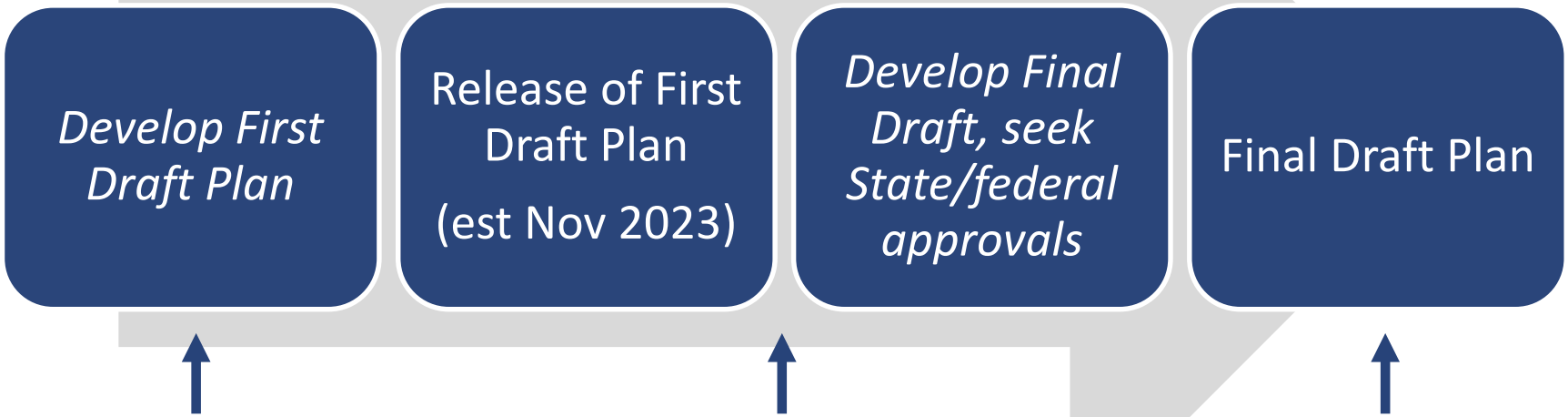
Planning Commission Engagement



October 2023:
Plan Introduction

Dec 2023:
Present First Draft Plan

Oct 2024 (est):
Present Final Draft (State/federally approved)

First Public Hearing: Request Planning Commission Recommendation to Council

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Community Outreach Plan

- Post Plan to website; physical copies at City Hall
- Staff presentations at DFSC and Planning Commission
- Accessible, hazard-specific education
  - Community meetings
  - Online videos
- Receive feedback
  - In-person meetings
  - Online (feedback collection tool; Mitigation@BerkeleyCA.gov)
  - Postal mail/comment drop-off at Public Safety Building

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LHMP Review and Approvals Process

Planning Commission

FINAL MINUTES OF THE REGULAR PLANNING COMMISSION MEETING
June 5, 2024

The meeting was called to order at 6:02 p.m.

Location: North Berkeley Senior Center, 1901 Hearst Avenue, Berkeley, CA 94709

- **ROLL CALL:**
  Commissioners Present: Blaine Merker, Jeff Vincent, Christina Oatfield, Elisa Mikiten, Emily Marthinsen, Alfred Twu, Savlan Hauser, and Barnali Ghosh

  Commissioner Absent: Chip Moore

  Staff Present: Secretary Justin Horner, Clerk Brian Garvey, Zoe Covello, Ashley James, Jamie Albrecht, and Alisa Shen.

- **LAND ACKNOWLEDGEMENT.**

  The City of Berkeley recognizes that the community we live in was built on the territory of xučyun (Huchiun (Hooch-yoon)), the ancestral and unceded land of the Chochenyo (Cho-chen-yo)-speaking Ohlone (Oh-low-nee) people, the ancestors and descendants of the sovereign Verona Band of Alameda County. This land was and continues to be of great importance to all of the Ohlone Tribes and descendants of the Verona Band. As we begin our meeting tonight, we acknowledge and honor the original inhabitants of Berkeley, the documented 5,000-year history of a vibrant community at the West Berkeley Shellmound, and the Ohlone people who continue to reside in the East Bay. We recognize that Berkeley's residents have and continue to benefit from the use and occupation of this unceded stolen land since the City of Berkeley's incorporation in 1878. As stewards of the laws regulating the City of Berkeley, it is not only vital that we recognize the history of this land, but also recognize that the Ohlone people are present members of Berkeley and other East Bay communities today. The City of Berkeley will continue to build relationships with the Lisjan Tribe and to create meaningful actions that uphold the intention of this land acknowledgement.

- **ORDER OF AGENDA:** No changes.

- **PUBLIC COMMENT PERIOD: 1**

- **PLANNING STAFF REPORT:**

- City Council approved contract for consultant team for College Ave, Shattuck Ave, and Solano Ave corridors upzoning. Project should start in summer 2024. Goal is to be done by end of 2026.
- Demolition Ordinance is scheduled for June 25 City Council Meeting.
- Two items for next meeting on July 17th: Public Hearing on Keep Innovation in Berkeley and Public Hearing on Technical Edits to Zoning Ordinance package.
- Reminder: June 26th Special Meeting is cancelled.

Information Items:

- Community Health Assessment (CHA) and Community Health Improvement Plan (CHIP)

Communications:

- General

Late Communications:

- None.

- **CHAIR REPORT:**

  - None.

- **COMMITTEE REPORT:** Reports by Commission committees or liaisons. In addition to the items below, additional matters may be reported at the meeting.

  - None.

8. APPROVAL OF MINUTES:

Motion/Second/Carried (Merker/Hauser) to approve the Planning Commission Meeting Minutes from May 1, 2024. Ayes: Merker, Vincent, Oatfield, Mikiten, Marthinsen, Twu, and Hauser. Noes: None. Abstain: Ghosh. Absent: Moore (7-0-1-1)

9. OTHER PLANNING RELATED EVENTS:

- None.

AGENDA ITEMS

10. Discussion: Draft Local Hazard Mitigation Plan

Emergency Services Coordinator Jamie Albrecht presented on the draft Local Hazard Mitigation Plan (LHMP). The Commissioners took public comment, asked questions, and provided feedback on the proposed Plan.

Public Comments: 1

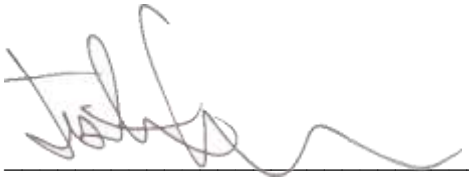
11. Discussion: General Plan Update: Disaster Preparedness & Safety, Environmental Justice, and Climate Metrics

Senior Planner Ashley James presented on the status of the general plan update. The Commissioners asked questions and provided feedback on the proposed updates.

Public Comments: 0

Motion/Second/Carried (Mikiten/Ghosh) to adjourn the meeting at 7:22 pm. Ayes: Merker, Vincent, Oatfield, Mikiten, Marthinsen, Twu, Hauser, and Ghosh. Noes: None. Abstain: None. Absent: Moore (8-0-0-1)

Members in the public in attendance: 3
Public Speakers: 2
Length of the meeting: 1 hr 20 min



Justin Horner, Planning Commission Secretary

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2024 Local Hazard Mitigation Plan (LHMP)

First Draft Plan

Planning Commission
June 5, 2024

Agenda

- Local Hazard Mitigation Plan (LHMP) Overview
- What is Hazard Mitigation?
- Plan Changes Since 2019
- First Draft Plan: Risk Assessment and Mitigation Strategy Updates
- Public Outreach
- Next Steps

Local Hazard Mitigation Plan

- Appendix to City's General Plan
- Adopted in 2004, 2014, and 2019
- Financial incentives (pre- and post-disaster)
- Public Review for First Draft: May 24 to July 31
- Key Plan Elements
  - B: Risk Assessment
  - C: Mitigation Strategy

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What is Hazard Mitigation?

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Hazard mitigation breaks the cycle of damage, by taking action now to reduce impacts later.

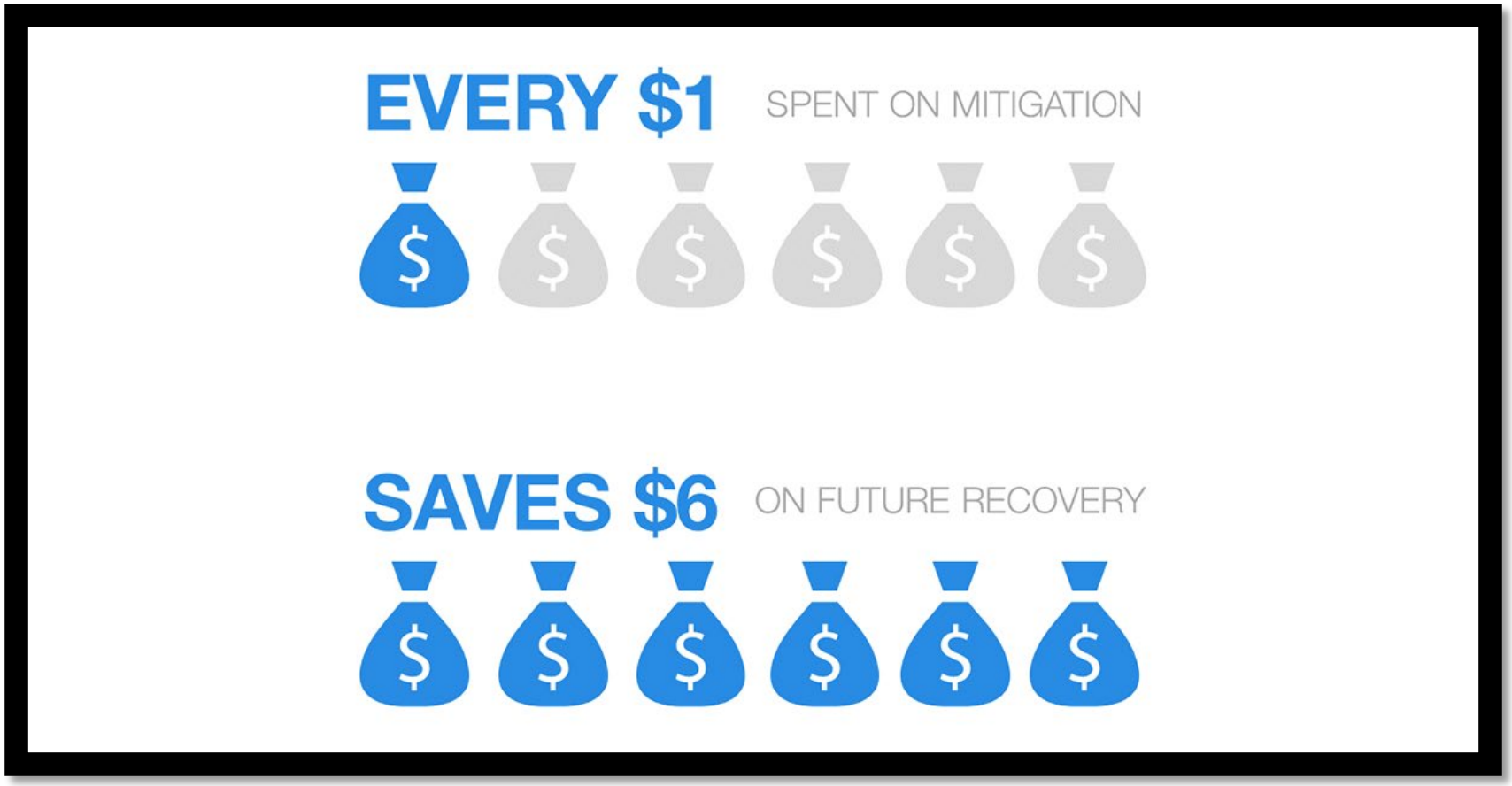

Image Credit: Boston.gov

Examples of mitigation activities

- Home hardening (like in top photo)
- Strengthening structures (like earthquake retrofits)
- Making land use decisions that will minimize damage
- Reducing vegetation in high-fire areas (like in bottom photo)
- Strapping down water heaters

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Major Plan Changes Since 2019

New Hazards Included in the Plan

- High Wind
- Poor Air Quality
- Infectious Disease
- Utility Interruption
- Sea Level Rise

Individual and Household Actions

- Previous versions: Heavy focus on City government actions
- 2024 LHMP: And what can you do?

- Example: Earthquake
  - City: Retrofitting municipal buildings, facilitating grants
  - Household: bolting down furniture

First Draft Plan:
Risk Assessment and Strategy Updates

Risk Assessment Summary

Hazard	Likelihood	Severity of Impact
Earthquake	Likely	Catastrophic
Wildland-Urban Interface Fire	Likely	Catastrophic
Extreme Heat	Likely	Moderate to Catastrophic
Poor Air Quality	Likely	Minor
High Wind	Likely	Minor
Rainfall-Triggered Landslide	Likely	Minor to Catastrophic
Tsunami	Possible	Minor to Catastrophic
Sea Level Rise	Likely	Minor to Major
Floods	Likely	Minor
Utility Interruption	Likely	Minor to Major
Hazardous Materials Release	Likely	Minor to Catastrophic
Infectious Disease	Likely	Minor to Catastrophic

Mitigation Strategy Summary

- 33 Actions
- Focus:
  - Current work with funding secured
  - Improvements to buildings, infrastructure, and wildfire mitigation (aligning with the Community Wildfire Protection Plan)
- New actions
  - Mitigating poor air quality, infectious disease, high winds, and utility interruption
  - New WUI fire mitigation measures
  - Action to improve the way we communicate hazard information to marginalized populations
  - Climate Equity Collaborative work to engage community partners in resilience work
  - Evacuation Time Study

Land Use Planning Actions

- Maintaining City participation in National Flood Insurance Program
- Ensuring new and existing developments and infrastructure are protected from floods due to sea level rise through the permitting process for new development and conditions
- Use development standards to ensure new development does not contribute to an increase in flood potential
- Streamline the rebuilding process: Give priority to project applications that would rebuild to current standards following disasters.
- Complete implementation of the Evacuation and Response Time Study to identify necessary roadway safety improvements, along with prioritized roadways, to facilitate safe evacuation during emergency scenarios.
  - Land Use Planning is involved by providing guidance on current and potential development that might impact evacuation
  - The results of this Study will be included in the update to the Safety Element

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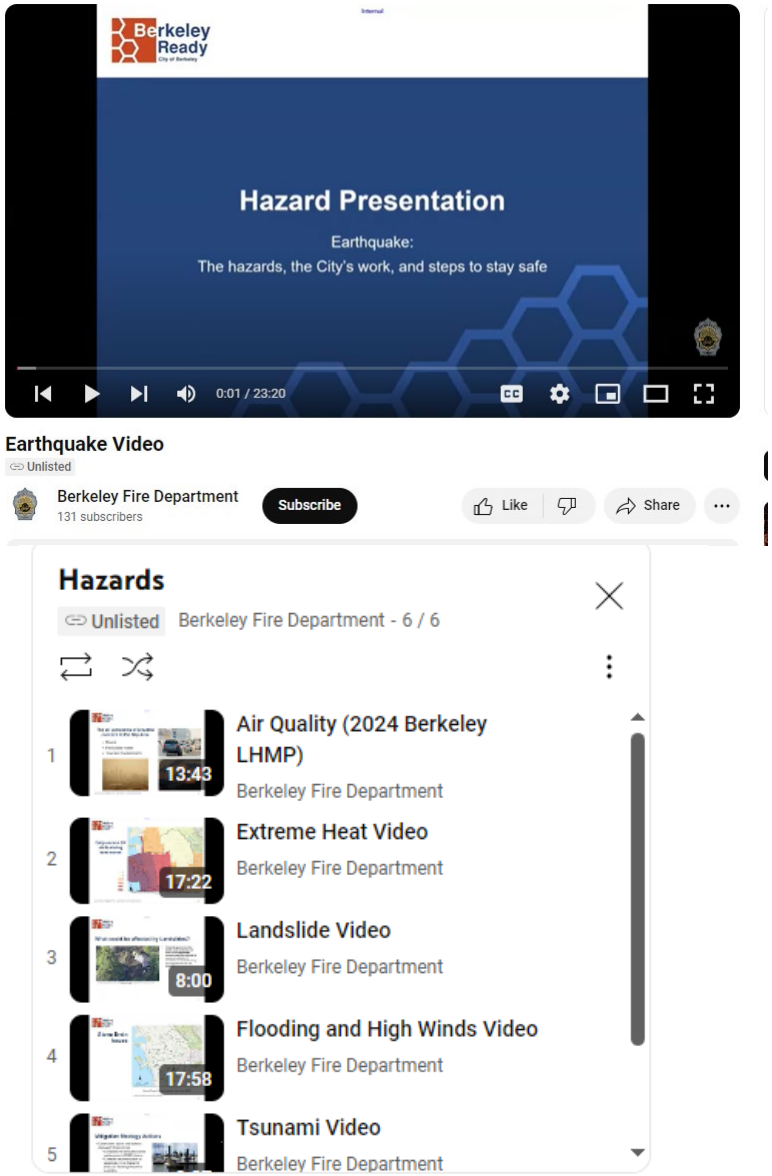
Public Outreach

Engagement Methods

- In-person outreach at various events during the drafting stage, including National Night Out and Solano Stroll
- Two in-person workshops during the drafting stage, including a Winter Weather Workshop and a Tsunami Workshop at the Marina
- Two in-person workshops after First Draft is released
  - June 3 5:30pm – 730pm at Central Library
  - July 20 10am – 12pm at South Berkeley Library
- Detailed hazard videos posted to YouTube
- Presentations to the Planning and Disaster and Fire Safety Commissions, memos to all other Commissions
- Community members are invited to send in feedback via email or in person at the Fire Department

Videos

- LHMP is written to satisfy FEMA requirements, making it long and dense.
- We don't want to just check the box!
  - We want community members to be able to engage with this material, so we made hazard videos.
- You can watch at your leisure and focus on the hazards you're most worried about.
- Videos are designed as both an alternative and a supplement to in-person meetings.
- These videos will remain available even after the LHMP process, continuing to support our outreach about hazards.



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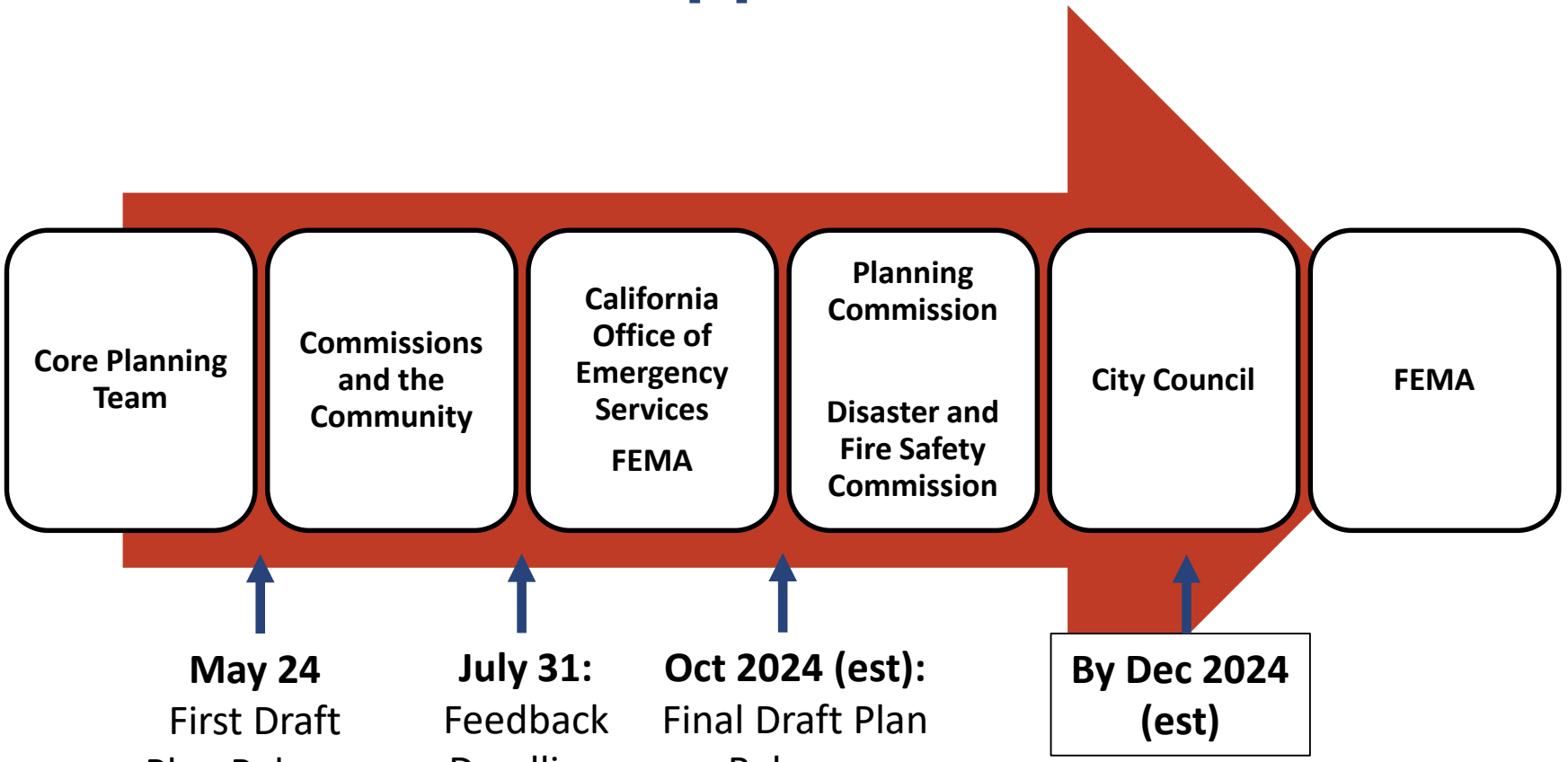
Next Steps

Plan Review and Approval Process



Next Steps

- First Draft 2024 LHMP at www.BerkeleyCa.gov/Mitigation
- Commission and community feedback deadline: July 31, 2024
- Submit written feedback:
  - To Mitigation@berkeleyca.gov
  - Via postal mail to the Fire Department
  - Via business hours drop off at the Fire Department
    - 2100 Martin Luther King Jr. Way, 2nd Floor

DISASTER AND FIRE SAFETY COMMISSION

REGULAR MEETING

June 26, 2024

7:00 PM

Fire Department Division of Training Classroom – 997 Cedar Street

Mayor's Appointee- Andy Katz

District 1 – Michael Wilson
District 2 – Weldon Bradstreet
District 3 – Todd Darling
District 4 – Robert Kinosian
District 5 – Shirley Dean
District 6 – Greg Murphy
District 7 – Harrison Raine
District 8 – Theo Gordon

AGENDA

Preliminary Matters

Call to Order

Meeting called to order at 7:00 PM
Present: Wilson, Bradstreet, Dean, Murphy, Gordon, Katz [arrived 7:02pm], Kinosian [arrived 7:03pm], Darling [arrived 7:06pm]
Absent: Raine

Approval of the Agenda

Motion to approve: Murphy
Second: Dean
Vote: Ayes: Wilson, Bradstreet, Dean, Murphy, Gordon
Nays: 0
Abstain: 0
Agenda Approved

Public Comment on Non-Agenda Matters

4 Public speakers

1. Chairperson's Report

Chair noted rising COVID rates and reminded fellow Commissioners that if they feel ill they should stay home. If a Commissioner's item is agendized at a meeting for which they must stay home sick, the Chair is committed to ensuring that the item will be set as item #4 at the following meeting.

2. Fire Department Staff Report*

REGULAR AGENDA MATTERS *All Regular agenda Matters are for discussion and possible action.*

3. *Action:* Minutes of May 22, 2024

Recommendation: Approve the draft minutes of the May 22, 2024 regular meeting.

Written Material: May 22, 2024 Draft Minutes

***Presentation*:** N/A

Motion to approve: Dean
Second: Wilson
Vote: Ayes: Wilson, Bradstreet, Dean, Murphy, Gordon, Katz, Kinosian, Darling
Nays: 0
Abstain: 0

4. *Action:* Support Of The Grizzly Peak Mitigation Project (Gordon)

Recommendation: Recommendation To Support Vegetation Management in Fire Zones

Written Material: Council Report and Resolution

Presentation: N/A

1 Public Speaker

Motion to approve the recommendation: Katz
Second: Wilson
Vote: Ayes: Wilson, Bradstreet, Dean, Murphy, Gordon, Katz, Kinosian, Darling
Nays: 0
Abstain: 0

5. *Discussion:* Local Hazard Mitigation Plan Update (Staff)

Recommendation: N/A

Written Material: First Draft 2024 Local Hazard Mitigation Plan available at https://BerkeleyCA.gov/Mitigation

Presentation: First Draft 2024 LHMP PowerPoint Presentation

3 Public Speakers

Extended meeting to 9:15pm by unanimous consent.

6. ***Action:*** Ad-Hoc LHMP Workgroup (Bradstreet)
   Recommendation: Create ad-hoc Workgroup to document proposed DFSC feedback on First Draft LHMP for action at August 7 2024 meeting
   Written Material: N/A
   Presentation: N/A

   0 Public Speakers

   Motion to approve the recommendation: Bradstreet
   Second: Murphy
   Vote: Ayes: Wilson, Bradstreet, Dean, Murphy, Gordon, Katz, Kinosian, Darling
   Nays: 0
   Abstain: 0

7. **Work Group Reports**
   Receive reporting on recent activities by the following work groups:

   - Plan & Budget Oversight
   - Home Hardening
   - Wildland Urban Interface
   - Safe Passages
   - Community Outreach

8. Future Agenda Items and Next Steps
   a. Fulfill by emailing Commission Secretary and Chair

Adjournment

Motion to approve: Bradstreet
Second: Kinosian
Vote: Ayes: Wilson, Bradstreet, Dean, Murphy, Gordon, Katz, Kinosian, Darling
Nays: 0
Abstain: 0

Meeting adjourned 9:14 pm

This meeting will be conducted in accordance with the Brown Act, Government Code Section 54953. Any member of the public may attend this meeting. Questions regarding this matter may be addressed to Keith May, kmay@berkeleyca.gov 510-981-5508.
Communications to Berkeley boards, commissions or committees are public record and will become part of the City's electronic records, which are accessible through the City's website. Please note: E-mail addresses, names, addresses, and other contact information are not required but, if included in any communication to a City board, commission, or committee, will become part of the public record. If you do not want your e-mail address or any other contact information to be made public, you may deliver

communications via U.S. Postal Service or in person to the secretary of the relevant board, commission, or committee. If you do not want your contact information included in the public record, please do not include that information in your communication. Please contact the secretary to the relevant board, commission, or committee for further information.
Any writings or documents provided to a majority of the commission regarding any item on this agenda will be made available for public inspection at Berkeley Fire Department located at 2100 Martin Luther King Jr. Way Berkeley, CA.

COMMUNICATION ACCESS INFORMATION:
This meeting is being held in a wheelchair-accessible location. To request a disability-related accommodation(s) to participate in the meeting, including auxiliary aids or services, please contact the Disability Services specialist at 981-6418 (V) or 981-6347 (TDD) at least three business days before the meeting date. Please refrain from wearing scented products to this meeting.

~~~~~~

I hereby certify that the agenda for this regular/special meeting of the Berkeley City's Disaster and Fire Safety Commission was posted at the front of the Division of Training, 997 Cedar Street, as well as on the City's website, three days prior to the scheduled Commission meeting.

SECRETARY SIGNATURE

Keith May 8/12/2024
~~~~~~

2024 Local Hazard Mitigation Plan (LHMP)

First Draft Plan

Disaster and Fire Safety Commission
June 26, 2024

Agenda

- Local Hazard Mitigation Plan (LHMP) Overview
- What is Hazard Mitigation?
- Plan Changes Since 2019
- First Draft Plan: Risk Assessment and Mitigation Strategy Updates
- Public Outreach
- Next Steps

Local Hazard Mitigation Plan

- Appendix to City's General Plan
- Adopted in 2004, 2014, and 2019
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- Public Review for First Draft: May 24 to July 31
- Key Plan Elements
  - B: Risk Assessment
  - C: Mitigation Strategy

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What is Hazard Mitigation?

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Hazard mitigation breaks the cycle of damage, by taking action now to reduce impacts later.

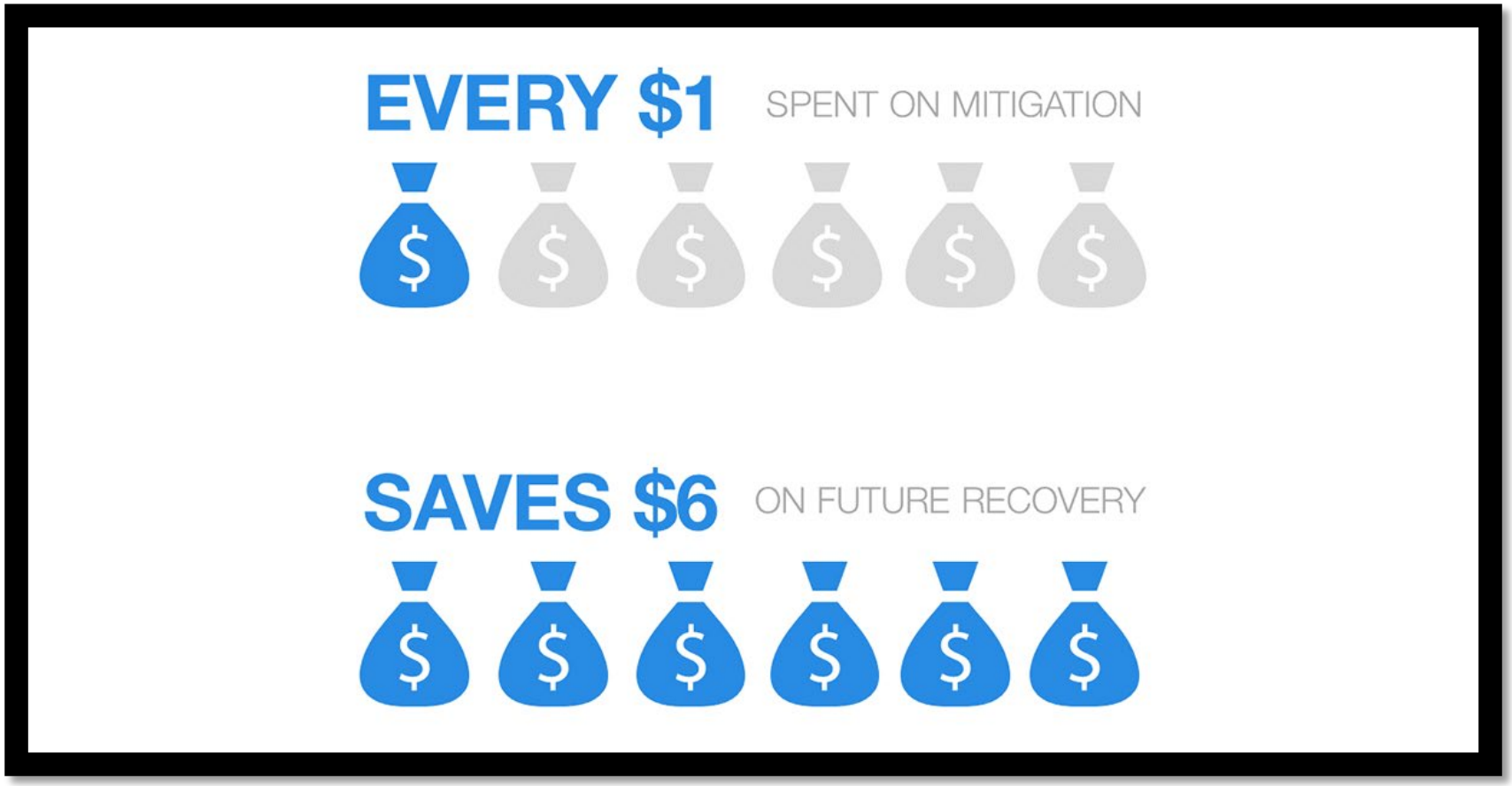

Image Credit: Boston.gov

Examples of mitigation activities

- Home hardening (like in top photo)
- Strengthening structures (like earthquake retrofits)
- Making land use decisions that will minimize damage
- Reducing vegetation in high-fire areas (like in bottom photo)
- Strapping down water heaters

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City of Berkeley

Major Plan Changes Since 2019

New Hazards Included in the Plan

- High Wind
- Poor Air Quality
- Infectious Disease
- Utility Interruption
- Sea Level Rise

Individual and Household Actions

- Previous versions: Heavy focus on City government actions
- 2024 LHMP: And what can you do?

- Example: Earthquake
  - City: Retrofitting municipal buildings, facilitating grants
  - Household: bolting down furniture

First Draft Plan:
Risk Assessment and Strategy Updates

Risk Assessment Summary

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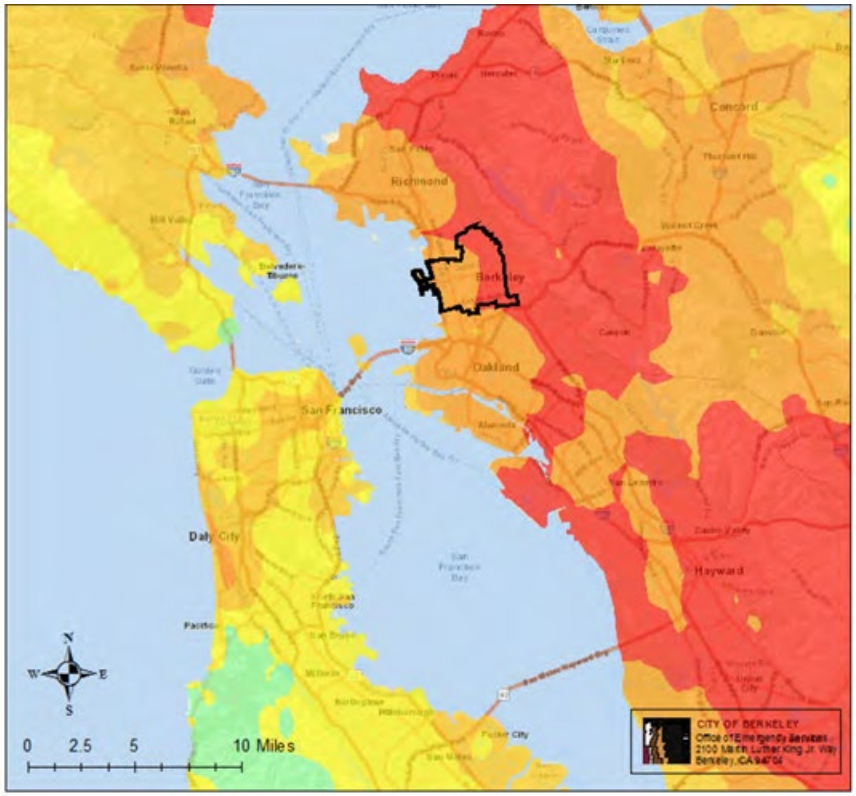
Mitigation Strategy Summary

- 33 Actions
- Focus:
  - Current work with funding secured
  - Improvements to buildings, infrastructure, and wildfire mitigation (aligning with the Community Wildfire Protection Plan)
  - New actions or activities related to new hazards
  - Upcoming Environmental Justice and Safety Element updates

Earthquake



Source: USGS, HayWired Scenario, August 2017.
Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, © OpenStreetMap contributors, and the GIS User Community

Mitigation Actions

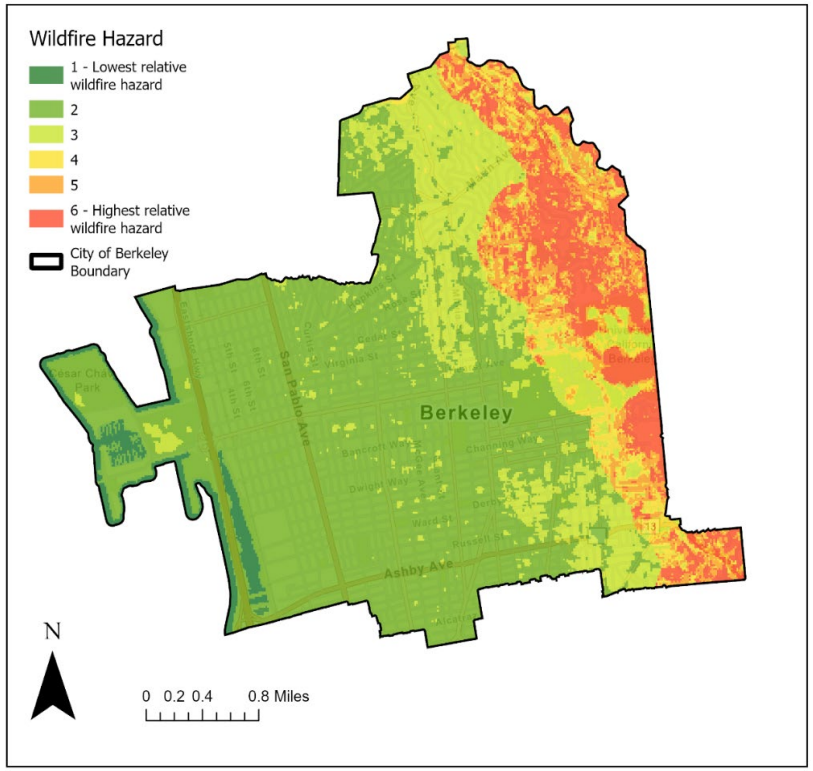
City buildings

- Building assessments
- Strengthen and replace in prioritized order

Privately owned buildings

- Soft Story Retrofit Program
- Retrofit Grants Program
- Concrete Retrofit Ordinance Research
- URM Ordinance

Wildland-Urban Interface Fire



Sources: 2020 Alameda and Contra Costa County Wildfire Risk to Structures and Wildfire Hazard Maps for Fire Prevention Planning, East Bay Regional Parks, et al.
California State Parks, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA, USFWS

Mitigation Actions

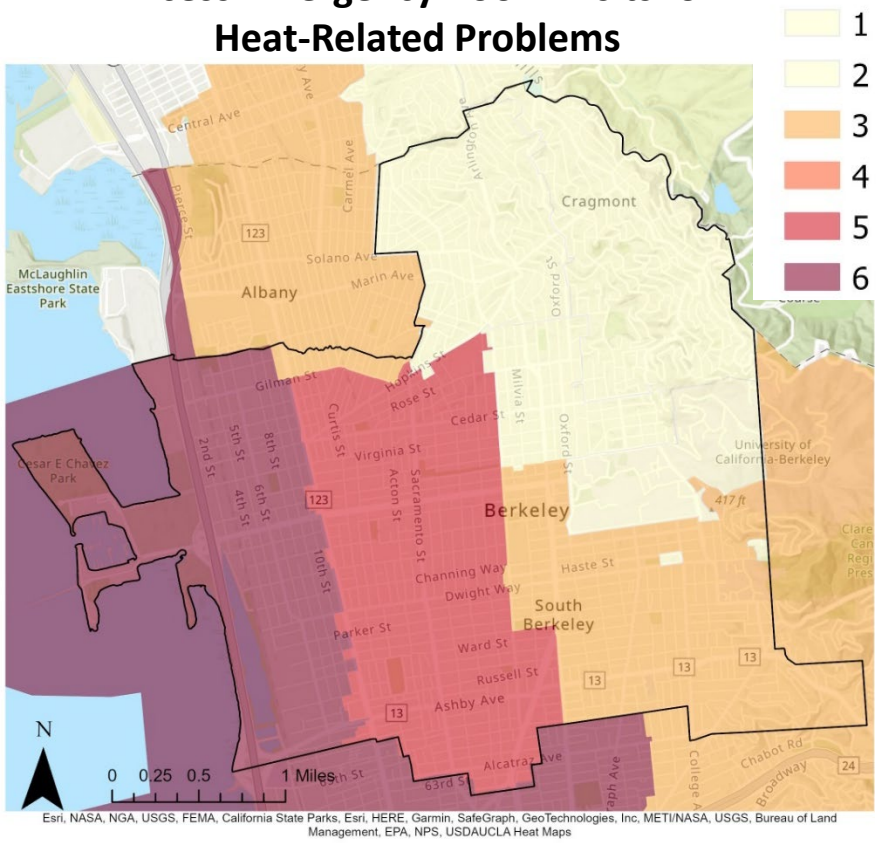
- Coordinate regional mitigation strategies
- Improve responder access and community evacuation in Fire Zones 2 and 3 through road maintenance and parking restrictions
- Manage and promote pedestrian evacuation routes in Fire Zones 2 and 3
- Mitigate risk to Berkeley's overnight camps
- Reduce fire risk through:
  - fire code and updates and enforcement
  - vegetation management
  - residential assistance program
  - utility undergrounding
  - Implementing actions in the Community Wildfire Protection Plan

Extreme Heat

Mitigation Actions

- Expanding Urban Forestry team and their activities
- Encouraging passive and energy-efficient strategies to cool down buildings
- Continuing to seek out funding to use cool paving materials on streets when feasible to reduce urban heat island impacts
- Implementing transportation projects and programs to reduce emissions

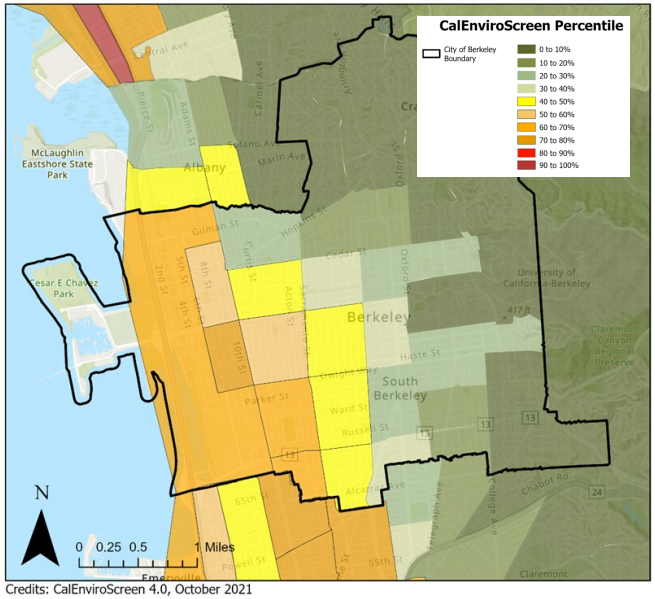
Excess Emergency Room Visits for Heat-Related Problems



Poor Air Quality

Mitigation Actions

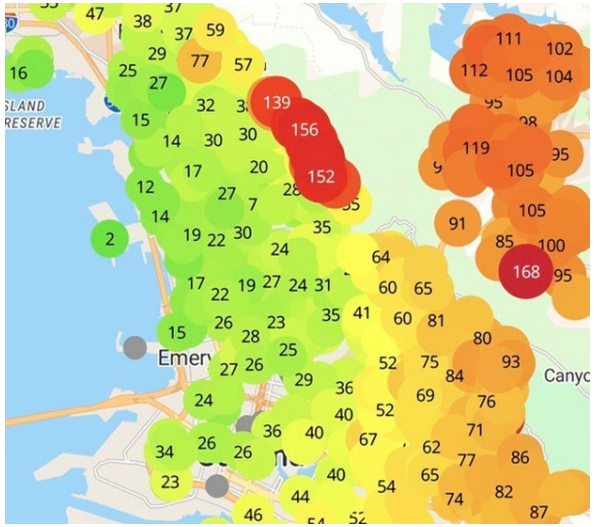
- Expanding Urban Forestry team and their activities
- Implementing transportation projects and programs to reduce emissions



Credits: CalEnviroScreen 4.0, October 2021

Esri, NASA, NGA, USGS, California State Parks, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/ NASA, USGS, Bureau of Land Management, EPA, NPS, USDA

Regular day poor air quality



Poor air quality from fires

High Wind

Photo credits: Berkeleyside (Benji Friedman, Ximena Natera, Berkeleyside/CatchLight)

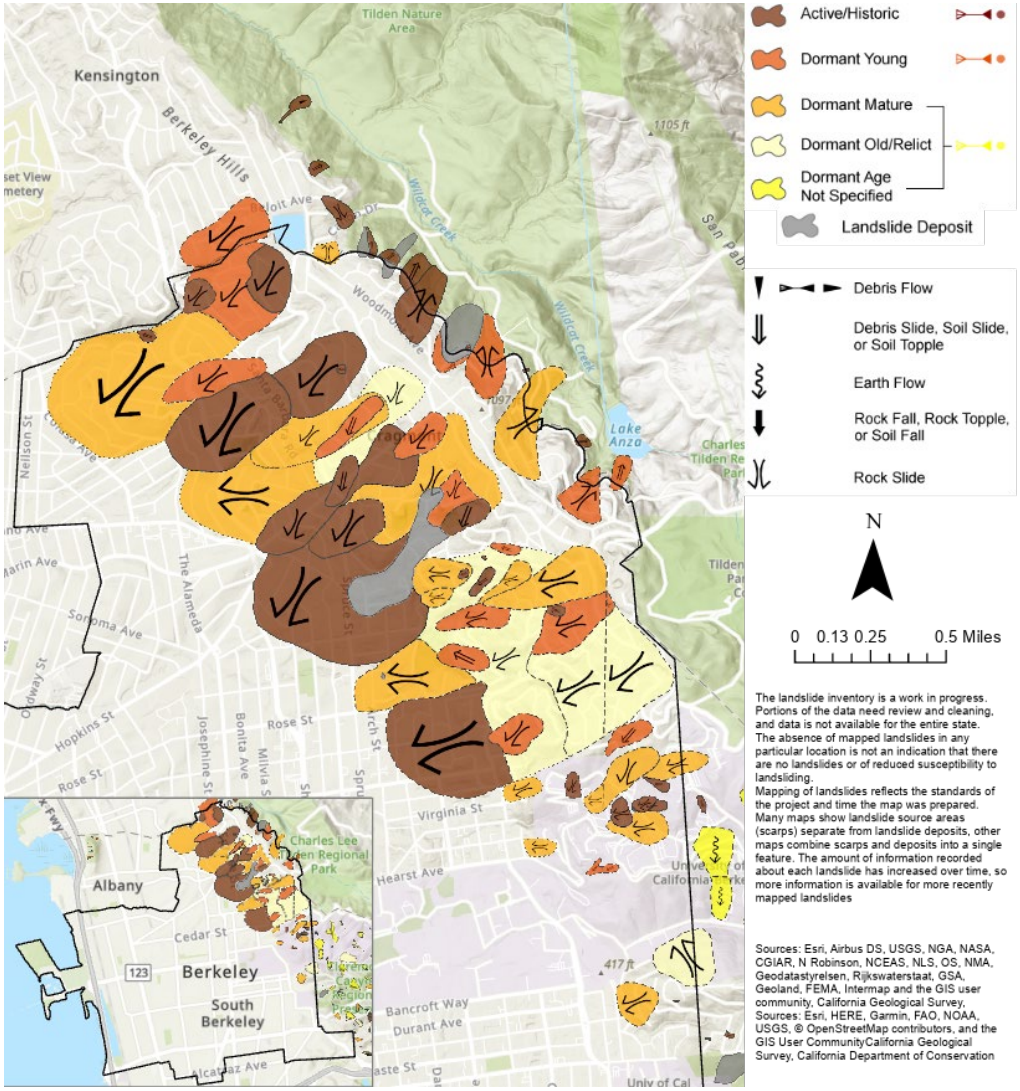
Mitigation Actions

- Expanding Urban Forestry team and their activities
- Reduce fire risk through utility undergrounding.

Landslide

Mitigation Actions

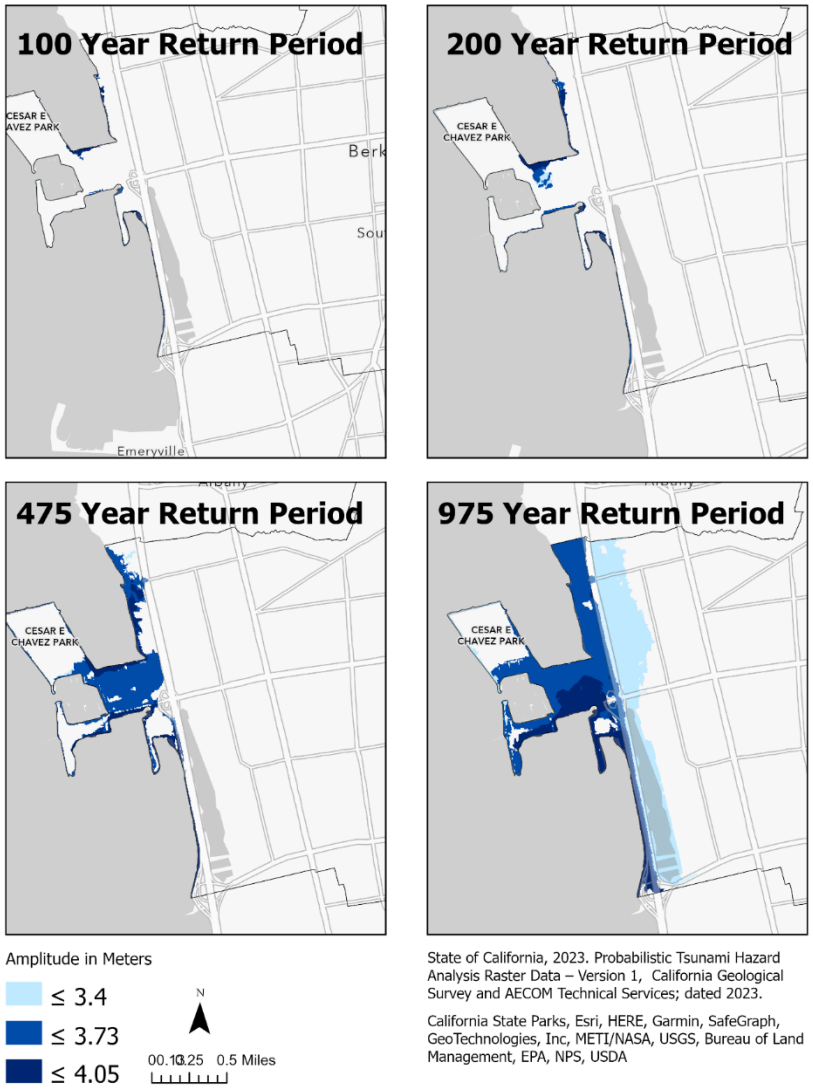
- **Collect, analyze and share information** with the Berkeley community about Berkeley hazards and associated risk reduction techniques.
  - Track changes in hazard risk using the best-available information and tools.
  - Collect and share up-to-date hazard maps identifying areas subject to heightened risk from hazards.



Tsunami

Mitigation Actions

- Continue to replace and repaid damaged finger docks
- Collaborate with the California Office of Emergency Services, the California Geological Survey, and the Federal Emergency Management Agency to **document and explore additional tsunami hazard mitigation measures for Berkeley's maritime communities.**



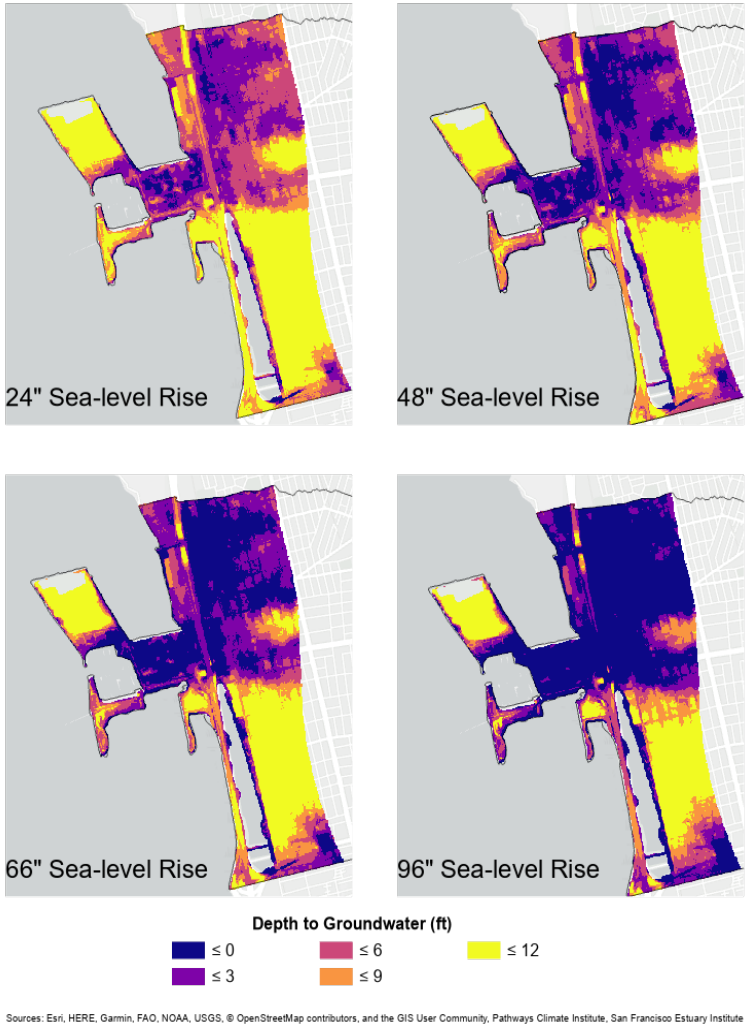
State of California, 2023. Probabilistic Tsunami Hazard Analysis Raster Data – Version 1, California Geological Survey and AECOM Technical Services; dated 2023.

California State Parks, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA

Sea Level Rise

Mitigation Actions

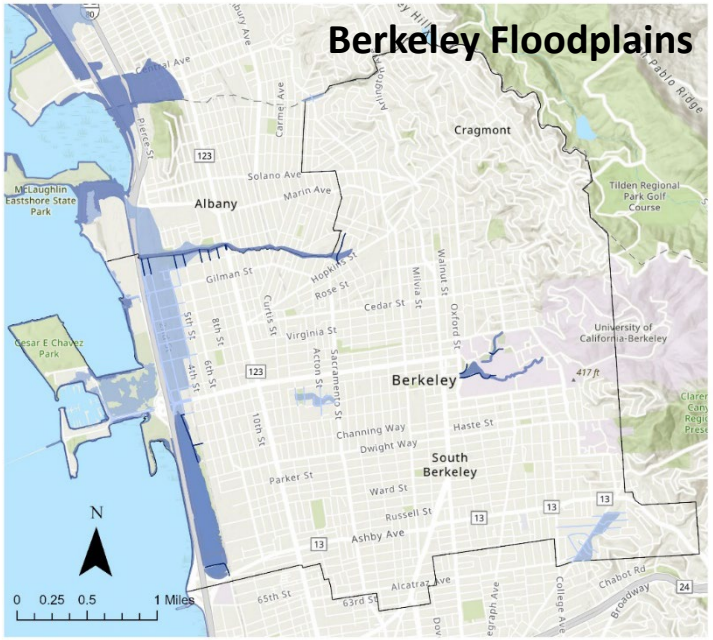
- Mitigate the impacts of sea level rise in Berkeley.
  - Continue to ensure new and existing public and private developments and infrastructure are protected from floods due to sea-level rise through the permitting process for new development and conditions.
  - Identify funding and nature based solutions to adapt to sea level rise at Berkeley Waterfront areas at risk of future inundation

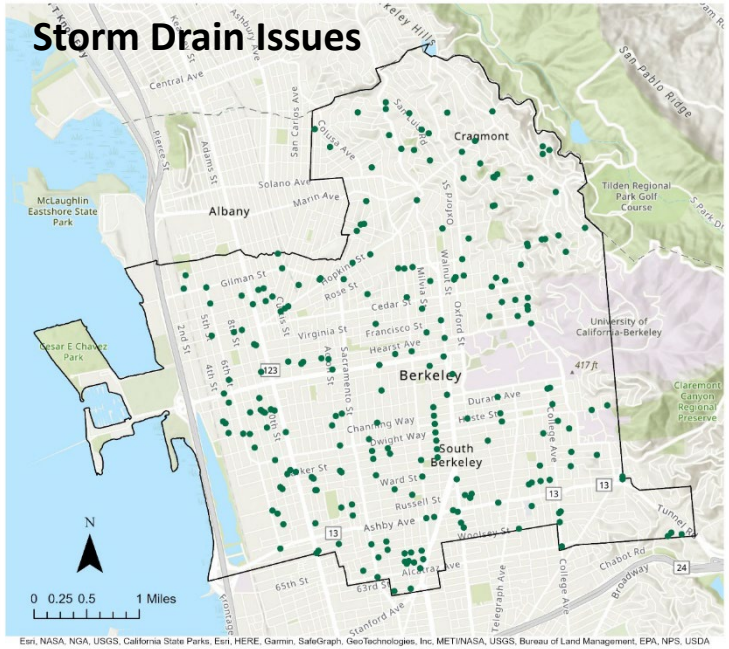


Flood

Mitigation Actions

- Maintain City participation in the National Flood Insurance Program
- Use development standards to ensure that new development does not contribute to an increase in flood potential
- Complete a Stormwater Master Plan for all City stormwater infrastructure
- Renovate the tide tubes that remove storm water from Berkeley Aquatic Park and Potter Street to the Bay
- Design public improvements such as streets, parks, and plaza for retention and infiltration of stormwater by diverting urban runoff to bio-filtration systems





Utility Interruption

Mitigation Actions

- Urge PG&E to perform utility undergrounding in Berkeley's Very High Fire Hazard Severity Zone (VHFHSZ) to mitigate wildfire risk and limit evacuation and ingress obstruction.
- Coordinate undergrounding efforts with the State of CA Public Utilities Commission, and elected officials.
- Provide key hazard information and best practices to Berkeley's business and arts community through established networks, for example by exploring opportunities for local business to share best practices and resources during utility interruptions.
- Identify potential actions to mitigate energy assurance vulnerabilities at critical City facilities during planning/conceptual design of both retrofits and new construction.
- Provide guidance to help the City consider opportunities to design, finance and implement clean energy assurance strategies (e.g., photovoltaic-supplemented generation, energy efficiency activities, and/or mobile charging stations).
- Work with partners to identify additional non-City critical facilities and develop strategies to provide clean backup power at these sites.
- Create new formats and user friendly guidance to educate the public, especially underserved populations, on Berkeley hazards.

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Public Outreach

Engagement Methods

- In-person outreach at various events during the drafting stage, including National Night Out and Solano Stroll
- Two in-person workshops during the drafting stage, including a Winter Weather Workshop and a Tsunami Workshop at the Marina
- Two in-person workshops after First Draft is released
  - June 3 5:30pm – 730pm at Central Library
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- Detailed hazard videos posted to YouTube
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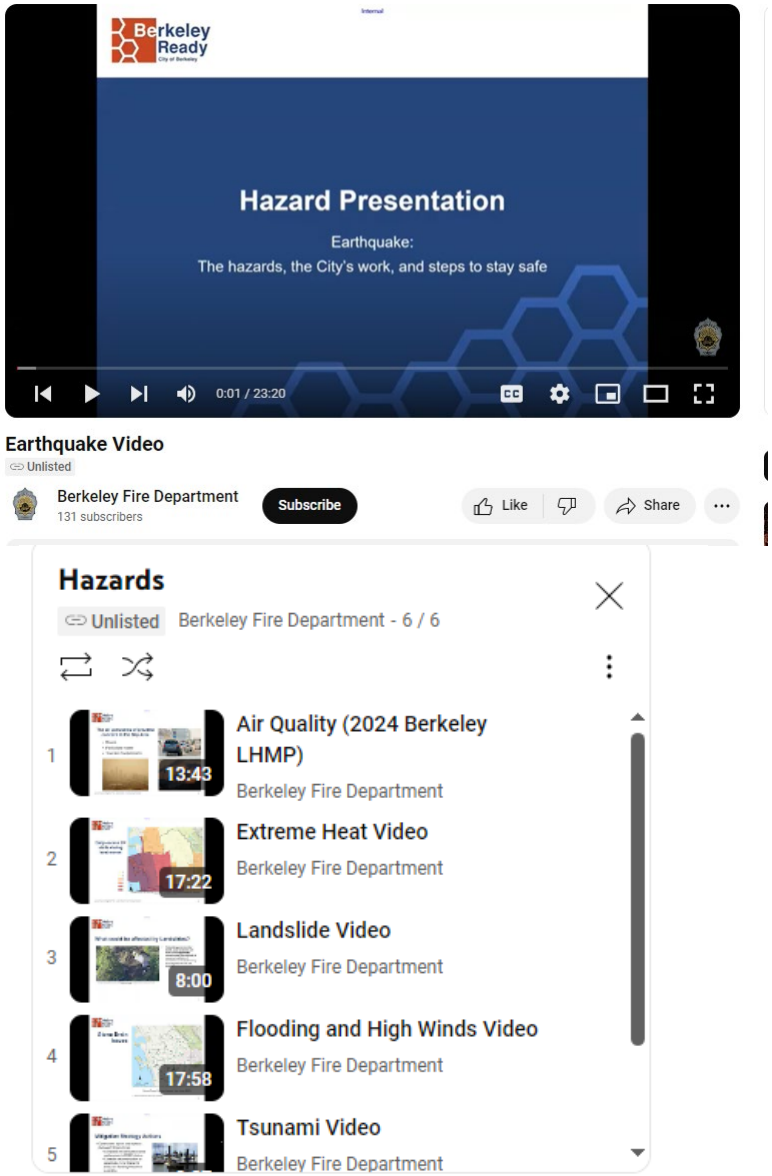

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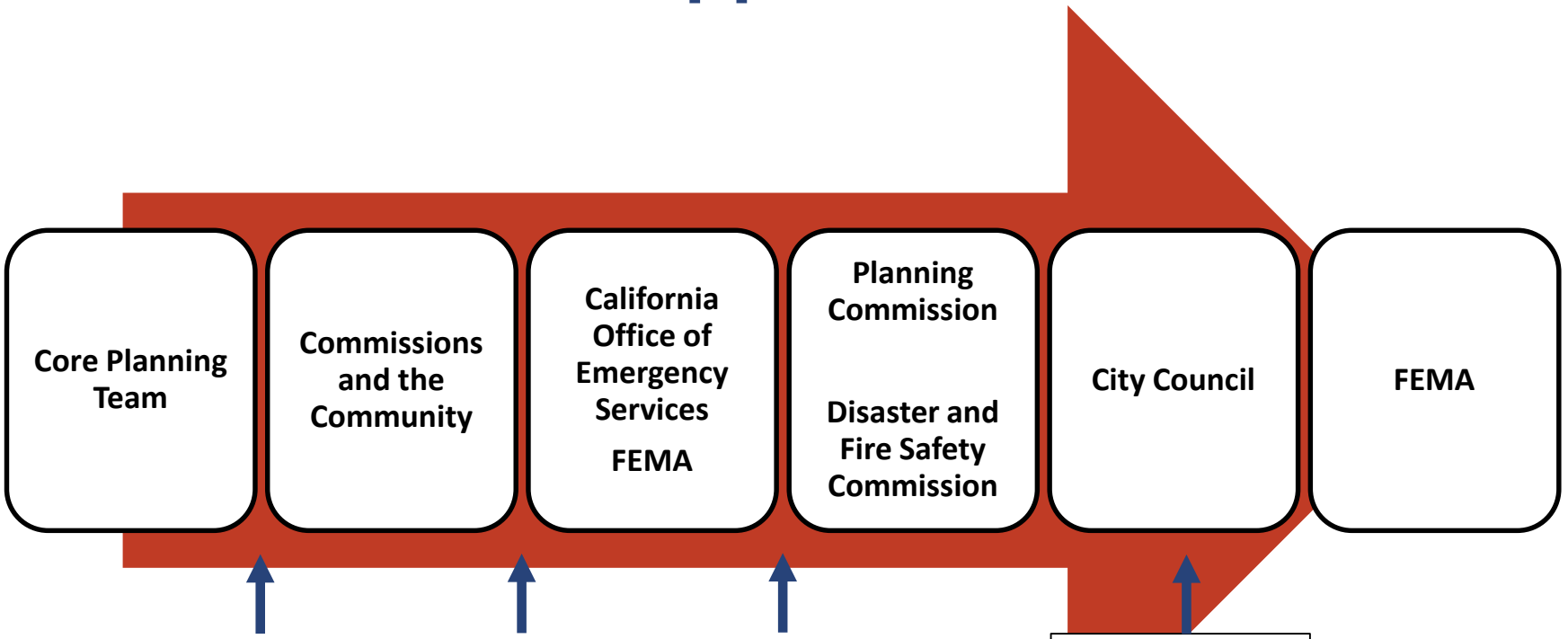
Next Steps

Plan Review and Approval Process



Next Steps

- First Draft 2024 LHMP at www.BerkeleyCa.gov/Mitigation
- Commission and community feedback deadline: July 31, 2024
- Submit written feedback:
  - To Mitigation@berkeleyca.gov
  - Via postal mail to the Fire Department
  - Via business hours drop off at the Fire Department

BERKELEY CITY COUNCIL PUBLIC SAFETY COMMITTEE
REGULAR MEETING MINUTES

Monday, July 15, 2024
10:30 AM

2180 Milvia Street, 6th Floor, Berkeley, CA 94704 – Redwood Room

Committee Members:

Councilmembers Terry Taplin, Ben Bartlett, and Igor Tregub
Alternate: Councilmember Mark Humbert

This meeting will be conducted in a hybrid model with both in-person attendance and virtual participation. If you are feeling sick, please do not attend the meeting in person.

Remote participation by the public is available through Zoom. To access the meeting remotely using the internet: Join from a PC, Mac, iPad, iPhone, or Android device: Use URL - https://cityofberkeley-info.zoomgov.com/j/1608671032. To request to speak, use the "raise hand" icon on the screen. To join by phone: Dial **1-669-254-5252 or 1-833-568-8864 (Toll Free)** and Enter Meeting ID: **160 867 1032**. If you wish to comment during the public comment portion of the agenda, press *9 and wait to be recognized by the Chair. Please be mindful that the meeting will be recorded.

To submit a written communication for the Committee's consideration and inclusion in the public record, email policycommittee@berkeleyca.gov.

Written communications submitted by mail or e-mail to the Public Safety Policy Committee by 5:00 p.m. the Friday before the Committee meeting will be distributed to the members of the Committee in advance of the meeting and retained as part of the official record.

Pursuant to the City Council Rules of Procedure and State Law, the presiding officer may remove, or cause the removal of, an individual for disrupting the meeting. Prior to removing an individual, the presiding officer shall warn the individual that their behavior is disrupting the meeting and that their failure to cease their behavior may result in their removal. The presiding officer may then remove the individual if they do not promptly cease their disruptive behavior. "Disrupting" means engaging in behavior during a meeting of a legislative body that actually disrupts, disturbs, impedes, or renders infeasible the orderly conduct of the meeting and includes, but is not limited to, a failure to comply with reasonable and lawful regulations adopted by a legislative body, or engaging in behavior that constitutes use of force or a true threat of force.

MINUTES

Roll Call 10:34 a.m.

Present: Taplin, Tregub

Absent: Bartlett

Councilmember Bartlett present at 10:37 a.m.

Public Comment on Non-Agenda Matters – None.

Election of Chairperson
Action: M/S/C (Tregub/Taplin) to elect Councilmember Taplin as Chairperson of the Public Safety Policy Committee.
Vote: Ayes – Taplin, Tregub; Noes – None; Abstain – None; Absent – Bartlett.

Minutes for Approval

Draft minutes for the Committee's consideration and approval.

1. Minutes - September 18, 2023
Action: M/S/C (Taplin/Tregub) to approve the September 18, 2023 minutes.
Vote: Ayes – Taplin, Tregub; Noes – None; Abstain – None; Absent – Bartlett.

Committee Action Items

The public may comment on each item listed on the agenda for action as the item is taken up. The Chair will determine the number of persons interested in speaking on each item. Up to ten (10) speakers may speak for two minutes. If there are more than ten persons interested in speaking, the Chair may limit the public comment for all speakers to one minute per speaker. Speakers are permitted to yield their time to one other speaker, however no one speaker shall have more than four minutes.

Following review and discussion of the items listed below, the Committee may continue an item to a future committee meeting, or refer the item to the City Council.

2. First Draft 2024 Local Hazard Mitigation Plan
From: Office of Emergency Services
Recommendation: Discussion on the first draft 2024 Local Hazard Mitigation Plan.
Financial Implications: See report
Contact: Jamie Albrecht, Emergency Services Coordinator, (510) 981-5514
Action: 0 speakers. Presentation made and discussion held. Item continued to a future meeting.

Committee Action Items

3a. Recommendation Regarding Panoramic Hill Secondary Evacuation
From: Disaster and Fire Safety Commission
Referred: April 25, 2024
Due: October 8, 2024
Recommendation: Adopt a Resolution approving the development of a plan that includes a feasibility study and identification of funding sources for the construction of an emergency secondary egress road on Panoramic Hill. Such a plan could include discussions between the City of Berkeley, the City of Oakland, UC Berkeley, East Bay Regional Parks District and Alameda County and should also provide for continued contact with the Disaster and Fire Safety Commission (DFSC) as well as other related Berkeley Commissions as the Council determines.
Financial Implications: See report
Contact: Keith May, Commission Secretary, (510) 981-3473
Action: See action for Item 3b.

3b. Companion Report: Recommendation Regarding Panoramic Hill Secondary Evacuation
From: Fire and Emergency Services
Referred: April 25, 2024
Due: October 8, 2024
Recommendation: Adopt a Resolution directing the Fire Department to reach out to other impacted landowners to determine interest in pursuing, and coordinate costs sharing to conduct a feasibility study to identify a safe secondary evacuation and access route for the access impaired Panoramic neighborhood. The results of the study should then be shared with the Public Safety Policy Committee.
Financial Implications: See report
Contact: David Sprague, Fire, (510) 981-3473
Action: 0 speakers. M/S/C (Taplin/Bartlett) to send item 3b. to Council with a positive recommendation for City Council to adopt a Resolution directing the Fire Department to reach out to other impacted landowners to determine interest in pursuing, and coordinate costs sharing to conduct a feasibility study to identify a safe secondary evacuation and access route for the access impaired Panoramic neighborhood.
Vote: All Ayes.

Unscheduled Items

These items are not scheduled for discussion or action at this meeting. The Committee may schedule these items to the Action Calendar of a future Committee meeting.

4. **Resolution: Opposition to Police Brutality and Use of Force on Nonviolent Protesters**
   From: Councilmember Harrison (Author)
   Referred: November 20, 2023
   Due: September 12, 2024
   Recommendation: Adopt a Resolution reaffirming the City of Berkeley's opposition to and condemning police brutality towards nonviolent protesters and discouraging use of "less-lethal" weapons for crowd control.
   Financial Implications: See report
   Contact: Kate Harrison, Councilmember, District 4, (510) 981-7140

Items for Future Agendas

- Discuss results of feasibility study regarding Panoramic Hill Secondary Evacuation.

Adjournment

Adjourned at 11:41 a.m.

I hereby certify that the foregoing is a true and correct record of the Public Safety Committee meeting held on July 15, 2024.

_____
Wendy Sorensen, Assistant City Clerk

Communications

Communications submitted to City Council Policy Committees are on file in the City Clerk Department at 2180 Milvia Street, 1st Floor, Berkeley, CA, and are available upon request by contacting the City Clerk Department at (510) 981-6908 or policycommittee@berkeleyca.gov.

2024 Local Hazard Mitigation Plan (LHMP)

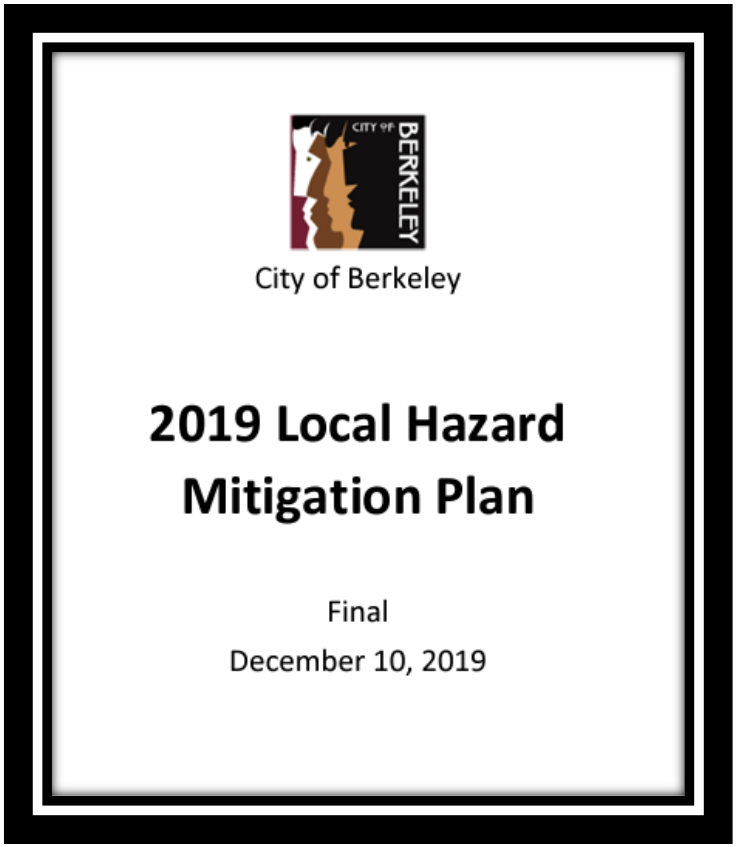
First Draft Plan

Public Safety Committee
July 15, 2024

Agenda

- Local Hazard Mitigation Plan (LHMP) Overview
- What is Hazard Mitigation?
- Plan Changes Since 2019
- First Draft Plan: Risk Assessment and Mitigation Strategy Updates
- Public Outreach
- Next Steps

Local Hazard Mitigation Plan



- Appendix to City's General Plan
- Adopted in 2004, 2014, and 2019
- Financial incentives (pre- and post-disaster)
- Public Review for First Draft: May 24 to August 8
- Key Plan Elements
  - B: Risk Assessment
  - C: Mitigation Strategy

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What is Hazard Mitigation?

Hazard mitigation breaks the cycle of damage, by taking action now to reduce impacts later.

Image Credit: Boston.gov

Examples of mitigation activities

- Home hardening (like in top photo)
- Strengthening structures (like earthquake retrofits)
- Making land use decisions that will minimize damage
- Reducing vegetation in high-fire areas (like in bottom photo)
- Strapping down water heaters

First Draft Plan:
Risk Assessment and Strategy Updates

Risk Assessment Summary

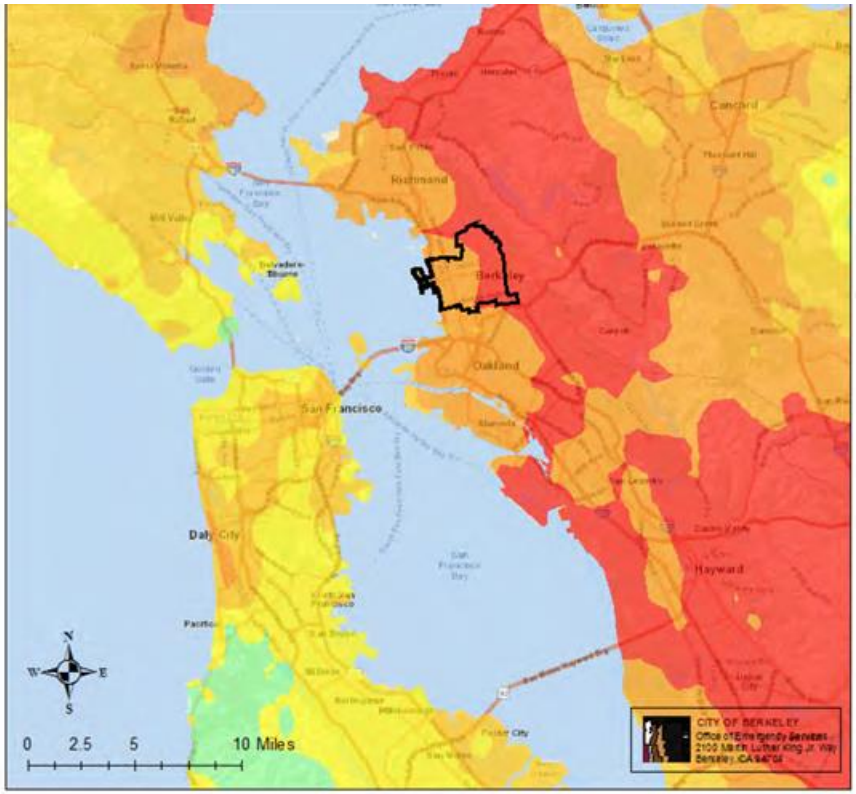
Hazard	Likelihood	Severity of Impact
Earthquake	Likely	Catastrophic
Wildland-Urban Interface Fire	Likely	Catastrophic
Extreme Heat	Likely	Moderate to Catastrophic
Poor Air Quality*	Likely	Minor
High Wind*	Likely	Minor
Landslide	Likely	Minor to Catastrophic
Tsunami	Possible	Minor to Catastrophic
Sea Level Rise*	Likely	Minor to Major
Floods	Likely	Minor
Utility Interruption*	Likely	Minor to Major
Hazardous Materials Release	Likely	Minor to Catastrophic
Infectious Disease*	Likely	Minor to Catastrophic

*New Hazard in 2024 Plan

Mitigation Strategy Summary

- 33 Actions
- Focus:
  - Current work with funding secured
  - Improvements to buildings, infrastructure, and wildfire mitigation (aligning with the Community Wildfire Protection Plan)
  - New actions or activities related to new hazards
  - Upcoming Environmental Justice and Safety Element updates

Earthquake



Source: USGS, HayWired Scenario, August 2017.
Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, © OpenStreetMap contributors, and the GIS User Community

Mitigation Actions

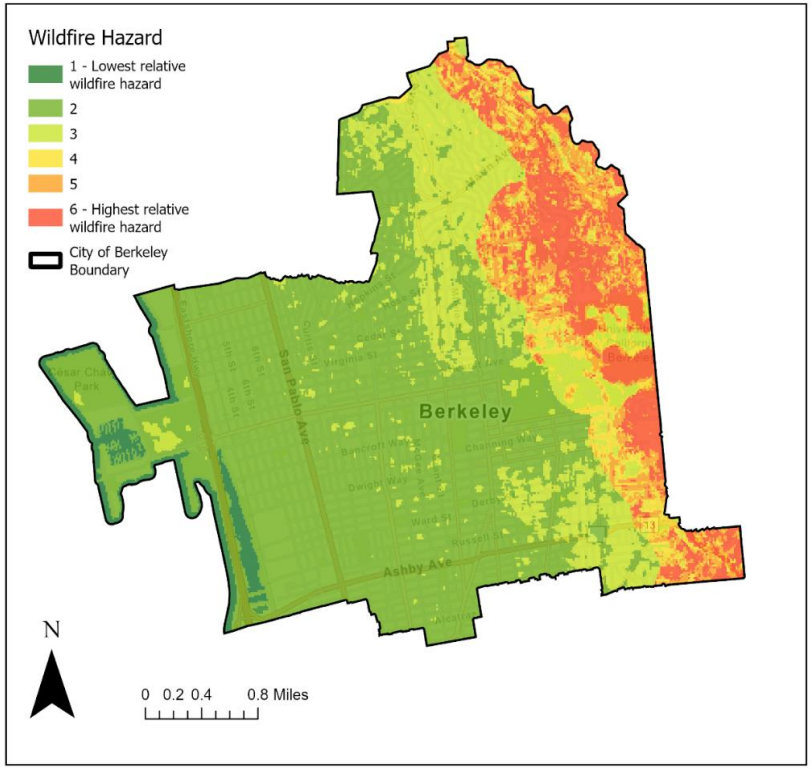
City buildings

- Building assessments
- Strengthen and replace in prioritized order

Privately owned buildings

- Soft Story Retrofit Program
- Retrofit Grants Program
- Concrete Retrofit Ordinance Research
- URM Ordinance

Wildland-Urban Interface Fire



Sources: 2020 Alameda and Contra Costa County Wildfire Risk to Structures and Wildfire Hazard Maps for Fire Prevention Planning, East Bay Regional Parks, et al.
California State Parks, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA, USFWS

Mitigation Actions

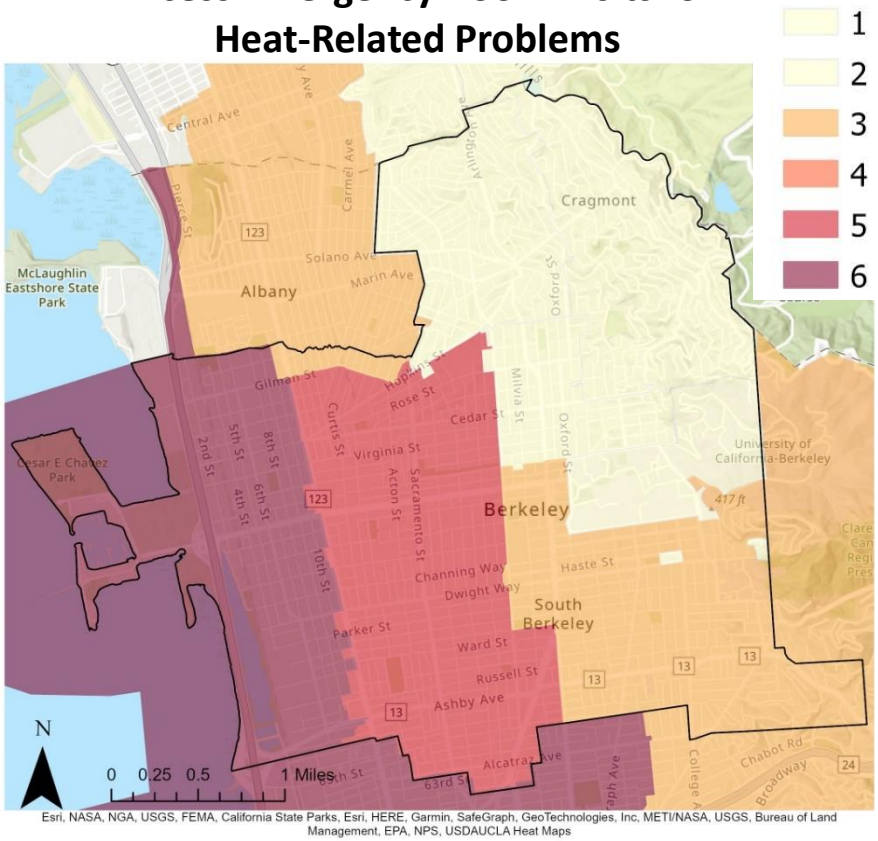
- Coordinate regional mitigation strategies
- Improve responder access and community evacuation in Fire Zones 2 and 3 through road maintenance and parking restrictions
- Manage and promote pedestrian evacuation routes in Fire Zones 2 and 3
- Mitigate risk to Berkeley's overnight camps
- Reduce fire risk through:
  - fire code and updates and enforcement
  - vegetation management
  - residential assistance program
  - utility undergrounding
  - Implementing actions in the Community Wildfire Protection Plan

Extreme Heat

Mitigation Actions

- Expanding Urban Forestry team and their activities
- Encouraging passive and energy-efficient strategies to cool down buildings
- Continuing to seek out funding to use cool paving materials on streets when feasible to reduce urban heat island impacts
- Implementing transportation projects and programs to reduce emissions

Excess Emergency Room Visits for Heat-Related Problems



Poor Air Quality

Mitigation Actions

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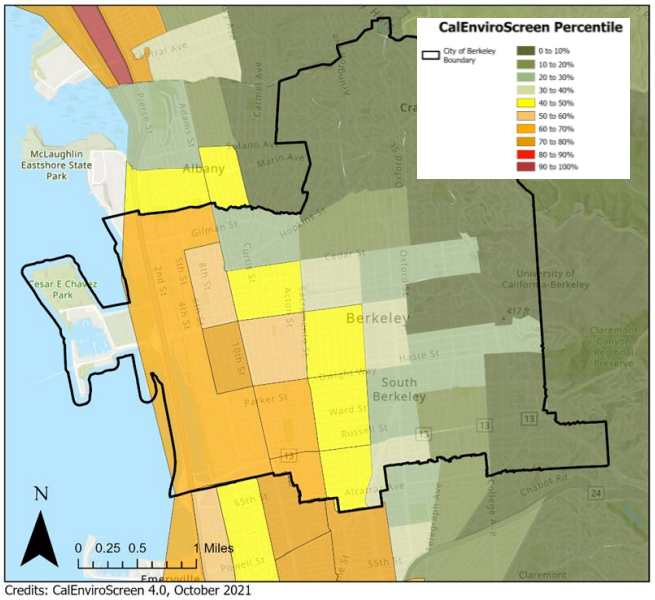

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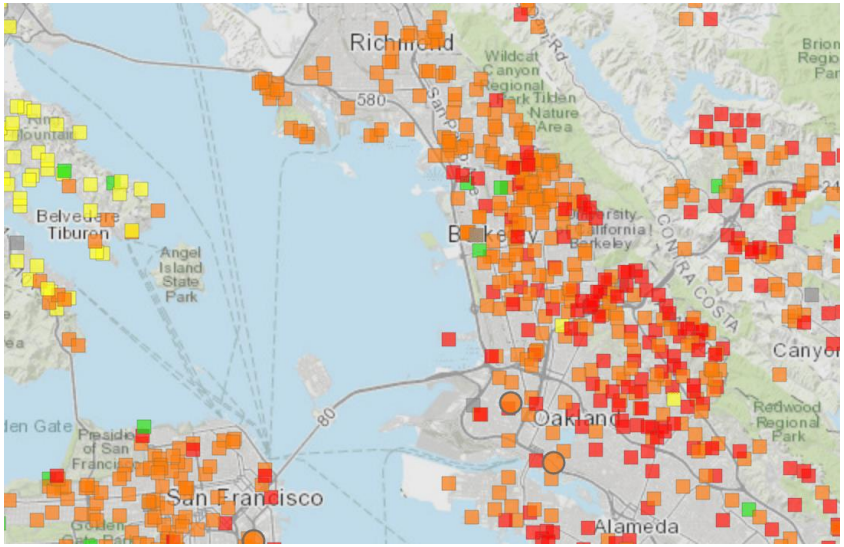

Poor air quality from fires

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Community Engagement

Individual and Household Actions

- Previous versions: What can City government do?
- 2024 LHMP: And what can you do in your household?

- Example: Earthquake
  - City: Retrofitting municipal buildings, facilitating grants
  - Household: bolting down furniture

Engagement Methods

- In-person outreach at various events during the drafting stage, including National Night Out and Solano Stroll
- Two in-person workshops during the drafting stage, including a Winter Weather Workshop and a Tsunami Workshop at the Marina
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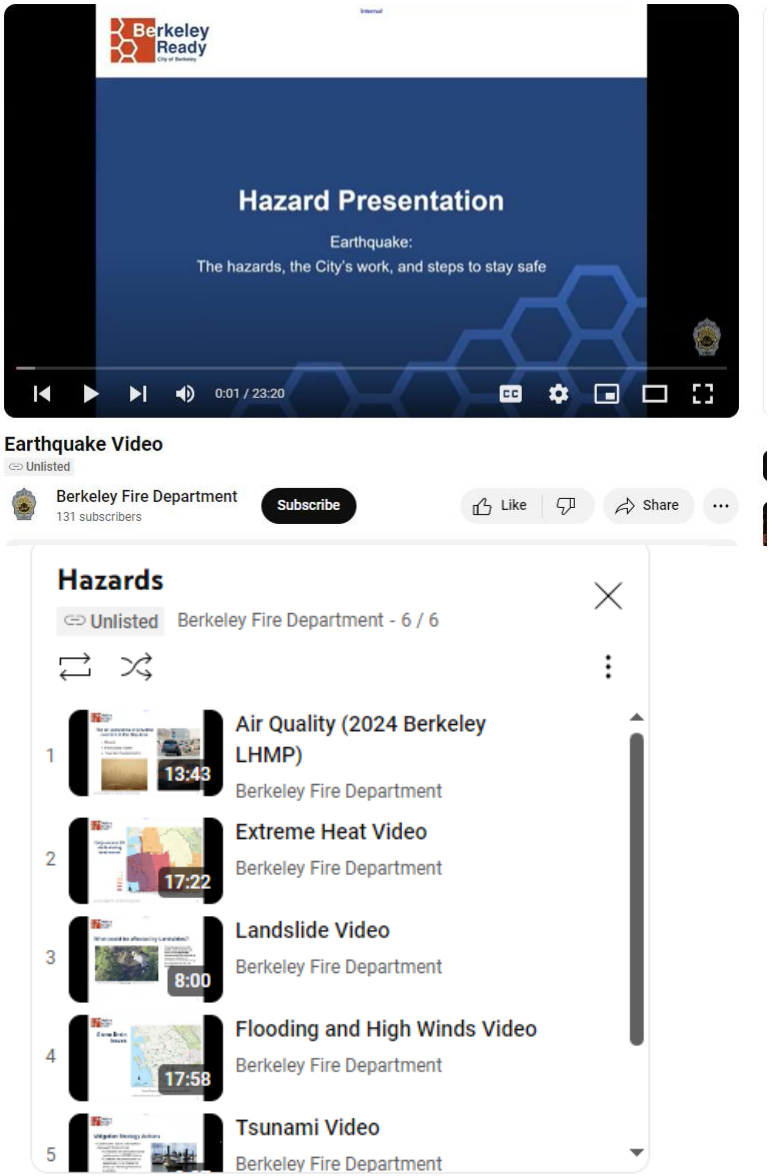


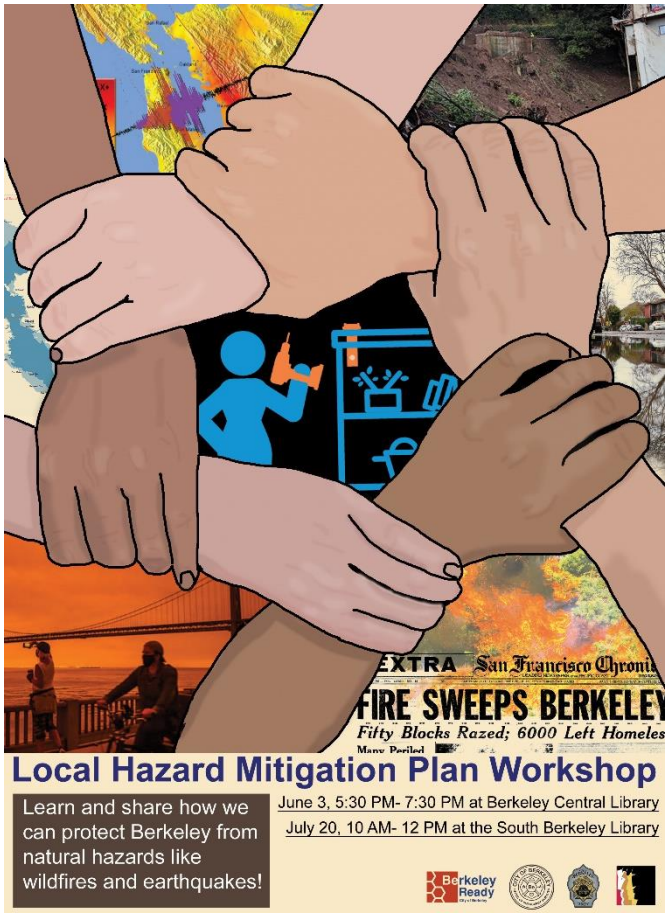
Next Steps

Please help us engage the community

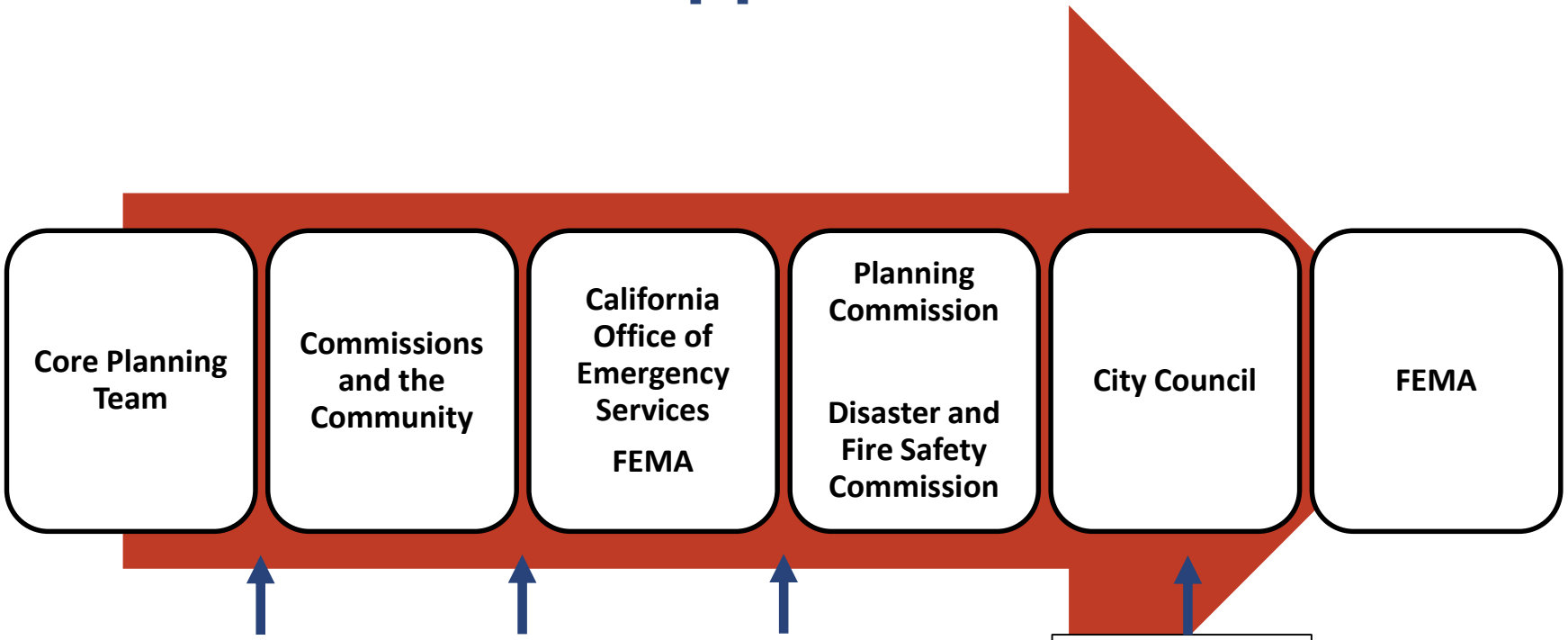
- Public Review Workshop
  - Sat 7/20 10a-12p Tarea Hall Pittman South Berkeley Branch

- Hazard videos and Plan berkeleyca.gov/mitigation

- Feedback to mitigation@berkeleyca.gov



Plan Review and Approvals Process



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CITY OF BERKELEY

Local Hazard Mitigation Plan Update

Share your ideas for actions the City of Berkeley and its residents can take to reduce risks from natural hazards, such as earthquakes and wildfires.

Help inform the City of Berkeley's updated First Draft 2024 Local Hazard Mitigation Plan. The Plan outlines the hazards that can occur in Berkeley and what actions the City is taking to reduce risk. It also lists actions that you can take to reduce personal risk and help our collective mitigation efforts.

The First Draft 2024 Local Hazard Mitigation Plan is available for review and comment until August 8. The Plan Elements are linked below:

- Executive Summary (updated on 06/04/2024 to fix page numbers)
- Element A Planning Process
- Element B Risk Assessment (updated on 06/04/2024 to correct Berkeley Fire Zone map and to fix page numbers)
- Element C Mitigation Strategy
- Element D Plan Maintenance
- Element E Plan Update
- Element F Plan Adoption (only for Final Draft Plan)
- Element G Community Education
- Appendix
    - Status of 2019 Actions Spreadsheet
    - 2024 Mitigation Strategy Actions Spreadsheet
    - 2024 Community Actions Spreadsheet

Help us by engaging with the first draft of the Plan, learning about the natural hazards that can occur in Berkeley, like earthquakes and wildfires, and commenting on the lists of actions to reduce our risks.

To learn more about the hazards that can occur in Berkeley, watch our videos.

To be involved in the planning process:

- Attend one of our community presentations, which will be posted under ‘upcoming events’ at the bottom of this page
- Email mitigation@berkeleyca.gov with your comments by August 8
- Attend the Planning Commission meeting on June 5
- Attend the Disaster and Fire Safety Commission meeting on June 26

PROJECT OVERVIEW

All local governments are required to update their Local Hazard Mitigation Plans every five years. This update provides an opportunity to assess any changes to the hazards Berkeley faces and to recommend projects to reduce risk.

Natural hazards, like earthquakes and wildfires, can cause loss of life and damage property and infrastructure. Mitigation is an investment in future safety and sustainability. By taking actions to reduce risk now, we can reduce losses later.

Having an updated Local Hazard Mitigation Plan increases community safety by providing a roadmap of actionable projects to reduce risks. An updated Plan also ensures the City is eligible for state and federal disaster assistance and mitigation grants, like the ones that fund our seismic retrofit programs.

PROJECT TIMELINE

The 2024 Local Hazard Mitigation Plan effort began in April 2023 and is estimated to be complete in December 2024.

- First Draft Released (May 2024)
- Public Comment Period (May 24 – August 8, 2024)
    - *The Public Comment period was extended from July 31 as of June 26.*
- California Office of Emergency Services and Federal Emergency Management Agency Approval (August – October 2024)
- Public Hearing at Planning Commission to Recommend Adoption of Plan (October 2024)
- Adoption of Final Plan (December 2024)

RESOURCES

- 2019 Local Hazard Mitigation Plan (LHMP)

- 2014 LHMP
- Hazard Videos:
    - Earthquake
    - Wildland-Urban interface Fire
    - Air Quality
    - Extreme Heat
    - Landslide
    - Flooding and High Winds
    - Tsunami
    - Utility Disruption

PAST EVENTS

Local Hazard Mitigation Plan Public Review Workshop

June 3, 2024 | 1 Documents

News

Sign up for AC Alert for official emergency information

Register your neighborhood event for National Night Out by July 21

High temperatures predicted; make a plan to stay cool

Safely celebrate July 4th—Avoid fireworks and certain hillside roads

FIRE DEPARTMENT

Email: fire@berkeleyca.gov

Phone: (510) 981-3473, TDD: (510) 981-6903

Create a resilient, safe, connected, and prepared City

VIEW OUR STRATEGIC PLAN

CITY OF BERKELEY **2180 Milvia St, Berkeley, CA 94704**

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SERVICES. RESOURCES. COMMUNITY.

News from the City of Berkeley

Help shape plan to protect our community from natural hazards

Give input on and learn how the City and Berkeleyans can best reduce risks from natural hazards such as earthquakes and wildfires. Join us for in-person workshops on June 3 or July 20.

Attend an upcoming workshop to give feedback on a draft plan for how Berkeley can prepare for wildfires, earthquakes, and other natural hazards.

The plan, known as a Local Hazard Mitigation Plan, identifies the hazards Berkeley faces and prioritizes City and community-member actions to reduce risks – which are increasing in severity and likelihood due to climate

N

News & Updates from the City of Berkeley <updates@news.berkeley

Courtesy Copy: Berkeley Ready June Updates

To Albrecht, Jamie; Lana, Sarah; Fang, David; Chakko, Matthai; Lee, Seung; Willis, Kimberly; Dailey, Dafina; Yocum, He
May, Keith

If there are problems with how this message is displayed, click here to view it in a web browser.

This is a courtesy copy of an email bulletin sent by Jamie Albrecht.

This bulletin was sent to the following groups of people:

Subscribers of Berkeley Ready Updates (3778 recipients)

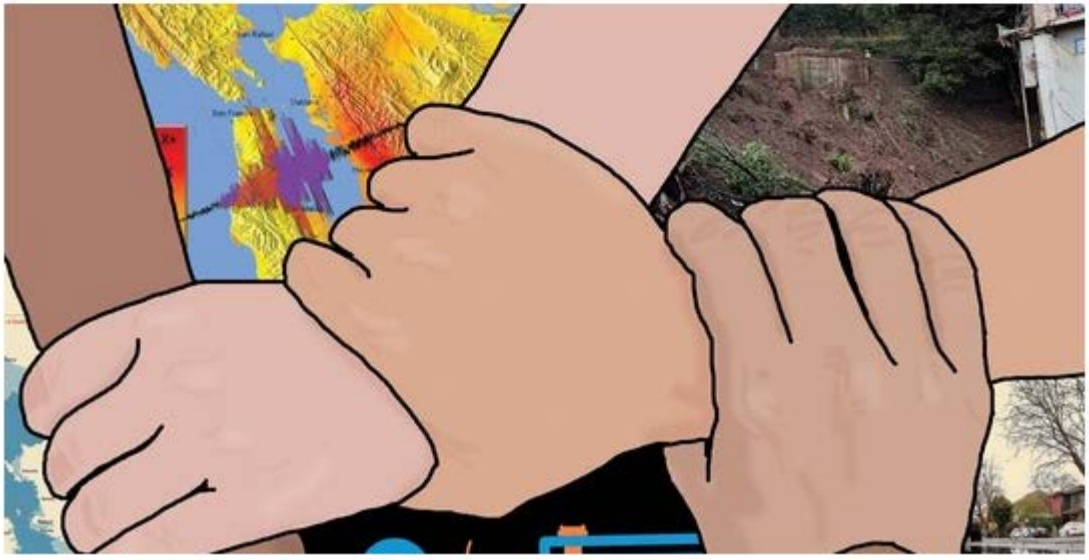
May 10, 2024 View this message as a webpage

Berkeley Ready
City of Berkeley

Office of Emergency Services

Berkeley Ready News & Updates

Engage with our Local Hazard Mitigation Plan



12:08 LTE
instagram.com

Post

berkeleyfiredept • Follow

10 likes

berkeleyfiredept Join us for a hands-on workshop to engage with the First Draft 2024 Local Hazard Mitigation Plan. This workshop is an opportunity to learn about the various natural hazards, such as wildfires and earthquakes, that can occur in Berkeley, and to understand the

Berkeley to host pair of disaster readiness workshops

Officials will review the city's local hazard mitigation plan, one at 5:30 tonight at the Berkeley Public Library and again in July.

By Alex N. Gecan June 3, 2024

Berkeley landlines may be preserved; regulators to discuss in June

AT&T wants to abandon much of its landline telephone network, but some residents in the hills say that's their only reliable means of communication. Regulators will take up the matter June 20.

By Alex N. Gecan
May 31, 2024

Where students gain the skills needed to engage a changing world — because *what they do matters.*

THE BERKELEY SCHOOL
ECC Campus 2030 Francisco St. K-8 Campus 1310 University Ave.
www.theberkeleyschool.org

SCHOOL OF THE MADELEINE
Your Catholic School in Berkeley.

berkeleyscanner.com/2024/05/29/disaster-preparedness/help-berkeley-prepare-natural-disasters/

Landslide Inventorie... drought

City of Berkeley

MAY 29, 2024 6:00 AM · 4

DISASTER PREPAREDNESS

Help Berkeley prepare for natural hazards and disasters

The Local Hazard Mitigation Plan identifies hazards Berkeley faces and prioritizes actions that reduce risks. Find out how to get involved.

Attend an upcoming workshop to give feedback on a draft plan for how Berkeley can prepare for wildfires, earthquakes and other natural hazards.

The plan, known as a Local Hazard Mitigation Plan, identifies the hazards Berkeley faces and prioritizes city and community actions to reduce risks — which are increasing in severity and likelihood due to climate change.

There are three ways you can help shape the plan:

DocuSign Envelope ID: 850753EA-2BA4-4753-AD2B-900C89239986

Office of the City Manager

May 31, 2024

To: Commission Secretaries

From: Dee Williams-Ridley, City Manager

DocuSigned by:
C1783A8ACD2246A...

Subject: 2024 Update to the Local Hazard Mitigation Plan; Public Comment Process

The First Draft of the City's 2024 Local Hazard Mitigation Plan (LHMP) update has been released on the City's website (www.BerkeleyCA.gov/Mitigation). The document's Executive Summary and Actions are attached to this letter.

As a Commission Secretary, please:

- Include the attached material as an Information Item in your next Commission meeting packet
- If your Commission wishes to provide feedback on the plan, please send comments to mitigation@berkeleyca.gov by July 31.

Plan Content

The LHMP identifies natural hazards in Berkeley and outlines a five-year strategy to further protect Berkeley's people, buildings, infrastructure, and environment from those hazards. The City began updating the LHMP in early 2023. This update effort will allow Berkeley to apply for federal mitigation grant programs and State funding, and is anticipated to be complete at the end of 2024.

The content of the LHMP is dictated by State and federal requirements and focuses on City actions to reduce risks. In an effort to make the LHMP more relevant and accessible to community members, staff created a new section called "Berkeley Household Risk Reduction" to offer clear steps people can take to mitigate risks in their own households. Staff also wants to acknowledge all the work community members do to contribute to collective risk reduction in Berkeley by taking these actions.

Commission Review

All City Commissions are welcome to review the First Draft Plan. Commissions interested in providing feedback must submit it to mitigation@berkeleyca.gov by July

DocuSign Envelope ID: 850753EA-2BA4-4753-AD2B-900C89239986

31, 2024. Staff will review the feedback and incorporate appropriate edits into the Final Draft Plan.

Staff will present on the First Draft Plan at the Planning Commission's June 5 meeting and the Disaster and Fire Safety Commission's June 26 meeting.

Community Review

The First Draft Plan has been posted for review and comment on the City website (www.BerkeleyCA.gov/Mitigation). Staff recognize that it is difficult to engage with long documents, such as the LHMP. In an effort to support community review of the materials, the website also has detailed videos about each hazard included in the LHMP. The videos describe each hazard, its impacts, actions the City is taking to reduce risk, and recommend actions that community members can take to reduce risk in their own lives.

Members of the public are invited to provide written feedback on the document until July 31, 2024.

Written feedback can be submitted:

a) Via email to mitigation@berkeleyca.gov
b) Via postal mail to:
   Fire Department – Office of Emergency Services
   Attn: Mitigation Plan
   2100 Martin Luther King, Jr. Way, 2nd Floor
   Berkeley, CA 94704
c) In-person during business hours to the Fire Department – Office of Emergency Services at the address above.
d) In-person at Public Review Workshops:
   a. Monday, June 3, 5:30 pm to 7:30 pm at the Central Library, in The Commons
   b. Saturday, July 20, 10 am to 12pm at the Tarea Hall Pittman South Branch Library

Following the public review process for the First Draft Plan, staff will review community member feedback and will incorporate appropriate edits into the Final Draft Plan. Staff will concurrently develop an outline of edits made based on Commission and community feedback.

The Final Draft Plan will undergo review first by the State of California Office of Emergency Services, and then the Federal Emergency Management Agency (FEMA). Staff will make changes to the plan as required by these State and federal bodies.

Adoption

In winter 2024 (est.), staff will post the Final Draft Plan, including any State and federal edits, to the City website. At that time, staff will present the Final Draft Plan to the

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Disaster and Fire Safety Commission and the Planning Commission, requesting their recommendations to the Council on the plan. The Planning Commission meeting will also serve as the First Public Hearing for the plan. Staff anticipates bringing the Final Draft Plan to the City Council for review and adoption in December 2024.

Commission Secretaries will serve as their Commissions' point of contact for this project. Please contact Jamie Albrecht, Emergency Services Coordinator (mailto:jalbrecht@berkeleyca.govx5514), with questions.

Attachment: 2024 Local Hazard Mitigation Plan: First Draft Executive Summary and Actions

cc: David Sprague, Fire Chief
LaTanya Bellow, Deputy City Manager
Anne Cardwell, Deputy City Manager
Jenny Wong, City Auditor
Farimah Brown, City Attorney
Mark Numainville, City Clerk
Matthai Chakko, Assistant to the City Manager

DocuSign Envelope ID: 850753EA-2BA4-4753-AD2B-900C89239986

Office of the City Manager

May 31, 2024

To: Honorable Mayor and Members of the City Council

From: Dee Williams-Ridley, City Manager

DocuSigned by:
C1783A8ACD2246A...

Re: 2024 Update to the Local Hazard Mitigation Plan; Public Comment Process

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The content of the LHMP is dictated by State and federal requirements and focuses on City actions to reduce risks. In an effort to make the LHMP more relevant and accessible to community members, staff created a new section called "Berkeley Household Risk Reduction" designed to offer clear steps people can take to mitigate risks in their own households. Staff also wants to acknowledge all the work community members do to contribute to collective risk reduction in Berkeley by taking these actions.

Community Review

The First Draft Plan has been posted for review and comment on the City website (www.BerkeleyCA.gov/Mitigation). Staff recognize that it is difficult to engage with long documents, such as the LHMP. In an effort to support community review of the materials, the website also has detailed videos about each hazard included in the LHMP. The videos describe each hazard, its impacts, actions the City is taking to reduce risk, and recommend actions that community members can take to reduce risk in their own lives.

Members of the public are invited to provide written feedback on the document until July 31, 2024.

2180 Milvia Street, Berkeley, CA 94704 ● Tel: (510) 981-7000 ● TDD: (510) 981-6903 ● Fax: (510) 981-7099
E-Mail: manager@berkeleyca.gov Website: https://berkeleyca.gov/

DocuSign Envelope ID: 850753EA-2BA4-4753-AD2B-900C89239986

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   Fire Department – Office of Emergency Services
   Attn: Mitigation Plan
   2100 Martin Luther King, Jr. Way, 2nd Floor
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   a. Monday, June 3, 5:30 pm to 7:30 pm at the Central Library, in The Commons
   b. Saturday, July 20, 10 am to 12pm at the Tarea Hall Pittman South Branch Library

Members of the public are invited to provide written feedback on the document until July 31, 2024.

Commission Review

All Commissions have been requested to include the First Draft Plan as an Information Item in an upcoming meeting, and to provide written feedback before July 31, 2024. Staff will present the Plan's proposed mitigation strategy at the June 5 meeting of the Planning Commission and the June 26 meeting of the Disaster and Fire Safety Commission. Following the public comment period for the First Draft Plan, staff will review and incorporate appropriate feedback from Commissions and community members into the Final Draft Plan.

Final Draft Plan

The Final Draft Plan will undergo review first by the State of California Office of Emergency Services and then the Federal Emergency Management Agency (FEMA). Staff will make changes to the plan as required by these State and federal bodies.

Once approved by these bodies, staff will present the Final Draft Plan to the Planning Commission. This meeting will be the first Public Hearing for the Final Draft Plan. At this meeting, staff will request the Commission's recommendation to Council on the Final Draft Plan. Because the LHMP will be an amendment to the City's General Plan, the Planning Commission must make a recommendation to Council on the Final Draft Plan.

Staff will also present the Final Draft Plan to the Disaster and Fire Safety Commission. Because the Disaster and Fire Safety Commission closely monitors the City's preparedness and mitigation efforts, staff will request that the Commission make a recommendation to Council on the Final Draft Plan at this meeting.

Staff anticipates bringing the Final Draft Plan to City Council for review and adoption in

DocuSign Envelope ID: 850753EA-2BA4-4753-AD2B-900C89239986

December 2024.

The First Draft Plan's Executive Summary and Actions are attached. Please let me know if you have any questions.

Attachments:

1. 2024 First Draft Local Hazard Mitigation Plan: Executive Summary and Actions

cc:

David Sprague, Fire Chief
LaTanya Bellow, Deputy City Manager
Anne Cardwell, Deputy City Manager
Jenny Wong, City Auditor
Farimah Brown, City Attorney
Mark Numainville, City Clerk
Matthai Chakko, Assistant to the City Manager

From:	Mitigation
To:	Mitigation
Bcc:	jmamjt@aol.com; sslaughter@peralta.edu; mblagg@bart.gov; jfeil@oaklandca.gov; phess@acgov.org; manleys@kindermorgan.com; david.cook@ebmud.com; swilmot@berkeley.edu; "JBoito@albanyca.org"; jenn.cogley@bayer.com; caltrans_d4@dot.ca.gov; mmayorga@kensingtonfire.org; Barry.Stallard@pge.com; aharte@berkeley.edu; ejunkins1@berkeley.edu; smithe@sutterhealth.org; atheile@ebparks.org
Subject:	Draft 2024 Local Hazard Mitigation Plan Posted for Public Comment
Date:	Tuesday, June 4, 2024 12:27:00 PM

Dear Berkeley Community Partner,

The City of Berkeley is updating its Local Hazard Mitigation Plan, and the First Draft has been posted for public review at http://www.berkeleyca.gov/mitigation. The Mitigation Plan identifies Berkeley's natural hazards of concern and outlines a five-year strategy to further protect Berkeley's people, buildings, infrastructure and environment from these hazards.

We invite you to engage with the Plan, by either:

- Attending our public review workshop on July 20
- Watching our detailed videos on Berkeley's natural hazards
- Emailing your comments to mitigation@berkeleyca.gov
- Providing feedback in-person or via mail to the Berkeley Fire Department (2100 Martin Luther King Jr. Way)
- Attending our presentations at the Planning Commission on June 5 or Disaster and Fire Safety Commission on June 26

You're invited to provide written feedback on the First Draft Plan until July 31, 2024.

Thank you for considering and all the work that you do.

Warmly,
City of Berkeley, Office of Emergency Services
Mitigation Planning Team

From:	Mitigation
To:	Mitigation
Bcc:	info@downtownberkeley.com; mail@telegraphberkeley.org; info@shoptheelmwood.com; info@northshattuck.org; liz@shotgunplayers.org; info@solanoavenue.org; gilmandistrict@gmail.com; contact@westberkeleydesignloop.org; uaaberkeley@yahoo.com
Subject:	Draft 2024 Local Hazard Mitigation Plan Posted for Public Comment
Date:	Thursday, May 30, 2024 4:18:00 PM

Dear Berkeley Commercial District,

The City of Berkeley is updating its Local Hazard Mitigation Plan, and the First Draft has been posted for public review at http://www.berkeleyca.gov/mitigation. The Mitigation Plan identifies Berkeley's natural hazards of concern and outlines a five-year strategy to further protect Berkeley's people, buildings, infrastructure and environment from these hazards. Businesses are a key piece in our collective disaster resilience, serving the Berkeley community everyday as go to places for everything we need, including most importantly social connection!

We invite you to engage with the Plan, by either:

- Attending one of our public review workshops on June 3 or July 20
- Watching our detailed videos on Berkeley's natural hazards
- Emailing your comments to mitigation@berkeleyca.gov
- Providing feedback in-person or via mail to the Berkeley Fire Department (2100 Martin Luther King Jr. Way)
- Attending our presentations at the Planning Commission on June 5 or Disaster and Fire Safety Commission on June 26

Members of the public are invited to provide written feedback on the First Draft Plan until July 31, 2021. Thank you so much for considering and for your dedication to the Berkeley community.

In service,
Jamie Albrecht

From:	Mitigation
Bcc:	"jgriffith@edrobertscampus.org"; "kwilliams@byaonline.org"; "frostiesmith73@gmail.com"; "natalia@lapena.org"; "lbranford@ymcaeastbay.org"; "Trevor Jacobson"; deborah@ecologycenter.org; jzerwekh@berkeleyhumane.org; rosefalanga@gmail.com; mirna@mionline.org; RevCarrie@bfuu.org; office@netivotshalom.org; office@cbiberkeley.org; operations@bethelberkeley.org; spberkeley05@gmail.com; ryoko.osa@gmail.com; berkeleyhigashi@gmail.com; thechairman1@comcast.net; berkeleymtzn@sbcglobal.net; noah.guynn@gmail.com; walzer@usa.net; berkeleylions@yahoo.com; jwenk69@gmail.com; nielsen.dennis.a@gmail.com; arch1132@gmail.com; rbermack@gmail.com; karen@sawbirds.com; dleveen@earthlink.net; susansilber07@gmail.com; karlreeh@gmail.com; coolcarole4@gmail.com; rjfinger@gmail.com; nancy94705@gmail.com; mbrayz@gmail.com; thelous.email@gmail.com; kathyhoare@sbcglobal.net; stasha13@comcast.net; berkgal22@gmail.com; naj.dnomyar@gmail.com; Petra.Liljestrand@gmail.com; daniel.leaverton@gmail.com; ginosegre@gmail.com; coxbanbury@gmail.com; bcfilms@me.com; hfortich@gmail.com; richard@richardschwartz.info; barrie@rokeachphoto.com; nazreenkadir@gmail.com; psamis@gmail.com; heathero75gwhs@gmail.com; mariceashe@gmail.com; marisa@steponeschool.org; lizbarry4@yahoo.com; vargasgabr@gmail.com; me@dietlind.net; Ben.s.ringler@gmail.com; stephporras@yahoo.com; laib.christa@gmail.com; kodanih@comcast.net; paperfortress@gmail.com; helend@berkeley.edu; elissa.s.lee@berkeley.edu; damonguthrie@gmail.com; janefischberg2@gmail.com; audrey12@comcast.net; ronkyle@lmi.net; msmensik@me.com
Subject:	Draft 2024 Local Hazard Mitigation Plan Posted for Public Comment
Date:	Wednesday, May 29, 2024 4:16:00 PM

Dear Berkeley Community Partner,

The City of Berkeley is updating its Local Hazard Mitigation Plan, and the First Draft has been posted for public review at http://www.berkeleyca.gov/mitigation. Thanks to so many of you who contributed previously to the plan with your words but also to all of you for contributing with your actions every day. It is the work that you do, in service to the community, connecting people to each other and resources that is truly the best thing we can do to reduce our disaster risks.

The Mitigation Plan identifies Berkeley's natural hazards of concern and outlines a five-year strategy to further protect Berkeley's people, buildings, infrastructure and environment from these hazards.

We invite you to engage with the Plan, by either:

- Attending one of our public review workshops on June 3 or July 20
- Watching our detailed videos on Berkeley's natural hazards
- Emailing your comments to mitigation@berkeleyca.gov
- Providing feedback in-person or via mail to the Berkeley Fire Department (2100 Martin Luther King Jr. Way)
- Attending our presentations at the Planning Commission on June 5 or Disaster and Fire Safety Commission on June 26

Members of the public are invited to provide written feedback on the First Draft Plan until July 31, 2021. Thank you so much for considering and for your dedication to the Berkeley community.

In service,
Jamie Albrecht

Jamie Albrecht
she/her/hers

Emergency Services Coordinator
City of Berkeley Office of Emergency Services
e | jalbrecht@cityofberkeley.info p | (510) 981-5514

From:	Albrecht, Jamie
To:	Mitigation
Bcc:	bampta@gmail.com; info@emersonelementary.org; ptapresident@cragmont.org; info@johnmuirelementray.org; communications@mxpta.org; pta@oxfordelementary.org; ruthactypta.berkeley@gmail.com; president@washington.berkeleypta.org; president4willard@gmail.com; ptsaberkeleyhigh@gmail.com; bis@berkeley.net
Subject:	Draft 2024 Local Hazard Mitigation Plan Posted for Public Comment
Date:	Thursday, May 30, 2024 4:38:00 PM

Dear Berkeley Parent Teacher Association,

The City of Berkeley is updating its Local Hazard Mitigation Plan, and the First Draft has been posted for public review at http://www.berkeleyca.gov/mitigation. The Mitigation Plan identifies Berkeley's natural hazards of concern and outlines a five-year strategy to further protect Berkeley's people, buildings, infrastructure and environment from these hazards. Schools are a key part of our collective disaster resilience – from the buildings they occupy to the services they provide to the connections they create. We are interested in hearing from you and how we can help you feel ready for the natural hazards in Berkeley.

We invite you to engage with the Plan, by either:

- Attending one of our public review workshops on June 3 or July 20
- Watching our detailed videos on Berkeley's natural hazards
- Emailing your comments to mitigation@berkeleyca.gov
- Providing feedback in-person or via mail to the Berkeley Fire Department (2100 Martin Luther King Jr. Way)
- Attending our presentations at the Planning Commission on June 5 or Disaster and Fire Safety Commission on June 26

Members of the public are invited to provide written feedback on the First Draft Plan until July 31, 2021. If engaging with the Plan feels like too much, we understand that. If you're interested in connecting more in general with the Office of Emergency Services, please email me at jalbrecht@berkeleyca.gov – I am very interested in connecting with schools, learning what you all need, and seeing how we can work together.

Thank you so much for considering and for your dedication to the Berkeley community.

In service,
Jamie Albrecht

From: Elsine Green
To: Mitigation
Subject: Re: Mitigation of Fires Hillside Berkeley
Date: Wednesday, June 5, 2024 2:40:17 PM

Thank you.
Sent from my iPhone

> On Jun 4, 2024, at 2:19 PM, Mitigation <Mitigation@berkeleyca.gov> wrote:
>
> Hi Elsine,
>
> Thank you for your message! The City of Berkeley hasn't used goats for fire fuel mitigation work.
>
> UC Berkeley and the Lawrence Berkeley National Lab have used goats in the past. I believe the area that you're asking about is UC Berkeley property so this question would be best for them.
>
> It is tricky to use goats. Many people are upset about them -- they tend to eat everything, not just the stuff you want them, too!
>
> I hope this is helpful!
>
> Thanks,
> Jamie
>
> _____
>
> Jamie Albrecht
> she/her/hers
> Emergency Services Coordinator
> City of Berkeley Office of Emergency Services
> e | jalbrecht@cityofberkeley.info p | (510) 981-5514
>
> -----Original Message-----
> From: Elsine Green <emkg99@icloud.com>
> Sent: Wednesday, May 29, 2024 5:18 PM
> To: Mitigation <Mitigation@berkeleyca.gov>
> Subject: Mitigation of Fires Hillside Berkeley
>
> WARNING: This is not a City of Berkeley email. Do not click links or attachments unless you trust the sender and know the content is safe.
>
> 29 May 24
>
> Until the last couple of years goats were used to remove the hillside grass, weeds , all potential fuel for fires. The goats did an excellent job. Now, whoever is cutting down the potential fire fuel has brush from approximately 5’´ to 12’´ of dry brush. This can easily be seen from east side of Sports Lane, next to the swimming pool. The children’s annual camp program is expected to start soon.
> Why don’t you use the goat service anymore?
>
> Concerned citizens
>
>
> Sent from my iPhone

From: rachel bradley
To: Mitigation
Subject: Re: Public meetings re plan
Date: Tuesday, June 4, 2024 5:50:32 PM

Thanks Jamie.

I have a couple of thoughts about WUI Fires (since I live in the Berkeley hills north of campus).

The first is the importance of protecting evacuation routes for residents (and incoming fire trucks) by restricting parking on the narrow roads in the hills to make sure two cars can pass. This is essential to keep residents safe. It should be enforced at all times by citations, and especially on high fire risk days, when cars in violation should be towed. This is just the most basic common sense, based on how people have died in previous fires. People act like they have the right to park as many giant vehicles as they want on the public street in front of their house, but this should not trump public safety. They may have to park elsewhere, or use their driveways or garages. It's time to get serious about this in my opinion, and I know many neighbors agree.

The second thing is the importance of having homeowners clear dead and dangerous vegetation on their properties. This needs to be taken more seriously, and quick clean up required (or else the city should clean and charge homeowners). I have called to report dangerous conditions on neighborhood properties, and it usually takes many calls over many weeks to get any results. Given the high risk of fire, this should be a priority.

Thanks for taking my comments into consideration.

From: Mitigation <Mitigation@berkeleyca.gov>
Sent: Tuesday, June 4, 2024 2:02 PM
To: rachel bradley <rachelbradleywood@hotmail.com>
Subject: RE: Public meetings re plan
Hi Rachel,
Hope you're doing well! I am attaching a PDF of our poster boards. Please feel free to send me any feedback you have!
Thank you again for your interest,
Jamie

Jamie Albrecht
she/her/hers
Emergency Services Coordinator
City of Berkeley Office of Emergency Services
e | jalbrecht@cityofberkeley.info p | (510) 981-5514

From: rachel bradley <rachelbradleywood@hotmail.com>
Sent: Thursday, May 30, 2024 4:01 PM
To: Mitigation <Mitigation@berkeleyca.gov>
Subject: Re: Public meetings re plan
Thanks, I would love to see the posters

> On May 30, 2024, at 3:52 PM, Mitigation <Mitigation@berkeleyca.gov> wrote:
>
> Hello Rachel,
> Thanks so much for following up! We don't currently have an online meeting scheduled. However, our YouTube videos are a good run down of the Plan and we welcome comments to this email address. I can also send you the posters that we're showing at our in person meetings and welcome your comments that way!
> Warmly,
> Jamie
>
> ---
>
> **From:** rachel bradley <rachelbradleywood@hotmail.com>
> **Sent:** Tuesday, May 28, 2024 5:34 PM
> **To:** Mitigation <Mitigation@berkeleyca.gov>
> **Subject:** Public meetings re plan
> **WARNING:** This is not a City of Berkeley email. Do not click links or attachments unless you trust the sender and know the content is safe.
> Will either of these meetings be available to join online?
> Sent from Mail for Windows

From: Sabina McMurtry
To: Mitigation
Subject: Re: suggestions
Date: Sunday, June 2, 2024 10:07:25 AM

And thank you for your response, Jamie.

I'm glad to hear the trees are, rightly, included in the mitigation plan. One additional comment about the maintenance of the street trees, and city work in general, is that I hope you are building in evaluation of work that is done, with recourse to improving any work that is not done well.

Sabina

On Thursday, May 30, 2024 at 03:57:46 PM PDT, Mitigation <mitigation@berkeleyca.gov> wrote:

Thanks for responding! Totally understand that – unfortunately federal requirements ensure that this Plan is very long! We're always looking for ways to make it more approachable, but it's difficult. We have made the YouTube videos with this in mind but they take time to watch too.
Appreciate your comment about the trees! We have an action in our Mitigation Plan to expand our Forestry Unit so that we can do more maintenance and planting. So hopefully this will improve soon – it is definitely on our radar.
Thanks so much for writing in,
Jamie

From: Sabina McMurtry <sabinamcmurtry@yahoo.com>
Sent: Wednesday, May 29, 2024 8:04 PM
To: Mitigation <Mitigation@berkeleyca.gov>
Subject: suggestions

WARNING: This is not a City of Berkeley email. Do not click links or attachments unless you trust the sender and know the content is safe.

Hello
I am a 50 year resident of Berkeley, a homeowner in South Berkeley.
I do not have the bandwidth to read your incredibly long proposals, but I would like to suggest an area of attention if it is not already included:
Many of our street trees are in abysmal condition and they present a variety of hazards to people and property. During natural disasters which may include heavy rain and winds, wildfires and earthquakes they can be the source of danger and damage. As an example, I will discuss the camphor trees on my block, the 2200 block of Stuart St. Many of them have been pruned by the city to avoid problems with power lines. Pruning in this manner only leaves them extremely lopsided, prone to toppling in high winds and heavy rains. A number of the trees on my block have huge dead limbs, and when the city has pruned some of these limbs (leaving other hazardous ones), again they have dealt with one problem and caused others, more lopsided trees with potential to fall. We even have one camphor tree where the entire crown is dead, but the city ignores it. I have been in touch with the Dept. of Forestry about this, been added to waiting lists and seen the city come out and do a very minor and unbalanced job of pruning. And this is just one block. Our street trees are important and valuable to us in so many ways - but the city must maintain them and plant additional ones as the old ones die. Here is something the city can do that is an integral part of disaster mitigation and which does not involve figuring out new ways to deal with difficult problems. The answers are obvious, but not put into effect. I understand that there is limited money for the Forestry Dept., but perhaps some funds for disaster mitigation could be correctly added to to street tree maintenance to mitigate these hazards.
Sabina McMurtry

From: Mitigation
To: Shela Ray; Mitigation
Subject: RE: Video quality (or lack)
Date: Thursday, June 27, 2024 4:41:23 PM

Hi Shela,
Thanks so much for sending another note! I appreciate it. I am excited to hear about your work in the peer ambassador program. It's such an exciting program and I am grateful for your work in this space, including watching our videos and providing feedback.
It's helpful to hear what made the other videos better! As I continue to build our outreach programs and materials, I will definitely keep this in mind. If you have other ideas for how we can better reach people and provide actionable materials, I am here to listen!
Warmly,
Jamie

Jamie Albrecht
she/her/hers
Emergency Services Coordinator
City of Berkeley Office of Emergency Services
e | jalbrecht@cityofberkeley.info p | (510) 981-5514
From: Shela Ray <sray.spacework@gmail.com>
Sent: Tuesday, June 18, 2024 3:24 PM
To: Mitigation <Mitigation@berkeleyca.gov>
Subject: Re: Video quality (or lack)
Hi Jamie Albrecht,
Thanks for getting back to me.
I'm sorry if I came across as harshly critical! A little more explanation is that I have been working my way through many emergency preparedness videos as part of my final project for a six-month training program I am just completing through the Center for Independent Living - it's a peer ambassador training in emergency preparedness for disabled and older adults.
https://thecil.org/emergency-preparedness/peer-ambassador-program/
I decided to compile a list of resources on emergency preparedness focusing particularly on older adults, and have been reviewing many web sites - federal, state, Alameda Cty and City of Berkeley, including check lists, articles, and videos. I think videos are a great way to get things across, as most people I know getting very tangled up in online research.
I have watched some really good videos from City of Berkeley so far - "Making your household fire weather plan: a step by step guide" (2022, on the City of Berkeley YouTube channel), and "What you can do: four key steps to take control before a wildfire starts" (on the Berkeley Fire Dept You Tube Channel). They were narrated by different people, but were slower, gave a bit more time to absorb what was being said, and had a more conversational tone than the ones I was commenting on.
I've got myself on various lists now and am trying to keep up, but as mentioned, I was disappointed in those last two I watched from the recent email notification I got.
I understand that time and budgets can be limiting factors in producing communications. A lot of helpful things have been done so far. I do appreciate your efforts and wish the best to all of you who are involved in these efforts.
Shela Ray
On Mon, Jun 17, 2024 at 1:13 PM Mitigation <Mitigation@berkeleyca.gov> wrote:

Hi Shela,
Thank you for watching and for the feedback. We have your recommendations noted – we will continue to improve our materials as much as we can, given our limitations.
Appreciate it,
Jamie

Jamie Albrecht
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From: Shela Ray <sray.spacework@gmail.com>
Sent: Thursday, June 13, 2024 6:43 PM
To: Mitigation <Mitigation@berkeleyca.gov>
Subject: Video quality (or lack)

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Hi,
I've tried watching the videos. The voice over is so bad, way too fast, lots of mistakes, flat, like someone bored and reading and not understanding that they are teaching, informing people for the first time, these very important points
You need to get someone who knows how to teach, how to communicate in this medium. I watched the Wildland Urban Interface and tried to go on with landslides but I just couldn't handle the rushed, flat presentation of info.
Thanks for trying, but it's really important information and needs a media specialist to help it get across in and engaging manner.
Shela Ray

From: Marilyn Sagna
To: Mitigation
Subject: Re: What I would like included in an equitable mitigation plan
Date: Thursday, August 1, 2024 1:32:54 PM

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P.S. I think a proactive psychosocial component could be a positive addition to this hazard mitigation plan. Especially if it is arched into a public health component.

Equity minded, holistic and inclusive!

On Thu, Aug 1, 2024 at 1:24 PM Marilyn Sagna <marilynsagna19@gmail.com> wrote:

> I am regularly exposed to dangerous dusts with neighborhood hired yard maintenance blowers. If I'm here and able to shut all windows in a rapid manner, I can momentarily protect my indoor air space from dangerous conditions. This happens often: neighbors right, left and cross change days blowing these toxins, fungi, allergens and other pollutants (noise, fumes, unknowns...) into my home. The homeowners are not there to be exposed to what we and these workers are subjected to.
>
> I would like to see language that protects renters who participate and take preventative safety measures that the city recommends. I have been threatened that I could lose my housing by my landlords for storing water. Many rentals are small carved spaces, without the space resources that home owners usually have at their discretion. How about language that guarantees renters space for emergency provision and gobags? How about vouchers for low income water, etc.? How about neighborhood caches?
>
> Furthermore, as an unpaid home based caregiver I have no OSHA or any other protections from landlords that hire people or do work themselves, that seriously threaten health and safety. These types of workplace health and safety violations would not be tolerated on a protected worksite. Allowing neighbors to hire vulnerable persons and exposing neighbors to continual and cumulative health and safety violations is unconscionable and should be addressed.
> As a worrisome example: should lead in the soil really be at the discretion of landlords? How about fire extinguishers? How about being exposed to unlabeled environmental and human toxins and/or flammables in locations unknown and perhaps not safe? Can you imagine being threatened for wanting to live in a healthy and safe home?
>
> I would like to see the economic environmental discrepancy dangers to be addressed. Please extend mitigation to the hazards above and many more that debilitate the health and safety of many in our community that are vulnerable sitting ducks to cumulative environmental dangers. Please merge within an equity platform where each and every person's health, inclusive of their voice, and community health are worthy goals. This plan needs to be inclusive for all that is missing here.
>
> Thank you for your works and for listening to some of my concerns. If anyone cares to respond, I thank you as well.
>
> --
> *Marilyn*

--
Marilyn

From: Elsine Green
To: Mitigation
Subject: Mitigation of Fires Hillside Berkeley
Date: Wednesday, May 29, 2024 5:18:19 PM

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29 May 24

Until the last couple of years goats were used to remove the hillside grass, weeds , all potential fuel for fires. The goats did an excellent job. Now, whoever is cutting down the potential fire fuel has brush from approximately 5’′ to 12’′ of dry brush. This can easily be seen from east side of Sports Lane, next to the swimming pool. The children’s annual camp program is expected to start soon.
Why don’t you use the goat service anymore?

Concerned citizens

Sent from my iPhone

From: kelly hammargren
To: Mitigation
Subject: LHMP Comments -
Date: Thursday, August 8, 2024 10:22:53 PM

WARNING: This is not a City of Berkeley email. Do not click links or attachments unless you trust the sender and know the content is safe.

The Local Hazard Mitigation Plan Update (LHMP) is very well done and as comprehensive as it is, listed here are a few additions that need to be addressed regardless of the required LHMP Update timeline.

1) Berkeley should be aggressively moving toward Passive Houses and using Passive House Principles in multi-unit buildings. This would increase living and working comfort and reduce energy load on the grid. https://www.phius.org/passive-building/what-passive-building/passive-building-principles

In the Strategy Action chart #49 encourage passive and energy efficient strategies are listed as is the word "ongoing." Since I have attended every public meeting on new project approvals for nearly 10 years, I can tell you this is not happening.

2) Passive house principles locate operable windows for the best exposure to cooling breezes. Currently new construction is designed with no consideration to cooling breezes.

3) The Zoning Adjustment Board (ZAB) and Design Review Committee (DRC) focus on the exterior design not the interior. There is no current regulation/ordinance in Berkeley that requires operable windows in bedrooms which means that multi-unit buildings have been approved with multiple bedrooms with no windows. In the situation where there is an extreme heat event and a power failure these rooms and units become a heat trap / a death trap.

4) The Zoning Ordinances before the City Council establish setbacks between buildings without consideration to air current, air circulation. This will be increasingly important as the climate continues to warm and heat events become more frequent. Lining San Pablo with wall to wall taller buildings will impact air flow, increase heat island effect and create micro climates of sustained heat.

5) Tree canopy is listed as a mitigation in heat events under 51, however, the problem is Berkeley's Urban Forestry selections are small trees in inadequate spaces instead native trees with large canopies as on California between Dwight and Allston. The city is being filled through the forestry program with none native trees that do not support local habitat and ecosystems besides being inadequate to provide shading in heat events.

6) Permeable paving is not listed as a mitigation to stormwater in 53. Permeable paving can easily be incorporated into street design as was done on the north side of Channing between MLK Jr Way and Milvia. It has also been used on the north side of San Pablo Park. Permeable paving is not the same as bioswales. Permeable paving could be used throughout the city instead of hardscape, impermeable concrete, or asphalt in driveways, sidewalks, etc.

5) A large gas pipeline runs up Allston through neighborhoods, past the high school (with over 3000 students) and by city hall. There is no reporting on inspections and status. A leak and explosion of this gas pipeline like what happened in 2010 in San Bruno at Milvia and Allston during a work day and school day has the potential to wipe out much of city government and the high school student body. Not only does there need to be reporting by PG&E, but in addition electrification needs to be accelerated to remove this kind of hazard.

6) Just like there are notifications of asbestos in buildings, there needs to be notifications to renters when units being considered for renting and to occupants of rented units that are in fire zones, hillside slide areas, within proximity to the Hayward fault and when rental housing is in soft story buildings at risk of collapse.

kelly hammargren

From: John Light
To: Mitigation
Subject: Hazards mitigation
Date: Thursday, July 25, 2024 2:58:05 PM

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How about removing those dangerous concrete bike lane dividers that people keep smashing into with their cars?
Sent from my iPhone

From: Burns, Anne M
To: Mitigation
Subject: General DRC Comments on First Draft Local Hazard Mitigation Plan (LHMP)
Date: Wednesday, July 31, 2024 3:11:32 PM

Internal

The City's First Draft Local Hazard Mitigation Plan (LHMP) was included in the Design Review Committee (DRC) July 18, 2024 Agenda as a general communication item. There were some general comments on this draft at the meeting. We have included these general comments below, as well as in the DRC's summary on-line under their July 18th Meeting Summary. Thank you. – Anne Burns, Design Review Committee Secretary

- General DRC Comments on the City's First Draft Local Hazard Mitigation Plan (LHMP): Good draft, but continue to work on:
  - Fire egress for tall buildings once outside the building;
  - Heat wave mitigations;
  - New building design for livability with climate changes. One example of this would be requiring windows in all bedrooms;
  - Shelter-in-place safety precautions; and
  - Bird safety measures.

From: Lana, Sarah
To: Mitigation
Subject: FW: Fire Chief Sprague - Evacuation Routes
Date: Tuesday, June 4, 2024 9:13:50 AM

Internal

From: Bernard Marszalek <ztangi@lmi.net>
Sent: Sunday, June 02, 2024 12:44 PM
To: Berkeley Fire Department <FireMailbox@berkeleyca.gov>
Subject: Fire Chief Sprague - Evacuation Routes

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Greetings Fire Chief Sprague,

I have been reading the City of Berkeley Local Hazard Mitigation Plan (Draft) and discovered that the only mention of Evacuation Routes refers to Fire Zone 2 & 3.* Though I failed to find a map of Fire Zones on the City of Berkeley website, I presume that these are hill district zones. I recall that the City of Berkeley was past due establishing safe routes and that a consulting group was hired to complete a study.

I would like to make a comment on the Draft that would request that that information be added to the section on Evacuation Routes. (See below)

Could you please provide that information to me?

Thank you,

-b.

*** map -** https://berkeleyca.gov/sites/default/files/documents/Berkeley-Emergency-Access-Evacuation-Routes-06-2011.pdf

Also, my summary of the draft's section on evacuation routes in Fire Zones 2 & 3:

> Document re **Local Hazard Mitigation Plan 2024 - Update**
> "Share your ideas for actions the City of Berkeley and its residents can take to reduce risks from natural hazards, such as earthquakes and wildfires."
> https://berkeleyca.gov/safety-health/disaster-preparedness/local-hazard-mitigation-plan-update
> Several things to note:
>
> 1. "For the first time, the plan identifies poor air quality, high wind, sea level rise, utility interruption, and infectious disease as hazards of concern."
> 2. "Manage and promote pedestrian evacuation routes in Fire Zones 2 and 3. Improve responder access and community evacuation in Fire Zones 2 and 3 through roadway maintenance and appropriate parking restrictions."
>
> There is no map provided to locate Fire Zone 2 and 3. Searching on the Berkeley City website proved fruitless. I presume that these are hill districts where narrow

streets prevail.

I scanned the entire LHMP Update and found nothing more about Evacuation Routes. Since at the first signs of a disaster, and even before some residents are immediately affected, people will practice preventive measures and seek safety. **If there are no plans for Evacuation Routes in a Mitigation Plan how do we prevent traffic chaos during a disaster?**

For example, an Evacuation Plan would include preferrable arteries to safety. The arterial roads might be designated as all lanes One Way West.

- - - - - - -

Berkeley Public Eye You Tube channel --> https://youtu.be/rjqB62h_vlQ?si=skjKW71MEruz1zY6

--

Bernard Marszalek • **510-693-5760** • Berkeley, CA 94703

From: Albrecht, Jamie
To: Mitigation
Subject: FW: Are there earthquake hardening resources for Berkeley residents? If so, please share?
Date: Thursday, June 13, 2024 2:13:07 PM

Internal

Jamie Albrecht
she/her/hers
Emergency Services Coordinator
City of Berkeley Office of Emergency Services
e | jalbrecht@cityofberkeley.info p | (510) 981-5514

From: Gregory, Thomas <TGregory@berkeleyca.gov>
Sent: Tuesday, June 11, 2024 1:21 PM
To: Sheela Gunn <sgunn@thecil.org>; Albrecht, Jamie <JAlbrecht@berkeleyca.gov>
Cc: Emma Martin <emartin@thecil.org>; Henry Maeko <hmaeko@thecil.org>; Lana, Sarah <slana@berkeleyca.gov>
Subject: Re: Are there earthquake hardening resources for Berkeley residents? If so, please share?

Hi Sheela,
I'm not aware of any such resource (be it City-sponsored or County-sponsored, or be it available to all or just available to folks with low-incomes).

Just last week, Berkeley's Commission on Disability was discussing how useful it would be if such a resource were available to Berkeleyans as part of (or a supplement to) the City's Local Hazard Mitigation Plan.

If you discover any good news on this front, please share...I will do the same.
Best,

Thomas Gregory / ADA Program Coordinator

City of Berkeley, Public Works Department

1947 Center Street, 4th Floor

Berkeley, CA 94704

(510) 981-6418

From: Sheela Gunn <sgunn@thecil.org>
Sent: Tuesday, June 11, 2024 1:11 PM
To: Albrecht, Jamie <JAlbrecht@berkeleyca.gov>; Gregory, Thomas <TGregory@berkeleyca.gov>
Cc: Emma Martin <emartin@thecil.org>; Henry Maeko <hmaeko@thecil.org>
Subject: Are there earthquake hardening resources for Berkeley residents? If so, please share?

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Hi, Folks,

I've just gotten an inquiry about getting shelves and other tall furniture secured. Are there such resources in Berkeley? I'mm assuming low income. It also occurs to me to check for county resources, and would appreciate any info you have on that front, else I'll ask my 211 contact.

Thanks,
Sheela Gunn, (ze, zeir, zeirs)
Emergency Preparedness Coordinator
Center for Independent Living (CIL),
Berkeley, CA
sgunn@thecil.org
510-422-5068 (Textable, too!)
www.thecil.org/emergency-preparedness/

Our main web site is:
www.thecil.org
****
See below for a list of some good emergency preparedness resources.

*New Resource! * Listos - Disaster Readiness
<https://www.listoscalifornia.org/disaster-readiness/>

*New Resource! * Alameda County's Disability-Specific page re Emerg. Prep.
<https://www.acgov.org/ready/disability.htm>

* The Access and Functional Needs (AFN) Library at Cal OES. Everything you might want to know about people with disabilities, older adults, and other folks with Access and Functional Needs (AFN), *including* what that phrase means.
https://www.caloes.ca.gov/office-of-the-director/policy-administration/access-functional-needs/afn-library/

* The Cal OES Listos resource hub that also features pamphlets about several kinds of emergencies/disasters in many languages. Different from the Readiness page listed above.
https://www.listoscalifornia.org/resources/

You may share any of these resources. :)

From: Steve Koppman
To: Mitigation
Subject: Fw: Air Pollution Mitigation, Citizen Comment
Date: Thursday, August 8, 2024 4:15:03 PM
Attachments: denahbooksteinCommentonCityofBerkeleyMitigation824.doc

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From: Denah S. Bookstein

This is in response to the City of Berkeley's 2024 Air Pollution Mitigation report, part of Berkeley's Local Hazard Mitigation Plan:

I recently watched with interest your video alerting Berkeley citizens to the presence and dangers of airborne pollutants and their toxic
effect on the health of our community. The video emphasizes that the health threats of air contaminants fall mainly on seniors and
pregnant and nursing women, two groups many of whose members lack the financial resources to protect themselves, at the same time
those most likely to be outside walking.

I have lived in Berkeley since 1987, first on the east side of the city and, since 2005, on the far west side. I have experienced an extreme
difference in air quality in the two locations and the lack of attention the City has given to this problem. On the far west side of the city,
there is constant infiltration of our homes and bodies by dangerous particulate matter. We sweep it up and wash it off our faces every
night. My house dust is dark grey. My lungs feel constricted and only when I make it to the Marina can I breathe deeply.

Berkeley's proposals for dealing with these problems are, to me, inadequate. The city proposes planting trees, providing more convenient parking spaces and encouraging residents to walk and use bikes, scooters and EV cars.

It seems the City government is trying to delegate responsibility for dealing with these toxic problems to the general citizenry while failing to take concerted City actions.

Must we wear a mask every day for the rest of our lives?
Install and maintain expensive air filtration systems?
Buy a very costly electric car?
Consult a 'Spare the Air' website to find out just how bad our air is on any given day?

Can we really expect our senior population to get around Berkeley on bicycles and scooters in increasing traffic, trying to be safe as cars
and cyclists alike fail to stop at stop signs and red lights, or even use their signals, drivers and pedestrians often lost on their phones?

The City wants to encourage walking to reduce auto pollution. But uneven sidewalks, broken surface streets and poor lighting are
endemic in Berkeley and hardly invite anyone, let alone older residents, to walk outside. I

myself have fallen twice on city streets and many seniors I know have fallen similarly with resulting sprains, bruising and broken bones.

I'm aware the City has planted some trees on the southwest side of Berkeley and has bought electric buses. However, our City must do
much better than this.

An important line of attack would be building highway barriers to shield residents from the roads' harmful air pollution. There is no barrier at all along 580/80 through Berkeley. In other cities along the 80 and 580 corridor, there are trees, berms, plantings and walls absorbing a significant amount of the particulate matter along the roadway. In Berkeley, there is basically nothing. Increased traffic including
trucks (and freight trains) along the 580/80 make this a worsening problem.

Apartment building developers also have had a continuously deleterious effect on how our City looks and how it feels to walk down a
street. On Berkeley's streets, buildings are being built to the last permitted inch, forcing pedestrians ever closer to truck and car exhaust
containing these particulates.

Imagine walking in the new shoreline park at the end of University Avenue, and not breathing in the toxic particulate-filled air of 580/80.

Imagine trees and bushes planted along the highway, train way and City commercial/major streets, providing an environment friendly to
people and birds besides pigeons and seagulls. Imagine tree-lined streets providing cooling protection from the heat,
cleaning the air and uplifting our spirits.

Imagine shady, spacious, accessible streets working to make life healthier and happier.

Thank you for your attention.

Denah S. Bookstein

2430 Fifth St., Studio L
Berkeley, CA 94710
District Two

From:	Friends of Five Creeks
To:	Mitigation
Cc:	May, Keith; Miller, Roger; Moore, Sarah M.; Amiri, Wahid; ccouncil@berkeleyca.gov
Subject:	Friends of Five Creeks comments on Local Hazards Mitigation Plan, May 24, 2024 draft
Date:	Thursday, August 8, 2024 3:24:55 PM

WARNING: This is not a City of Berkeley email. Do not click links or attachments unless you trust the sender and know the content is safe.

To: Comments on draft Local Hazards Mitigation Plan

cc: Berkeley Commissions on Disaster and Fire Safety; Transportation and Infrastructure; Parks, Recreation, and Waterfront; and Enviroment and Climate; Mayor and Council

Friends of Five Creek appreciates the opportunity to comment on Berkeley's Local Hazards Mitigation Plan, May 2024 draft.

We are a 28-year-old, all-volunteer group working for creeks, watersheds, and local nature from Berkeley to Richmond. We have dealt with risks of erosion and flooding on local creeks for many years and seen the collapse of aging culverts. As climate changes, we are increasingly concerned with the likely effects of sea-level rise and groundwater infiltration, as well as increased probability of deluges.

This plan is an excellent start. Ongoing improvements and collaborations will be vital.

The plan's focus and highest level of detail are on wildfire and earthquake. **Development in other areas will be needed.** The examples below regarding collaboration come from our water-related interests. We believe they apply to other areas as well, with many potential win-wins. For example, without claiming expertise, increased subsidies for heat pumps might benefit low-income residents, reduce greenhouse-gas emissions, lessen air pollution, and reduce dangers from heat waves, leading to a high cost-benefit ratio.

1. We are delighted that the plan builds in frequent opportunities for updates as well as ongoing input via a dedicated web site, to be reviewed by a specific commission.

We have already recommended this model to another city! We look forward to its use in other Berkeley planning processes. (From the July 31 meeting of the Council Policy Committee on Facilities, Transportation, Infrastructure, and Sustainability (FITES), we believe that a similar web site will be used in developing the coming Stormwater Plan).

2. Collaboration among departments and commissions will be essential to flesh out this plan. Here are examples from F5C's areas of interest:

- In the area of sea-level rise, the draft recognizes that groundwater infiltration due to sea-level rise is a serious threat, with research new and ongoing. This should be developed in the coming stormwater plan, whose scope is being amended to incorporate these effects. The

Disaster and Fire Safety Commission should be aware of, and have input into, these aspects as they develop.

- Similarly, from the FITES meeting, we understand that the stormwater plan's scope is being expanded to include modeling of the increasing probability of deluges, as these will affect severity and length of flooding (p. B204). This should be collaboratively incorporated into the Local Hazards Mitigation Plan as soon as possible.
- The current draft refers only in passing to the effects of higher tides on flooding in West Berkeley, and tides' and storms' interplay with Aquatic Park, which serves as a safety outlet for the city's largest storm drains, Strawberry/University and Potter. These threats should be explored as part of the stormwater plan.
- The maps and comments in Section B are highly informative, but they also show data gaps. For example, the storm drain overflow map on B 195 shows locations of service calls -- but not which sites get preventive maintenance or repeat calls. The stormwater plan should remedy this, and thus strengthen this plan.

3. Planning should move rapidly toward exploring and advocating collaboration with agencies other than the city.

For example, the East Bay Regional Park District is beginning plans for the North Basin Strip -- much of northwest Berkeley's waterfront -- in September. **Berkeley should be involved in this process, because decisions will affect flood potential in Northwest Berkeley**. In a simple example, "daylighting" the mouth of Schoolhouse Creek would decrease flood risk in residential areas east of the freeway (by, in effect, shortening the constricted "hose" that water needs to pass through).

Collaboration is important with tate Parks and East Bay Regional Park District for most of the waterfront, CalTrans and the railroad near the waterfront, and UC Berkeley, Albany, and El Cerrito for creeks, which are now recognized as being possible wildfire conduits as well [possible areas of floods and slides.

T**he plan's collection of low-cost recommendations for preparedness looks valuable. We hope to find ways to publicize those dealing with flooding and urban runoff.** Perhaps there could be brainstorming for ways to remind people repeatedly, without too heavy a hand? Could nonprofits help? An interesting project for a student intern?

These comments are not criticisms. They look to the near future and the promise of frequent improvements to this plan.

Susan Schwartz, President

Friends of Five Creeks
510 848 9358
f5creeks@gmail.com
www.fivecreeks.org

From: Michael Tompkins
To: Mitigation
Subject: Earthquake Hazard Mitigation
Date: Friday, July 26, 2024 10:46:31 AM

WARNING: This is not a City of Berkeley email. Do not click links or attachments unless you trust the sender and know the content is safe.

In reading the description of earthquake hazards and mitigations I saw no mention of perhaps the most common and widespread hazards in our residential neighborhoods. Unreinforced fireplace chimneys on older homes are just columns of heavy masonry ready to crumble or fall in large chunks. Many of us who live in these homes have long since stopped using our fireplaces because of particulate pollution and BAAQMD and others are discouraging their use. I'm a senior on a fixed income and have no idea how to get my 25 foot tall chimney safely removed at an affordable price. There are no contractors answering to the description of chimney removal and no information that I can find on city websites on the subject. I hope this gets addressed.
Michael Tompkins
1230 Monterey Avenue
Berkeley

Sent from my iPad

Office of the City Manager

To: City of Berkeley Office of Emergency Services

From: Disaster and Fire Safety Commission

Submitted by: Weldon Bradstreet, Chair

Subject: Commission Comments and Questions about the 2024 Local Hazard Mitigation Plan

The Disaster and Fire Safety Commission presents the following comments on the Local Hazard Mitigation Plan ("LHMP") The Commissioners are referring these comments to the OES for their consideration and inclusion, where appropriate, into the LHMP.

General Comments on the LHMP

A key point we would like to raise in the hazard mitigation work is pointing out that Berkeley's continuing efforts to implement Vision Zero by installing protected bike lanes and pedestrian improvements represents a mitigation strategy for the Extreme Heat, Sea Level Rise and Air Pollution scenarios because it is the key ingredient in motivating people to ride or walk in Berkeley, rather than drive. Vehicle emissions are of course a key driver of carbon emissions and climate change.

Many other cities are ignoring this approach to creating a transportation mode shift, so Berkeley should get credit for this. We know from the City's transportation survey, cited in the attached, that over 70% of Berkeley residents have indicated that they would use a bike rather than a vehicle for most needs, but only about 10% do this because the streets are unsafe for cycling.

Creating a transportation infrastructure that's safe for cycling is essential to reducing vehicle emissions and the environment problems they produce, including extreme heat, sea level rise and air pollution events.

"Vapor Pressure Deficit" should be added to our metrics in determining when to warn residents of potential fire hazard. Vapor Pressure Deficit measures the dryness in the atmosphere that has the propensity to suck moisture out of all vegetation. A spike in the Vapor Pressure Deficit signals dangerous fire conditions. This index should be monitored.

The Planning Department should not announce zoning or planning changes without first consulting with the Fire Department and the Disaster and Fire Safety Commission, including changes in planning codes and ordinances. Berkeley is a densely populated town, one of the densest places in California. Increased density may play an important role in our emergency response capability, and thus impact the safety of our citizens.

City streets need to be considered when planning or approving multi-story developments. The spate of plans on the two lane section of Shattuck between Derby and the border with Oakland would seem to strain our ability to move people and equipment on that narrow stretch. There are numerous retail operations on this street - most importantly the Berkeley Bowl grocery store, What will be the impact if several multi-story buildings go up? A fire or earthquake in the late afternoon could be calamitous if fire trucks had to access these blocks.

In terms of climate resilience Berkeley needs to take measures to protect roof top solar panels, especially those attached to batteries. Right now, solar arrays have little or no value in the planning process. **Solar access must be prioritized in planning.** In power blackouts, these roof top arrays, attached to batteries could be our main source of power, apart from emergency generators attached to buildings. But, these arrays do not require any fuel.

Berkeley should research and adopt measures to establish "micro-grids" based on solar panels in neighborhoods. This could be vital to power medical equipment, cooling, communication, and water pumps.

With the increased impacts of climate change Berkeley should heed the UN scientists who have determined that any structure over five stories is not carbon neutral and cannot generate adequate power to keep itself going. The UN panel does say this will have an impact on urban density, but that it is more important that density.

With more intense storms, Berkeley needs to review its flood and water flow rules, ordinances and regulations. Right now, the Planning Department says that there are no rules regulating run-off from one property onto another. If true, this needs to be addressed, given that we have stronger storms, the water table is rising, and the sea level is rising. New or old developments may start to cause problems with how their water does or does not drain from their property. This is especially important along historic creeks, storm drains, hillsides, and new developments with excavations deeper than five feet.

Specific Commentary Based upon the 2024 Mitigation Strategy Actions Spreadsheet

(listed by item number and action, with the recommendation, question, or commentary following at the end)

6. Complete the ongoing program to retrofit all remaining non-complying Unreinforced Masonry (URM) buildings.
The Commission would like to know How many buildings are left to retrofit, how will we track completion? Why is there no timeline for the project?

7. Continue appropriate seismic and fire safety analysis based on current and future use for all City-owned facilities and structures. The Commission would like to know What does 'continue' analysis mean? How many buildings still need to be analyzed?

8. Continue implementation of the Soft Story Retrofit Program, which mandates seismic retrofit of soft story buildings with 5+ residential units. The Commission asks: When will all MFRs be retrofitted? Why only 5+ units?

9. Continue to implement the Retrofit Grants Program, which helps Berkeley building owners increase safety and mitigate the risk of damage caused by earthquakes. The Commission asks: How are we tracking overall seismic safety of the housing stock?

10. Continue to monitor passage and implementation of mandatory seismic retrofit ordinances for concrete buildings in other jurisdictions to assess best practices. The Commission would like to see a more tangible goal for the next 5 years.

11. Coordinate regional wildfire mitigation strategies with key partners and stakeholders. The Commission would like to see continued monitoring of passage and implementation of mandatory seismic retrofit ordinances for concrete buildings in other jurisdictions to assess best practices.

12. Coordinate regional wildfire mitigation strategies with key partners and stakeholders - Coordinate regional efforts to mitigate wildfire risk in the Oakland - Berkeley hills through the Hills Emergency Forum. The Commission would like to know what the new mitigation measures are, and when will those be identified?

13. Coordinate with and encourage mitigation actions of key City partners. The Commission asks if we know what actions we want to see from other institutions?

14. Improve responder access and community evacuation in Fire Zones 2 and 3 through roadway maintenance and appropriate parking restrictions - Continue to enforce Fire Code requirement for fire fuel clearance on public roadways. Commission: By the end of this period, what percentage of roadways will be cleared of fuels?

15. Improve responder access and community evacuation in Fire Zones 2 and 3 through roadway maintenance and appropriate parking - With multiple agency partners, clear hazardous vegetation along 45 roadways in Fire Zone 2 protecting evacuation routes. The Commission asks: Have these 45 roadways be identified? Can we get periodic briefings of the progress?

16. Improve responder access and community evacuation in Fire Zones 2 and 3 through roadway maintenance and appropriate parking - Develop process to increase parking enforcement in fire-vulnerable areas during fire weather. The Commission asks: How is this moving forward? In the underserved communities section, I'd like to call out that FF raises money from underserved communities and disproportionately spends it in the wealthiest communities. So I'd like to call out that we need to spend the money responsibly and take into accounts the needs of the whole community, not just the loudest voices in the hills.

17. Improve responder access and community evacuation in Fire Zones 2 and 3 through roadway maintenance and appropriate parking - Maintain and improve roadways in Fire Zones 2 and 3. The Commission asks: Are there roadways that need improvement?

19. Maintain City participation in the National Flood Insurance Program. The Commission asks: Are there any FEMA guidelines that we're working on incorporating now?

21. Maintain City programs and projects to mitigate the impacts of infectious diseases in Berkeley. The Commission asks: Do we need to invest in stockpiles of these interventions so that we're ready?

24. Manage and promote pedestrian evacuation routes in Fire Zones 2 and 3. The Commission asks: What percentage of paths are appropriately maintained? What percentage are we aiming for?

28. Mitigate hazards associated with natural gas usage, including disaster damage and energy service disruption, by minimizing need for energy use and moving toward use of electricity in lieu of natural gas. The Commission asks: Do we have a goal for number of buildings electrified? Do we know when a building disconnects from natural gas?

29. Reduce fire risk in existing development through fire code updates and enforcement - Continue to evaluate inspection procedures and adjust inspection cycle annually based on changing climatic conditions. The Commission asks: Are we meeting our goals for number of inspections?

30. Reduce fire risk in existing development through fire code updates and enforcement - Maintain Fire Department efforts to reduce fire risk through inspections through annual building inspections in all Fire Zones, including Multi-unit-residential building inspections. The Commission asks: Are we meeting our goals for number of inspections?

38. Reduce fire risk in existing development through vegetation management - Maintain Fire Fuel Abatement Program on Public Land with technical assistance from WUI Division. The Commission asks: Do we have goals for the abatement program?

39. Reduce fire risk in existing development through vegetation management - Continue to allocate UC Settlement Funding to do vegetation management projects on UC Berkeley properties. The Commission asks: are these projects defined?

40. Reduce fire risk in existing development through vegetation management - Maintain redesigned and expanded citywide fire fuel chipper program to provide curbside pickup, chipping, and disposal of vegetation material from residential properties. The Commission asks: What does it mean to provide access to all residents.

44. Reduce hazard vulnerabilities for non-City-owned buildings throughout Berkeley. The Commission asks: Maintain redesigned and expanded citywide fire fuel chipper program to provide curbside pickup, chipping, and disposal of vegetation material from residential properties.

45. Reduce wildfire risk throughout Berkeley by implementing the Action Plan identified in the Community Wildfire Protection Plan (CWPP). The Commission asks: Do we intend to accomplish all action items in the CWPP during this cycle?

46. Research, identify, and implement infrastructure improvements to facilitate emergency evacuation. The Commission asks: Is the study going to come with action items that will be implemented? Or is this just to complete the study?

48. Strengthen or replace City buildings in the identified prioritized order as funding is available - West Berkeley Service Center,Old City Hall, Veterans Memorial Building . The Commission asks: What's the timeline for completing these buildings?

49. Strengthen or replace City buildings in the identified prioritized order as funding is available - Continue to seek funding to seismically strengthen or replace additional City buildings in a prioritized order. The Commission asks: Do we have a goal for additional buildings?

58. Implement energy assurance strategies at critical facilities - Identify potential actions to mitigate energy assurance vulnerabilities at critical City facilities during

planning/conceptual design of both retrofits and new construction. The Commission asks: What is the timeline for identifying these actions.

59. Implement energy assurance strategies at critical facilities - Provide guidance to help the City consider opportunities to design, finance and implement clean energy assurance strategies (e.g., photovoltaic-supplemented generation, energy efficiency activities, and/or mobile charging stations). The Commission asks: What is the timeline?

60. Implement energy assurance strategies at critical facilities -Work with partners to identify additional non-City critical facilities and develop strategies to provide clean backup power at these sites. The Commission asks: What is the timeline?

61. Implement existing City programs, plans, and projects designed to reduce emissions that contribute to poor air quality - Continue to implement the traffic safety capital construction projects identified and prioritized in the Berkeley Pedestrian Plan (2021), Berkeley Bicycle Plan (2017), Berkeley Vision Zero Action Plan (2020), and Berkeley Transit-First Implementation Plan; these projects are intended to encourage non-driving modes. The Commission would like to call out increased efforts to have the FD take a more pro-active role in implementing these plans. This should be in the purview of the new STP.

62. Implement existing City programs, plans, and projects designed to reduce emissions that contribute to poor air quality - Continue to implement the City's Electric Mobility Road Map which includes electric shared mobility (bikes and scooters) as well as electric and hybrid car-sharing, and the installation of public charging stations. The Commission would like to call out increased efforts to have the FD take a more pro-active role in implementing these plans. This should be in the purview of the new STP.

63. Implement existing City programs, plans, and projects designed to reduce emissions that contribute to poor air quality - Transportation program coordination with transit providers, Berkeley Unified School District (Safe Routes to Schools), Berkeley Police Department (Vision Zero), and others, to promote transit efficiency and traffic safety for non-driving modes. The Commission would like to call out increased efforts to have the FD take a more pro-active role in implementing these plans. This should be in the purview of the new STP.

64. Mitigate impacts of sea level rise - Continue to ensure new and existing public and private developments and infrastructure are protected from floods due to sea-level rise through the permitting process for new development and conditions. The Commission asks: Are these standards documented and enforced ministerially or are they at the discretion of ZAB/Plancom?

70. Reduce Berkeley's vulnerability to extreme heat events and associated hazards - Continue to seek out funding to use cool paving materials on streets when feasible to

reduce urban heat island impacts. The Commission asks: Is there a timeline for deploying these materials on X percent of city streets? Is there a tie-in to the two street improvement ballot initiatives?

72. Reduce Berkeley's vulnerability to extreme heat events and associated hazards - Encourage passive and energy-efficient strategies to cool buildings such as natural ventilation, shading, insulation, cool roofs, whole-house fans, and heat pump HVAC systems. The Commission asks: How is this being encouraged?

From: Irene Rice
To: Mitigation
Subject: Comments on Air Quality
Date: Thursday, August 8, 2024 1:38:29 PM
Attachments: image.png

WARNING: This is not a City of Berkeley email. Do not click links or attachments unless you trust the sender and know the content is safe.

Thank you for the excellent mitigation planning by the Berkeley City Council; your exemplary ideas are well thought out. The inclusion of links for easy citizen access to find information on air quality is so important and thoughtful - Thank you!

I have only two comments regarding Air Quality.

As all three of the pollutants listed as affecting air quality included fossil fuel combustion, the mitigation plan might focus heavily on reducing fossil fuel combustion. It is noted that the City has addressed this in good ways. Consider any possible incentives that might encourage drivers (Taxis/Uber/Lyft) to purchase electric/hybrid vehicles. Possibly more good ideas could be gleaned from the three countries with high scores for reducing fossil fuel combustion emissions: https://earth.org/countries-climate-policy/#:~:text=Denmark%2C%20Sweden%2C%20and%20Chile%20are%20leading%20countries%20in%20climate%20action.

The mitigation plan for improving air quality states that the City will plant more trees. Please consider including the planting of **California Native** trees and shrubs. Expert advice on native plants is very available locally though the California Native Plant Society - East Bay Chapter (https://ebcnps.org/), the Tilden Regional Botanic Garden (nativeplants.org), the Native Here Nursery (nativeherenursery.org) - to name only a few of our local dedicated organizations. For your reference, an excellent presentation on the importance of prioritizing native plants was introduced during Kathy Kramer's annual 'Bring Back the Natives' event - that of Author and Entomologist/Ecologist/Conservationist and professor at the University of Delaware, Douglas Tallamy: https://www.youtube.com/watch?v=vARtLzygjN0&authuser=0
Your ongoing and dedicated work is very appreciated; it is nice to see the City of Berkeley strive to be a climate change leader with intelligent and informed planning; promoting efforts that sustain the good health of the earth and its inhabitants!
Thank you,
Irene Rice

berkeleyfiresafecouncil.org info@firesafeberkeley.org
(415) 340-0152

June 28, 2024

Project Managers
Local Hazard Mitigation Team
City of Berkeley

Via mitigation@berkeleyca.gov

Re: 2024 First Draft Local Hazard Mitigation Plan (LHMP)

Dear LHMP Project Managers,

The Berkeley FireSafe Council (FireSafe Council) is pleased to provide comments on the 2024 First Draft Local Hazard Mitigation Plan (LHMP).

About the FireSafe Council

The FireSafe Council is a community not-for-profit 501(c)(3) organization with the primary mission of preventing the next catastrophic wildfire in Berkeley. Our principal focus since 2019 has been reducing hazardous vegetation in and around the city, focusing on the 100+ tons of eucalyptus debris in the understory of nine eucalyptus groves among the homes in the City's Fire Zone 2. We have developed a volunteer-led model, conducting 37 debris-clearing events to date involving over 50 residents and approximately 1,000 UC Berkeley student workdays. The City of Berkeley has supported this effort by providing Zero Waste green bins and Parks Department trucks to remove the debris to the City's green waste site at no charge.

The FireSafe Council estimates that we have removed 75 tons of highly flammable bark, branches, and leaves from the understory of six of the nine eucalyptus groves on private property, more than half of the accumulated fuel. These clean ups have been funded by community donations and grants. Although highly efficient, this model cannot be sustained by the FireSafe Council and, at the pace we have been able to work, the groves we cleared in 2021 will need to be cleaned up again before we complete the process. For this reason, the FireSafe Council strongly supported the City Council's recent resolution in support of using up to $1 million of Measure FF funds to conduct a one-time, voluntary eucalyptus understory clean-up on select private properties within the city, with subsequent maintenance by the property owners. The one-time clean-up of eucalyptus debris by the City will also enable property access to Fire Department inspectors, an obstacle that has been particularly problematic for inspecting the eucalyptus groves.

In addition to the above direct action to remove fuel, we have supported Chief Sprague in his development and implementation of the city's residential inspection program, participated in essentially all the Disaster and Fire Safety Commission meetings, and taken numerous other steps to point out wildfire safety needs and to support public officials in pursuing wildfire safety.

Comments on Draft LHMP

Discuss hazardous vegetation in Element B (Risk Assessment). Element B mentions dense fuel loads as a compounding factor in the WUI risk, but while the section elaborates, for example, on existing structure density (which is not mitigatable), it does not elaborate on vegetative fuel loads (which the city is addressing, as noted, through various vegetation management programs). The vegetative fuel load – particularly hazardous, fire-prone vegetation such as eucalyptus, Monterey Pine, and juniper – should be characterized in terms of the WUI risk it presents.

As the FireSafe Council has documented, there are approximately 1,000 eucalyptus trees in northeast Berkeley, most of which are concentrated in 9 groves on private property. Should these tall groves ignite in a wind-driven canopy fire, embers and firebrands would ignite additional ground fires miles ahead of the leading edge of the fire. Including this information in Element B would provide some context for the statement in Element C, p. C-44, that "Since 2019, Berkeley has removed nearly 300 hazardous trees (mostly eucalyptus and Monterey Pine) from City parks, paths, and street rights-of-way" and the recently approved eucalyptus debris-clearing program that should be mentioned in Element C, as noted below.

Junipers and other fire-prone vegetation commonly seen adjacent to homes are more prone to ignite homes and other structures, particularly in structure-dense areas, leading to the "structure-to-structure ignition" discussed on pp. B-65 and B-66.

Re-locate the Element B section on Berkeley Household Risk Reduction to Element C. Element B is focused on risk assessment but includes a section on "Berkeley Household Risk Reduction" (p. B-87) that lists numerous steps that individual community members and households can take to reduce their fire risk. This section is better suited for Element C as part of the mitigation strategy.

Placing the household action section in Element C will also allow it to be paired with the City's efforts to encourage or require individuals and households to act to reduce the community's risk, and how the City is complementing those efforts. This will better describe "how the whole community can work together to mitigate Berkeley's wildland-urban interface fire hazards" (p. B-87).

Element C should state an intention to develop specific planning goals and metrics on several topics. Element C:

> "outlines Berkeley's mitigation strategy, and how it connects to Berkeley's disaster resilience vision. The strategy identifies and analyzes a comprehensive range of specific mitigation actions and activities being considered to reduce the effects of each hazard described in Element B: Risk Assessment. The Strategy is based on existing authorities, policies, programs, and resources, as well as Berkeley's ability to expand on and improve these existing mitigation tools …"

Thus, it is intended to include forward-looking actions as well as descriptions of current programs. However, the section mostly lists or describes existing programs with little to no discussion of what the goals of these programs are, when they will be accomplished,

and where funding or additional policies are needed. In short, it is missing a plan for how Berkeley intends to measurably reduce WUI fire risk. The document should reference the city's intentions to develop such a plan.

We are pleased to see the statement on p. C-43 that the BFD's WUI Division is:

> "working to develop a comprehensive WUI work plan that will provide strategic guidance for related work for the next five years. Plans are to expand existing programs and extend some services citywide, including fuel reduction on public lands and roadsides, private land incentives, debris bins, and citywide chipping services."

While we strongly support such planning, the stated intention to plan should be extended to include risk-reduction goals, timelines, funding, policy needs, and metrics.

Similarly, the LHMP should state an intention to develop a plan with goals and metrics to improve WUI evacuation routes through the Safe Passages and other programs, following the completion of the evacuation studies now underway (noted on pp. C-52 and C-53). The draft LHMP includes very little discussion of evacuation issues, and the Safe Passages program is not noted.

Related and more broadly, the LHMP should state an intention to develop a spending plan for Measure FF funds, with goals, timelines, funding, and metrics for WUI and other LHMP-related issues. The section on Measure FF (p. C-20) summarizes the measure and includes only backward-looking achievements without any forward-looking goals. For example, the long-range plan could include removal of all fire-prone vegetation in Fire Zones 2 & 3, with special emphasis on any hazardous vegetation near structures and all hazardous trees, primarily eucalyptus. The section should mention that the funding measure is indefinite, and that wildfire prevention and preparedness activities is one of three categories of allowed purposes for the use of Measure FF funds.

These items should be included in the list of action items.

Element C should indicate the importance of land use planning in reducing exposure to wildfire risks. The document notes the importance of planning and zoning in reducing Berkeley's vulnerability to landslide and flood hazards (Table 5, PDF-p. 61). The document should similarly note (in the text and the table) the importance of planning and zoning – as well as building codes and property transfer requirements – in reducing Berkeley's vulnerability to wildfire, e.g., by studying the wildfire risks associated with additional population and street parking in Berkeley's fire zone 2 and 3.

Specific additional suggestions.

Executive Summary

- The compounding impact of climate change on WUI fire should be noted in the Executive Summary. The FireSafe Council supports the change in this updated LHMP to incorporate climate change into every hazard of concern, rather than addressing it as a separate item. The compounding impact of climate change on WUI fire is discussed in

  Element B but is not mentioned in the WUI fire section of the Executive Summary, as it is in the "high wind" and "extreme heat" sections of Executive Summary.

Element B

- The architectural significance of Berkeley's Zone 2 should be noted in the "Natural, historical, and culture assets" section of Element B (p. B-82), in addition to the features in Zones 1 and 3. Many of the Berkeley Architectural Heritage Association's "41 Berkeley Walking Tours" are in Zone 2.

- Exhibit 11 (p. B-86) is difficult to understand. The y-axis should be redrawn to end at $20 billion (so the trend lines are visible) and the increments relabeled as billions of dollars, rather than millions. Otherwise, it's easy to misread $40,000 million as $40 million, instead of $40 billion, which we assume is what is intended.

Element C

- The statement (p. C-20) that the Disaster and Fire Safety Commission reviews and approves projects to receive Measure FF funding should be modified. The Commission can only recommend budgets and expenditures to Council and, to date, has not been able to do that due to lack of sufficient and timely information.

- To the list of vegetation management programs listed on p. C-43, add the new program to use Measure FF funds to conduct one-time, voluntary eucalyptus understory clean-ups on select private properties within the City, prioritized based on assessed wildfire risk. On May 7, 2024, the City Council adopted the supportive "Resolution to Mitigate Hazardous Eucalyptus Understory on Participating Properties," stating that "hazardous fuel mitigation is the safest and most effective method to reducing wildfire risk."

- In Table 4 on High Priority Actions, add the underlined text to this action item: "Coordinating regional wildfire mitigation strategies with key partners and stakeholders <u>in adjacent municipal jurisdictions</u>." Consider naming the regional partners in subsection C.1.m.

General

The document should be proofread for typos.

The FireSafe Council appreciates the opportunity to comment on the draft LHMP.

Sincerely,

Nancy Rader
Member, Berkeley FireSafe Council Leadership Group
On behalf of the Berkeley FireSafe Council

From: David Halligan
To: Mitigation
Subject: Berkeley Hazard Mitigation Plan
Date: Wednesday, August 7, 2024 3:23:21 PM

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Glad to see utility undergrounding as part of the plan, but it seems like the entire City would benefit from such, not just the high fire hazard area (basically the hills). While that might make sense as a priority, seems like ultimately umdergrounding should be implemented City-wide.
Thanks for considering my comment.
Kind Regards,
Dave Halligan
2043 Berryman St.

Sent from my iPhone

From: Mitigation
To: Heather Christenson; Mitigation
Subject: RE: LHMP and soft story rentals
Date: Tuesday, June 4, 2024 12:37:43 PM

Hi Heather,
Thank you for your note. The Soft Story Retrofit program is managed by the Building and Safety Division of our Planning Department. You can reach them by emailing: softstory@berkeleyca.gov
There is more information on this page of our website, which does include the latest inventory of soft story buildings as of March 2024.
Some buildings are removed from the inventory for a variety of reasons, including if it does not have 5 or more dwelling units. Currently, the City ordinance only requires retrofits of soft story buildings with 5 or more units.
Please let know if you have any additional questions or you want to share additional comment/feedback.
Warmly,
Jamie

Jamie Albrecht
she/her/hers
Emergency Services Coordinator
City of Berkeley Office of Emergency Services
e | jalbrecht@cityofberkeley.info p | (510) 981-5514

From: Heather Christenson <h.christenson@yahoo.com>
Sent: Thursday, May 30, 2024 3:10 PM
To: Mitigation <Mitigation@berkeleyca.gov>
Subject: LHMP and soft story rentals

WARNING: This is not a City of Berkeley email. Do not click links or attachments unless you trust the sender and know the content is safe.

Hello,
I am a Berkeley resident and I hope to attend a community meeting on the Berkeley Local Hazard Mitigation Plan, thank you for the opportunity.
I have big concerns about my current soft story rental and do not see it reflected in your maps. It is cracking and sinking and the chimney is separating, even with just the small earthquakes we've had lately.
Can you please direct me to the correct city department to report a soft story rental house so that it is at least documented?
Thank you in advance,
Heather Christenson

From:	Nancy Rader
To:	Lana, Sarah; "Weldon Bradstreet"; Mitigation
Subject:	RE: Berkeley FireSafe Council Comments on 2024 First Draft LHMP
Date:	Friday, June 28, 2024 2:35:26 PM
Attachments:	BFSC Comments on LHMP (6-28-24).pdf

And now, just to annoy everyone, here's a version with the formatting changed to fix the straddling signature block. Sorry for any inconvenience!
Nancy

From: Lana, Sarah <slana@berkeleyca.gov>
Sent: Friday, June 28, 2024 12:10 PM
To: Nancy Rader <nraderhome@gmail.com>; Weldon Bradstreet <weldonbradstreet@yahoo.com>
Cc: Mitigation <Mitigation@berkeleyca.gov>
Subject: RE: Berkeley FireSafe Council Comments on 2024 First Draft LHMP

Thank you, Nancy.
I am also copying in the mitigation@berkeleyca.gov address to make sure the comments are incorporated into the plan's official response record.
Best,
Sarah

Sarah Lana, CEM®
she/her/hers
Emergency Services Manager
City of Berkeley Office of Emergency Services

From: Nancy Rader <nraderhome@gmail.com>
Sent: Friday, June 28, 2024 9:16 AM
To: Weldon Bradstreet <weldonbradstreet@yahoo.com>; Lana, Sarah <slana@berkeleyca.gov>
Subject: Berkeley FireSafe Council Comments on 2024 First Draft LHMP

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Hi Weldon & Sarah,
Wanted to share the Council's comments on the LHMP with the DFSC, attached.
Thanks,
Nancy

From: Nancy Rader <nraderhome@gmail.com>
Sent: Friday, June 28, 2024 9:09 AM
To: mitigation@berkeleyca.gov
Subject: Berkeley FireSafe Council Comments on 2024 First Draft LHMP

Please find attached the Berkeley FireSafe Council's Comments on the 2024 First Draft Local Hazard Mitigation Team.

Nancy Rader
Member, Leadership Team
Berkeley FireSafe Council
1198 Keith Avenue
Berkeley, CA 94708
(510) 919-6358 cell

From: kelly hammargren
To: Mitigation
Subject: LHMP Comments -
Date: Thursday, August 8, 2024 10:22:53 PM

WARNING: This is not a City of Berkeley email. Do not click links or attachments unless you trust the sender and know the content is safe.

The Local Hazard Mitigation Plan Update (LHMP) is very well done and as comprehensive as it is, listed here are a few additions that need to be addressed regardless of the required LHMP Update timeline.

1) Berkeley should be aggressively moving toward Passive Houses and using Passive House Principles in multi-unit buildings. This would increase living and working comfort and reduce energy load on the grid. https://www.phius.org/passive-building/what-passive-building/passive-building-principles

In the Strategy Action chart #49 encourage passive and energy efficient strategies are listed as is the word "ongoing." Since I have attended every public meeting on new project approvals for nearly 10 years, I can tell you this is not happening.

2) Passive house principles locate operable windows for the best exposure to cooling breezes. Currently new construction is designed with no consideration to cooling breezes.

3) The Zoning Adjustment Board (ZAB) and Design Review Committee (DRC) focus on the exterior design not the interior. There is no current regulation/ordinance in Berkeley that requires operable windows in bedrooms which means that multi-unit buildings have been approved with multiple bedrooms with no windows. In the situation where there is an extreme heat event and a power failure these rooms and units become a heat trap / a death trap.

4) The Zoning Ordinances before the City Council establish setbacks between buildings without consideration to air current, air circulation. This will be increasingly important as the climate continues to warm and heat events become more frequent. Lining San Pablo with wall to wall taller buildings will impact air flow, increase heat island effect and create micro climates of sustained heat.

5) Tree canopy is listed as a mitigation in heat events under 51, however, the problem is Berkeley's Urban Forestry selections are small trees in inadequate spaces instead native trees with large canopies as on California between Dwight and Allston. The city is being filled through the forestry program with none native trees that do not support local habitat and ecosystems besides being inadequate to provide shading in heat events.

6) Permeable paving is not listed as a mitigation to stormwater in 53. Permeable paving can easily be incorporated into street design as was done on the north side of Channing between MLK Jr Way and Milvia. It has also been used on the north side of San Pablo Park. Permeable paving is not the same as bioswales. Permeable paving could be used throughout the city instead of hardscape, impermeable concrete, or asphalt in driveways, sidewalks, etc.

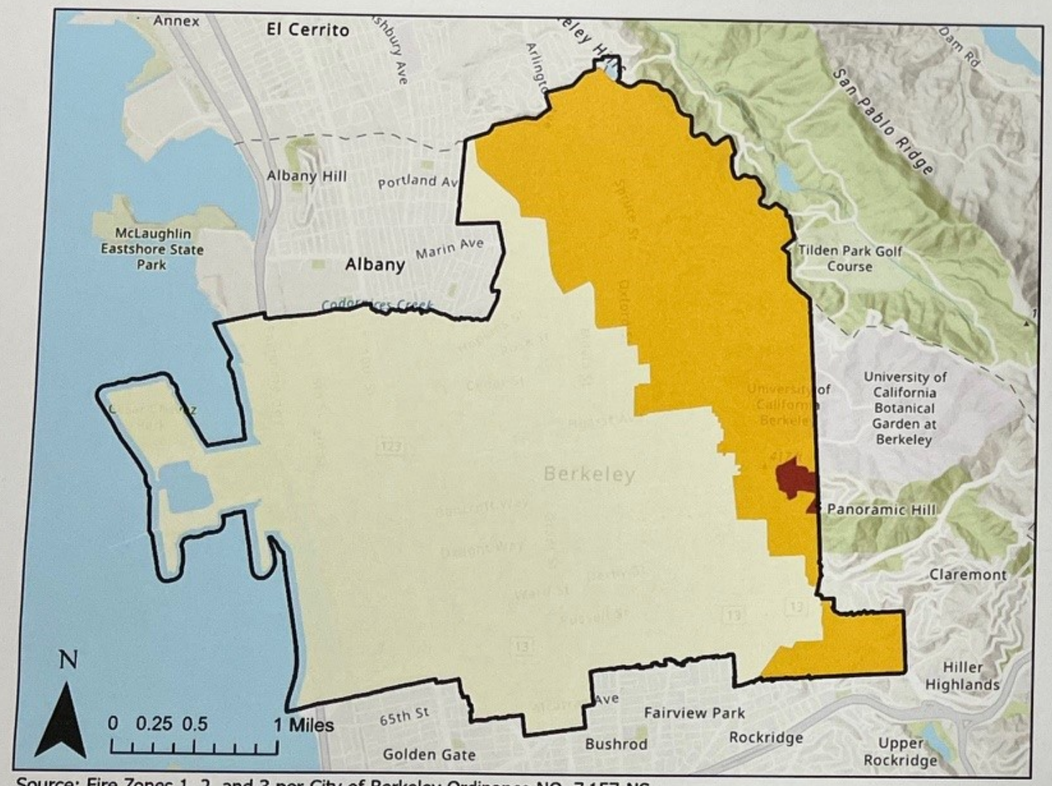
5) A large gas pipeline runs up Allston through neighborhoods, past the high school (with over 3000 students) and by city hall. There is no reporting on inspections and status. A leak and explosion of this gas pipeline like what happened in 2010 in San Bruno at Milvia and Allston during a work day and school day has the potential to wipe out much of city government and the high school student body. Not only does there need to be reporting by PG&E, but in addition electrification needs to be accelerated to remove this kind of hazard.

6) Just like there are notifications of asbestos in buildings, there needs to be notifications to renters when units being considered for renting and to occupants of rented units that are in fire zones, hillside slide areas, within proximity to the Hayward fault and when rental housing is in soft story buildings at risk of collapse.

kelly hammargren

Wildland Urban Interface (WUI) Fire

Locations of WUI Fire:
Berkeley is most vulnerable to a wind-driven fire incident originating in an area adjacent to the City's eastern border. This map shows Berkeley Fire Zones.



Source: Fire Zones 1, 2, and 3 per City of Berkeley Ordinance NO. 7.157-NS.

Esri, NASA, NGA, USGS, California State Parks, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA, USFWS

Legend

- City of Berkeley Boundary
- Berkeley Fire Zone 1
- Berkeley Fire Zone 2
- Berkeley Fire Zone 3

PERSONAL ACTIONS TO MITIGATE RISK

PLACE A DOT NEXT TO PERSONAL ACTIONS YOU'VE TAKEN

Residents in Fire Zones 2 and 3

1. Followed instructions on your home's Defensible Space Report.
   a. Created defensible space around home
   b. Hardened home by focusing on highest priority items:
      i. Installed a fire resistive roof
      ii. Cleared decks and covered porches
      iii. Regularly clear tree debris
      iv. Removed large rugs and combustible wood, wicker, or plastic furniture
      v. Removed anything stored under the deck or stairs
      vi. Included a five-foot noncombustible buffer around deck and stairs
      vii. Installed non-combustible gutter guards
      viii. Ensured the vents to your attic, basement, and crawlspace will block wind-blown embers.

All Berkeley Residents

1. Used the free Berkeley Chipper Day Program for curbside pickup, chipping, and disposal of vegetation material from my residential property.
2. Signed up for AC Alert and bookmarked with Berkeley's Emergency Map
3. Learned the test and emergency tones from Berkeley's Outdoor Warning System
4. Made my household fire weather plan.
5. Stayed out of the hills during extreme fire weather days.

Questions or comments? Write them on a post it note!

Wildland Urban Interface (WUI) Fire

About the Hazard:
WUI fires occur where the natural landscape and urban-built environment meet or intermix. Low humidity and high sustained winds create the most dangerous conditions for wildfire spread. While WUI fires can occur at any time of the year, they are especially dangerous in fall when the landscape and vegetation are dry, and strong, hot, dry offshore winds further desiccate vegetation and can push a fire down or up a slope with amazing speed.

Berkeley has a history of devastating WUI fires, including the 1923 Fire mapped below. The fire burned from Tilden all the way to Shattuck Avenue. The map also shows the fire at the municipal dump that very same day, likely the result of embercast. This highlights the potential impacts of WUI fires on the Berkeley flatlands.

CITY ACTIONS TO MITIGATE RISK

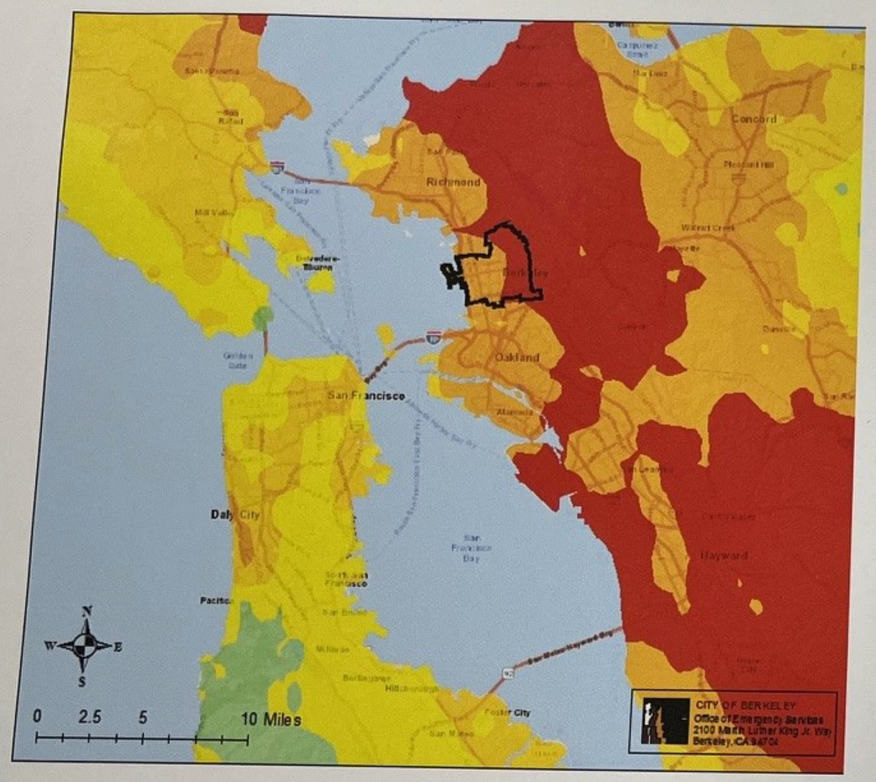
PLACE A DOT NEXT TO THE CITY ACTIONS YOU THINK ARE MOST IMPORTANT

1. Reduce fire risk in existing development through fire code updates and enforcement.
   a. Continue YouthWorks Pilot program to staff expansion of Defensible Space Inspections in Fire Zones 2 and 3.
2. Reduce fire risk in existing development through vegetation management programs.
3. Pursue external funding to perform vegetation management on public and private property and to increase education and awareness of vegetation management standards.
4. Improve responder access and community evacution in Fire Zones 2 and 3 through roadway maintenance and appropriate parking restrictions.
   a. With multiple agency partners, clear hazardous vegetation along 45 roadways in Fire Zone 2 protecting evacuation routes
   b. Develop process to increase parking enforcement in fire-vulnerable areas during fire weather.
   c. Continue to enforce Fire Code requirement for fire fuel clearance on public roadways.
5. Coordinate regional wildfire mitigation strategies with key partners and stakeholders.
6. Manage and promote pedestrian evacuation in Fire Zones 2 and 3
7. Reduce wildfire risk throughout Berkeley by implementing the Action Plan in the Community Wildfire Protection Plan.
8. Reduce fire risk through utility undergrounding.

Questions or comments? Write them on a post it note!

EARTHQUAKES

About the Hazard:
According to the USGS, there is a 72% probability of one or more 6.7+ magnitude earthquakes occurring from 2014 to 2043 in the San Francisco Bay Region.
This means that many Berkeley residents will likely experience a severe earthquake in their lifetime.



This map shows the shaking associated with a magnitude 7.0 earthquake on the Hayward Fault. The City of Berkeley outlined in black would experience severe and violent shaking, indicated by orange and red coloring respectively.

CITY ACTIONS TO MITIGATE RISK

PLACE A DOT NEXT TO THE CITY ACTIONS YOU THINK ARE MOST IMPORTANT

1. Conducting ongoing building assessments for City facilities and structures
2. Strengthening and or replacing City buildings in prioritized order as funding becomes available
3. Offering the Soft Story Retrofit Program which reimburses eligible building owners up to 75%
4. Offering the Retrofit Grants Program to multi-family homes of 3+ units, non-residential buildings, hotels, and mixed-use buildings
5. Completing Concrete Retrofit Ordinance Research with a Team from the Earthquake Engineering Research Institute
6. Completing program to retrofit all non-complying Unreinforced Masonry Buildings (URM)

Questions or comments? Write them on a post

Community focused program to do in home EQ furniture bolting (Rena)

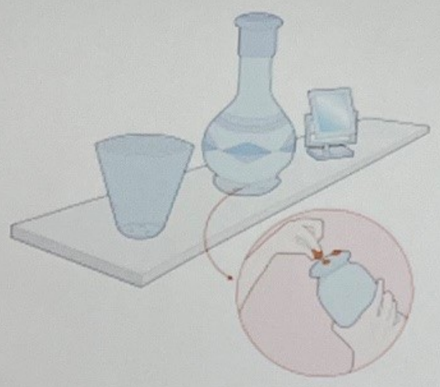
CIL John Benson – designing program – housing CIL has accessibility – mechanical common sense

embed code for gen/earthquake for websites

How do we ensure safe routes/evac centers, before & after earthquake?

What other carrot-or-stick incentives are available to help or even force private landlords to do appropriate retrofitting?

EARTHQUAKES



Did you know that the most common cause of injuries during an earthquake is falling objects?

PERSONAL ACTIONS TO MITIGATE RISK

PLACE A DOT NEXT TO PERSONAL ACTIONS YOU'VE TAKEN.

1. Made living space more safe by storing heavy and breakable objects on low shelves.
2. Properly anchored bookshelves and heavy furniture
3. Moved beds away from windows
4. Moved or secured hanging objects over beds, sofas, or chairs
5. Used quake gel or putty to secure breakables in place
6. Had home assessed and retrofitted using available grants.
7. Talked to landlord about disaster preparedness and seismic safety of my rental.
8. Considered or bought earthquake insurance.
9. Stored water (1-2 gallons per day per person)
10. Practiced drop, cover, and hold on.
11. Learned how to turn off utilities at home or business.
12. Have taken free CERT Training.

Questions or comments? Write them on a post it note!

Utility Disruption

About the Hazard:
Utility interruption is any loss of a public service which includes but is not limited to electrical service, telecommunications, wastewater and potable water, and natural gas. Interruption can be planned and include a warning, such as with Power Safety Power Shutoffs that proactively turn off electricity to mitigate wildfire risk, or come a secondary impact of the other natural hazards included in this plan.

What will you need if you have no power? Water? Communications?

CITY ACTIONS TO MITIGATE RISK

PLACE A DOT NEXT TO THE CITY ACTIONS YOU THINK ARE MOST IMPORTANT

1. Identify and implement potential actions to mitigate energy assurance vulnerabilities at key City facilities
2. Consider opportunities to design, finance, and implement clean energy assurance strategies.
3. Provide key hazard information and best practices during utility disruptions to Berkeley's business and arts community

training and outreach for CBOs

PERSONAL ACTIONS TO MITIGATE RISK

PLACE A DOT NEXT TO PERSONAL ACTIONS YOU'VE TAKEN

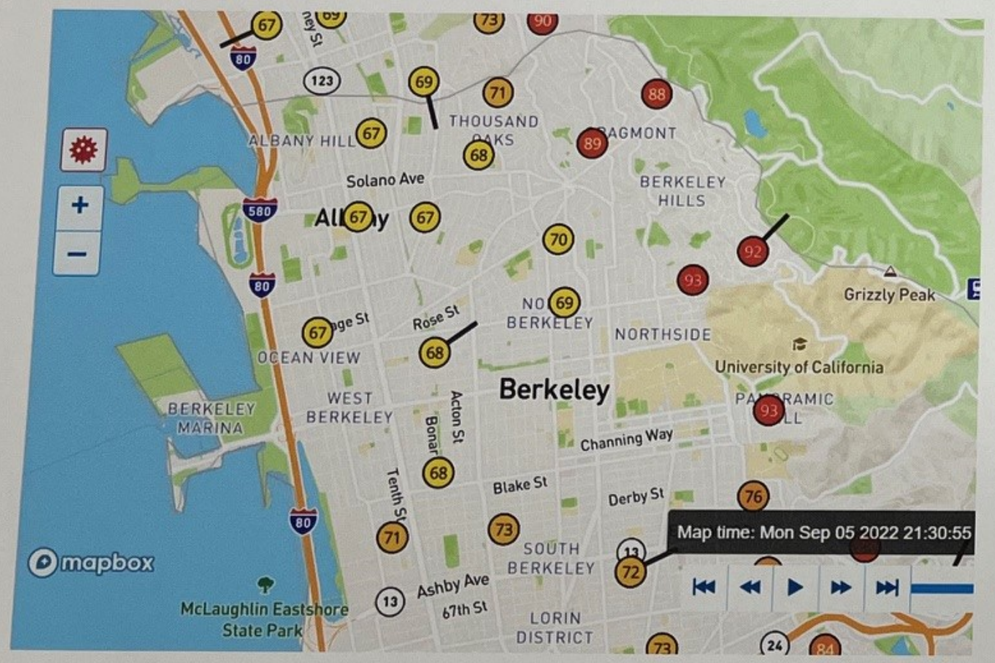
1. Made a plan to stay safe and comfortable during power outages
   a. Determined emergency power needs to stay warm, keep food and medicine cool, and to operate medical devices.
   b. Determined the power draw of these devices
   c. Considered purchasing a power bank or generator
2. Made sure outage alerts reach me by calling PG&E 800-743-5000 and updating my contact information.
3. Stored 1-2 gallons of water per person per day for at least 3 days.
4. Made a plan for alternative bathroom options, like using a bucket when the toilet can't be flushed.
5. Established backup communication with my family.
6. Printed important documents or saved them to a thumb drive.

Questions or comments? Write them on a post it note!

Extreme Heat

About the Hazard:

In Berkeley, an extreme heat day is a day above 88.3 degrees Fahrenheit. Extreme heat days can be further exacerbated by the urban heat island effect in which densely built cities experience higher temperatures due to a relative lack of vegetation, reduced air flow, and an abundance of hard, dark surfaces. However, the Berkeley hills often experiences higher temperatures than the rest of the city, due to a phenomenon known as thermal belting.



This map shows temperatures in Berkeley at 9:30 pm on September 5, 2021. Temperatures remain in the 90s in the Berkeley hills and in the 60s and 70s in the rest of Berkeley.

CITY ACTIONS TO MITIGATE RISK

PLACE A DOT NEXT TO THE CITY ACTIONS YOU THINK ARE MOST IMPORTANT

1. Encouraging passive and energy-efficient strategies to cool down buildings including natural ventilation, shading, insulation, green/cool roofs, whole-house fans, and heat pump HVAC systems.
2. Continuing to seek out funding to use cool paving materials on streets
3. Implementing programs and projects to reduce emissions.
4. Monitoring and supporting regional and state efforts to forecast the impact of climate change on temperatures and integrate extreme heat readiness into City operations.
5. Continue Urban Forestry Unit's tree maintenance and planting programs to increase canopy coverage for extreme heat events to provide shade and mitigate impacts from poor air quality.

Questions or comments? Write them on a post it note!

investing in resilience hubs for ~~co~~ folks to access AC

Extreme Heat

Heat Exhaustion

ACT FAST

- Move to a cooler area
- Loosen clothing
- Sip cool water
- **Seek medical help if symptoms don't improve**

Dizziness
Thirst
Heavy Sweating
Nausea
Weakness

***Heat exhaustion** can lead to heat stroke.*

Heat Stroke

Confusion
Dizziness
Becomes Unconscious

ACT FAST

CALL 911

- Move person to a cooler area
- Loosen clothing and remove extra layers
- Cool with water or ice

***Heat stroke** can cause death or permanent disability if emergency treatment is not given.*

Stay Cool, Stay Hydrated, Stay Informed!

Did you know that heat waves kill more people than any other type of severe weather in the US?

PERSONAL ACTIONS TO MITIGATE RISK

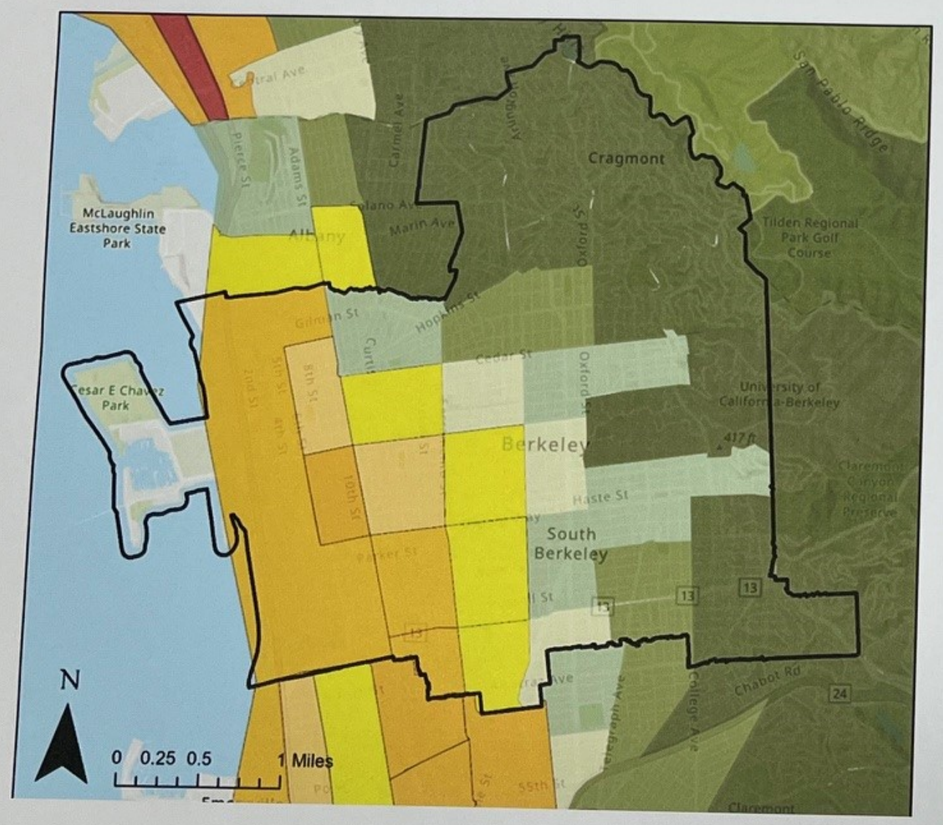
PLACE A DOT NEXT TO PERSONAL ACTIONS YOU'VE TAKEN

1. Purchased or have supplies for extreme heat events, including ice, spray bottle, and personal fan.
2. Implemented methods to keep your home cool without air conditioning, including using larger fans and blocking sunlight with blackout curtains, reflective film, or solar blankets.
3. Made a plan for where and how you will get to a cooling center during extreme heat events, like libraries.
4. Learned the signs and symptoms of heat stroke and exhaustion.
5. Checked in on friends and neighbors.
6. Prepared for power outages.
7. On previous hot days, made sure to get plenty to drink, wear lightweight clothing, and schedule outdoor activities carefully.

Questions or comments? Write them on a post it note!

Poor Air Quality

About the Hazard:
Poor air quality is a major public health concern. Poor air quality can irritate the eyes, nose, and throat, cause shortness of breath, aggravate asthma and other respiratory conditions, and affect the heart and cardiovascular system. Poor air quality can last for a few hours or a few weeks, depending on its source. It can also be more of a chronic issue, especially in places near industries and highways for example.



This map shows the CalEnviroScreen Percentile for Berkeley. Higher percentiles shown in yellows and oranges in west and south Berkeley indicate higher pollution burden.

CITY ACTIONS TO MITIGATE RISK

PLACE A DOT NEXT TO THE CITY ACTIONS YOU THINK ARE MOST IMPORTANT

1. Expanding Urban Forestry team and their activities
2. Implementing programs and projects to reduce emissions, such as electrifying transportation options and improving traffic safety.

PERSONAL ACTIONS TO MITIGATE RISK

PLACE A DOT NEXT TO ACTIONS YOU'VE TAKEN

1. Prepared home by replacing or sealing leaky windows and doors.
2. Bookmarked pages to see forecasts from AirNow.gov and real-time readings from Fire.AirNow.gov
3. On poor air quality days, stayed indoors with windows and doors closed and filtered the air.
4. Installed a MERV 13 rating or higher filter on HVAC system.
5. Purchased a certified portable air cleaner or constructd one with a box fan.

Questions or comments? Write them on a post it note!

High Wind

CITY ACTIONS TO MITIGATE RISK

PLACE A DOT NEXT TO THE CITY ACTIONS YOU THINK ARE MOST IMPORTANT

1. Keep City trees maintained. These are trees located between the sidewalk and the street, in street medians, public parks, or on other properties owned by the City of Berkeley. Their maintenance is the responsibility of the forestry team of the City of Berkeley.

work w/ residents + businesses w/ trees in danger or failing through training, mitigations for maintenance/care.

PERSONAL ACTIONS TO MITIGATE RISK

PLACE A DOT NEXT TO PERSONAL ACTIONS YOU'VE TAKEN

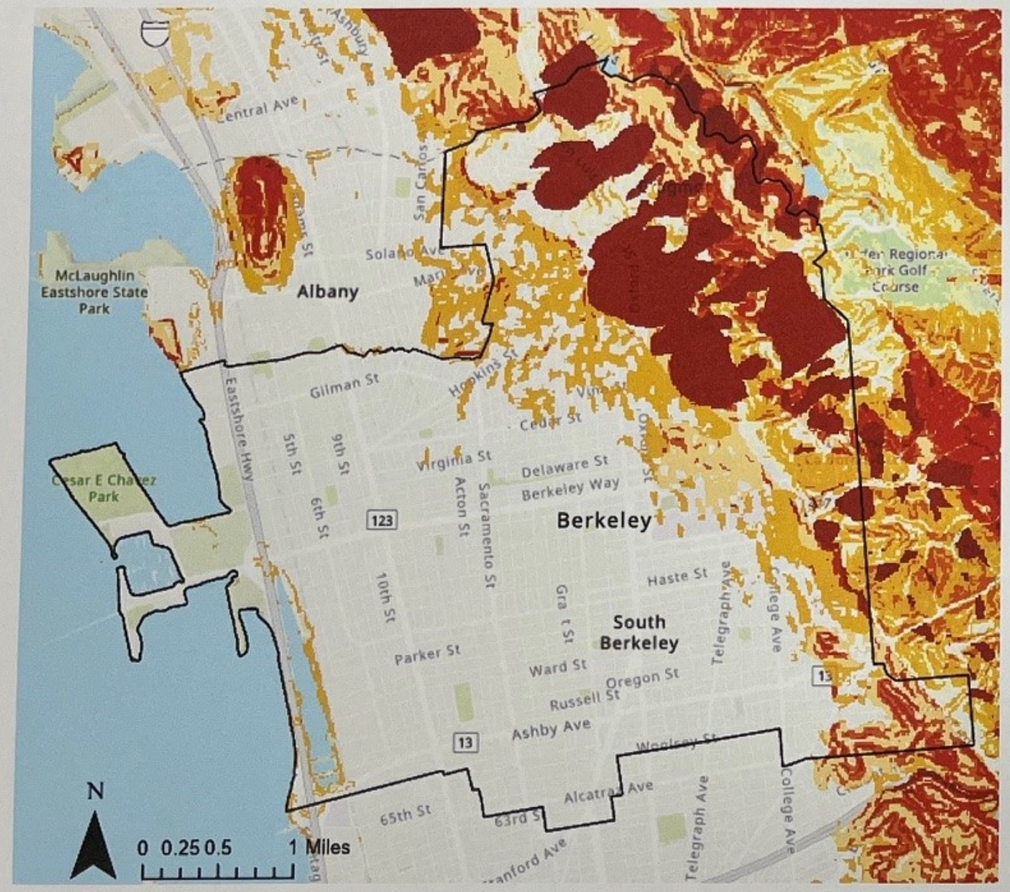
1. Kept trees on my property maintained.
2. Have submitted a request for help with public trees that require attention by calling 311 or emailing trees@berkeleyca.gov.
3. Brought in any loose outdoor items, such as holiday decorations and chairs, or securely tied them down.
4. Kept a safe distance from trees and avoided driving on high wind days.
5. Called 9-1-1 about downed power lines.

Questions or comments? Write them on a post it note!

LANDSLIDE

About the Hazard:

A landslide is a movement of a mass of rock, debris, or earth down a slope. The most frequent and widespread damaging landslides are started by prolonged or heavy rainfall. In Berkeley, there are active and dormant landslides spread throughout locations in the Berkeley hills.



This map shows landslide susceptibility in Berkeley. The dark reds and oranges throughout the Berkeley hills indicate higher susceptibility (higher susceptibility is defined by higher slopes and weaker rocks).

CITY ACTIONS TO MITIGATE RISK

PLACE A DOT NEXT TO THE CITY ACTIONS YOU THINK ARE MOST IMPORTANT

1. Collect, analyze and share information with the Berkeley community about landslide hazard and associated risk reduction techniques.
2. Track changes in landslide hazard risk using the best-available information and tools.
3. Collect and share up-to-date landslide hazard maps identifying areas subject to heightened risk from hazards.

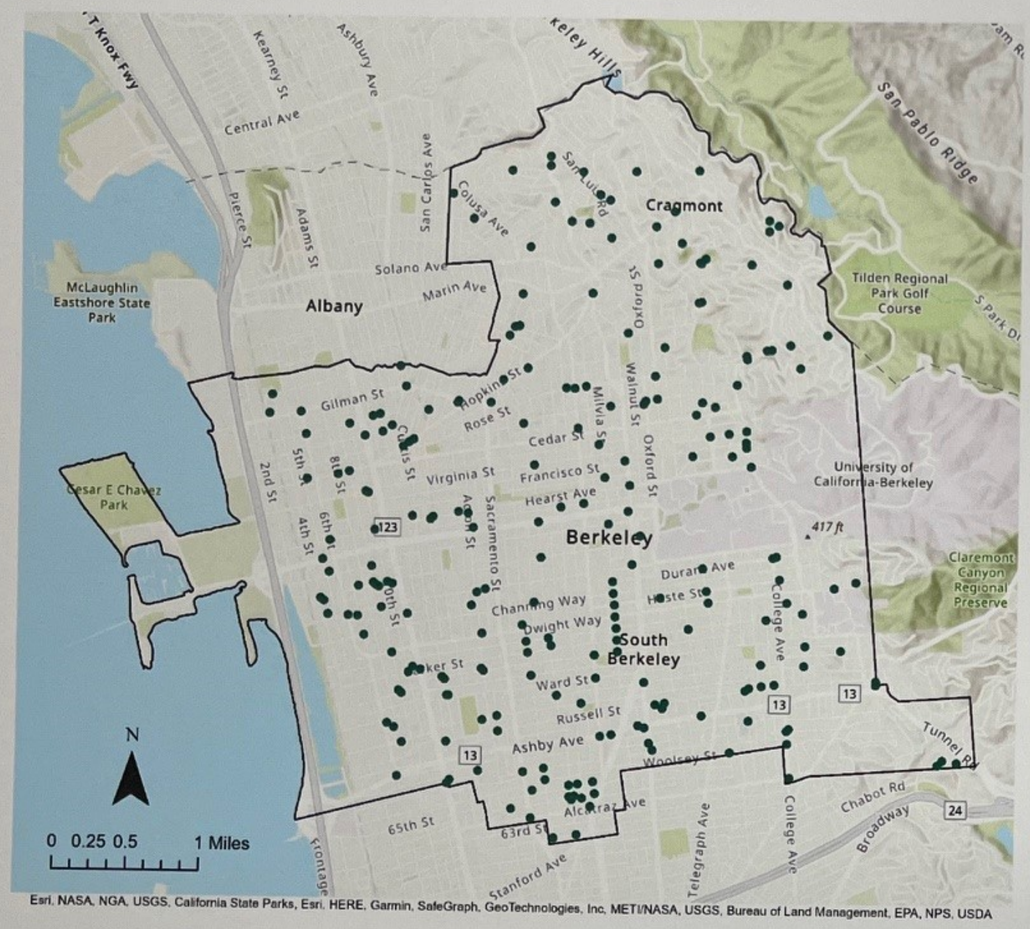
PERSONAL ACTIONS TO MITIGATE RISK

PLACE A DOT NEXT TO PERSONAL ACTIONS YOU'VE TAKEN.

1. Learned if location of home or business is susceptible to landslides.
2. Had a gas company or professional install flexible pipe fittings to avoid leaks.
3. Planted appropriate vegetation to prevent erosion risk on hillsides and other suceptible areas
4. Consider "a difference in conditions" insurance policy, which can cover the gap in traditional homeowner's insurance.

Questions or comments? Write them on a post it note!

FLOODING



Storm Drain System Issues, Jan-June 2023

During storms and flooding, community members call Berkeley's 3-1-1 service to report locations of storm drain backup or other locations where water is pooling. This map presents locations of community reports of these issues from January-June, 2023. This time period included two federally-declared storm emergencies.

PERSONAL ACTIONS TO MITIGATE RISK

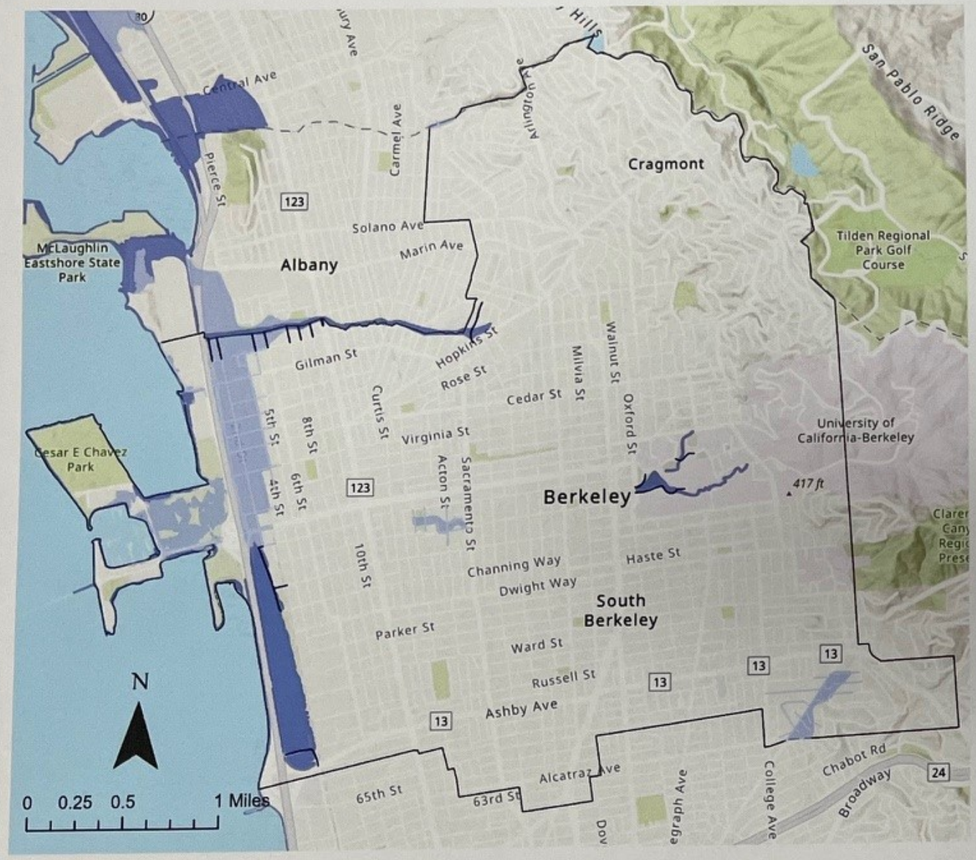
PLACE A DOT NEXT TO PERSONAL ACTIONS YOU'VE TAKEN

1. Kept neighborhood sewer grates clean by "adopting a drain."
2. Identified trouble spots around home where water accumulates and created a plan to manage them
3. Considered flood insurance, since typical homeowners insurance policies do not cover flooding.
4. Have learned how to fill sand bags and how to place them to reduce flooding problems
5. Connected with neighbors to help with sand-bagging
6. Moved important objects to higher shelves
7. Learned not to walk, swim, or drive through flooded waters.
8. Prepared for power outages and disruptions to the internet
9. Learned proper methods for clean-up after a flood occurs

Questions or comments? Write them on a post it note!

FLOODING

About the Hazard:
Floods occur when there is an overflow of water in areas that are normally dry. In Berkeley, three types of flooding typically occur: coastal flooding, creek flooding, and storm drain overflow.
This map shows where water will flood when creeks overflow.



Flood Zone Map

Street Segment in 500-Year Floodplain

Street Segment in 100-Year Floodplain

FEMA Floodplains
100 Year Floodplain
500 Year Floodplain

FEMA National Flood Hazard Layer
Last updated for Alameda County: June 22, 2020

CITY ACTIONS TO MITIGATE RISK

PLACE A DOT NEXT TO THE CITY ACTIONS YOU THINK ARE MOST IMPORTANT

1. Maintain City participation in the National Flood Insurance Program.
2. Use development standards to ensure that new development does not contribute to an increase potential for flooding.
3. Complete a Stormwater Master Plan for all City stormwater infrastructure to identify system deficiencies.
4. Establish a capital Stormwater Improvement Plan and identify funding mechanisms.
5. Renovate the tide tubes that remove storm water from Berkeley Aquatic Park and Potter Street to the Bay.
6. Design stormwater improvements in streets, parks and plazas.

Questions or comments? Write them on a post it note!

TSUNAMI

About the Hazard:
A tsunami occurs in a body of water when a rapid displacement of water occurs (usually following an earthquake) that creates a surge of water. Tsunamis affecting Berkeley can result from offshore earthquakes near the Bay Area, or from very distant events. Tsunamis historically impacting Northern California were usually generated by earthquakes off the shore of Oregon, Washington and Alaska.

This map shows the Tsunami Inundation Zone in Berkeley. This is generally from sixth street west to the Bay. This doesn't represent a specific scenario but rather what is possible for all types of scenarios (including the worst case scenario).

CITY ACTIONS TO MITIGATE RISK

PLACE A DOT NEXT TO THE CITY ACTIONS YOU THINK ARE MOST IMPORTANT

1. Continue to repair and replace damaged docks at Berkeley waterfront.
2. Collaborate with the California Office of Emergency Services, the California Geological Survey, and the Federal Emergency Management Agency onl tsunami hazard mitigation measures for Berkeley's maritime communities.

PERSONAL ACTIONS TO MITIGATE RISK

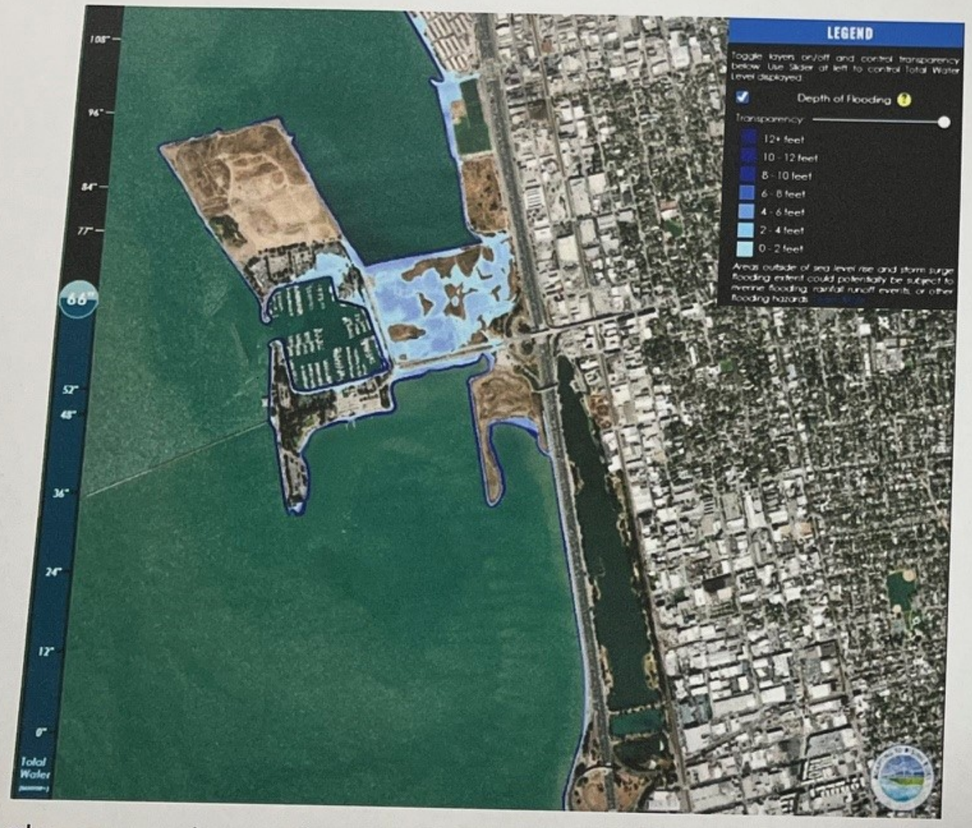
PLACE A DOT NEXT TO PERSONAL ACTIONS YOU'VE TAKEN

1. Familiarized myself with Berkeley's tsunami inundation area (map to the left).
2. Learned indications of tsunami and what to do.
3. Signed up for AC Alert and Tsunami Zone.
4. Bookmarked Berkeley's Emergency Map.
5. Familiarized myself with Berkeley's Outdoor Warning System
6. Created household evacuation plan for tsunami.
7. Considered flood insurance

Questions or comments? Write them on a post it note!

SEA LEVEL RISE

About the Hazard:
Sea level rise is an increase in the level of the world's oceans.
Warmer temperatures associated with climate change are causing global sea levels to rise. Damage from sea level rise may include increased infiltration rates into sewer systems, flooding of basements, and destroying underground infrastructure. Toxic materials may also move and release. Rising groundwater will also increase liquefaction hazards in response to earthquakes.



This map shows the Berkeley shoreline areas prone to permanent inundation due to 2 feet of sea level rise (a very likely scenario by 2100).

CITY ACTIONS TO MITIGATE RISK

PLACE A DOT NEXT TO CITY ACTIONS YOU THINK ARE MOST IMPORTANT

1. Continue to ensure new and existing public and private developments and infrastructure are protected from flooding due to sea-level rise through the permitting process.
2. Identify funding and nature based solutions to adapt to sea level rise at Berkeley Waterfront areas at risk of future inundation.
3. Conduct a groundwater study on impacts of groundwater rise combined with sea level rise.

PERSONAL ACTIONS TO MITIGATE RISK

PLACE A DOT NEXT TO ACTIONS YOU'VE TAKEN

1. Considered raising living spaces during a major home renovation or construction project.
2. Taken steps to reduce carbon emissions.

Questions or comments? Write them on a post it note!

Other Ideas

What level of coord-ination between CA/City for student populations (4704 area code) will campus be sanctuary?

Hazardous materials spilling during disasters (earthquake, flooding, etc.)
Encourage people to dispose before disaster

OES pres'n at Commission on Disability
→ best CBOs to engage with
→ emergency planning priorities

Dispose hazardous materials
- dispose days
Safe from EQ
High wind
fire

Electrified and removed gas
line + Meter

Arcgis map (online)
So people can zoom in
El Cerrito → real time location

other inspections?
fire Zone 1
more than five.
↳ reducing insurance

Watch Duty app

Extreme Heat
VOLUNTEER

Other ideas

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Hazard Presentation

Air Quality:

The hazards, the City's work, and steps to stay safe

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Air Quality

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The air pollutants of greatest concern in the Bay Area

- Ozone
- Particulate matter
- Toxic Air Contaminants

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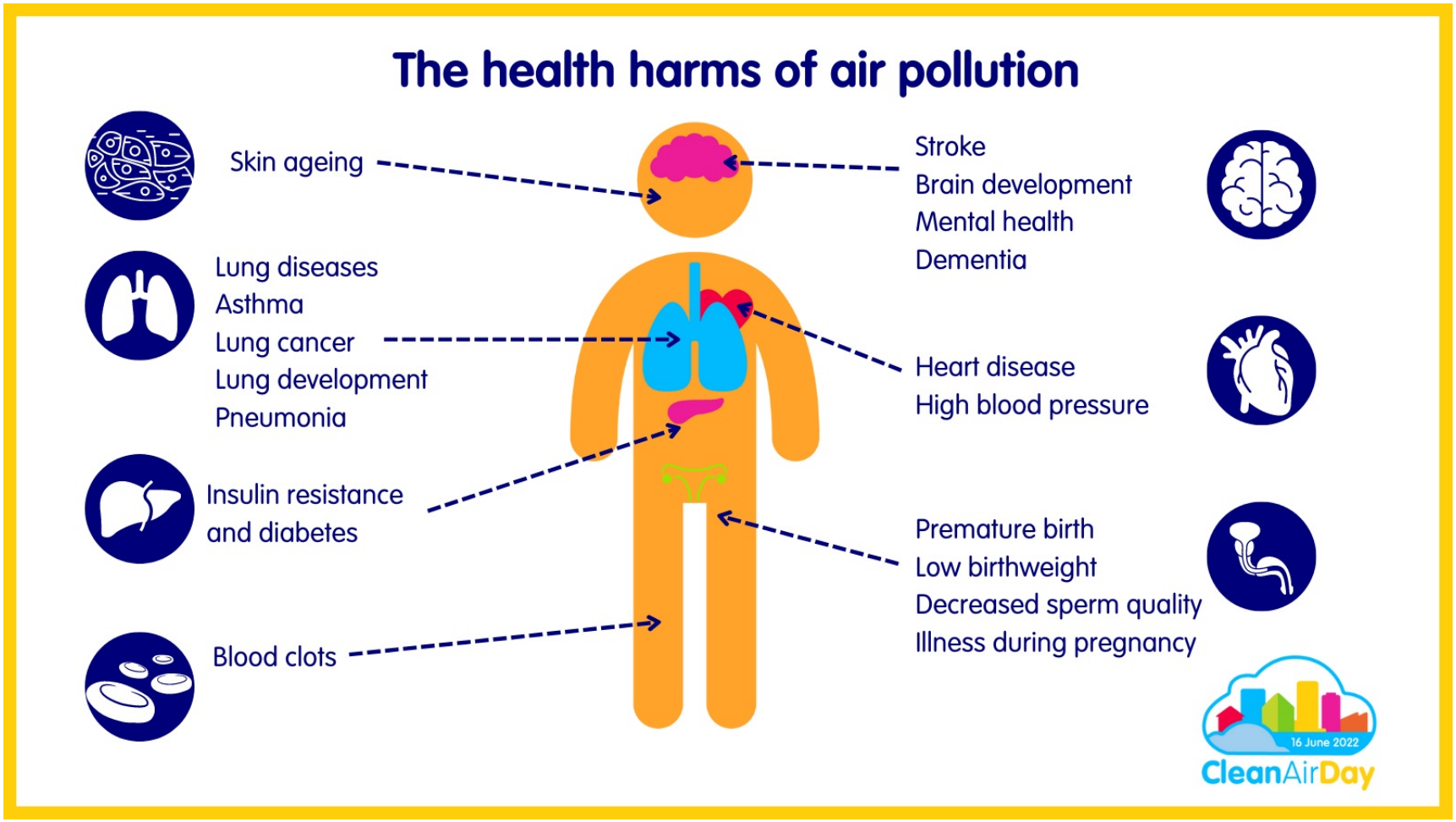
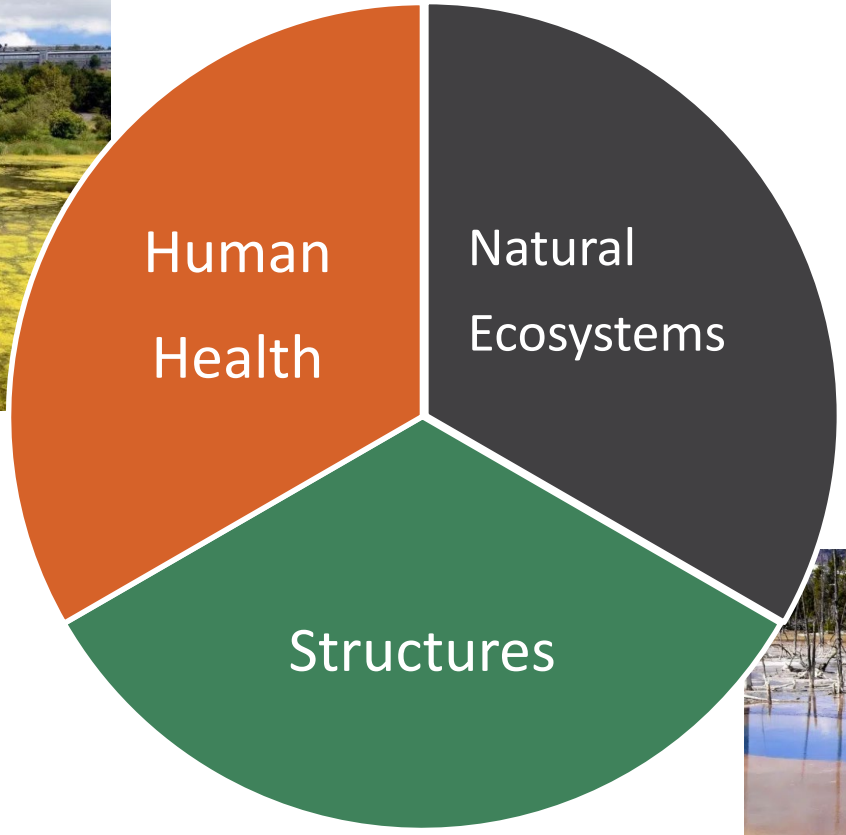


Impacts of Poor Air Quality

Eutrophication



Acid Rain

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Human Interaction with Poor Air Quality

Indoors:

- Leaky windows and doors
- Gas appliances
- Wood burning fireplace
- Smoking

Outdoors:

- Motor vehicles, planes, trains
- Industrial facilities
- Wildfire smoke

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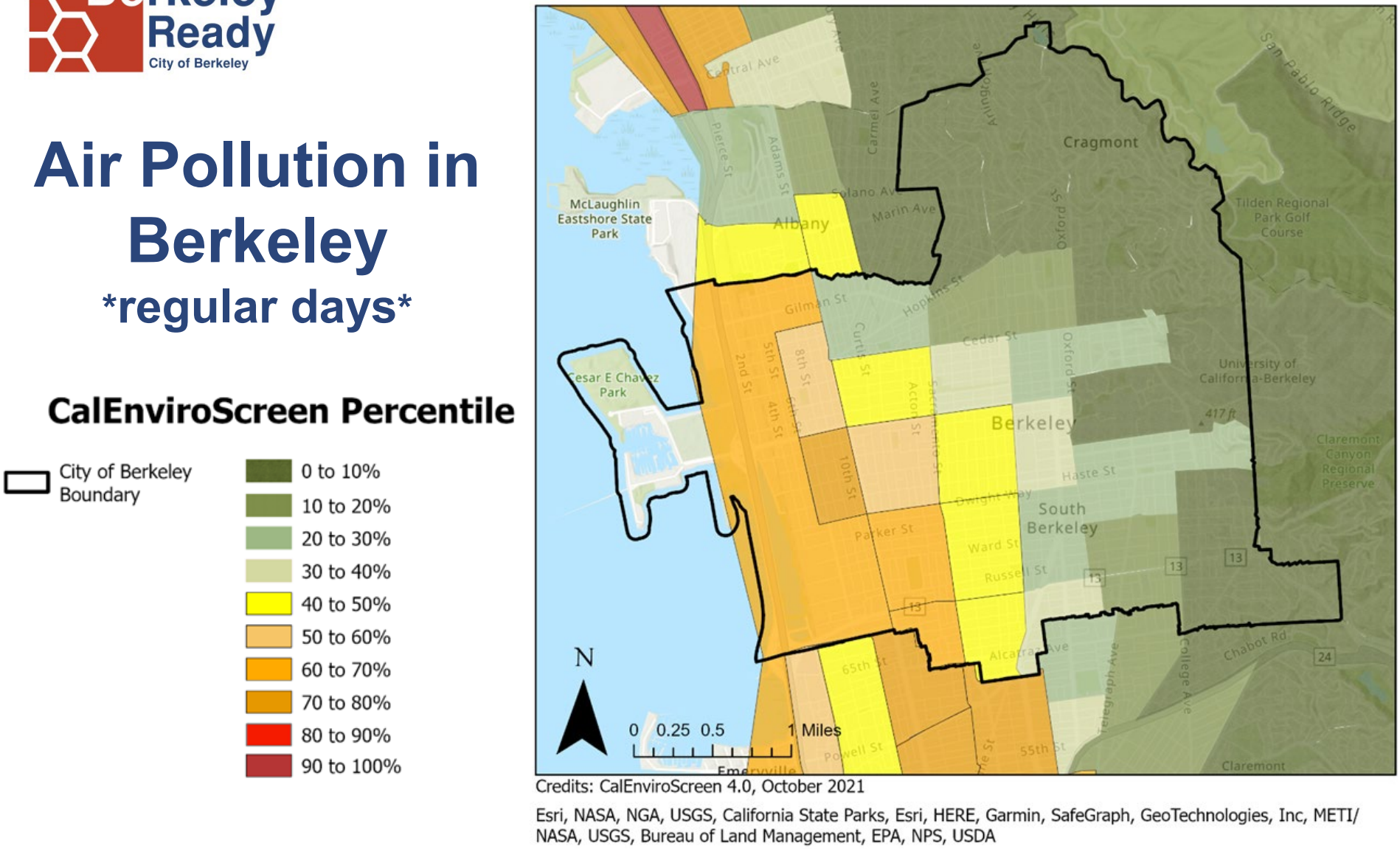
Air Pollution in Berkeley

regular days



Credits: CalEnviroScreen 4.0, October 2021

Esri, NASA, NGA, USGS, California State Parks, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA

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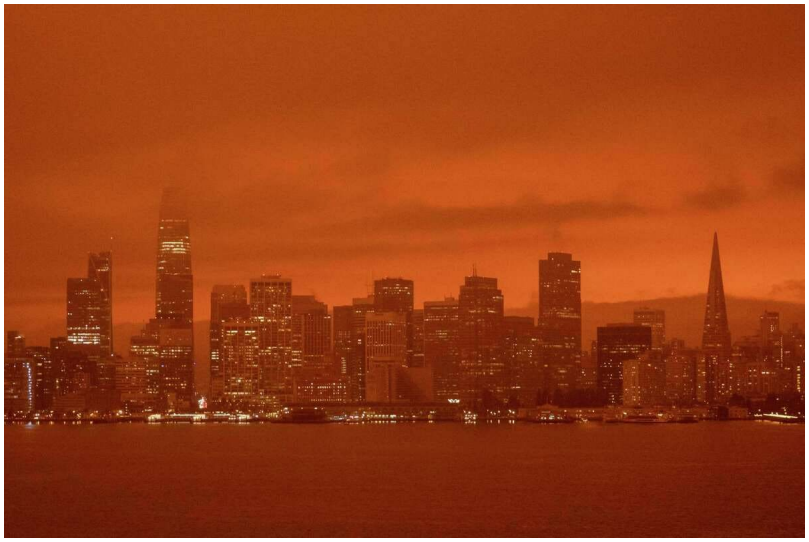
Human activity accelerates the effects of climate change, such as *longer, hotter, and drier fire seasons*, which increases risk of severe wildfires and **exposure to smoke**.



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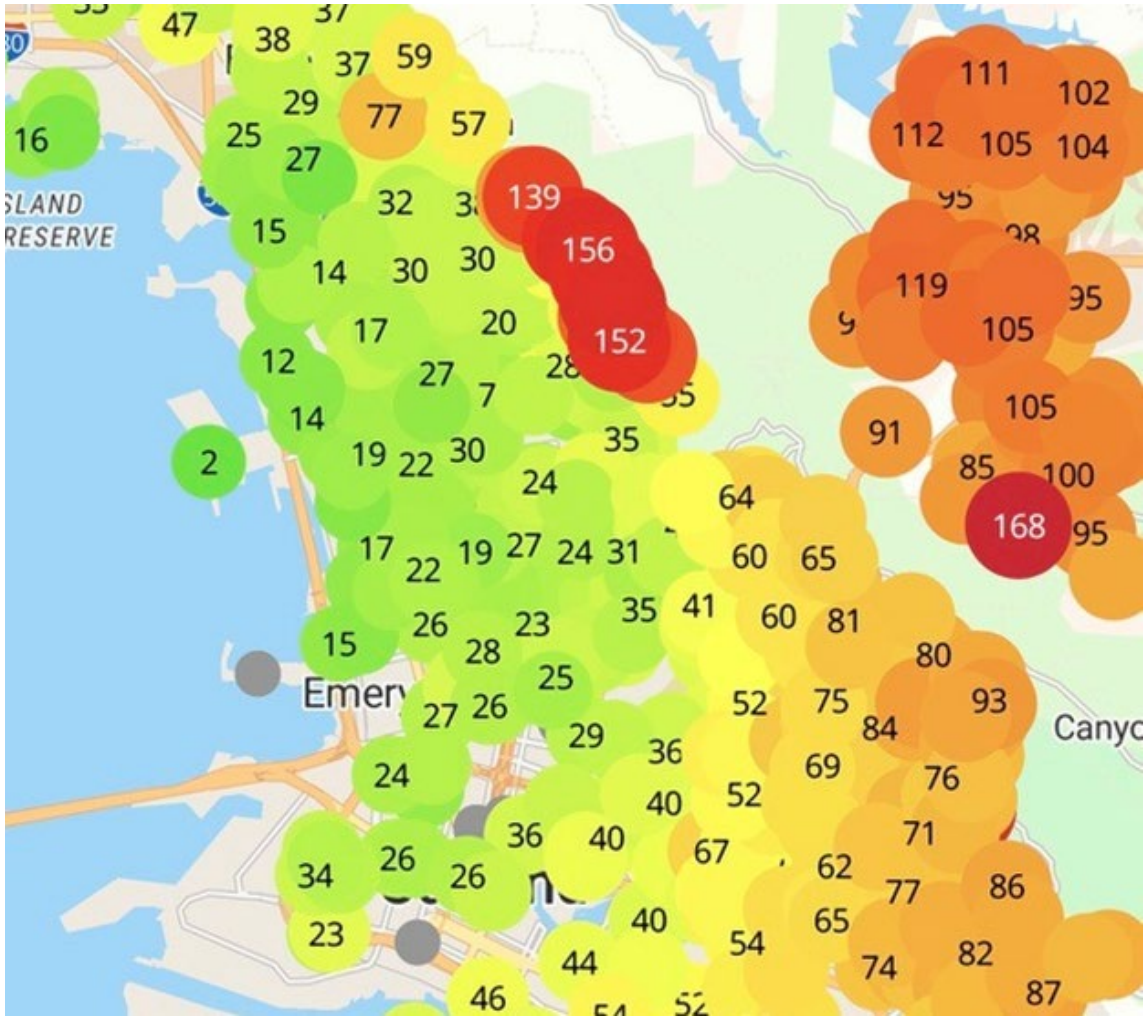
Air Pollution from Fires

Example, September 2021

- In Berkeley Hills AQI >150



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Air Quality Index

0-50	Good	Enjoy your usual outdoor activities.
51-100	Moderate	Extremely sensitive children and adults should refrain from strenuous outdoor activities.
101-150	Unhealthy for Sensitive Groups	Sensitive children and adults should limit prolonged outdoor activity.
151-200	Unhealthy	Sensitive groups should avoid outdoor exposure and others should limit prolonged outdoor activity.
201-300	Very Unhealthy	Sensitive groups should stay indoors and others should avoid outdoor activity.
301-500	Hazardous	Everyone should avoid all outdoor exertion.

CARB

- **Spare the Air**

https://www.sparetheair.org/understanding-air-quality/air-quality-forecast

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2024 Draft Mitigation Plan: Air Quality Strategy

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Expanding Urban Forestry team and their activities

- *Parks, Recreation, and Waterfront Department*
  - Tree planting projects and increase of vegetation coverage

Photo Credit: Berkeleyside

Photo Credit: The City of Berkeley

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Implementing programs and projects to reduce emissions

- *Public Works: Transportation Division*
  - Electric and hybrid car/bike/scooter-sharing, installation of public charging stations, and managing public parking

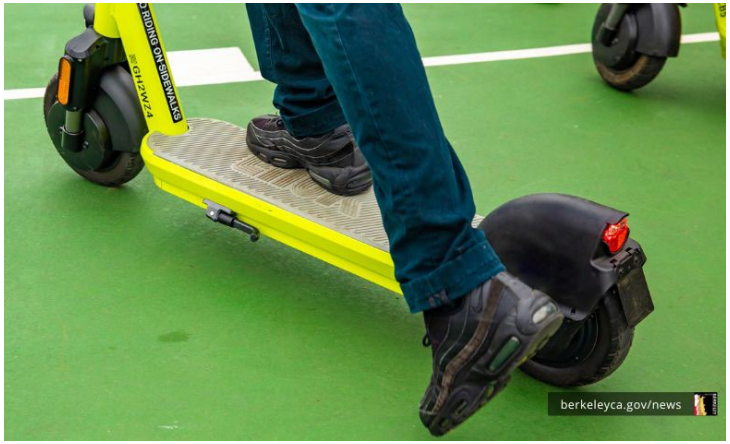

Photo Credit: City of Berkeley

Photo Credit: City of Berkeley

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What can you do about poor air quality?

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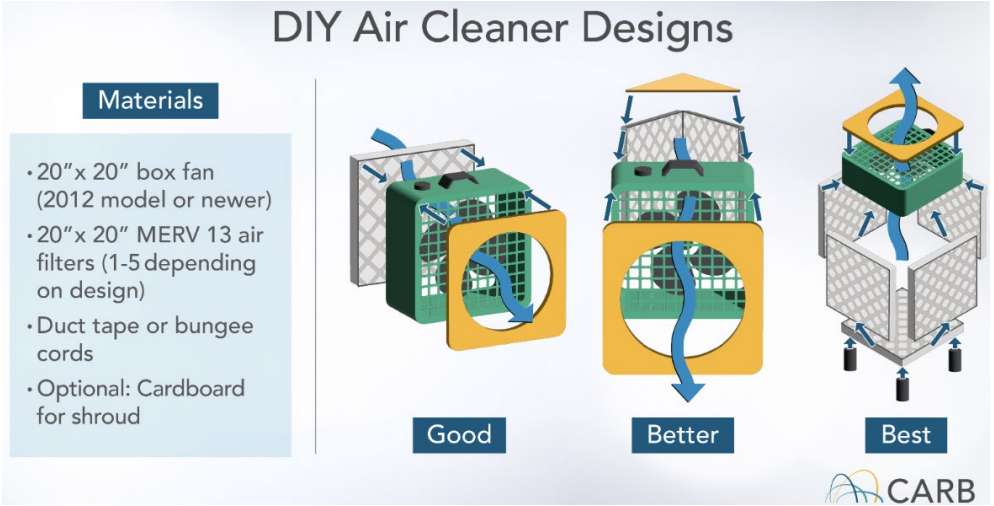
Prepare Your Home:

- Replace or seal leaky windows and doors
  - See *California Weatherization Assistance Program*
- Purchase equipment to clean the air inside your home
  - HVAC system filters
  - Portable Air Cleaners
  - See the list of *California Certified Air Cleaners*:
    https://ww2.arb.ca.gov/list-carb-certified-air-cleaning-devices
  - If necessary, construct an air cleaner with a box fan



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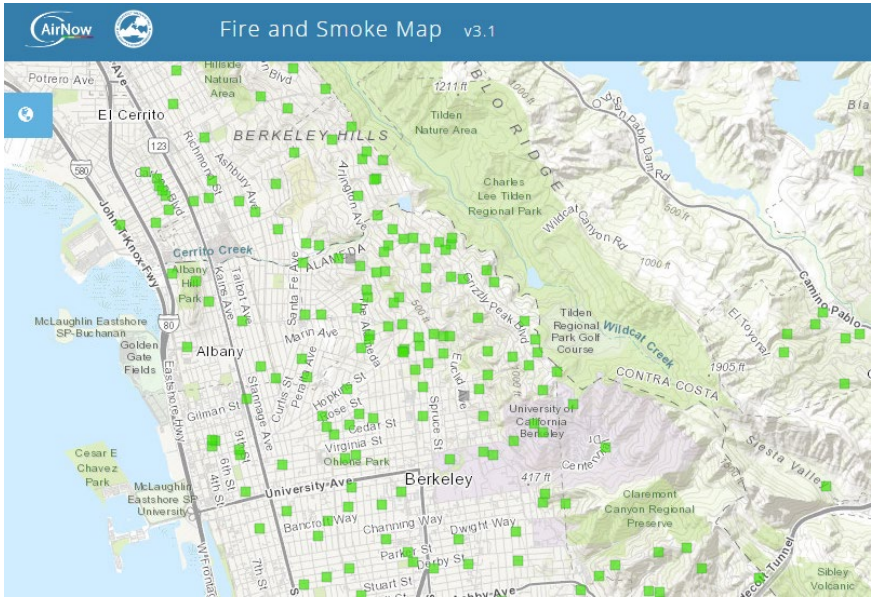
Stay Updated:

- Be familiar with the Air Quality Index (AQI)
- Bookmark sites with key air quality information
  - Forecasts: *AirNow.gov*
  - Real-time readings: *Fire.AirNow.gov*



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Poor Air Quality Events:

- Stay indoors with windows and doors closed
- See *Smoke Ready California*: *ww2.arb.ca.gov/smokereadyca*

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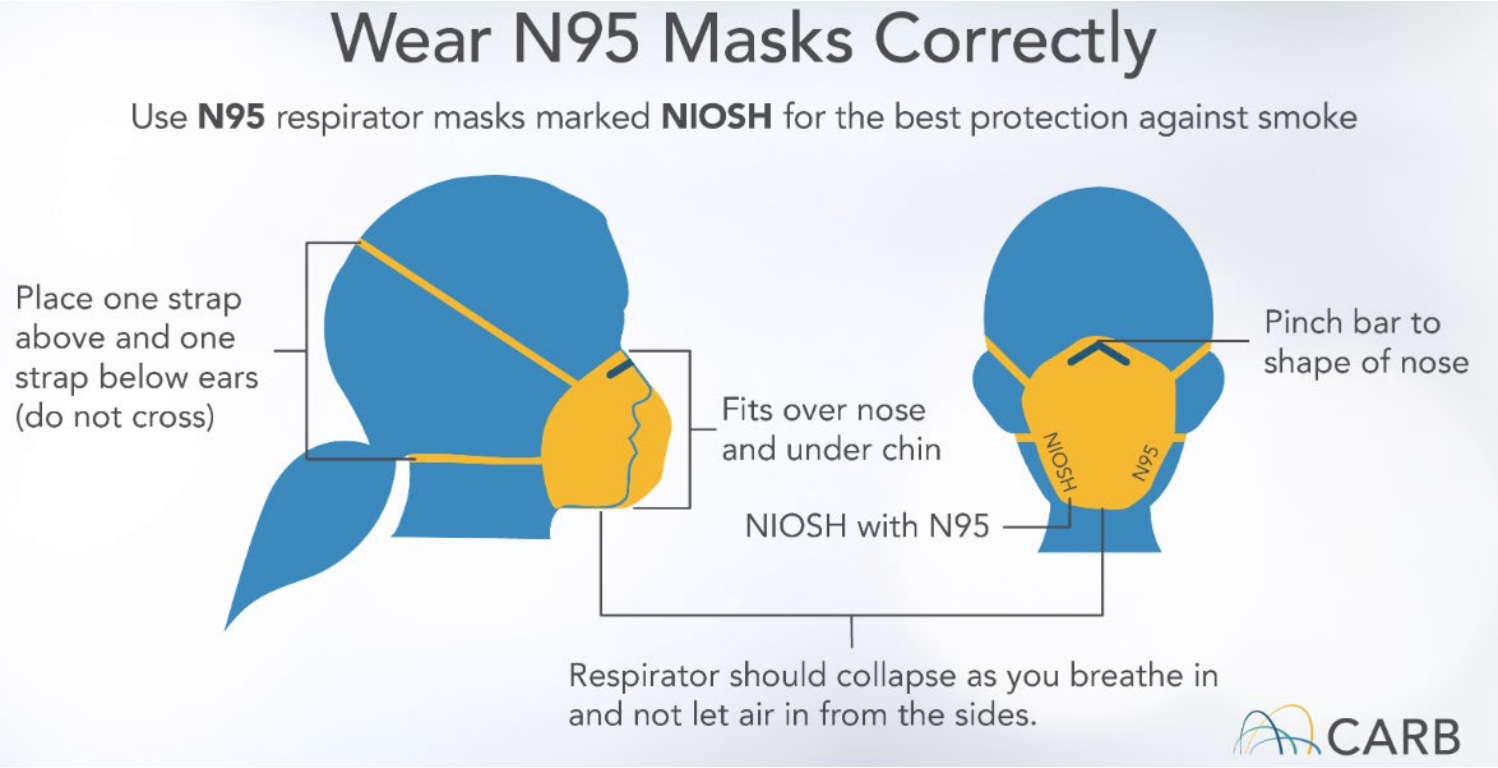
Poor Air Quality Events:

- Learn how to wear a mask, preferably N95 respirator mask
- Look out for signs that you or those around you need cleaner air



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Next Steps

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Next Steps Today!

- Mitigation plan:
  - Share your top mitigation actions and other ideas
  - Full draft plan available in 2024
  - Mitigation@BerkeleyCA.gov

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Stay Connected and Informed!

Key sources of information and instructions during an emergency

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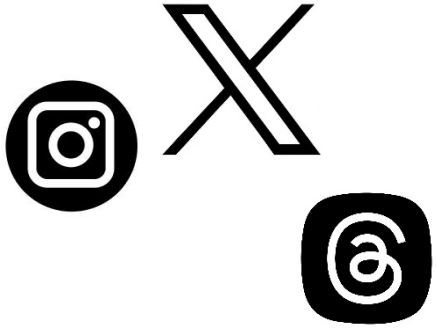
Welcome!



Be prepared to use *different sources* to find information in an emergency

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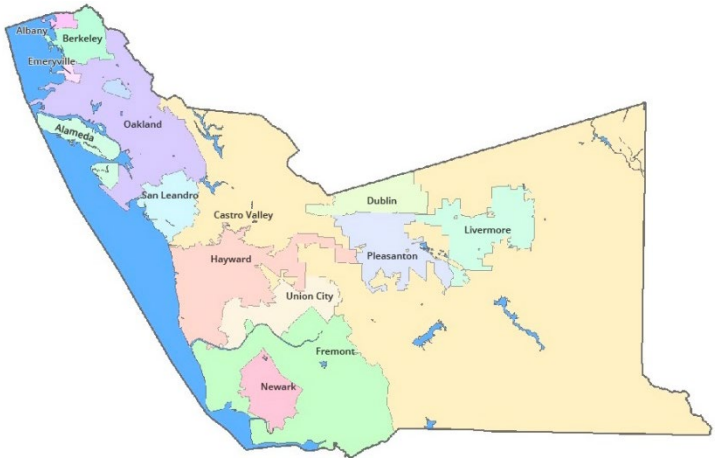
AC Alert

- **A Mass Notification System (Alameda County):**
  - Voice alerts to phones
  - SMS text messages
  - Email
  - TTY/TDD
- An Opt-in System
- Sign up for AC Alert today!



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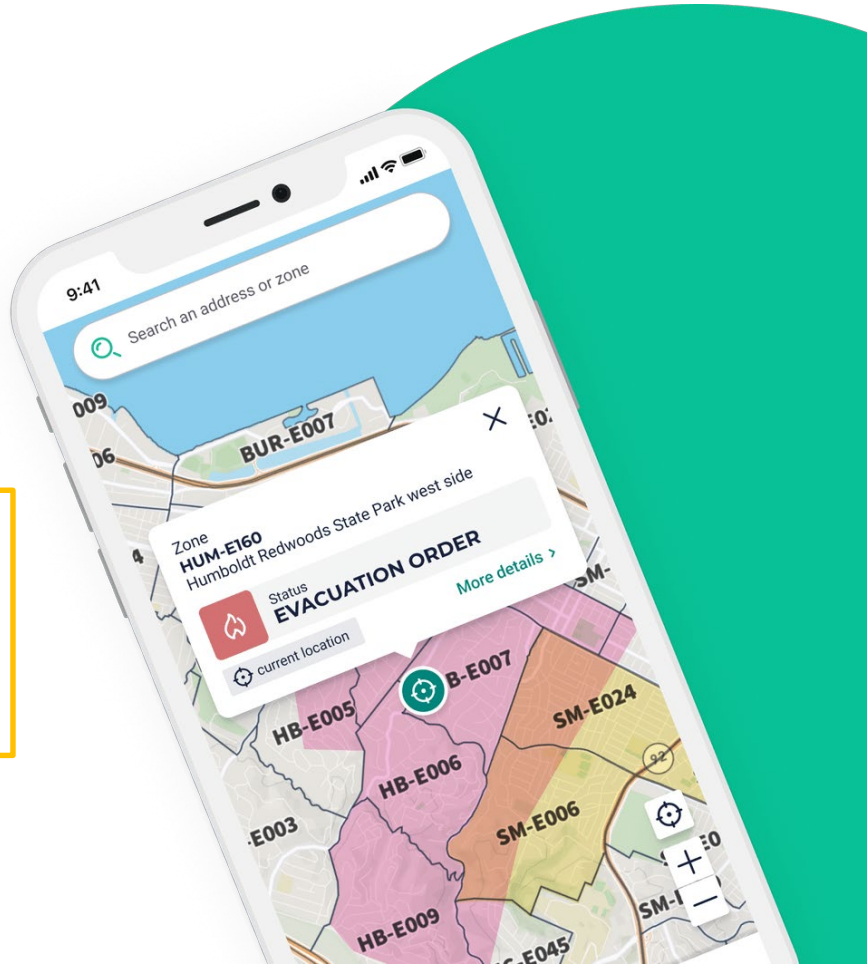
Berkeley Emergency Map

During an emergency, review *Berkeley's Real-Time Emergency Map* to find emergency information, like evacuation orders or open shelters.

genasys Protect



Let's check out the browser version together: **protect.genasys.com**

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Outdoor Warning System

15 locations across Berkeley

Let's get familiar with the OWS emergency tones!

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google.com/maps/d/u/0/viewer?mid=11Z2wQK8kecmbRE586JAktqgQ4Cy36FI&ll=37.873501037537814%2C-122.27619008135814&z=14

Berkeley Siren Locations

Phase 1 Siren Locations

- Berkeley Marina
- Animal Care Services
- Fire Station 7
- City Hall
- Zaytuna College (Upper Campus)

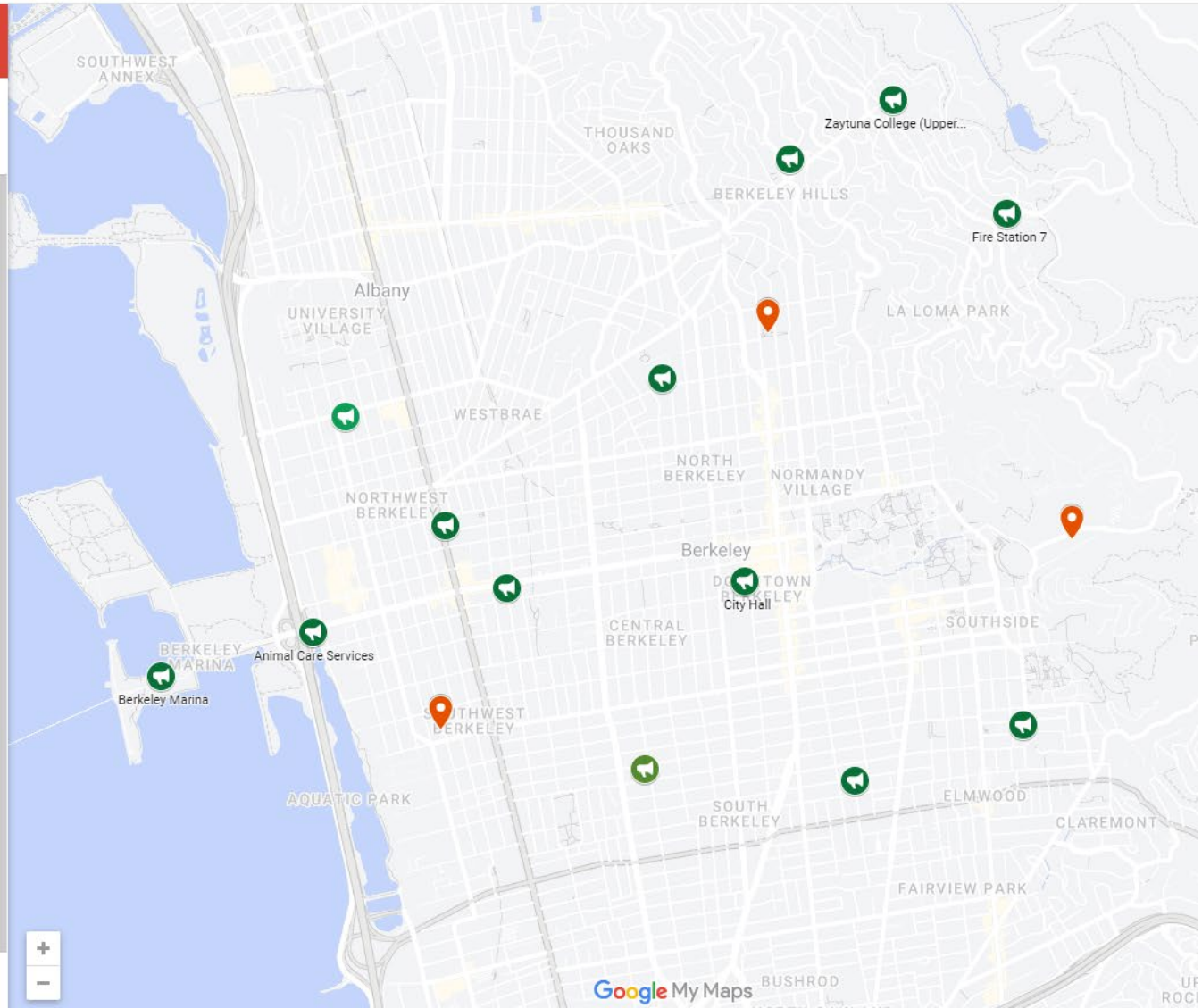
Phase II Siren Locations

- Sylvia Mendez Elementary
- Emerson Elementary
- Cragmont Elementary
- Oxford Elementary
- Berkeley Adult School
- Martin Luther King Jr. Middle School

Phase III Siren Locations (late 2023/2024)

- Strawberry Canyon Recreation Center
- Fire Station #1
- Longfellow Middle School
- BUSD Transportation
- Live Oak Park

Other Sirens Systems



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Radio - 1610 AM

- Run by the City of Berkeley
- Plays:
  - recorded messages
  - emergency information
  - instructions
- Or use **KPFB – 89.3 FM**

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Nixle

- Get information from Berkeley Police Department through BFD primary communication tool, which includes urgent and non-urgent communication
  - Email
  - Advisories
  - Text messages

everbridge NIXLE

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Wireless Emergency Alerts (WEA)

- Short emergency text government agencies send to smartphones to alert about critical threat requiring public's attention, such as shelter-in place or evacuation order
- You cannot sign up to receive WEA
  - DO NOT rely only on WEA
  - For more detailed instructions sign up for AC Alert

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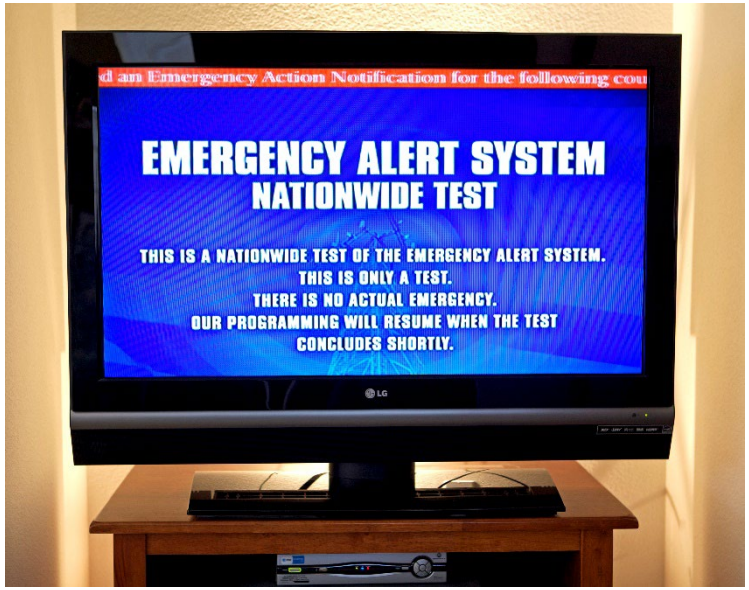
Television

All television channels will broadcast messages sent by Alameda County through the Emergency Alert System. Local news networks may also carry specific information and instructions from authorities.



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Emergency Alert System (EAS)

A national public warning system that enables the President or other authorities to address the American public via television and radio broadcast during a national emergency or to deliver important information.

In Berkeley, EAS radio stations:

- KCBS - 740 AM
- KQED - 88.5 FM
- KSOL - 98.9 FM (Spanish)

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UC Berkeley Recommendation

- Access UCB OEM Website - https://oem.berkeley.edu/

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WarnME (UC Berkeley)

- A warning system for *UC Berkeley students, staff, and faculty*
- By default, all UC Berkeley email addresses are enrolled in WarnME to receive emergency notifications, community advisories, and timely warnings from UCPD.
- Register your mobile number to receive crucial life safety SMS alerts.

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warn me

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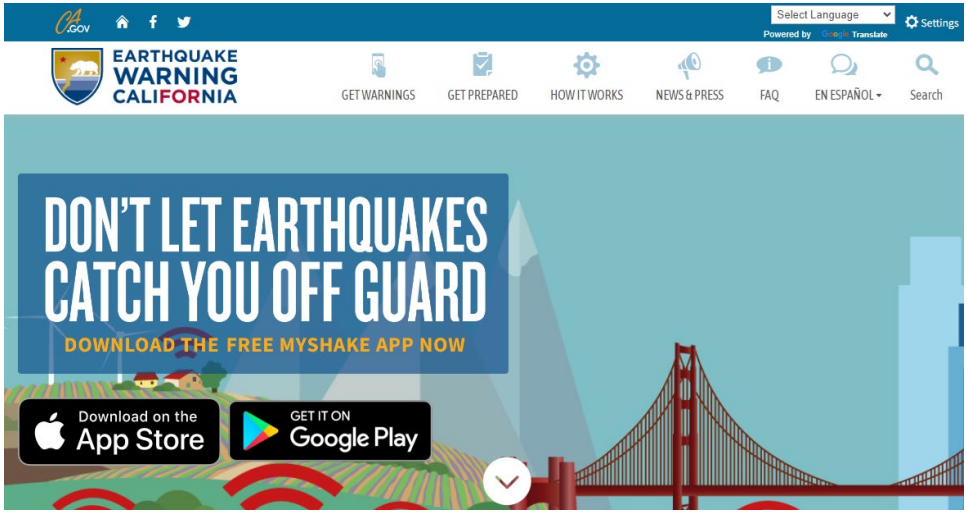
Earthquake Warning for California

- The first earthquake early warning system
- Learn more at https://earthquake.ca.gov

- Install the ***MyShake App*** receive alerts before earthquake shaking starts

MyShake™



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Hazard Presentation

Earthquake:

The hazards, the City's work, and steps to stay safe

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Earthquake

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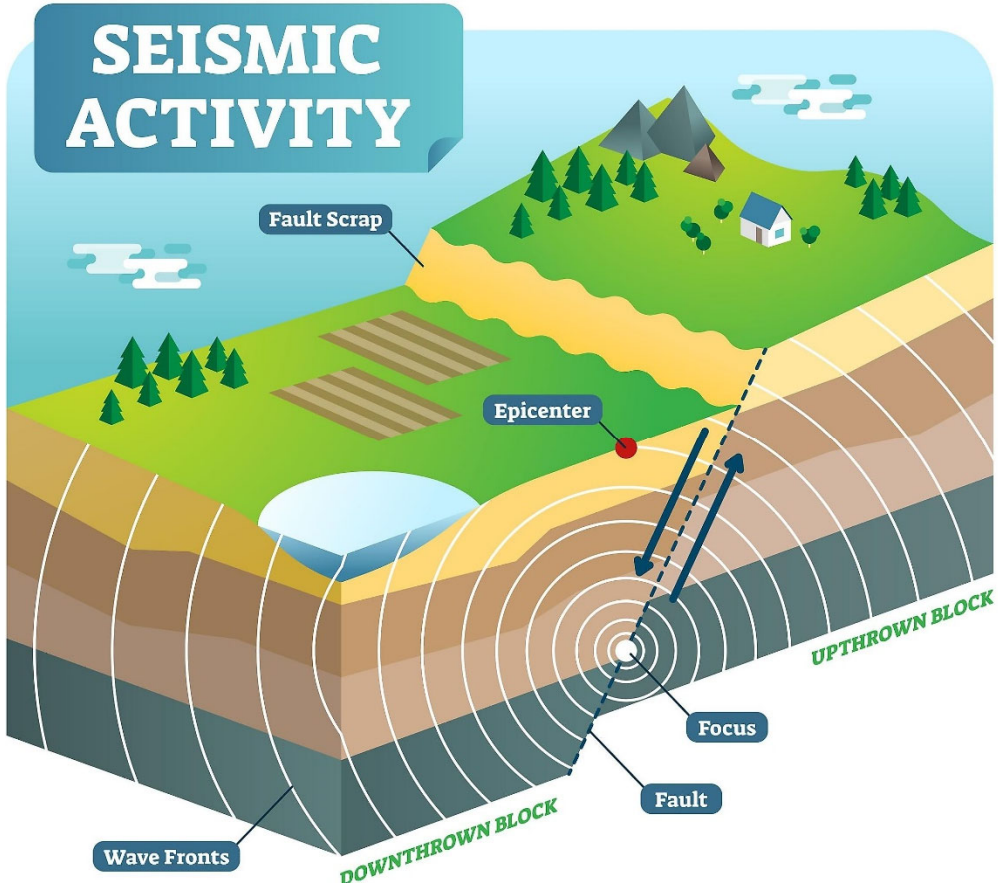

What is an earthquake?

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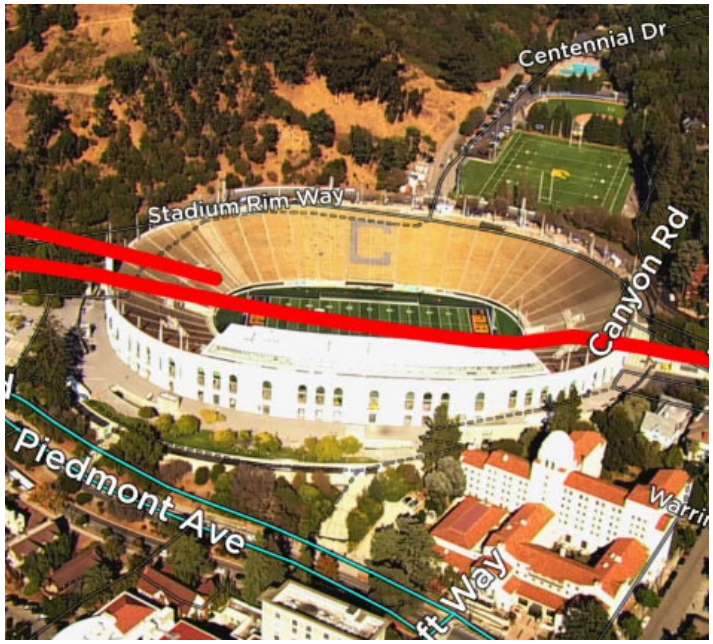
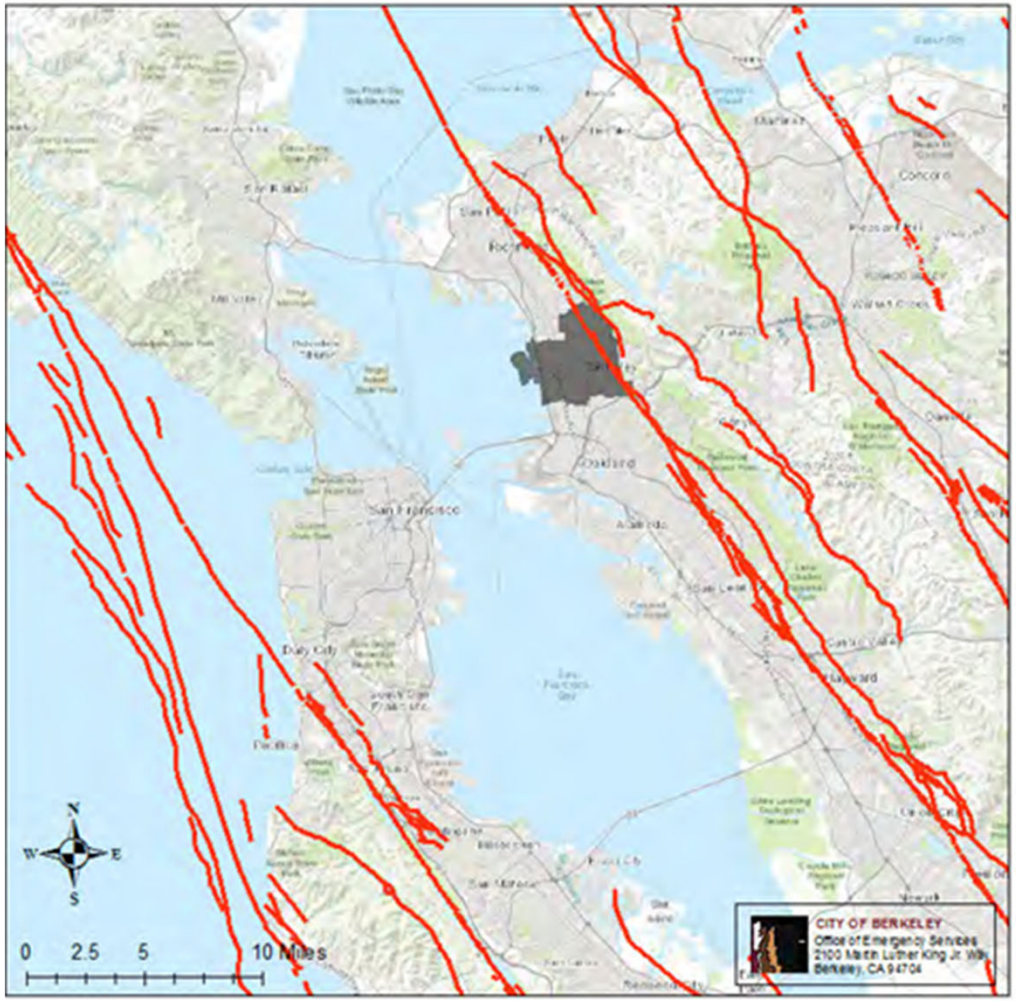
Regional Faults

The Hayward Fault at UC Berkeley Stadium



Map 1. ***Regional faults and their location with respect to Berkeley***



Source: In 2012, USGS mapped multiple faults in the region that can produce damaging shaking in the region. (Shapefiles and description from ABAG website)
Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, ©

Fault
City of Berkeley

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Fault Rupture

Liquefaction

Landslide

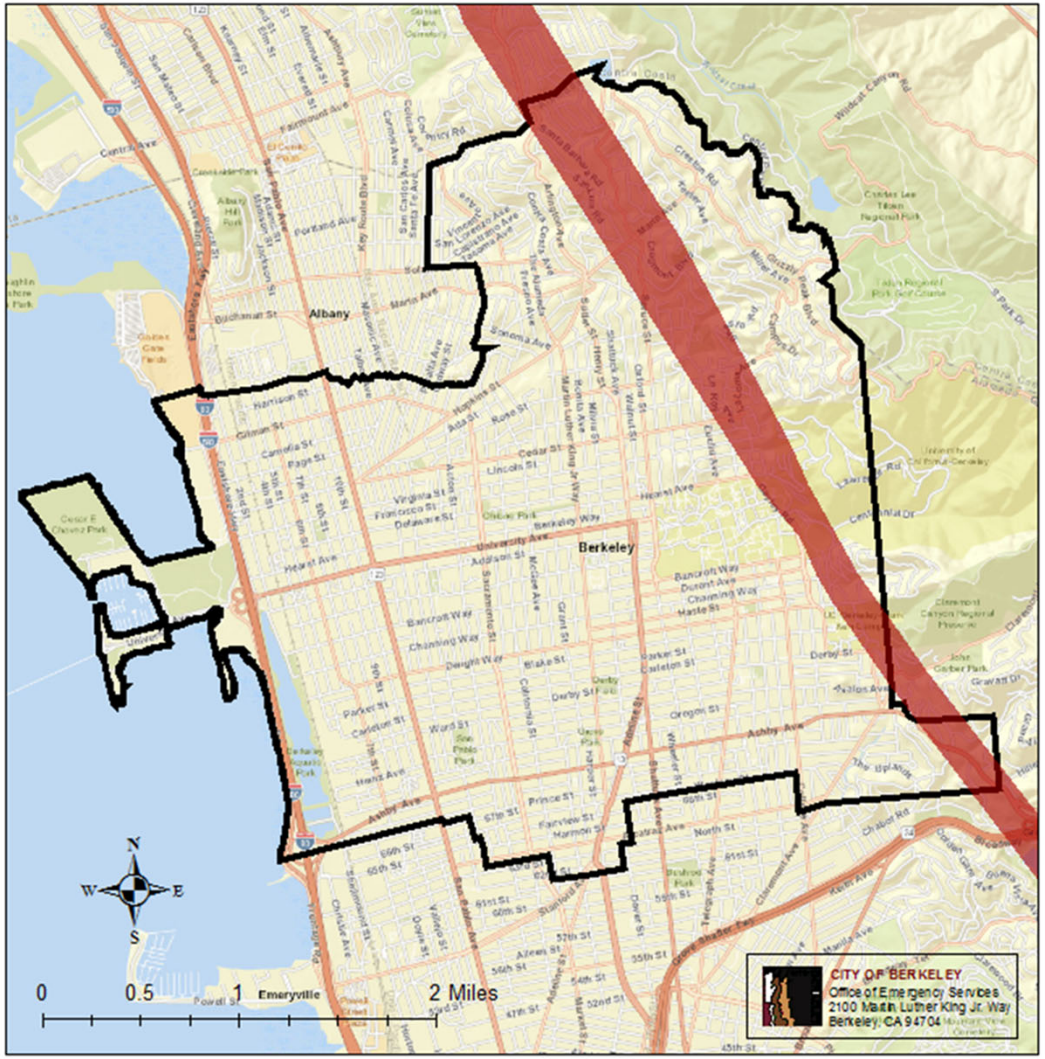
Berkeley Ready
City of Berkeley

Fault Rupture

Fault Planning Zone

Earthquake Fault Zone

City of Berkeley



Source: California Geological Survey, Earthqauke Fault Planning Zone.
Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, © OpenStreetMap contributors, and the GIS User Community

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Seismically-Triggered Landslide

Landslide Planning Zone

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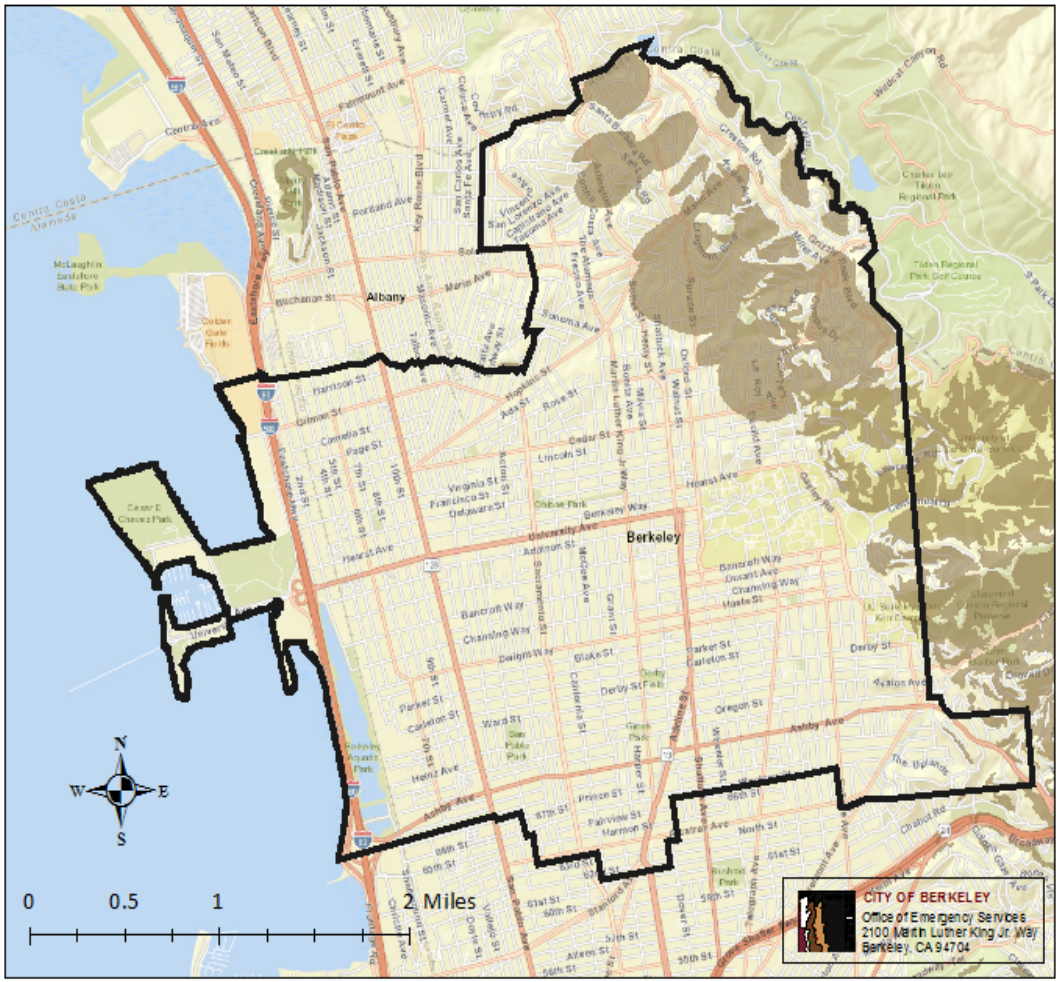
Earthquake-Induced Landslide Planning Zone



Source: California Geological Society, Earthquake-Induced Landslide Planning Zone.
Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, © OpenStreetMap contributors, and the GIS User Community

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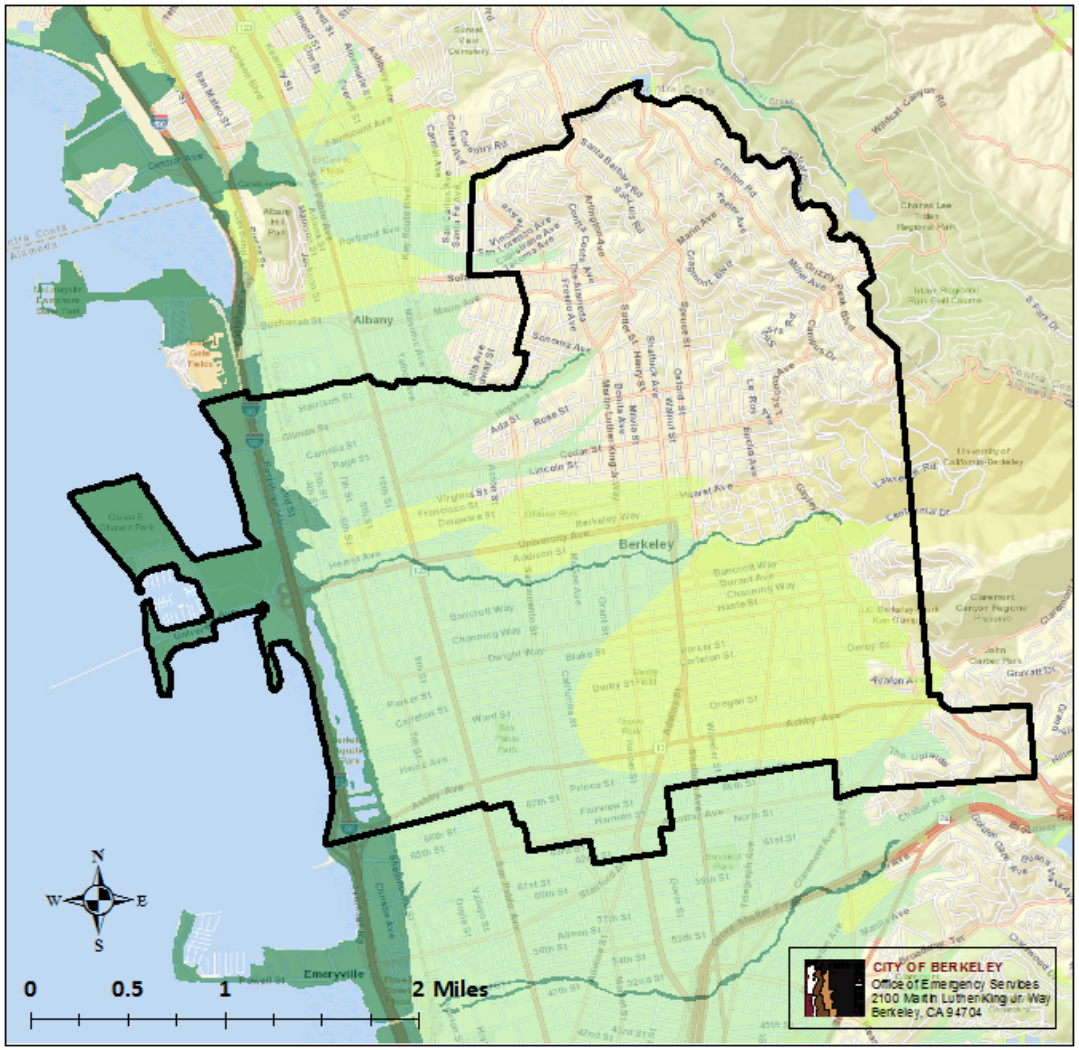
Liquefaction

Level of Susceptibility to Liquefaction in Berkeley

- City of Berkeley
- Very low
- Low
- Moderate
- High
- Very high



Source: USGS, 2006.
Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, © OpenStreetMap contributors, and the GIS User Community

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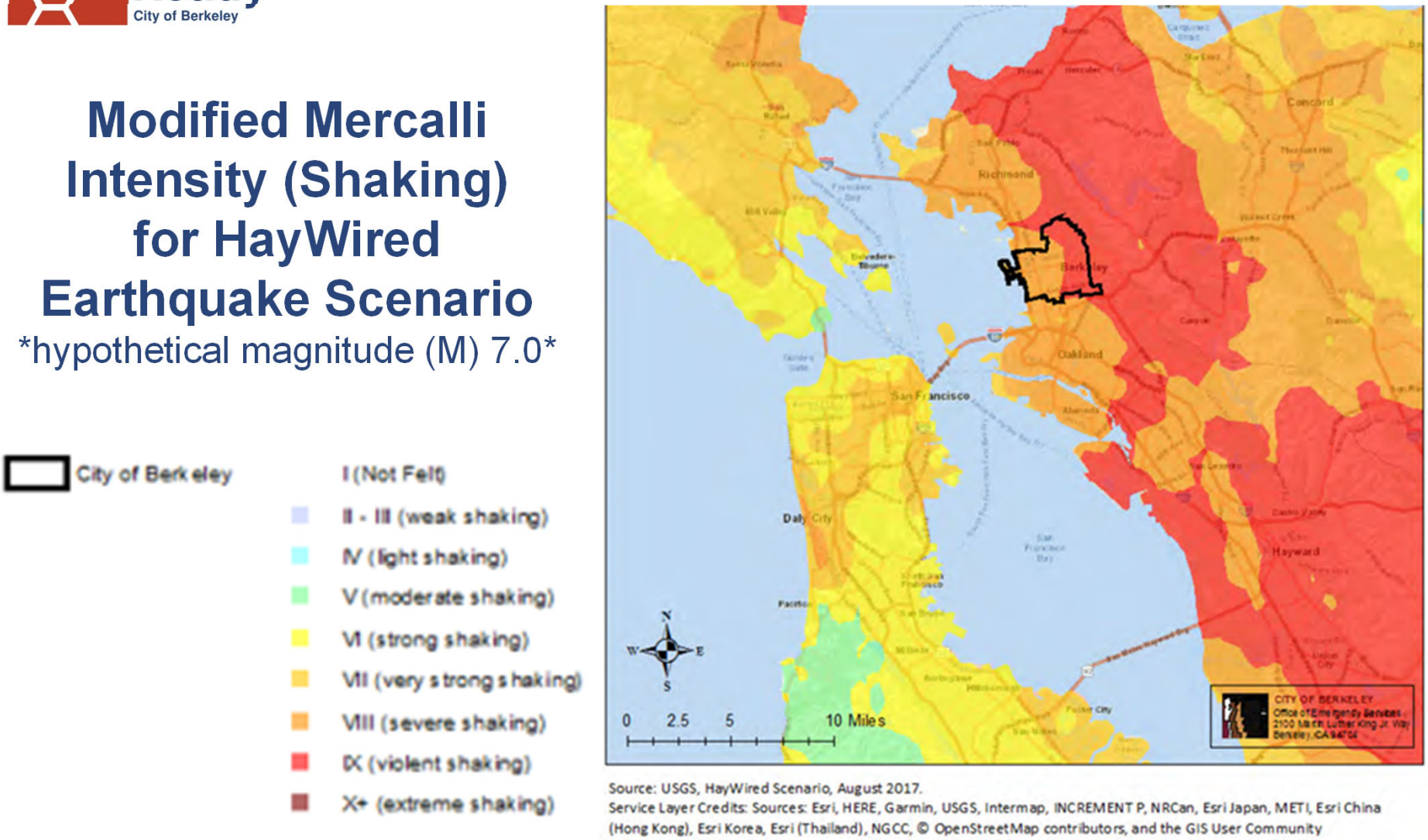
Modified Mercalli Intensity (Shaking) for HayWired Earthquake Scenario

hypothetical magnitude (M) 7.0



Source: USGS, HayWired Scenario, August 2017.
Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, © OpenStreetMap contributors, and the GIS User Community

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Modified Mercalli Intensity (MMI)

MMI	Shaking	Description and damage
I	Not felt	Not felt except by a very few under especially favorable conditions.
II	Weak	Felt only by a few persons at rest, especially on upper floors of buildings.
III	Weak	Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated.
IV	Light	Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.
V	Moderate	Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.
VI	Strong	Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight.
VII	Very strong	Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly build or badly designed structures; some chimneys broken.
VIII	Severe	Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned.
IX	Violent	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shift off foundations.
X+	Extreme	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.

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Earthquake Hazard: Vulnerabilities

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What we will *NOT* see in Berkeley

Photo Credit: USA Today

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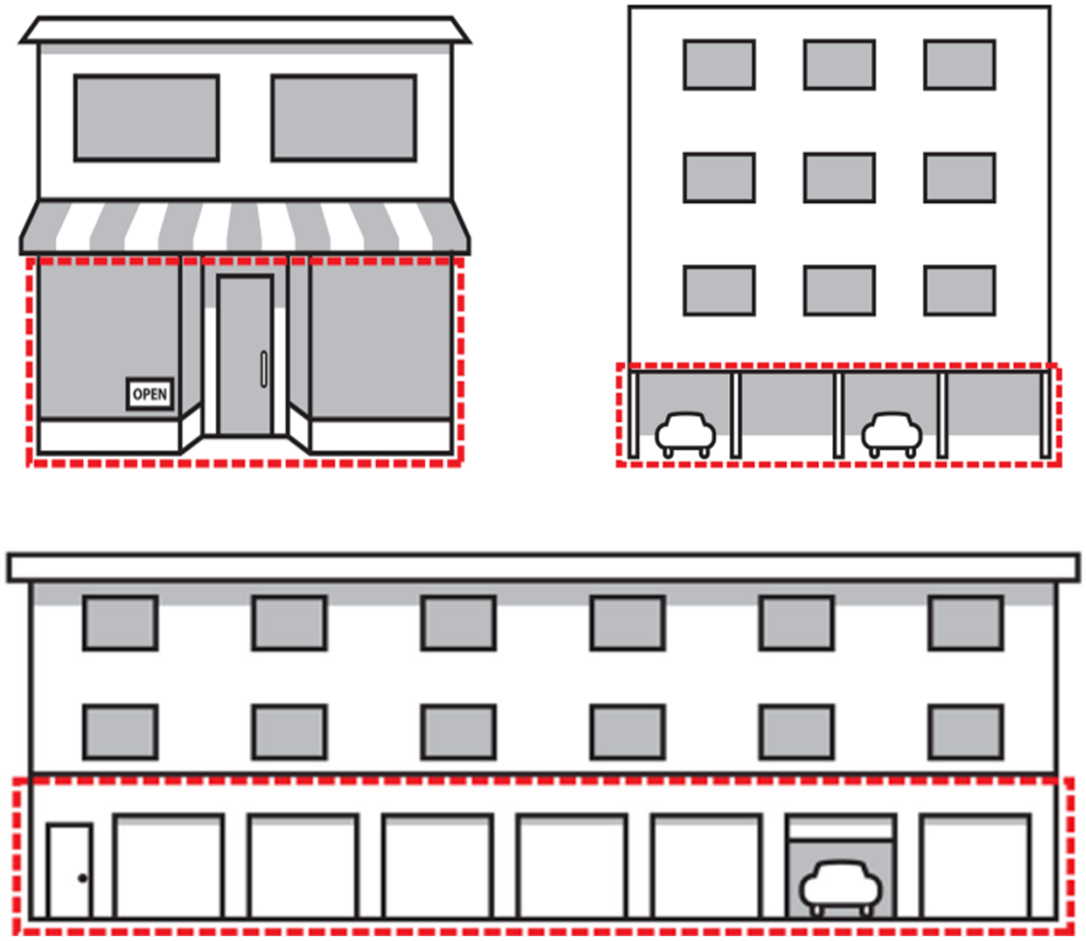
Vulnerable Structures

Soft, Weak or Open Front (SWOF)



SWOF buildings have *large openings on ground floor*, such as storefront windows, car openings.

Vulnerable Structures

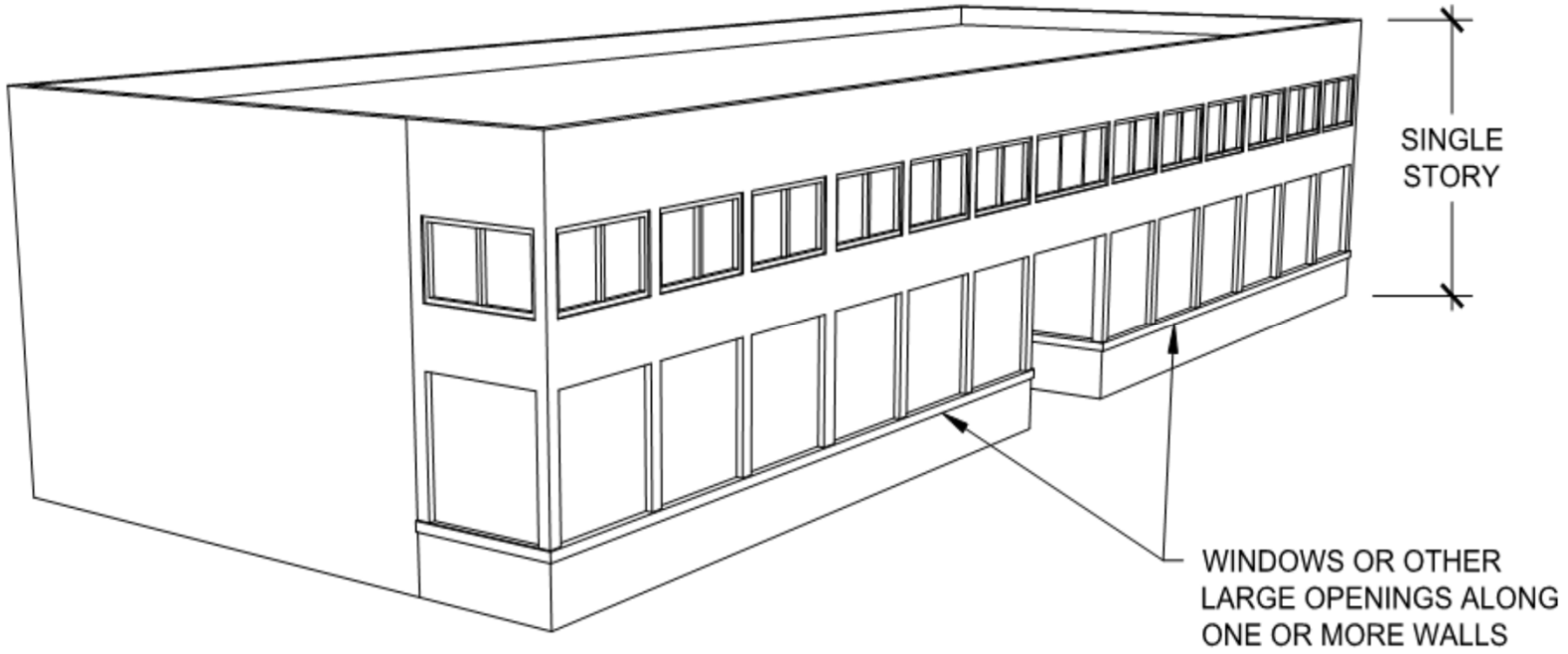
Soft, Weak or Open Front (SWOF)

Example: A wood frame multi-unit residential building with soft, weak or open front soft story condition at first story due to garage openings.

Vulnerable Structures

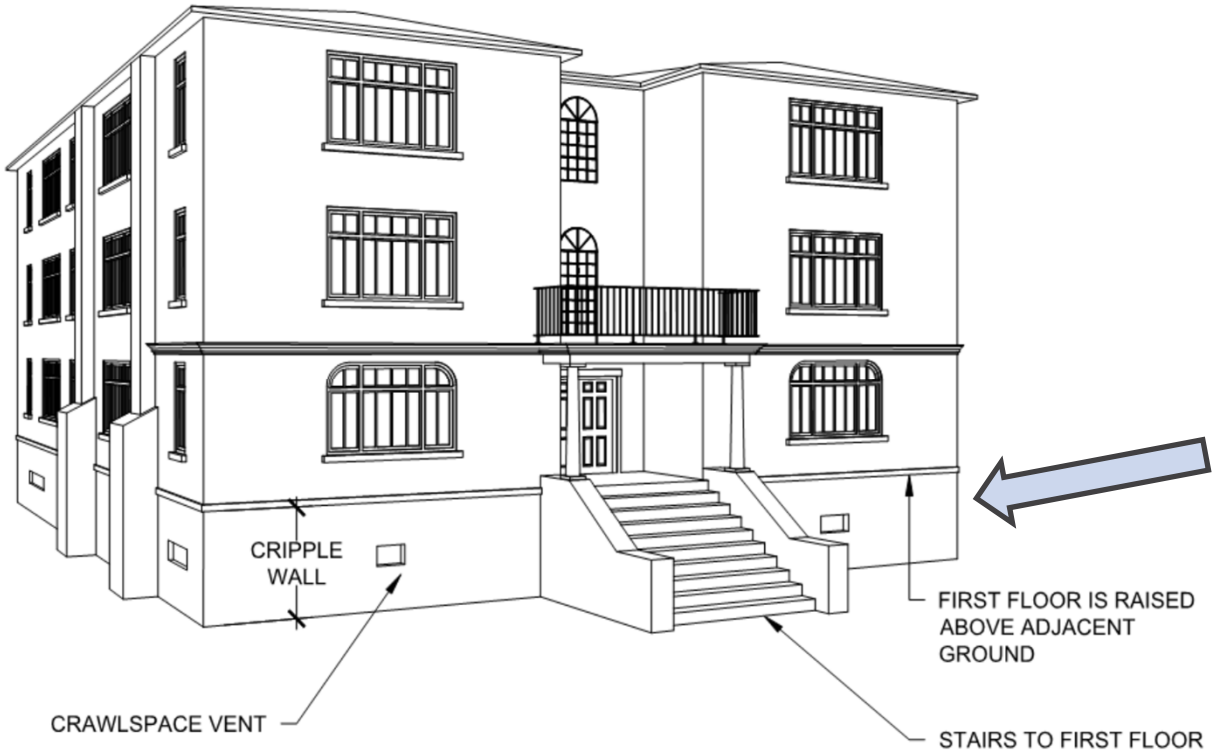
Soft, Weak or Open Front (SWOF)

Example: One-story, open-front building with windows or other large openings along one or more walls



Vulnerable Structures

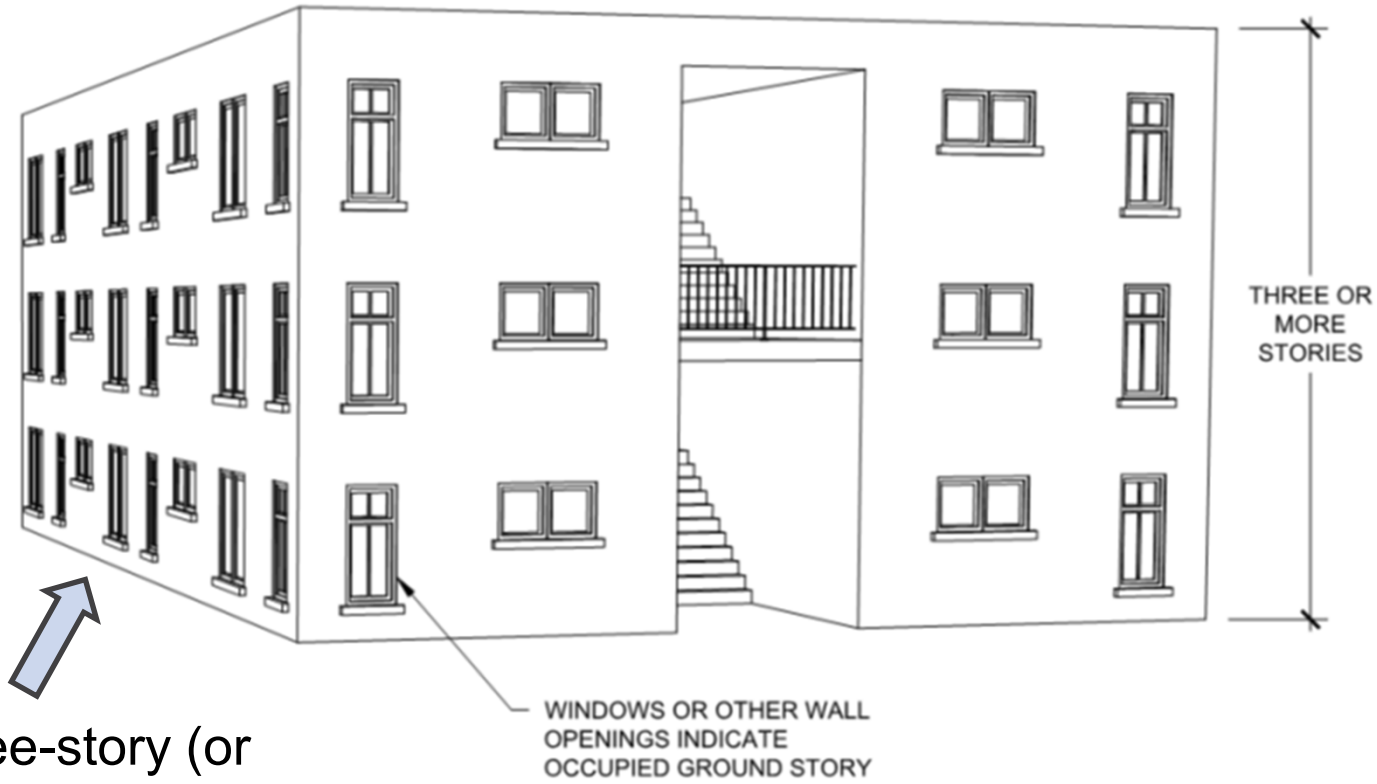
Soft, Weak or Open Front (SWOF)



Example: A building with cripple walls. Stairs to first occupied floor and vents to area below the occupied floors are indications of possible cripple walls.

Vulnerable Structures

Soft, Weak or Open Front (SWOF)



Example: A three-story (or more) multi-family residential building with potential weak first story.

Vulnerable Structures

Unreinforced Masonry (URM)

URM buildings are constructed with *brick walls* that **are not** reinforced with *steel or other materials* to increase their structural strength

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Vulnerable Structures

Unreinforced Masonry (URM)

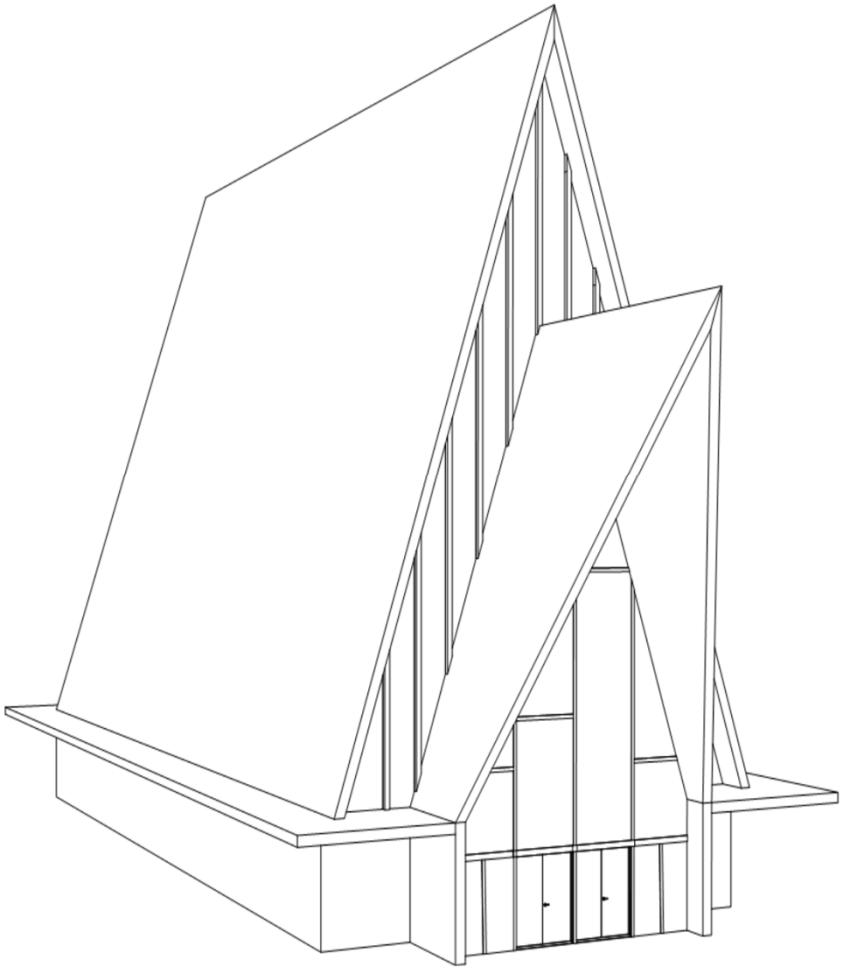
Seismically Retrofitting URMs

- Steel "through" bolts and plates

- Steel diagonal braces that secure roof parapets

Vulnerable Structures

Wooden Buildings



Example: A wooden building with unique A-frame geometry, which falls outside normal light-frame construction

Vulnerable Structures

Rigid Wall-Flexible Diaphragm (RWFD)

Photo Credit: FEMA, 2021

Example: This type of building is typically used for warehouses or retail stores and has experienced severe damage or even collapse in past earthquakes.

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2024 Draft Mitigation Plan: Earthquake Strategy

Mitigation Action Plan

City-Owned Buildings

- Building Assessment
- Strengthen and Replace City Buildings

Mitigation Action Plan

Privately-Owned Structures

- Soft-Story Retrofit Program
  - Earthquake Soft-Story (ESS) Retrofit grants reimburse eligible owners up to 75%
- Retrofit Grants Program
  - Available to multi-family homes of 3+ units, non-residential buildings, hotels/motels, and mixed use buildings
- Concrete Retrofit Ordinance Research
  - Collaborative work an Expert Engineer Advisory Team from the Earthquake Engineering Research Institute

More Information:

www.berkeleyca.gov / construction-development / **seismic-safety**

Mitigation Action Plan

Retrofit URM structures

- to improve seismic resistance of URM or to remove the buildings and replace them with safer buildings

- Applying available legal remedies to owners who fail to comply with the URM ordinance

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What can you do about earthquake hazard?

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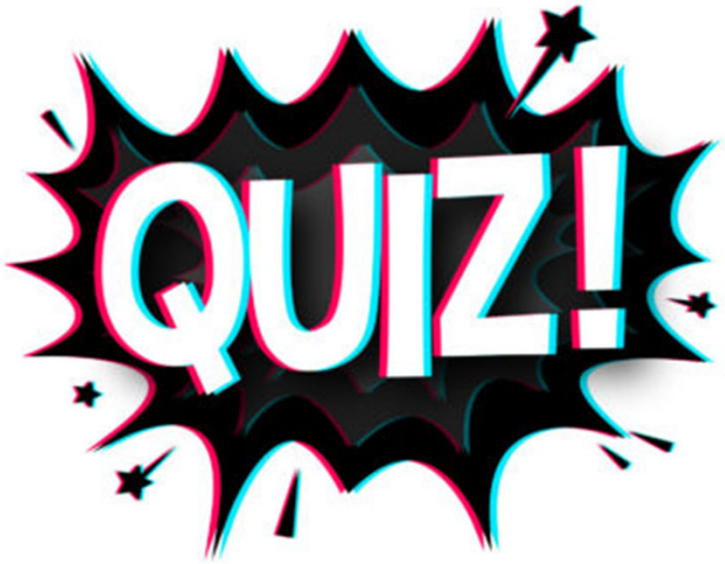
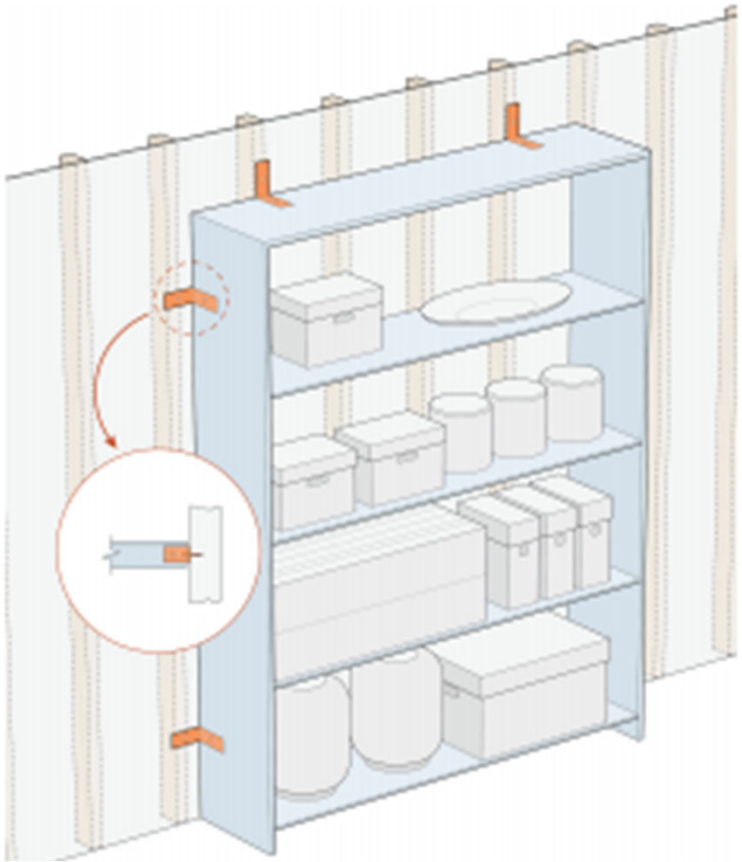


In the United States, what is the cause of *most injuries* and/or deaths during an earthquake?

Actions You Can Take Now

Secure your home

store heavy and breakable objects on low shelves



Actions You Can Take Now

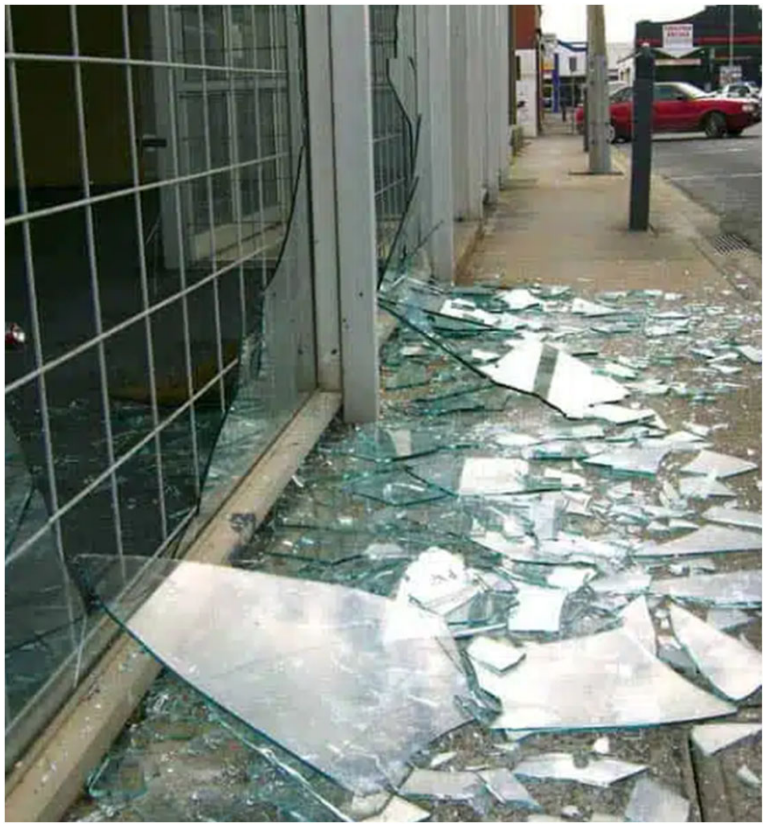
Secure your home

secure bookshelves

Actions You Can Take Now

Secure your home

move beds *away* from windows



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This is pretty, but unsafe if not secured

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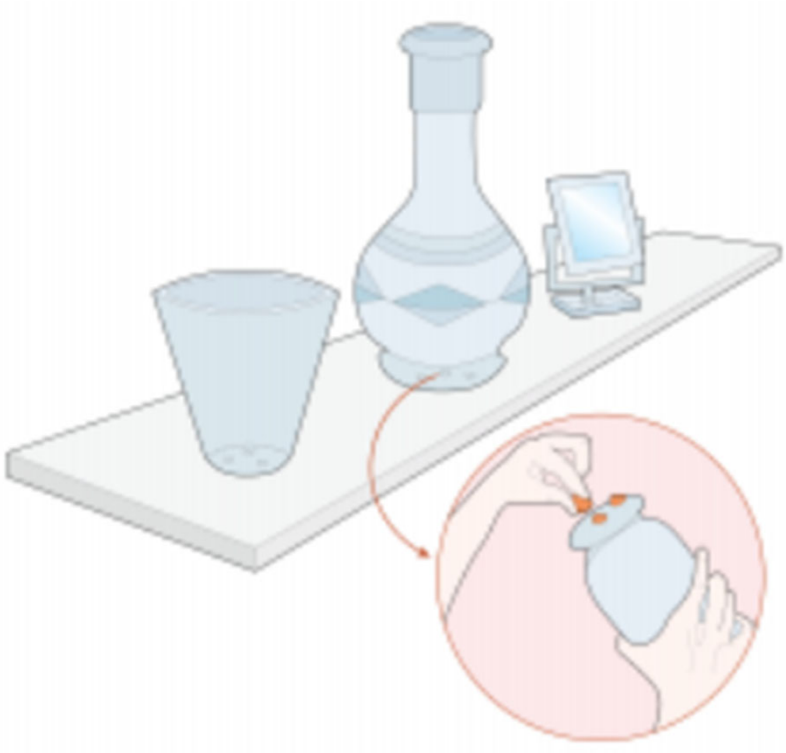
use clear quake gel or microcrystalline was to secure breakables in place



Actions You Can Take Now as a Homeowner

1) Assess your home:
   - Hire a structural engineer / Figure out your building type
   - Check Building Permits for your home (Building Eye)

   especially, if it's a wooden home build before 1973 or concrete home build before 1980

2) Retrofit your home (if needed)

3) Understand available grants:
   - Funding for Seismic Retrofits
   - City's Brace & Bolt program

Actions You Can Take Now as a Renter

Talk to your landlord

- When was the house built?
- What materials were used?
- Is your building retrofitted?
- Does it require retrofitting?

Actions You Can Take Now

Consider purchasing **earthquake insurance** for both homeowners and renters

Actions You Can Take Now

Recommended

Do you have 7 gallons per 1 person per week stored in your house?

1 gallon per

1 person per 1 day

AT ALL TIMES

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What NOT to do during an earthquake!

Standing in a doorway

Running

Getting into the "Triangle of Life"

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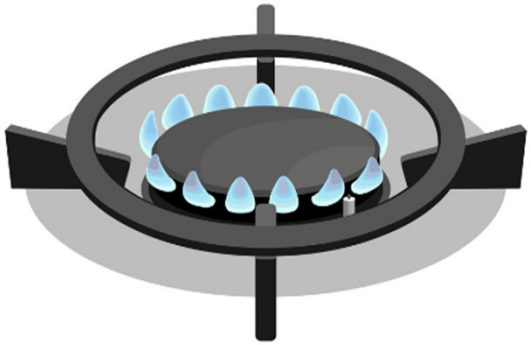
During an Earthquake

During an Earthquake



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Next Steps

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Next Steps Today!

- Mitigation plan:
  - Share your top mitigation actions and other ideas
  - Full draft plan available in 2024
  - Mitigation@BerkeleyCA.gov

Useful Links

- **City of Berkeley Seismic Safety:** https://berkeleyca.gov/construction-development/seismic-safety
- **City of Berkeley Funding for Seismic Retrofits**: https://berkeleyca.gov/construction-development/seismic-safety/funding-seismic-retrofits
- **Search Building Permits**: https://berkeley.buildingeye.com/building
- **CA Earthquake Authority Insurance**: https://www.earthquakeauthority.com/
- **United Policyholders Insurance**: https://uphelp.org/
- **How to prepare for, survive and recover from an earthquake**: https://www.earthquakecountry.org/step1/

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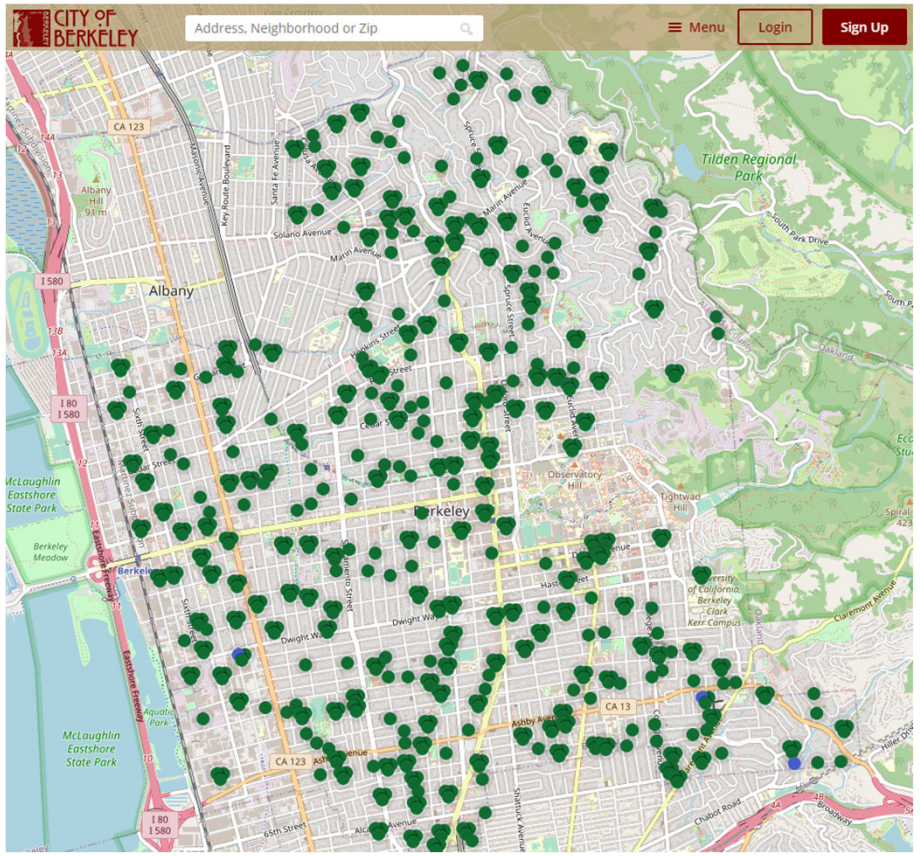
(Building Eye)



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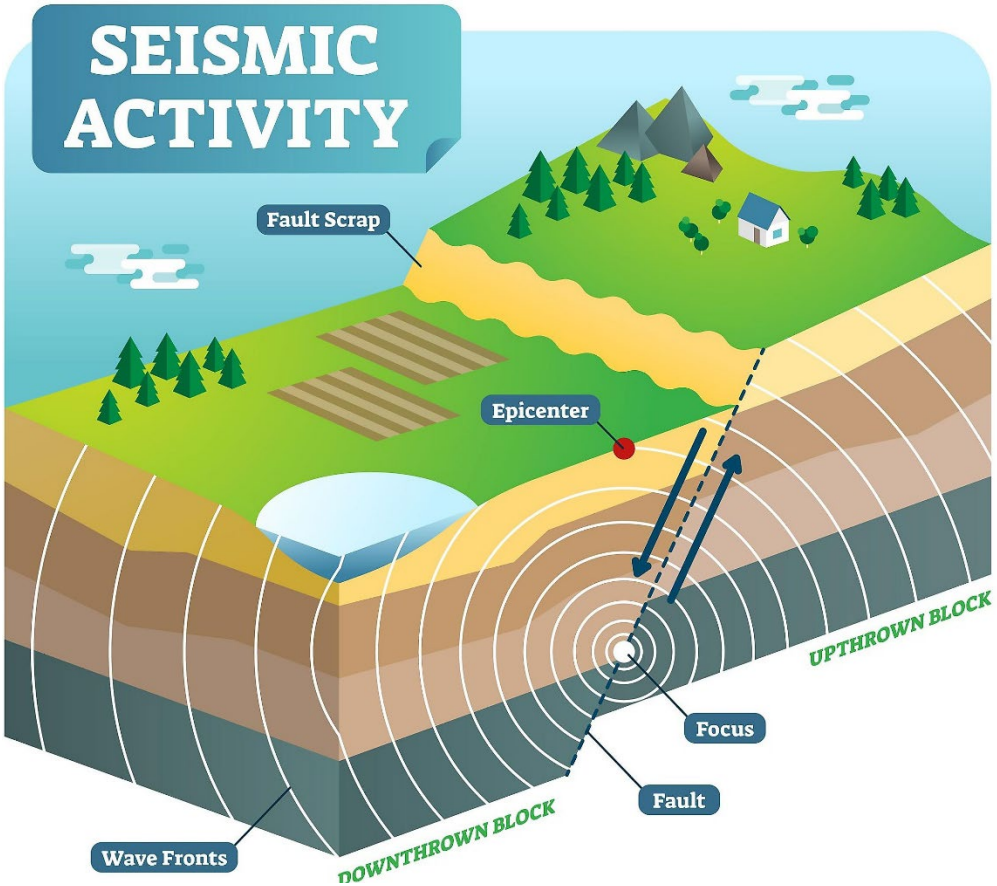

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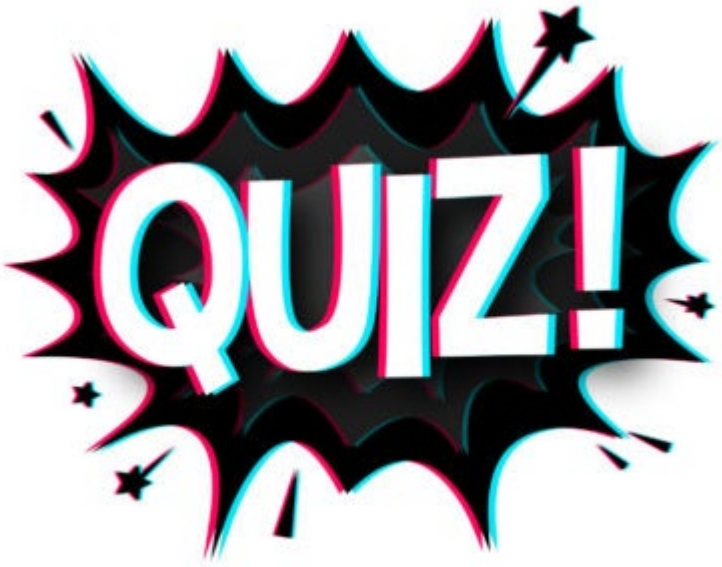
City of Berkeley



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City of Berkeley

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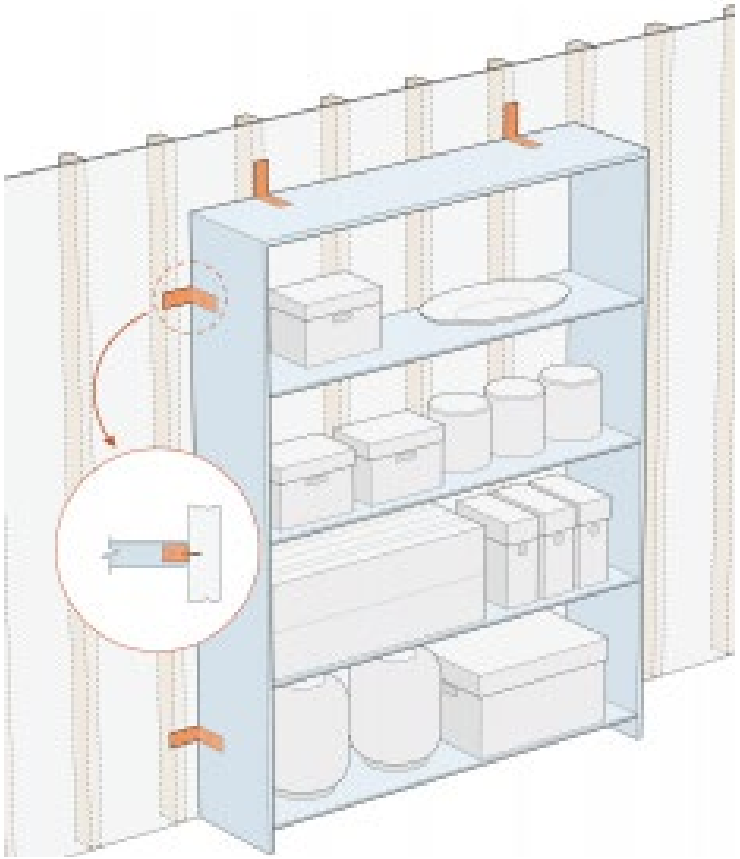

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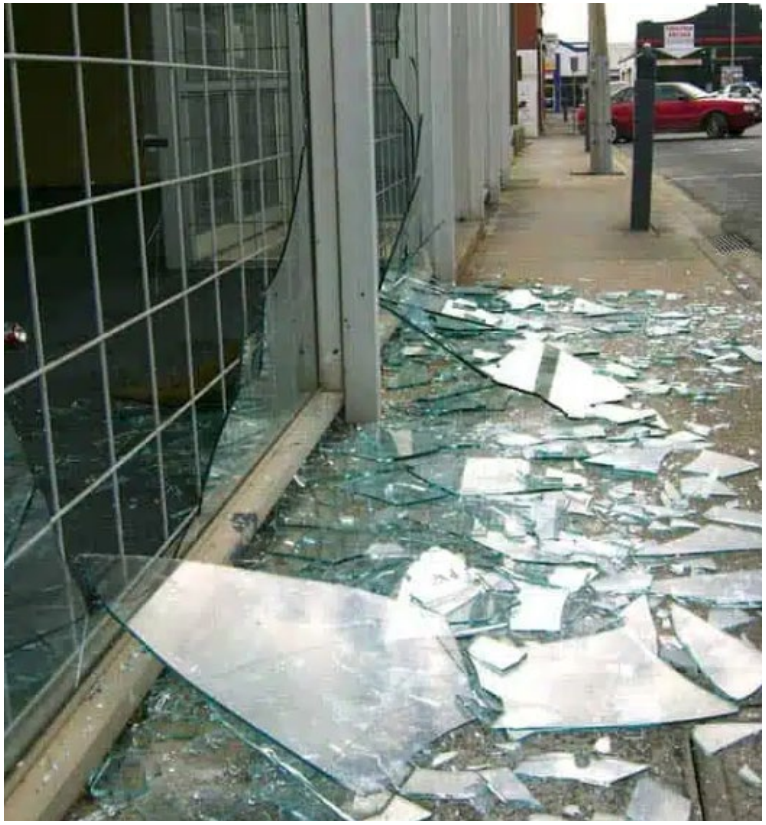

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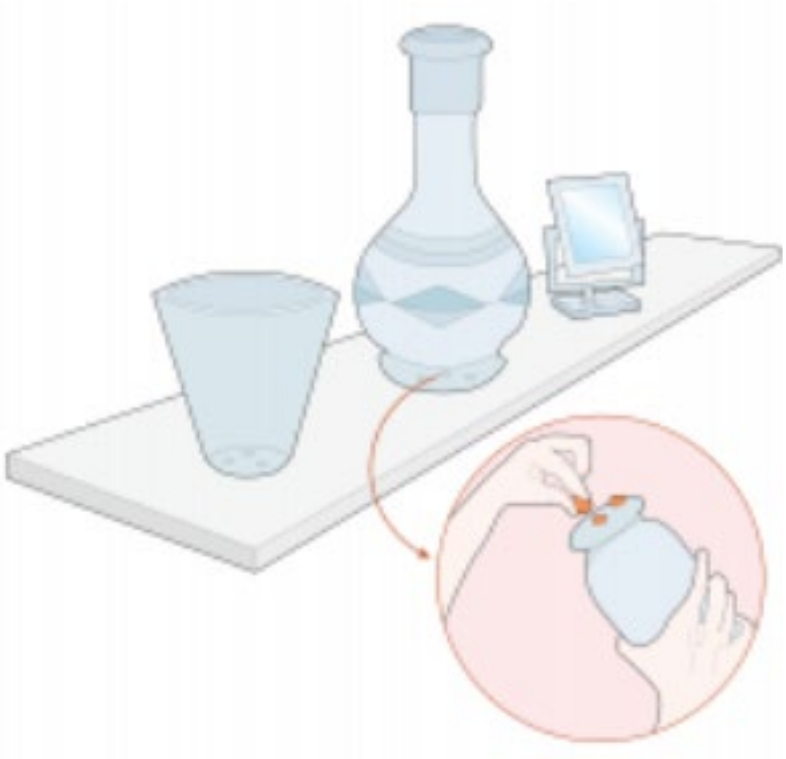

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AT ALL TIMES

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What NOT to do during an earthquake!

Standing in a doorway

Running

Getting into the "Triangle of Life"

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During an Earthquake

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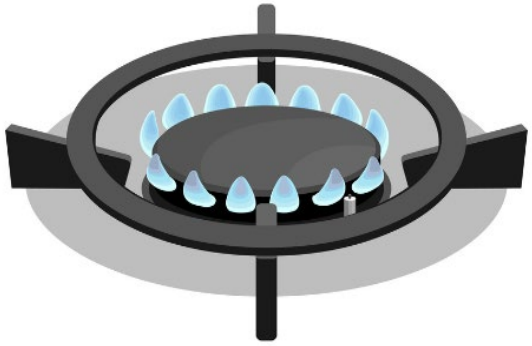
During an Earthquake



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Next Steps

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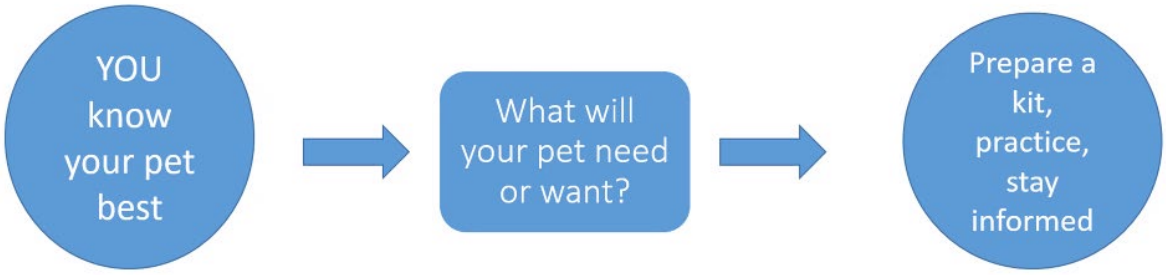
Next Steps Today!

- Mitigation plan:
  - Share your top mitigation actions and other ideas
  - Full draft plan available in 2024
  - Mitigation@BerkeleyCA.gov

Evacuation Planning for Pets



marin humane
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- You need to understand your pets' priorities and make sure the necessities go into their emergency kits
- Emergency Kit:
    - Collapsible bowl
    - Kitty litter / box
    - Canned food (lasts longer)
    - Medications
    - Toys / beds
    - Copy of pet records from the vet hard copy / photo of it

ID Tags = Key Lifesavers

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- Make sure your animal is microchip

Emergency Pet Housing Options

- Out of area relatives, friends, colleagues
- Pet-friendly hotels, motels, camping, Airbnb, other rentals
- Pet boarding facilities, veterinary hospitals (limited)
- Designated evacuation sites
- Designated disaster shelters (Red Cross doesn't always allow pets)
- Emergency housing at Marin Humane or other animal shelters

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Important Tips

- Become a “weather watcher” – Red Flag Warning Days
- Know the evacuation plan for your area and get alerts
- Stay calm around animals
- Extra planning required for special species
- Take advantage of folding pet carriers, wheeled bags, and backpacks
- Know your pet’s prescriptions, special medications, and diets
- Always take your pets with you if you need to evacuate
- Take advantage of all resources and contact Marin Humane
- Crate train your pets and include enrichment

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415-883-4621

marinhumane.org

https://marinhumane.org/get-help/marin-animal-services/disaster-preparedness/

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Extreme Heat

Slide: Extreme Heat Events

There are multiple factors that identify an extreme heat as a hazard and they include:

- Extreme heat days: days when temperatures reach the 98th percentile of historic maximum temperature. In Berkeley, an extreme heat day is a day above 88.3 degrees F.

- Warm nights: Nights that do not allow people to cool down and recover, which can increase health risks. Tn Berkeley, nights are considered warm when temperatures do not cool below 61.7 degrees F.

- Heat wave: happens when there are five or more days of extreme heat days.

- Extreme heat during unexpected times of year: occurs outside of historically hotter months.

- And the last factor is the duration of a heat wave. The longer heat waves have proportionally more negative impacts on human health and infrastructure than shorter heat waves.

Slide: Urban Heat Island Effect

Extreme heat events can be further exacerbated by the urban heat island (UHI) effect, through which densely-built cities like Berkeley experience higher temperatures in comparison to surrounding more rural areas. Factors contributing to the UHI effect include:

- A relative lack of vegetation;

- Reduced air flow because of structures;

- An abundance of hard, dark surfaces—such as buildings, streets, cars and sidewalks— which absorb heat rather than reflect it. These surfaces also slowly release that absorbed heat throughout the night, contributing to warmer nighttime temperatures as well.

UHI Connections to…

UHI effect could also be connected to climate change, wildfires, and the air quality.

Due to climate change, projections indicate that the number of extreme heat days, warm nights, and heat waves will increase exponentially in the next few decades. In addition to this increased frequency and duration, heat waves are also expected to occur in months not typically associated with extreme heat.

While hot temperatures do not necessarily start fires, they can decrease moisture in vegetation, increasing its flammability and the duration and severity of the fire season. Warming temperatures combined with increased development in the wildland-urban interface are projected to increase fire risk in most of the Bay Area.

While naturally-occurring ozone that exists higher in the Earth's atmosphere is beneficial to the climate, ground-level ozone can be extremely harmful to human health. Extreme heat can contribute to the formation of ground-level ozone, also known as smog, and other secondary air pollutants, when

emissions from industrial facilities, power utilities, cars, trucks and other sources chemically react in the presence of heat and sunlight. Extreme heat can also cause stagnant air conditions, causing the smog to stay low longer, and increase community exposure.

Slide: Map of the Tree Coverage

The two main factors that influence how hot it is in certain parts of Berkeley are the urban heat island effect and thermal belting.

We know that the urban heat island effect often makes temperatures hotter in the urban, more dense parts of a city. This map of the percentage of tree coverage visualizes what parts of Berkeley might be more likely to suffer from the urban heat island effect. In Berkeley, The areas shaded in darker green, predominately in the hills in east Berkeley, have the greatest percentage of tree canopy, while west and south Berkeley have the smallest percentage of tree canopy.

Urban tree canopy directly reduces the available for heat absorption surfaces and creates shading beneficial to individuals and buildings. Trees also improve air quality that often worsens during extreme heat events.

Slide Thermal Belting

Another factor that influences how hot it is in certain parts of Berkeley is thermal benting.

Although the Berkeley hills have a greater tree canopy, temperatures are often higher there than the rest of the city. The thermal belt phenomenon occurs in areas where there is a hillside and a valley below. Heat is absorbed by the ground during the day, and the heat energy radiates up from the soil at night. As the warm air rises, the radiation of the heat causes the air closest to the ground to cool. Since cold air is heavier than warm air, cooler air sinks down the hillside into the valley. As the cooler air fills the valley, the warm air heads upwards. This warm air becomes trapped on the hilltop and is referred to as a thermal belt. For Berkeley, this means that the hills are likely to be way hotter at night than the rest of the city. The map below shows temperature differentials between the Berkeley hills, flats, and coast at 11:30 pm at night on Monday, September 5. The Berkeley hills have temperature readings in the 90s while the flats and waterfront have temperatures in the 60s and 70s.

Heat Index Table

The National Weather Service uses a Heat Index to measure how hot it really feels when relative humidity is factored in with actual air temperature. The National Weather Service will initiate alert procedures when the heat index is expected to exceed 105 degrees to 110 degrees Fahrenheit (which is the orange section of the table marked as dangerous).

Heat Risk Table

Another National Weather Service HeatRisk index provides a forecast of heat-related impacts to occur after a 24-hours of exposure to heat. HeatRisk takes into consideration how unusual the heat is for the time of year, the duration of the heat including daytime and nighttime temperatures, and if those temperatures pose an elevated risk of heat-related impacts.

Map of ER visits

According to the University of California, Los Angeles, across the entire state of California, on an average heat day, there are a total of 8,222 excess emergency room visits. Alameda County has, on average, 3.5 excess visits to the emergency room for heat related problems per 10,000 persons. This map shows the rate of the excess emergency room visits in Berkeley, with the darker colors in West and South Berkeley, indicating higher rates of emergency room visits. Both, West and South Berkeley, have higher concentrations of low income individuals and people of color, due to historic patterns of disinvestment, resulting in higher risk and worse outcomes on hot days.

Slide Reducing Vulnerabilities

One of the main strategies to mitigate extreme heat is to reduce Berkeley's vulnerabilities. This could be accomplished by expanding the urban forestry team and their activities, encouraging passive and energy-efficient strategies to cool down buildings, and implementing programs and projects to reduce emissions. The departments that work on reducing vulnerabilities, such as lack of vegetation, abundance of dark-absorbing surfaces and poor air quality, are *Parks, Recreation, and Waterfront Department, Office of Energy and Sustainable Development, and Public Works Department.*

Few of the implemented strategies include usage of natural ventilation, building of green/cool roofs and cool pavements, and increase in vegetation, via tree planting projects.

The existing City programs and projects to reduce emissions that contribute to poor air are

- Implement the traffic safety capital construction projects identified and prioritized in the Berkeley Pedestrian Plan (2021), Berkeley Bicycle Plan (2017), Berkeley - Vision Zero Action Plan (2020), and Berkeley Transit-First Implementation Plan; these projects are intended to encourage non-driving modes

- Implementing the City's Electric Mobility Road Map which includes electric shared mobility (bikes and scooters) as well as electric and hybrid car-sharing, and the installation of public charging stations

- Manage on-street parking and maintain parking garages to reduce emissions by making it easier to find a parking space more quickly (and thus reduce the time spent circling around looking for parking)

Cooling Centers

Another extreme heat mitigation strategy consists of operating cooling centers in Berkeley.

As extreme heat becomes more frequent and severe, Berkeley buildings, including City facilities, will need to increase cooling capacity. This effort must be undertaken strategically over the coming decades to find solutions that are clean, efficient, and functional during electrical grid outages. Approaches will include natural ventilation and passive cooling techniques such as shading and orientation, particularly in new building design. For existing buildings and new construction, consideration may also be given to heat pump technology, a highly-efficient electric system (up to 400% efficient in energy-efficient buildings) with both heating and cooling capabilities.

Cooling centers are necessary, particularly for those individuals who cannot escape the heat: they either lack cooling in their homes, work outside, or are homeless. Citizens of Berkeley and others can utilize one of the five cooling centers currently operating in the City during heatwaves. Cooling centers are

located in the North Berkeley Senior Center, South Berkeley Senior Center, Central Library, Claremont Branch Library, and Tarea Hall Pittman South Branch Library. The dangers of heat have been proven in studies that have found links between rising temperatures and a range of mental health issues, including mental fatigue, aggression, and even higher rates of suicide, as well as physical health issues such as premature death, cardiovascular stress, and failure of major organs such as the heart and kidneys.

Vulnerable People

- The cooling centers are particularly important for vulnerable community members, including:
- Elderly and children
- People with access and functional needs
- Underprivileged areas that lack tree canopy for shading, air conditioning and insulation in buildings, or car
- People that work outdoors and homeless populations

Prepare to be safe at home:

How can you prepare to be safe at home

Gather supplies to keep yourself cool, including:

Ice – fill up all your ice trays and freeze them and any ice packs overnight

Spray bottle – to spray mist on yourself to keep cool

Personal fan – fan to point at yourself

Towel – to wet and put on your body

Plan to keep your home cool on hot days without air conditioning, using:

A larger fan – to move hot air out of your home

An indoor/outdoor thermometer – set this up to know when to let cooler outside air into your home

Be ready to block sunlight and heat, using blackout curtains, reflective film, solar blankets or cardboard. Blocking your windows with a light-colored sheet facing out, followed by a dark-colored sheet facing in, can help to reflect light away and keep your home cooler.

Prepare for potential power outages *(or see power outage section)*

Keep Pet Safe

How to keep pets safe on hot days:

NEVER LEAVE YOUR PETS IN A PARKED CAR

Not even for a minute! Not even with the car running and air conditioner on. On a warm day, temperatures inside a vehicle can rise rapidly to dangerous levels. On an 85-degree day, for example, the temperature inside a car with the windows opened slightly can reach 102 degrees within 10 minutes. After 30 minutes, the temperature will reach 120 degrees. Your pet may suffer irreversible

organ damage or die. Learn how to help a pet left inside a hot car by taking action or calling for help. Local law enforcement can follow this handy guide [PDF] on how to proceed.

Limit exercise on hot days

Take care when exercising your pet. Adjust intensity and duration of exercise in accordance with the temperature. On very hot days, limit exercise to early morning or evening hours, and be especially careful with pets with white-colored ears, who are more susceptible to skin cancer, and short-nosed pets, who typically have difficulty breathing. Asphalt gets very hot and can burn your pet's paws, so walk your dog on the grass if possible. Always carry water with you to keep your dog from dehydrating.

Don't rely on a fan

Pets respond differently to heat than humans do. (Dogs, for instance, sweat primarily through their feet.) And fans don't cool off pets as effectively as they do people.

Provide ample shade and water

Any time your pet is outside, make sure they have protection from heat and sun and plenty of fresh, cold water. In heat waves, add ice to water when possible. Tree shade and tarps are ideal because they don't obstruct air flow. A doghouse does not provide relief from heat—in fact, it makes it worse.

Cool your pet inside and out

Whip up a batch of quick and easy DIY pupsicles for dogs. And always provide water, whether your pets are inside or out with you.

Keep your pet from overheating indoors or out with a cooling body wrap, vest or mat. Soak these products in cool water, and they'll stay cool (but usually dry) for up to three days. If your dog doesn't find baths stressful, see if they enjoy a cooling soak.

Watch for signs of heatstroke

Extreme temperatures can cause heatstroke. Some signs of heatstroke are heavy panting, glazed eyes, a rapid heartbeat, difficulty breathing, excessive thirst, lethargy, fever, dizziness, lack of coordination, profuse salivation, vomiting, a deep red or purple tongue, seizure and unconsciousness.

Animals are at particular risk for heat stroke if they are very old, very young, overweight, not conditioned to prolonged exercise, or have heart or respiratory disease. Some breeds of dogs—like boxers, pugs, shih tzus and other dogs and cats with short muzzles—will have a much harder time breathing in extreme heat.

Make a Plan

Make a plan for where to go (and how to get there) if your home gets too hot.

Consider locations you could visit that have air conditioning, like malls, stores, or community cooling centers.

Make a transportation plan – consider using friends and family, public transit, carpooling, or using a taxi or rideshare service.

If you use a wheelchair or other mobility device, you may also consider:

Pre-scheduling a paratransit trip to a cool location before the hottest hours of the day

Using Easy Does It for a Rescue Ride or Routine Transportation (BRSD members only)

Buddy up with your friends, family, and neighbors:

Make a plan to check on each other at least twice a day during a heat wave. Check to see if people are developing signs of heat exhaustion or heat stroke. Remember that people who live alone are at the greatest risk in a heat wave because no one will notice if they develop heat stroke.

Think about how you can work together to get to a location with air conditioning or a community cooling center if someone's home gets too hot.

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Hazard Presentation

Extreme Heat:

The hazards, the City's work, and steps to stay safe

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Extreme Heat

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Extreme Heat Events

Extreme Heat Days:

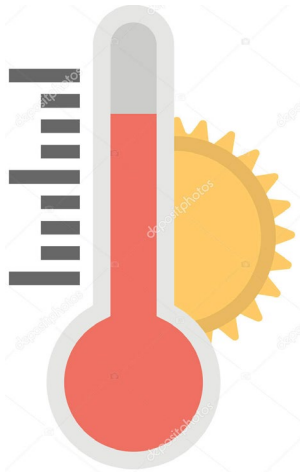
- In Berkley, it is a day above 88.3 F (31.3 C)

Warm Nights:

- In Berkley, it is a night that does not cool below 61.7 F (16.5 C)

Heat Wave:

- There are 6 or more days of extreme heat



Extreme Heat During Unexpected Times of the Year:

- Occurs outside of historical hotter seasons

Duration of Heat Wave:

- Longer heat waves have more negative impacts

Urban Heat Island (UHI) Effect

The heat is absorbed rather than reflected

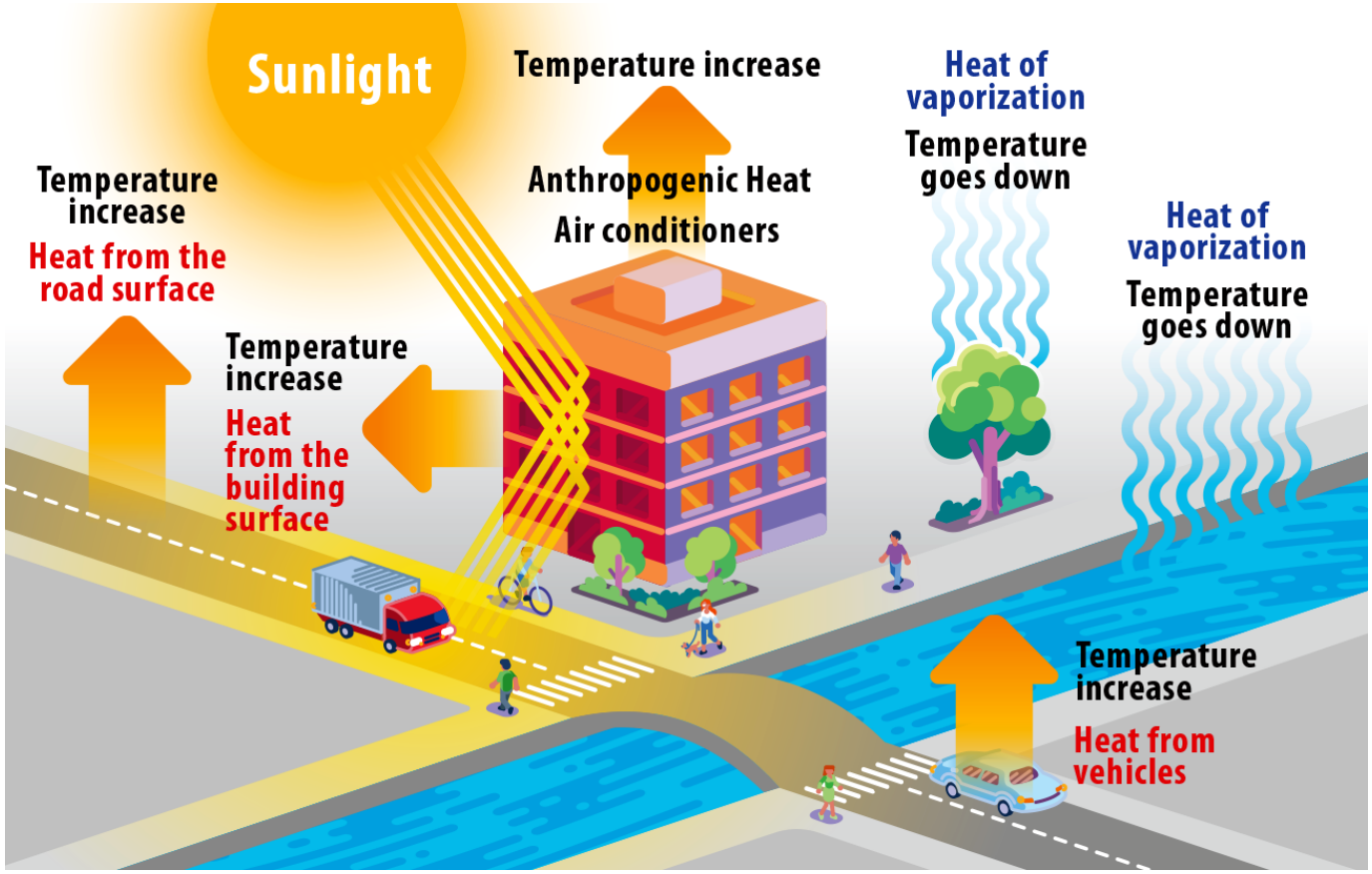


Image Credit: Pavetechinc

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UHI Connections to…

- Climate Change
- Wildland-Urban Interface Fire
- Poor Air Quality

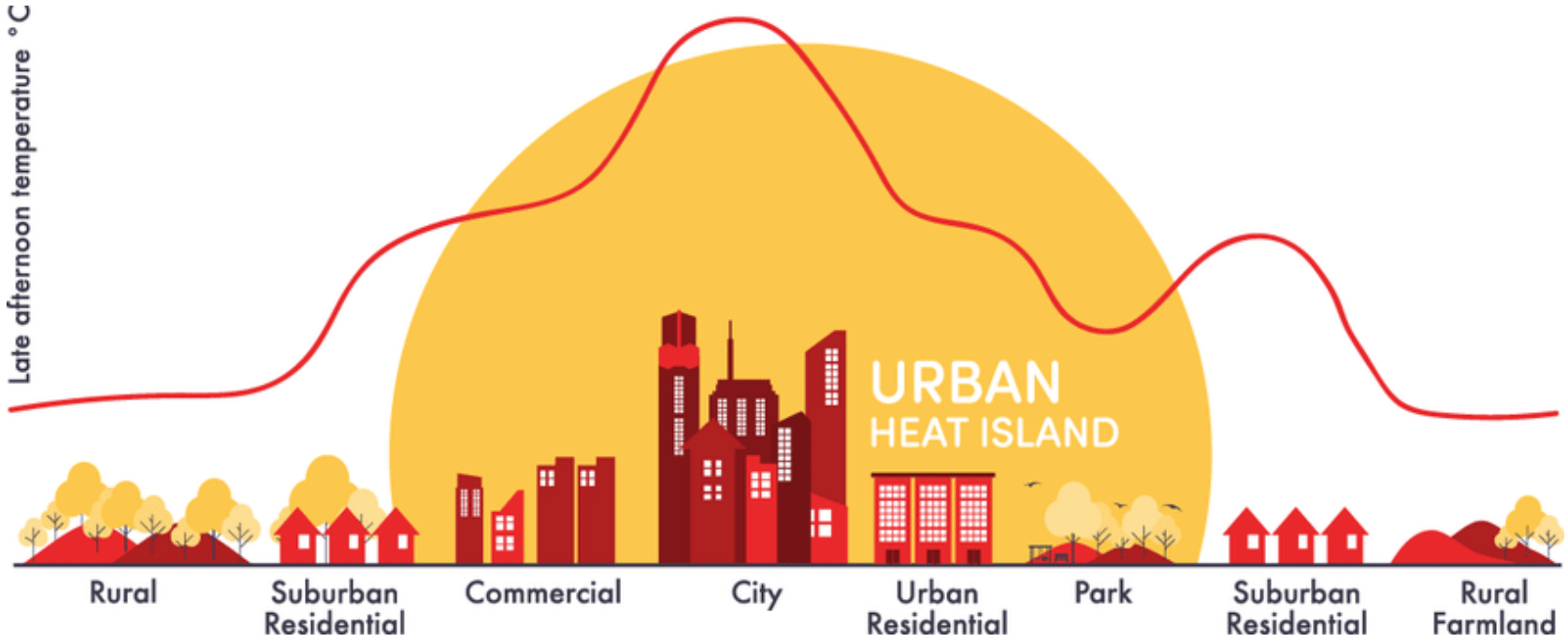

Image Credit: Community.wmo.int

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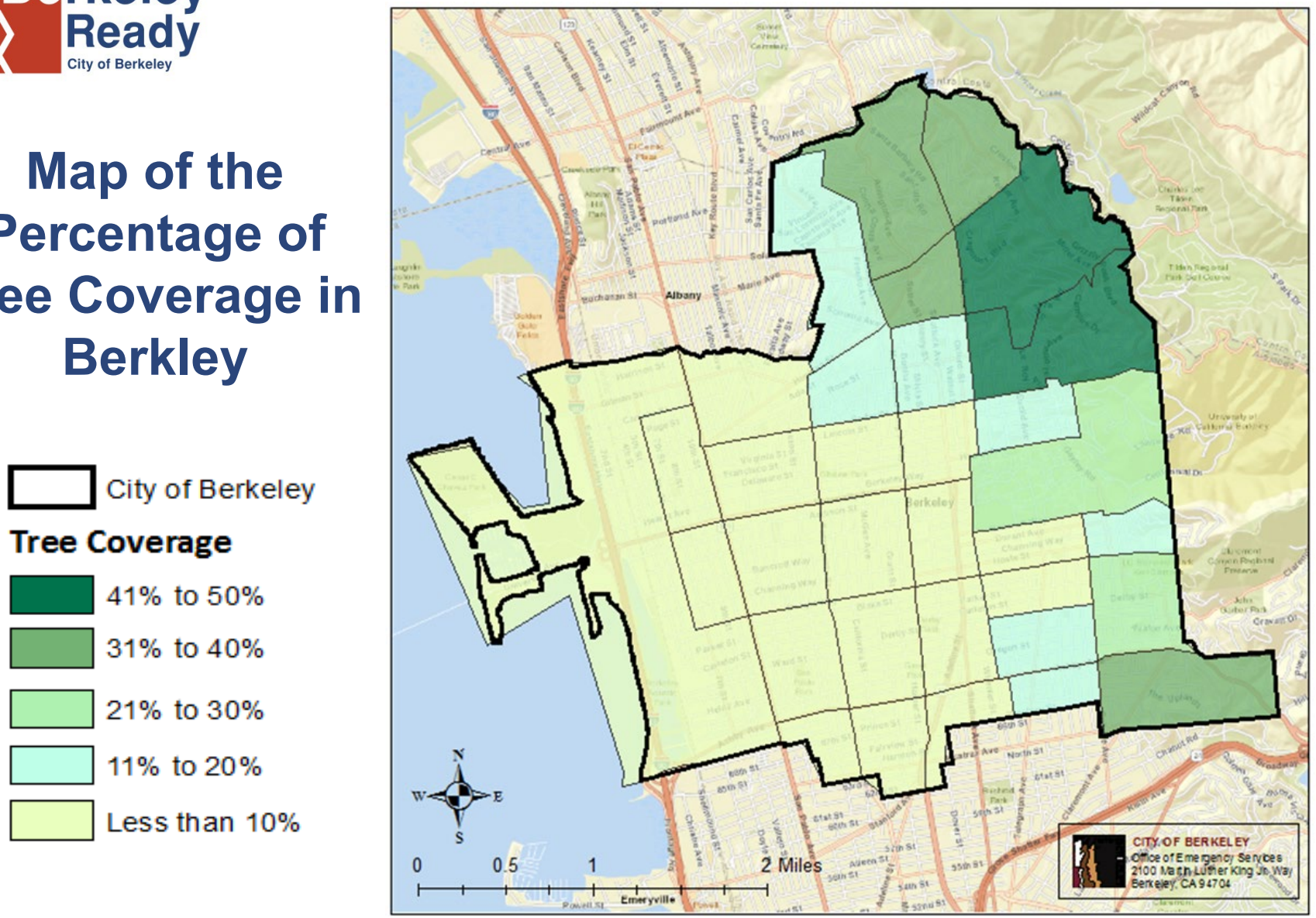
Map of the Percentage of Tree Coverage in Berkley



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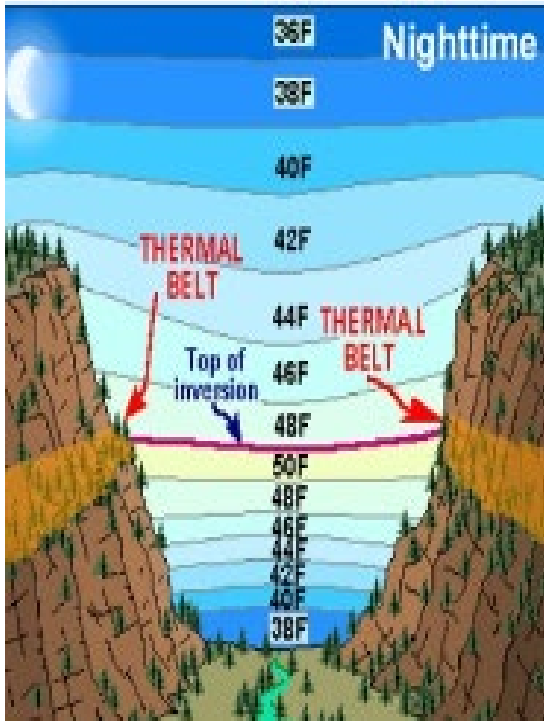
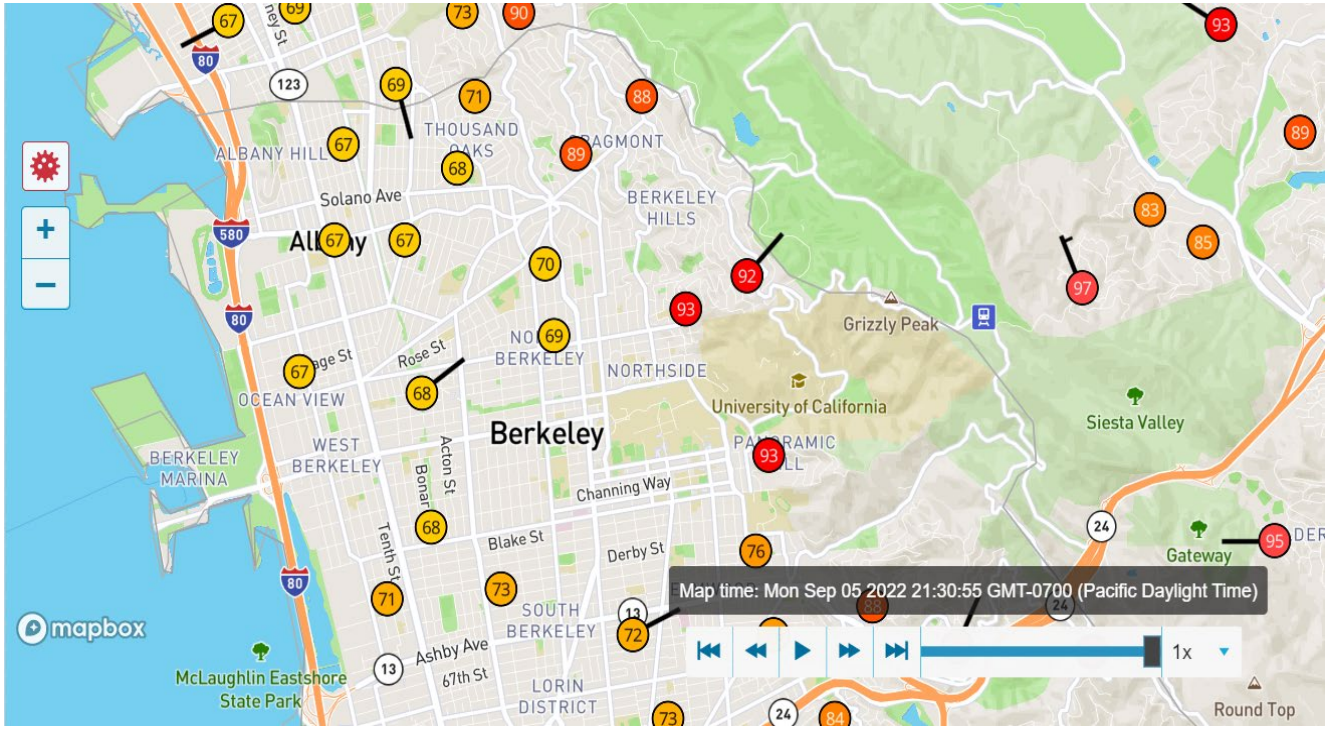
Thermal Belting occurs in areas where there is a hillside and a valley below





Map of temperature differentials between the Berkeley hills, flats, and coast at 11:30 pm at night on Monday, September 5.

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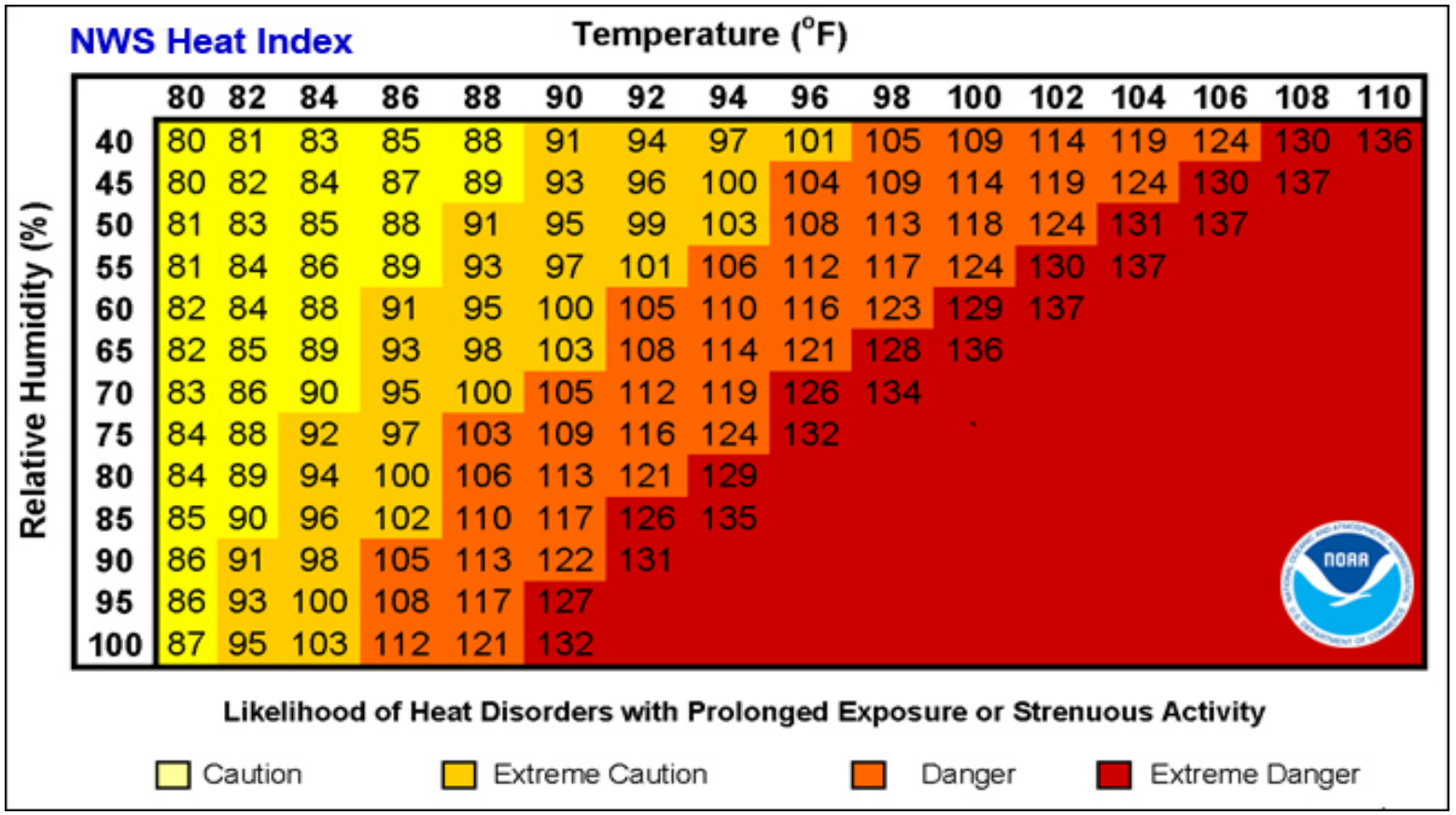
Heat Index Table

It tells how hot the air *really feels* to humans as it considers both **Relative Humidity & Air Temperature**



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Heat Risk Table

This index provides a forecasts of heat-related impacts to occur after the 24 hours exposure to heat

Category	Risk of Heat-Related Impacts
Green 0	Little to no risk from expected heat.
Yellow 1	Minor - This level of heat affects primarily those individuals extremely sensitive to heat, especially when outdoors without effective cooling and/or adequate hydration.
Orange 2	Moderate - This level of heat affects most individuals sensitive to heat, especially those without effective cooling and/or adequate hydration. Impacts possible in some health systems and in heat-sensitive industries.
Red 3	Major - This level of heat affects anyone without effective cooling and/or adequate hydration. Impacts likely in some health systems, heat-sensitive industries and infrastructure.
Magenta 4	Extreme - This level of rare and/or long-duration extreme heat with little to no overnight relief affects anyone without effective cooling and/or adequate hydration. Impacts likely in most health systems, heat-sensitive industries and infrastructure.

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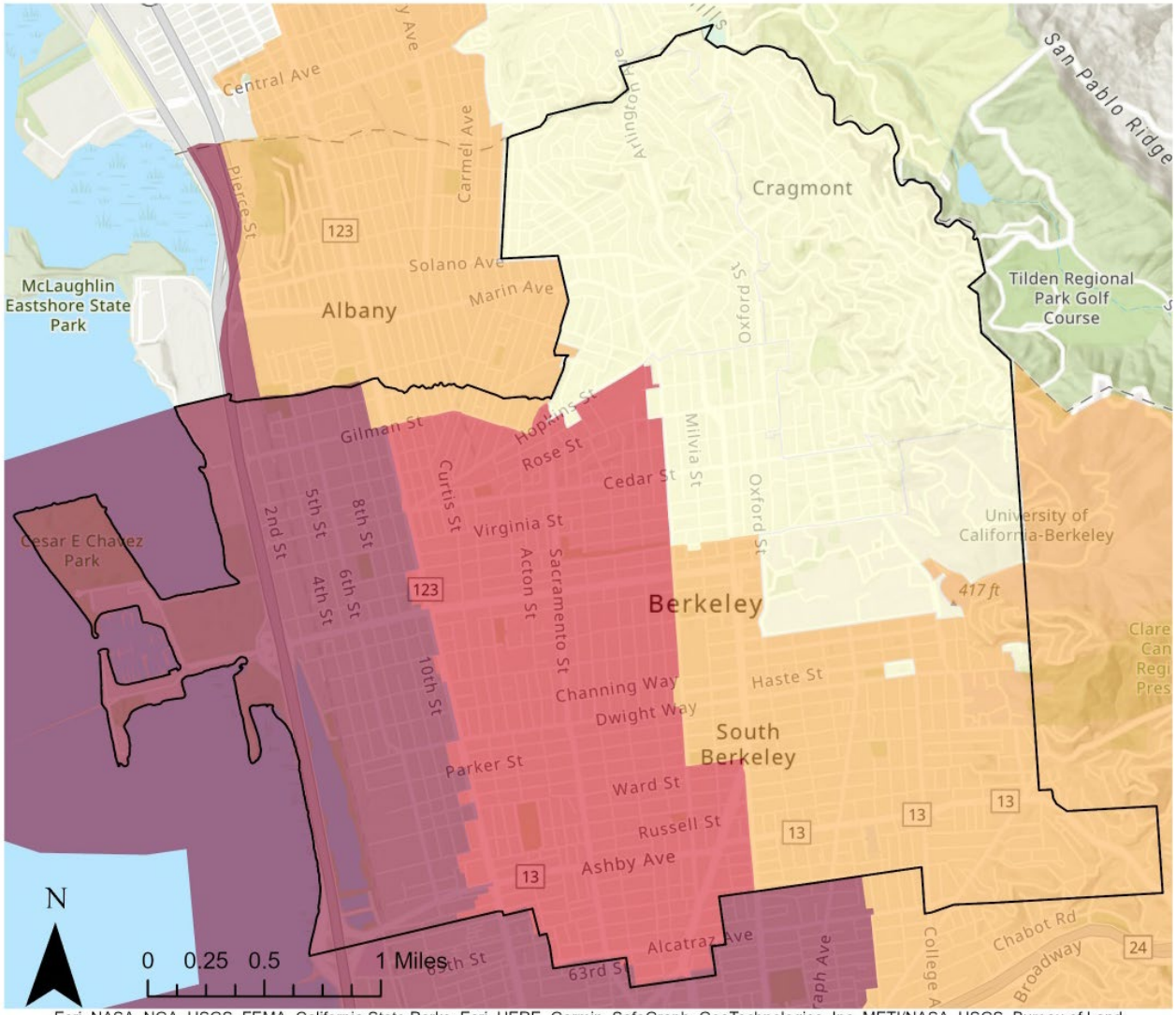
Daily excess ER visits during heat-waves



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2024 Draft Mitigation Plan: Extreme Heat Strategy

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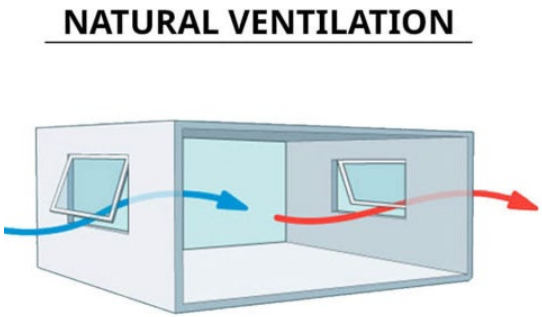
Reducing Berkeley's Vulnerabilities

Cool Pavement

Photo Credit: Berkeley Lab



Green Roof

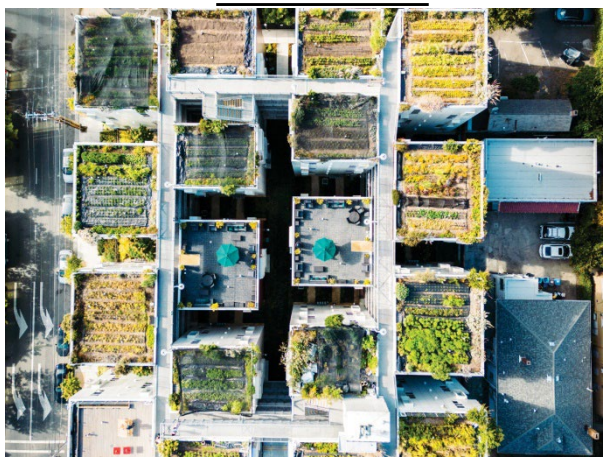


Photo Credit: Bluma Flower Farm

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Expanding Urban Forestry team and their activities

- *Parks, Recreation, and Waterfront Department*
  - Tree planting projects and increase of vegetation coverage

Photo Credit: Berkeleyside

Photo Credit: The City of Berkeley

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Encouraging passive and energy-efficient strategies to cool down buildings

- *Office of Energy and Sustainable Development*
  - Natural ventilation, shading, insulation, green/cool roofs, whole-house fans, and heat pump HVAC systems

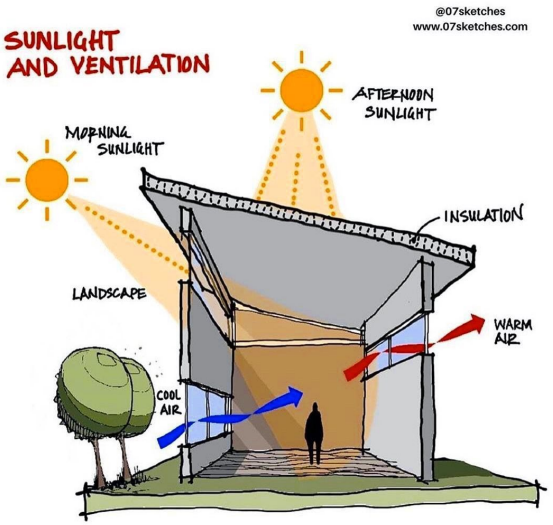

Photo Credit: Bluma Flower Farm

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Continuing to seek out funding to use cool paving materials on streets when feasible to reduce urban heat island impacts

- *Office of Energy and Sustainable Development*

Photo Credit: UCLA Newsroom

Photo Credit: LA Times

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Implementing programs and projects to reduce emissions

- *Public Works: Transportation Division*
  - Electric and hybrid car/bike/scooter-sharing, installation of public charging stations, and managing public parking

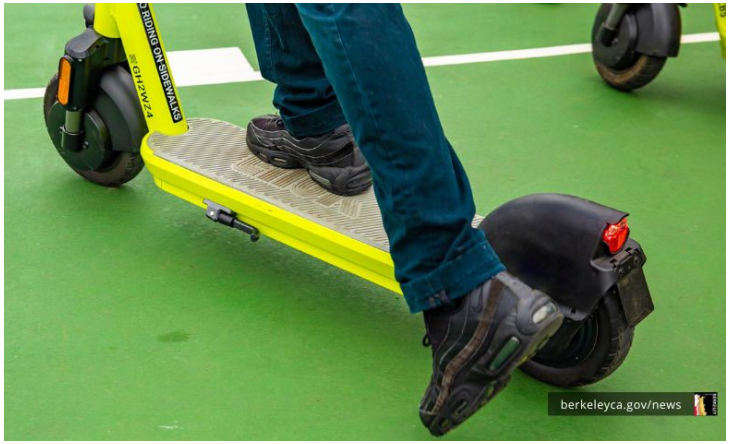

Photo Credit: City of Berkeley

Photo Credit: City of Berkeley

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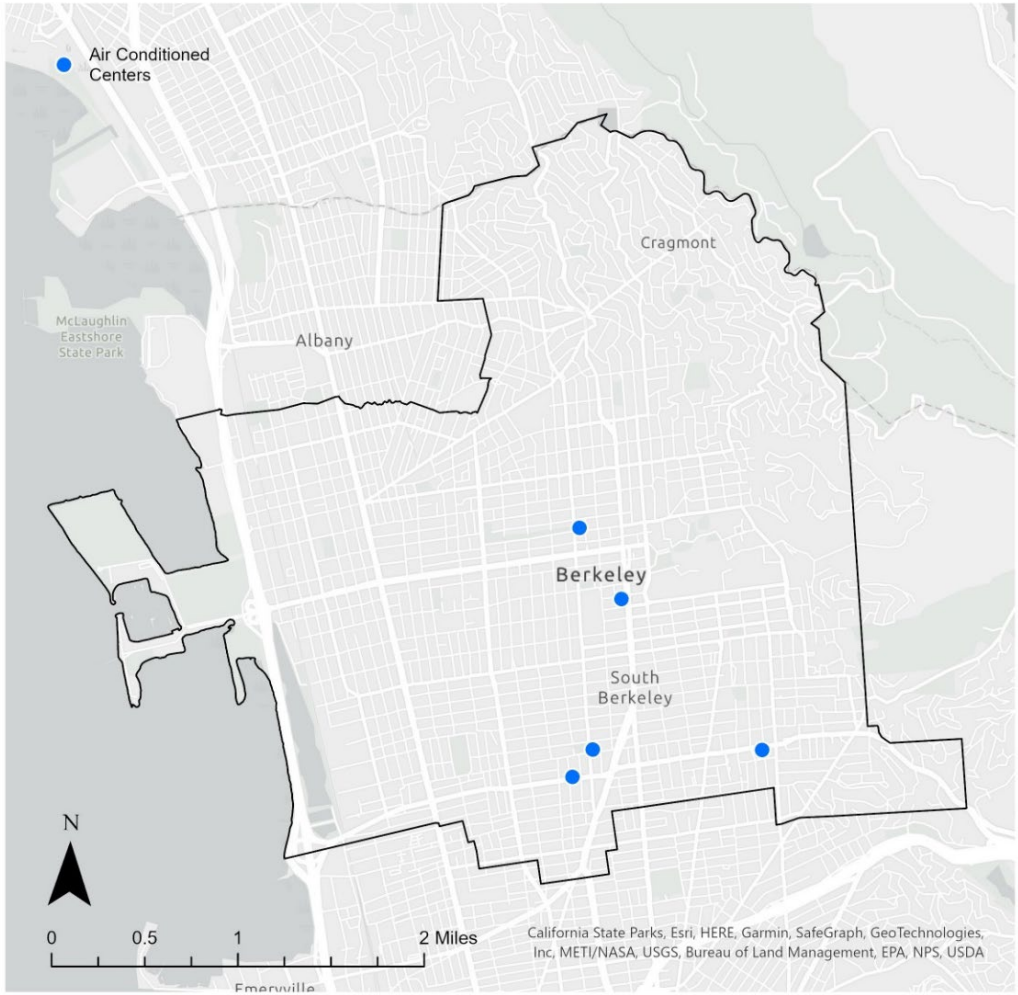
Cooling Centers in Berkley



Community Spaces with AC:

- North Berkeley Senior Center
- South Berkeley Senior Center
- Central Library
- Claremont Branch Library
- Tarea Hall Pittman South Branch Library

Cooling is necessary to human physical and mental health

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Particularly important for vulnerable community members:

- Elderly and children
- People with access and functional needs
- Those from areas that lack tree canopy for shading, air conditioning and insulation in buildings or car
- People that work outdoors
- Homeless populations

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What can you do about extreme heat?

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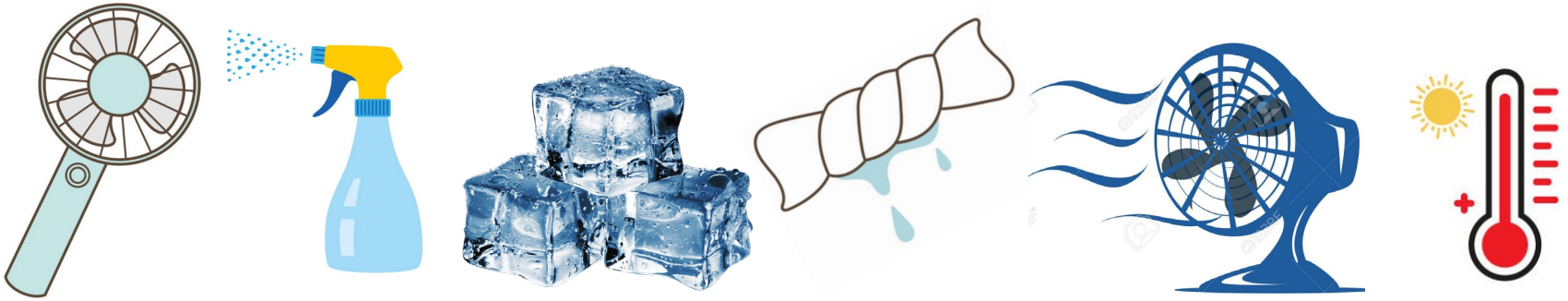
Prepare to be Safe at Home

Supplies to keep <u>yourself</u> cool:

- Ice
- Spray Bottle
- Personal Fan
- Towel

Supplies to keep your <u>home</u> cool:

- Large Fan
- Indoor/Outdoor Thermometer
- Blackout Curtains/ Reflective Film/ Solar Blankets/ Cardboard



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Make a Plan

- **Where can you go when your home gets too hot?**
  - Malls, stores, or community cooling centers
- **What are your transportation options?**
  - Wheelchair or other mobility device users, please check out *Easy Does It* services
- **Who can you buddy up with?**
  - Check on each other at least twice a day during a heat wave

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During a Heat Wave…

- **Drink Plenty of Water**
  - Avoid drinks with caffeine (tea, coffee, and cola)
- **Stay at home**
  - Wear as little clothing as possible and choose lightweight, loose-fitting clothing
  - Spray yourself with water and stand in front of a fan
  - Keep you windows open at night
- **When outside**
  - Use sunscreen with SPF of 15 or higher and reapply every 2 hours
  - Schedule outdoor activities carefully
  - Never leave children or pets in a parked car
- **Pace Yourself**

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How to Keep Pets Safe

- Never leave your pet in a parked car!
- Limit exercise on hot days
- Don't rely on a fan
- Provide ample shade and water
- Watch for signs of heatstroke
- See “Pet Disaster Preparedness” The Humane Society for more info

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Next Steps

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Next Steps Today!

- Mitigation plan:
  - Share your top mitigation actions and other ideas
  - Full draft plan available in 2024
  - Mitigation@BerkeleyCA.gov

NOTE – MOST CURRENT VERSION OF SCRIPT IS IN NOTES FOR SLIDE DECK

High Wind Events

How is wind formed?

Wind is the movement of air, traveling from areas of high pressure to low pressure. The greater the difference in air pressure, the stronger the wind becomes. High- and low-pressure systems are formed by ascending and descending air, primarily influenced by variations in temperature. Wind is characterized by its horizontal speed and the direction from which it originates.

Wind in Berkeley

In Berkeley, high wind events are typically associated with the seasons. During winter, generally spanning November through March, high winds are linked to weather systems and cold fronts. In the summer months, temperature and pressure disparities between the Pacific Ocean and the interior valleys to the east result in stronger afternoon and evening winds from the west. In spring and fall, Berkeley experiences dry, offshore winds from the northeast, commonly known as the "Diablo Winds." These winds are most prevalent in the fall when the jet stream shifts southward, impacting California with alternating areas of high and low pressure.

High wind events are could be felt throughout the city, with different areas experiencing varying wind strengths based on the type of wind event. For instance, the westerly wind carries oceanic moisture toward the city, and as the wind flow hits the Berkeley Hills, it splits, producing northward and southward winds. The hot and dry Diablo wind, particularly common in the spring and fall, affects the Berkeley Hills area more, while the cold storms, more common in the winter, increase wind speeds in the flats.

Connections with wind

Climate change is contributing to the escalation of extreme storms and weather conditions, frequently accompanied by high winds. Considering the increased frequency of high wind events in recent years, it is anticipated that each subsequent year will bring more of these occurrences. Climate change is projected to instigate additional severe storms, further intensifying the frequency of damaging wind events.

Among these wind events, Diablo winds in the fall are particularly worrisome. This is due to the wildlands and vegetation being at their driest during this season. The combination of Diablo winds and dry conditions poses a significant risk of a high fire danger.

Extent of high wind and anticipated intensities

The National Weather Service (NWS) defines "high winds" as sustained wind speeds of 40 miles per hour (mph) or greater lasting for one hour or longer, or wind gusts 58 mph or greater for any duration. The NWS issues a wind advisory when there are sustained winds of 31 to 39 mph, or gusts to 46 to 57 mph. Sustained wind speed is different than a wind gust. A wind gust is a brief increase in the wind speed typically around 20-30 seconds.

Wind scale

This Beaufort Wind Scale measures wind severity according to visible environmental impacts, without the use of instruments. For example, when wind speeds is between 1 to 3 mph, the direction of wind could be determined by looking at the smoke drift. In these conditions there will be little if any movement with flags or tree leaves. When wind speed is between 32-38 mph, people should be careful walking under and around trees because in these conditions they get in motion. And at the higher wind speeds we could expect damages to trees and some structures.

Timing of the wind event could also play a role. If it's the first high wind event of the season, there might be more foliage, limbs, or branches that fall as the wind blows for the first time in a while.

Vulnerabilities

High winds could pose risks to people, structures and systems.

High winds could pose significant safety risks to people. Large branches can break off trees, heavy objects may blow around, and dust and debris can get into the eyes, throat, and mouth. High winds can be particularly dangerous for people experiencing homelessness, people who work outside, and people who live in mobile or unanchored homes, like RVs that may dislodge.

Downed tree or blowing objects can result in significant damage to public and private infrastructure, including residential homes, public and private buildings, and vehicles.

Wind can take down power lines and or cause other objects to do the same. Damage to power lines can result in power outages.

How to reduce risk from high winds?

How the whole community can work together to mitigate Berkeley's high wind hazard? The following steps are key for individual community members and households to reduce their risk from high winds.

Keep trees maintained

- City trees are located between the sidewalk and the street, in street medians, public parks, or on other properties owned by the City of Berkeley. If you notice a tree near your home that requires attention from the forestry team, please submit a request by calling 311 or emailing trees@berkeleyca.gov.
- Privately owned trees fall under the responsibility of the owner. It is advisable to obtain a professional arborist assessment to identify signs of decay, dead branches, or other structural issues that could lead to future problems. Ensure the maintenance of your trees by regular trimming and pruning every few years.

Before a wind event

- Bring in any loose outdoor items, such as holiday decorations and chairs, or securely tie them down. Aside from the risk of these items being blown away or damaged, airborne debris can pose a safety hazard.
- Be prepared for potential power outages. During winter months, consider raising the temperature on your thermostat in case you lose power for a few hours or longer. This ensures that your living space remains comfortable during unforeseen electrical disruptions.

During high winds

- If you need to be outdoors, keep a safe distance from trees. This precaution reduces the risk of injury in case of falling branches or trees during strong winds.
- Avoid driving, particularly in high-profile vehicles, during the most intense winds. Strong gusts could potentially blow your vehicle off the road. Additionally, falling trees may obstruct the road ahead, posing a hazard that can be challenging to discern at night until it's directly in front of you. Exercise caution to ensure your safety on the road.

Stay in a safe space until it’s safe to come out.

- If you come across downed power lines, promptly report them to the appropriate authorities.
- Stay away from downed power lines to ensure your safety.
- Refrain from walking under trees, especially if there's a possibility they have been damaged by winds and could fall. This precaution minimizes the risk of injury due to falling branches or trees.

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LHMP Hazard Presentation

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Landslide

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Agenda

- Landslide Info
  - What is a landslide?
  - Where is it in Berkeley?
  - What could be affected by landslides
- Mitigation Strategy Actions
- Community Readiness Steps

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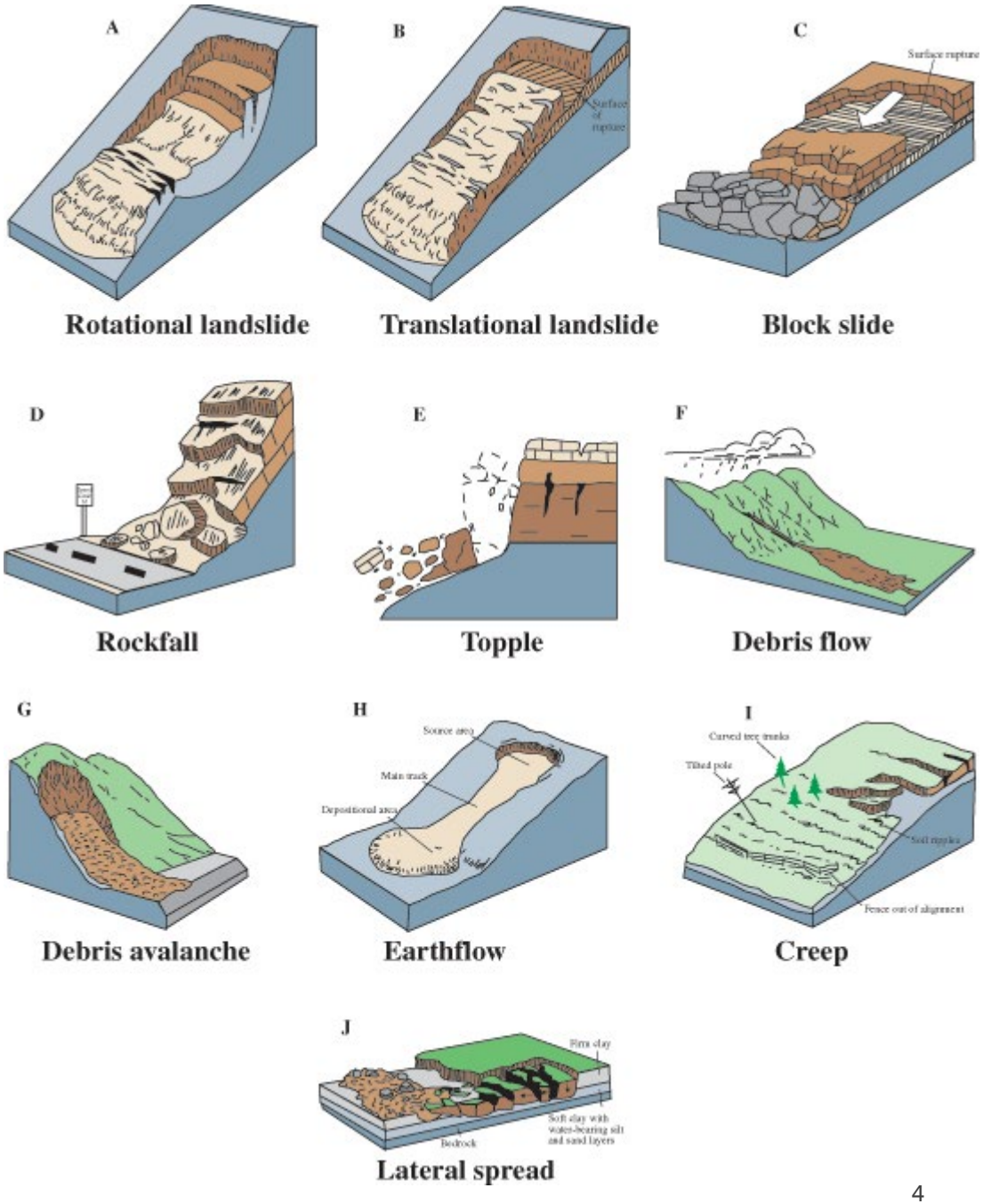
What is a Landslide?

According to the United States Geologic Survey, a landslide is a movement of a mass of rock, debris, or earth down a slope.



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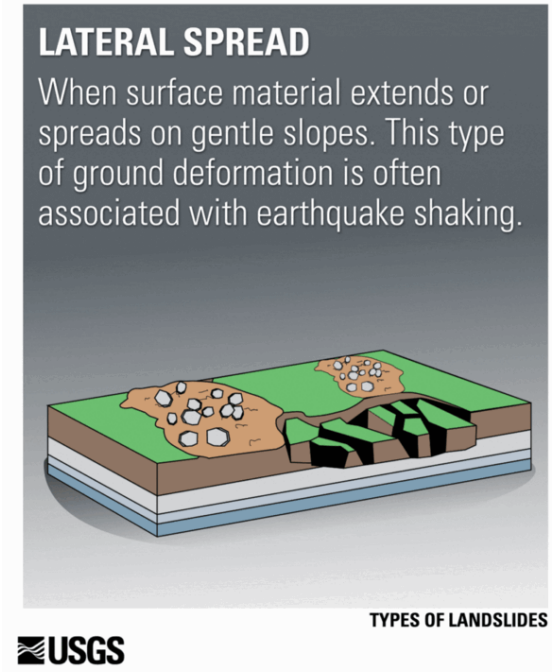
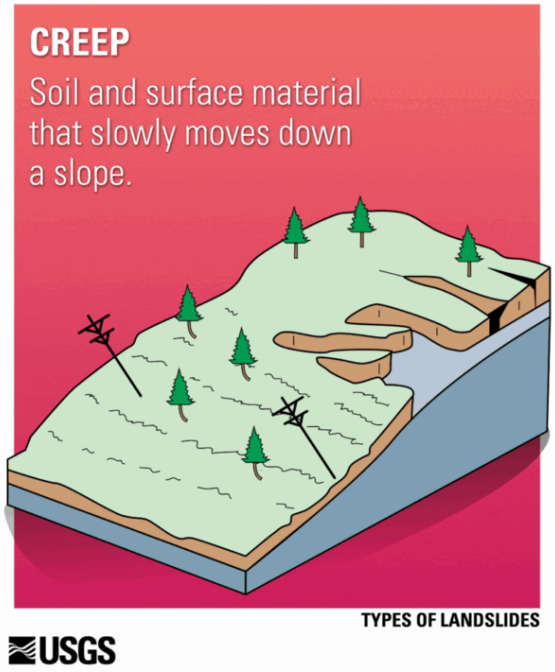
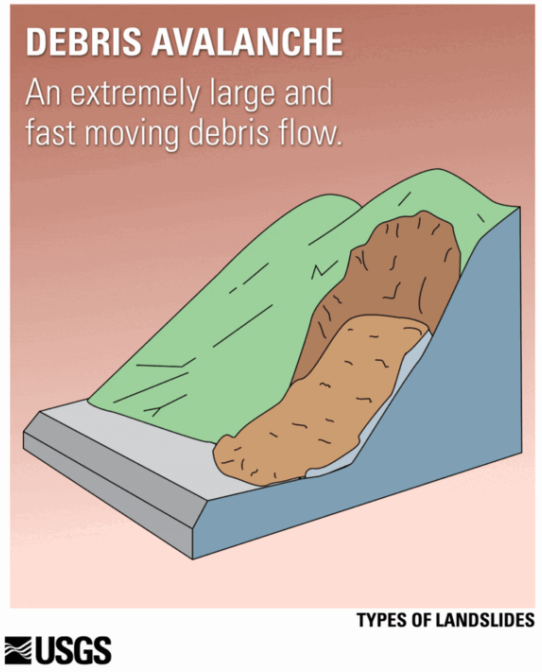
What is a Landslide?







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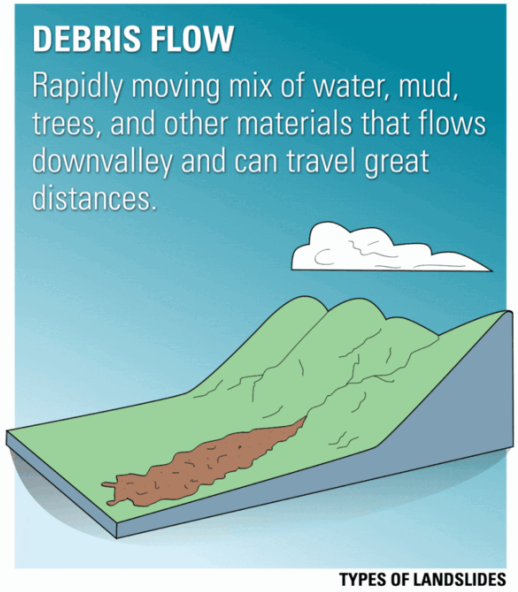
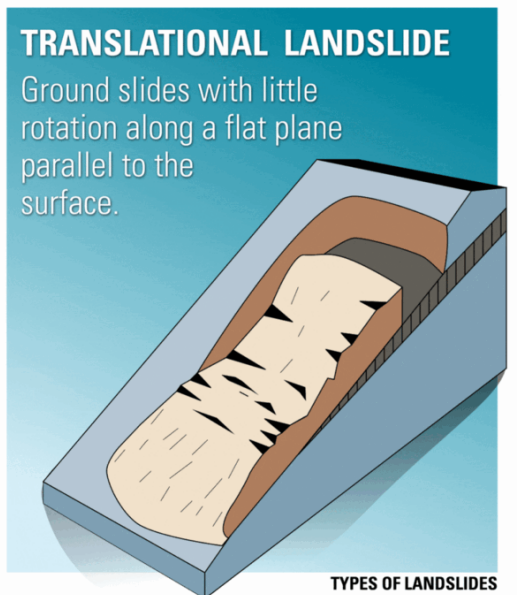
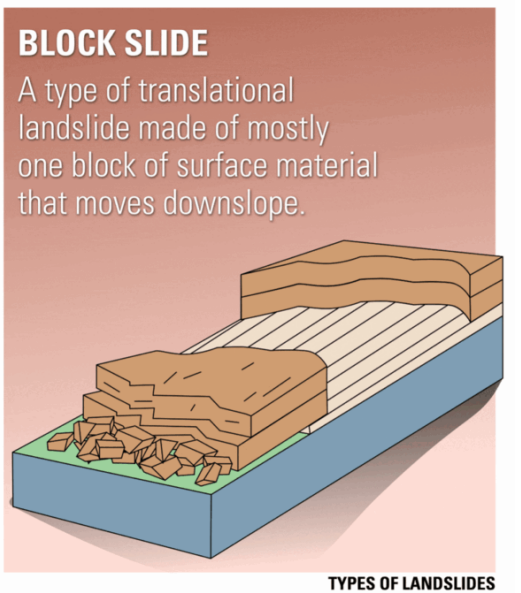
What is a Landslide?







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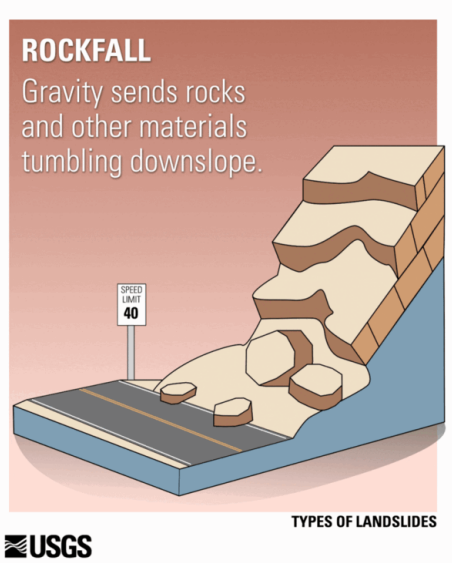
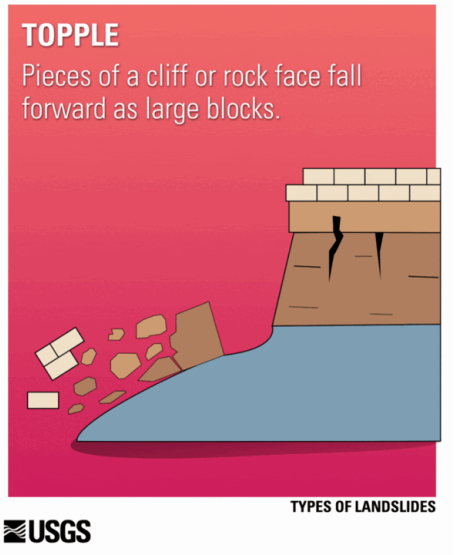
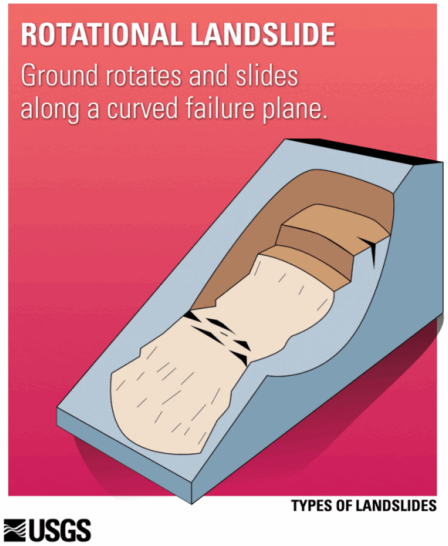
What is a Landslide?







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What is a Landslide?

The debris flow landslide hit a home on Middlefield Road on its way down the hill from The Spiral on Jan. 16, 2023.
Credit: Kelly Sullivan

- The most dangerous landslides in terms of life safety are fast-moving, generally shallow **debris flows.**
  - These are triggered when intense rainfall follows storms that have already saturated hillsides.
  - Once initiated, debris flows can travel great distances at relatively high velocities, flowing down drainages and onto alluvial fans and damaging any structures lying in their paths.

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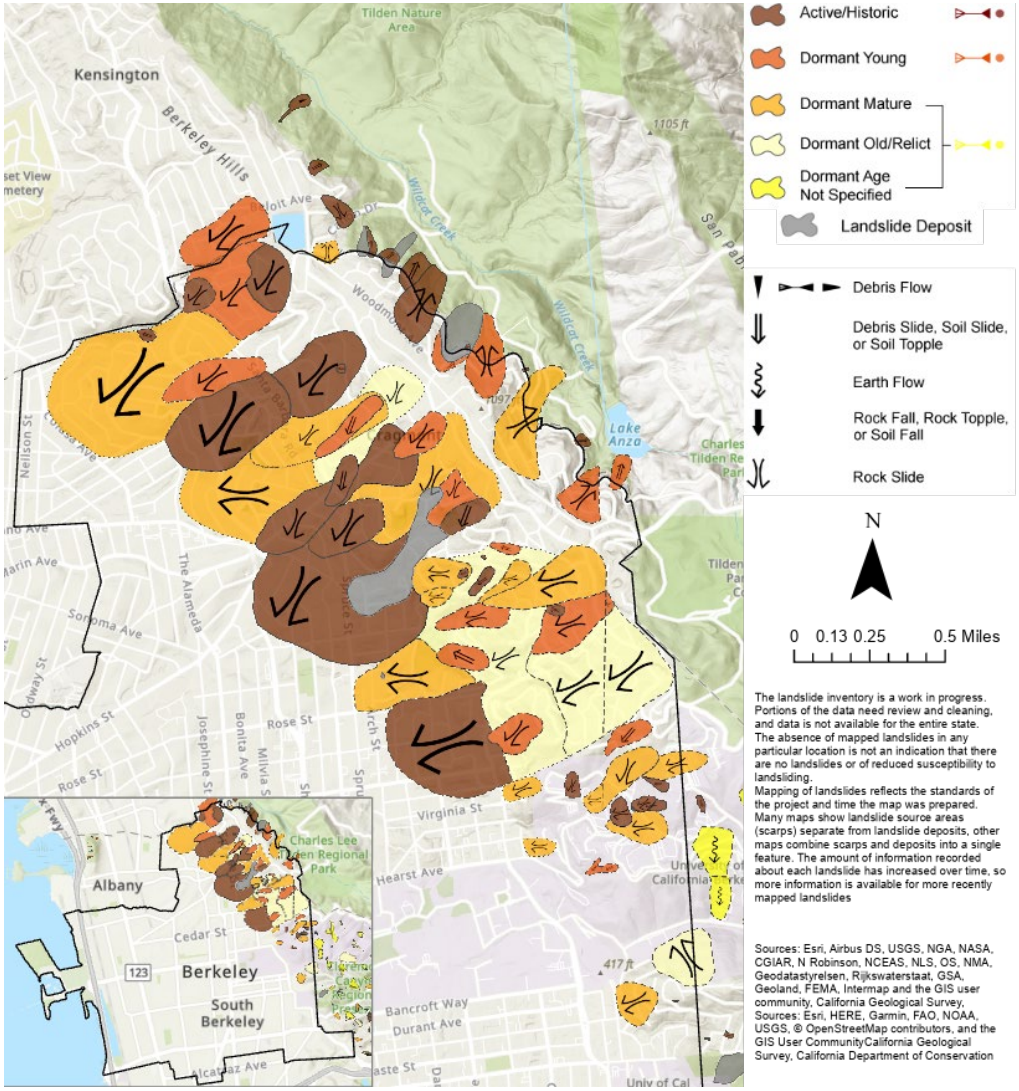
Where is it in Berkeley?

This is the **Landslide Inventory** for Berkeley, focused in on the Berkeley hills.

The Landslide Inventory is an ongoing project to collect and display current and historical landslide data for the State of California.



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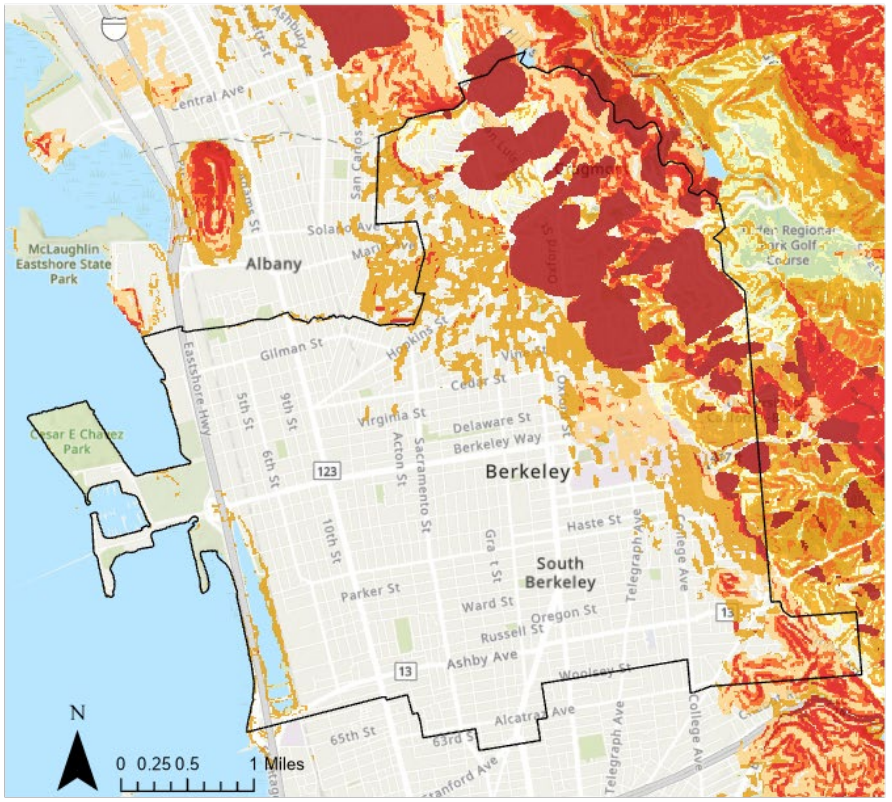
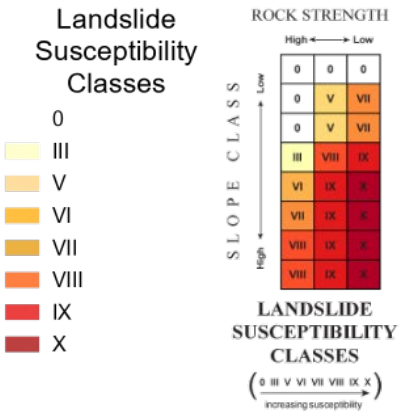
Where is it in Berkeley?

This is a **landslide susceptibility** classes map focused on Berkeley.

Rock strength and slope are combined to create classes of landslide susceptibility.



Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community, Sources: Esri, HERE, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community, DOC/CGS California Geological Survey, California Department of Conservation



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What could be affected by Landslides?

The debris flow landslide hit a home on Middlefield Road on its way down the hill from The Spiral on Jan. 16, 2023.
Credit:Sky7 Footage

- **Preexisting and recently-active**, larger landslides are more often **triggered by exceptionally long periods of seasonal rainfall,** and sometimes do not start moving until long after the rain has stopped.

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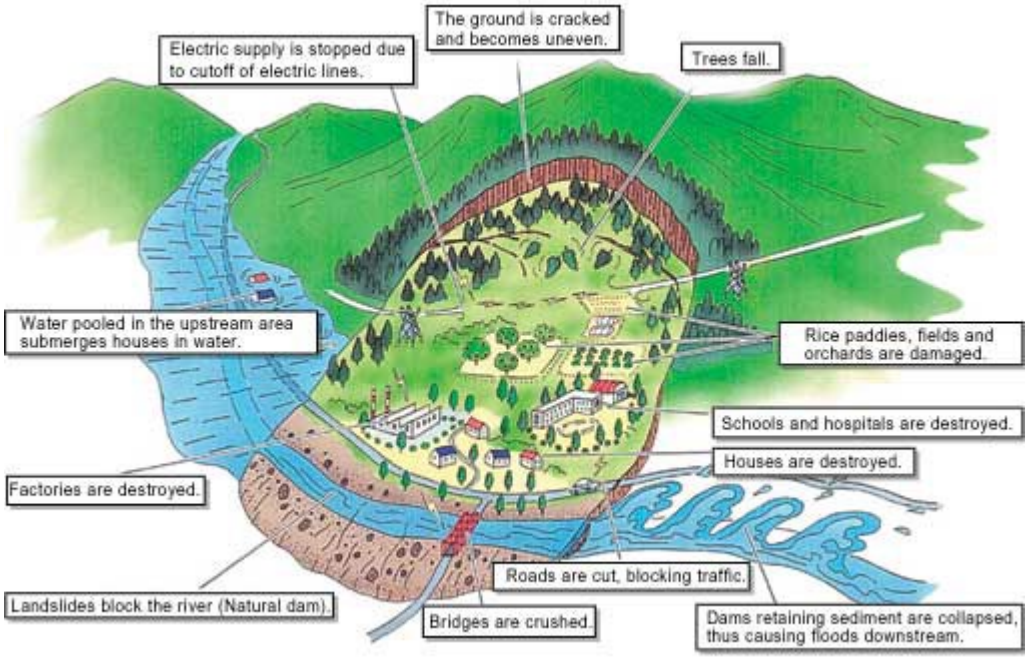
What could be affected by Landslides?

- People
- Structures
- Systems
- Natural, historic, and cultural resources



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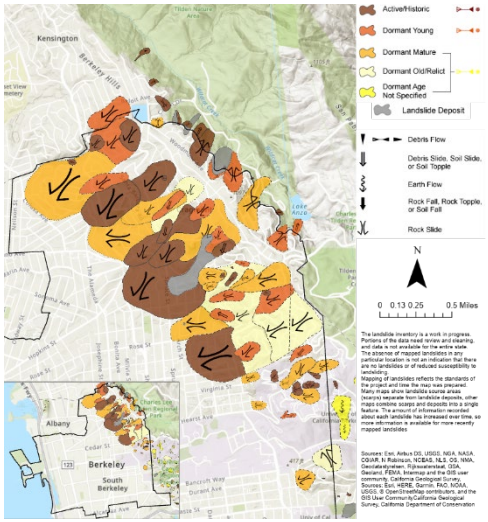
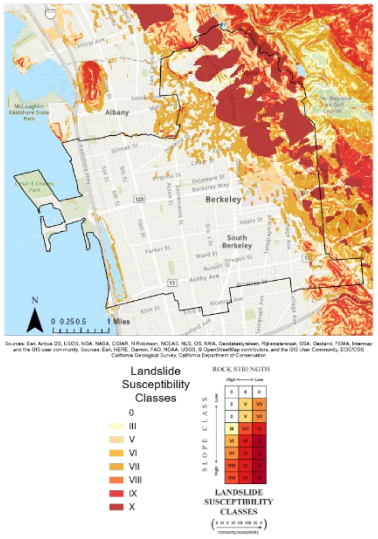
Mitigation Strategy Actions

Collect, analyze and share information with the Berkeley community about Berkeley hazards and associated risk reduction techniques.

- Track changes in hazard risk using the best-available information and tools.
- Collect and share up-to-date hazard maps identifying areas subject to heightened risk from hazards.





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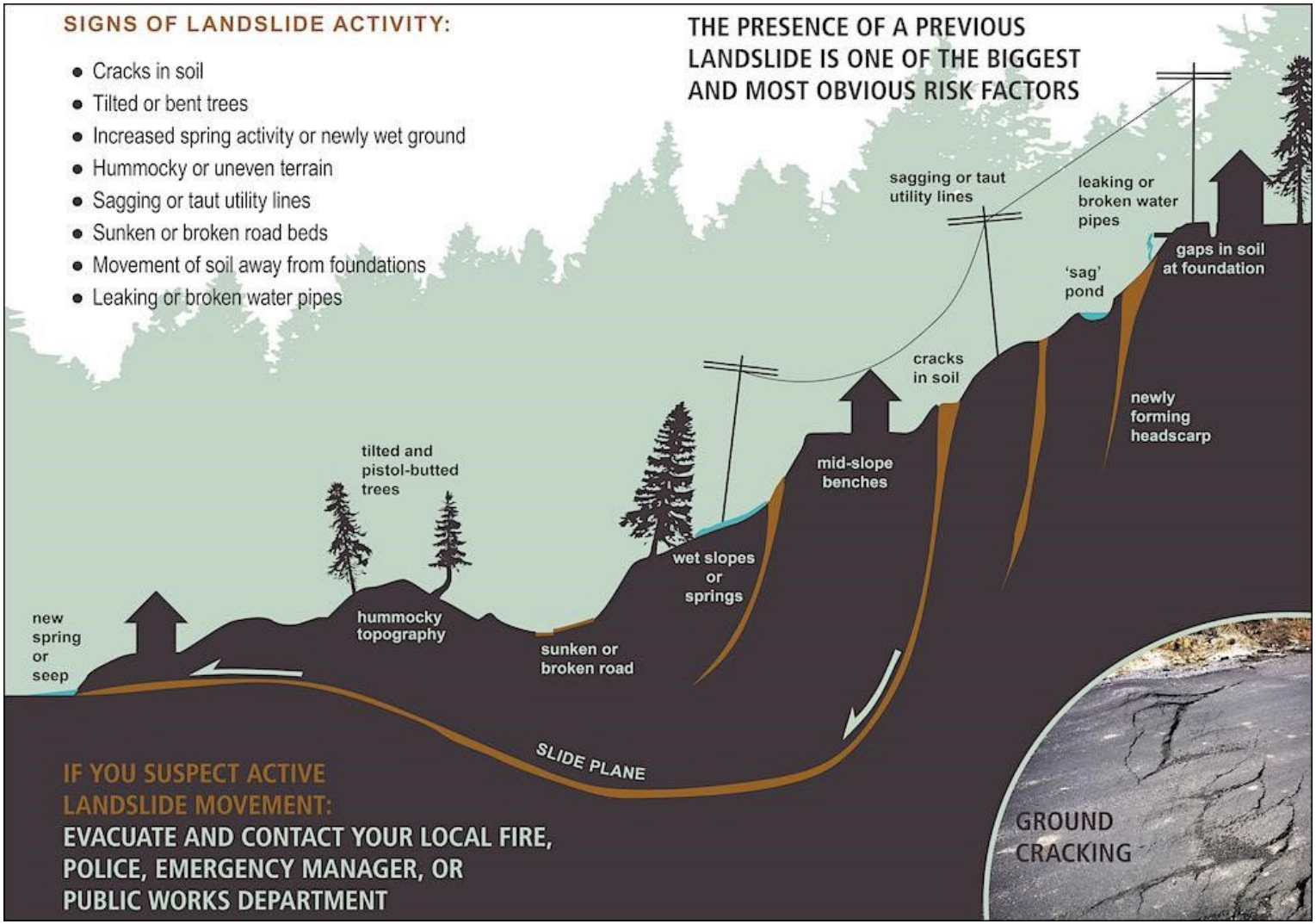

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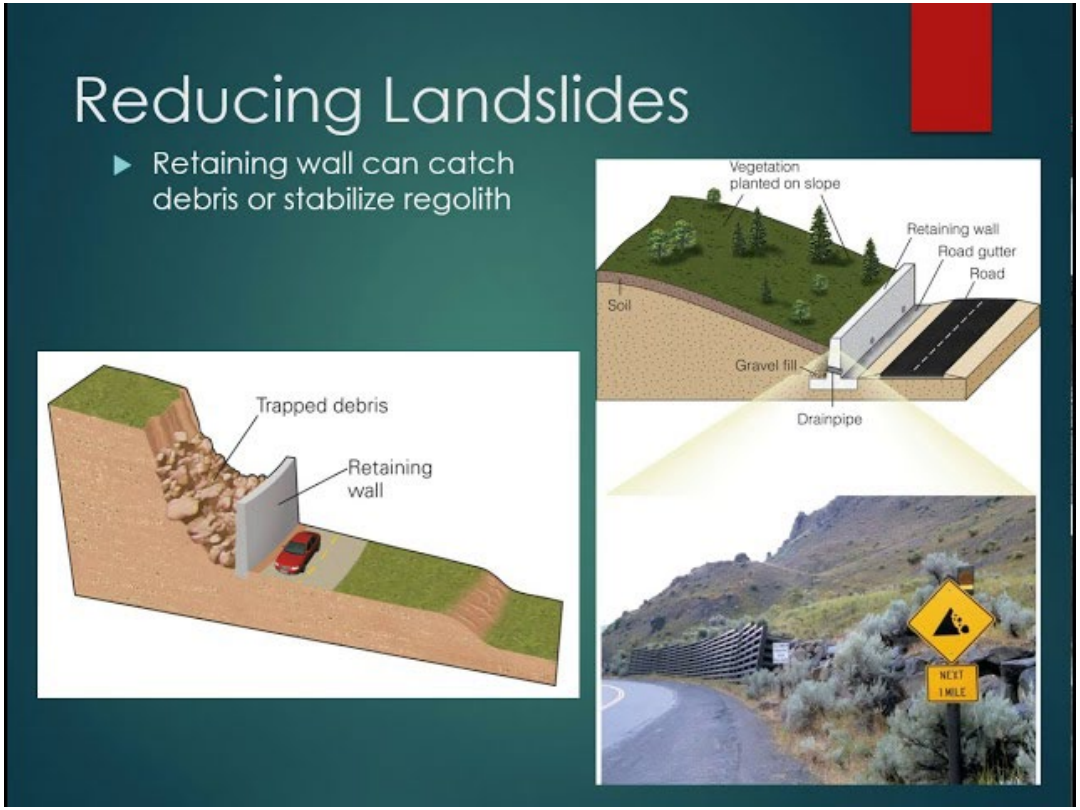
Community Readiness Steps

Minimize home hazards:

- Have **flexible pipe fittings** installed to avoid gas or water leaks, as flexible fittings are more resistant to breakage (only the gas company or professionals should install gas fittings).
- **Plant ground cover** on slopes and build **retaining walls.**



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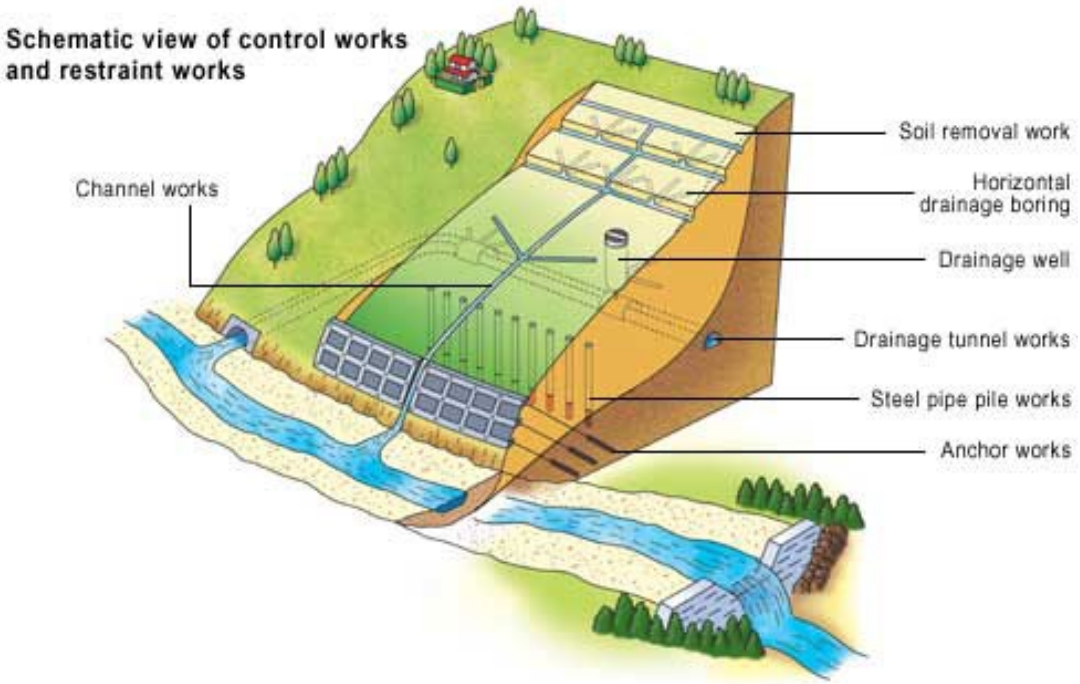
Community Readiness Steps

- In mudflow areas, **build channels or deflection walls** to direct the flow around buildings.



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Community Readiness Steps

- Landslide damage on private property is the homeowner's responsibility. And homeowner's insurance does not typically cover landslide damage.
- A **difference in conditions** insurance policy can help cover this gap, if you live in the landslide prone area.

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AHA CENTRE
ASEAN

ONE ASEAN
ONE RESPONSE

DISASTER PREPAREDNESS TIPS

LANDSLIDE PREPAREDNESS TIPS

Recognise landslide-prone areas near your location.

Recognise early signs of landslides, such as: widening cracks, collapsed pavement, leaking water at new locations, tilting fences/trees/walls.

Replant the previously landslide-damaged area.

Stay alert during a severe storm. More casualties occur when a landslide happens at night.

Fortify slopes area near your neighbourhood.

Prepare and regularly update your personal emergency kit. If applicable, also your family emergency kit, kids emergency kit and office/school emergency kit.

NEXT

www.ahacentre.org

BEFORE

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There's an App for that!

Key phone apps for emergency readiness

BDPNN Disaster Technology Workshop

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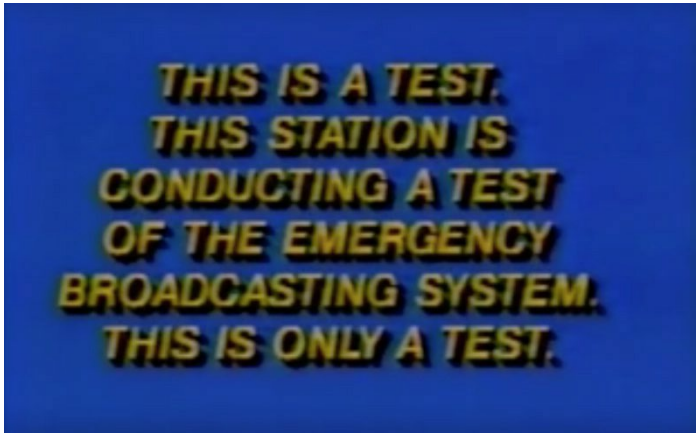
The history of emergency alert technology



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More recent focus: Phone Apps

MyShake

Everbridge (to get Nixle and AC Alert)

Genasys Protect (aka Zonehaven aka Berkeley's Emergency Map)

EPA AirNow

Heat Index

Official Government Resources

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Some other apps…

NextDoor

Watch Duty

Citizen

American Red Cross
(suite of apps including Emergency!, First Aid and Pet First Aid)

Not Official Government Resources

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Now let's check out each app…

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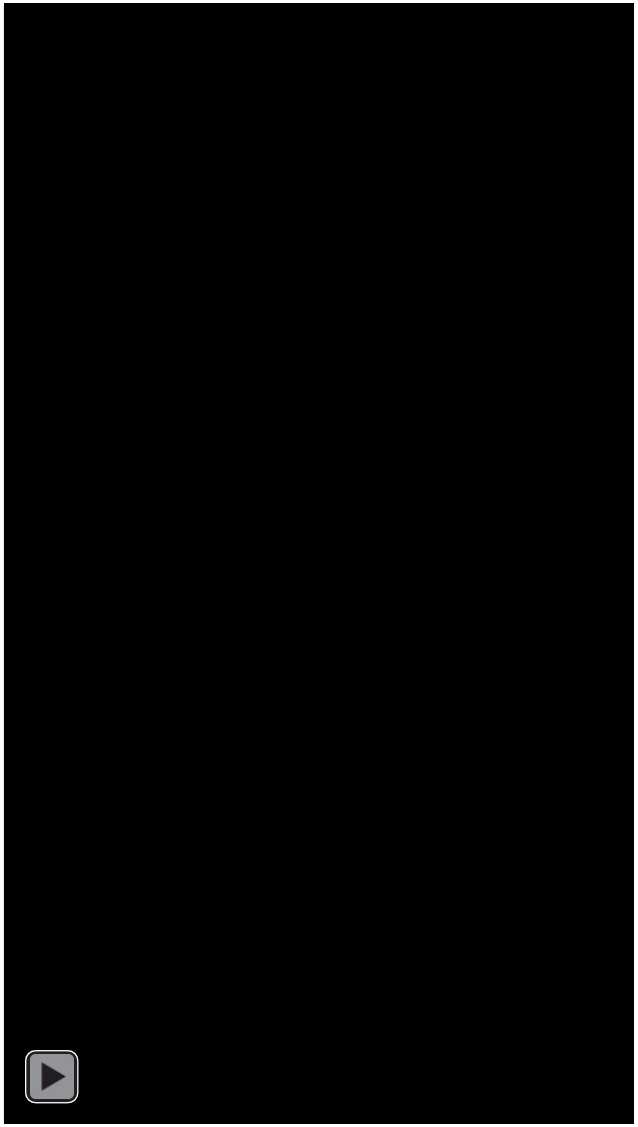
MyShake

- The MyShake app (developed by the UC Berkeley Seismology Lab) is the first app to provide statewide earthquake early warning alerts in California.
- Adjust notification settings by geography and magnitude
- Be a citizen scientist and help report earthquake motion



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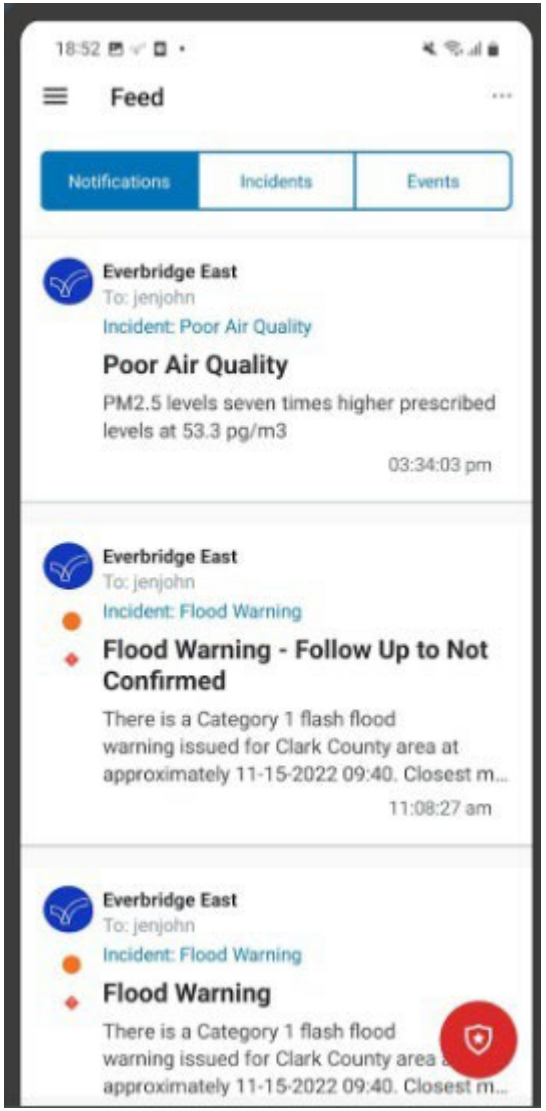
Everbridge

- Everbridge is the supporting software for AC Alert and Nixle—so it's an important app to have!
- Manage subscriptions to public agency notifications
- See a feed of recent alerts in areas of interest
- Enable notifications to receive lower-level alerts that don't go to text



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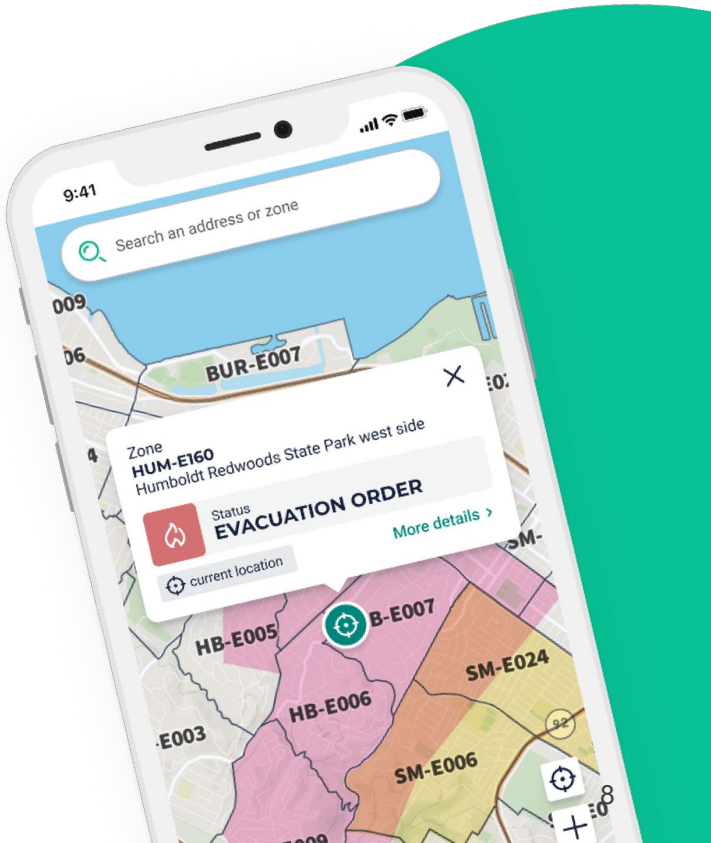
Genasys Protect (aka Berkeley's Emergency Map, aka "Zonehaven")

genasys

- Live, interactive map that divides City of Berkeley into planned evacuation zones
- Used in the field by first responders
- Get app notifications when there is a change to your zone



Lets check out the browser version together: **protect.genasys.com**

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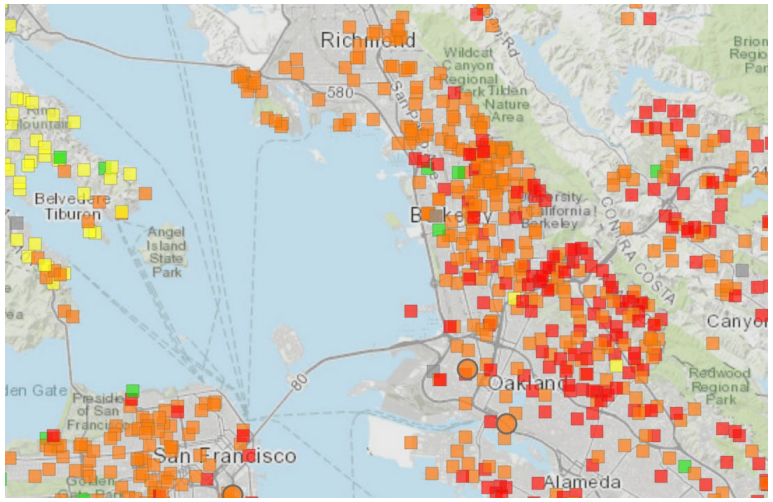
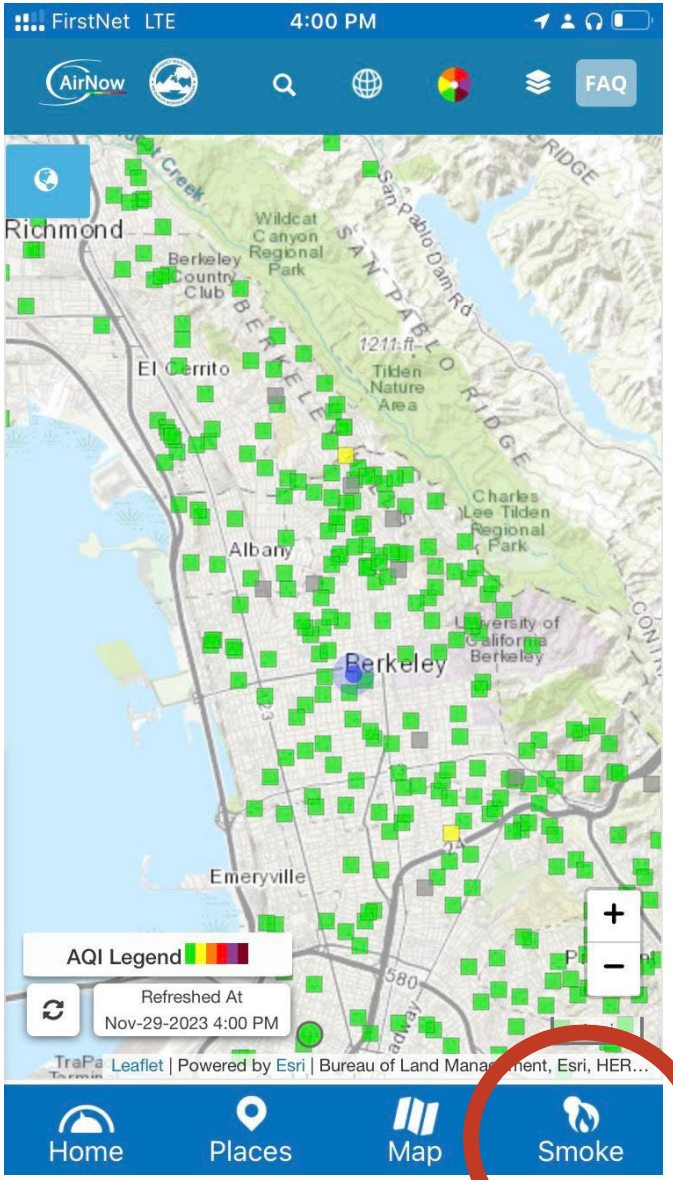
EPA AirNow



Lets check out the browser version together: **fire.airnow.gov**



Check out this tab

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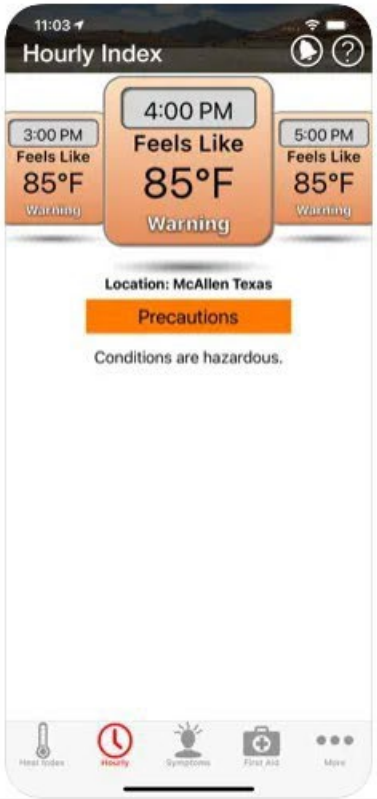
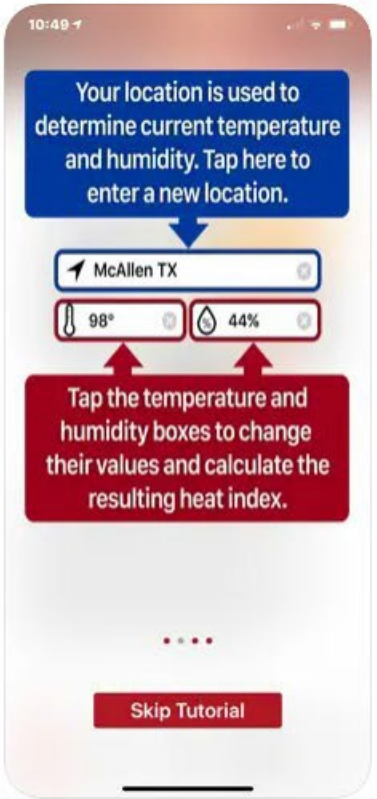
OSHA Heat Safety Tool





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Is there still time? Let's check out a couple more apps…

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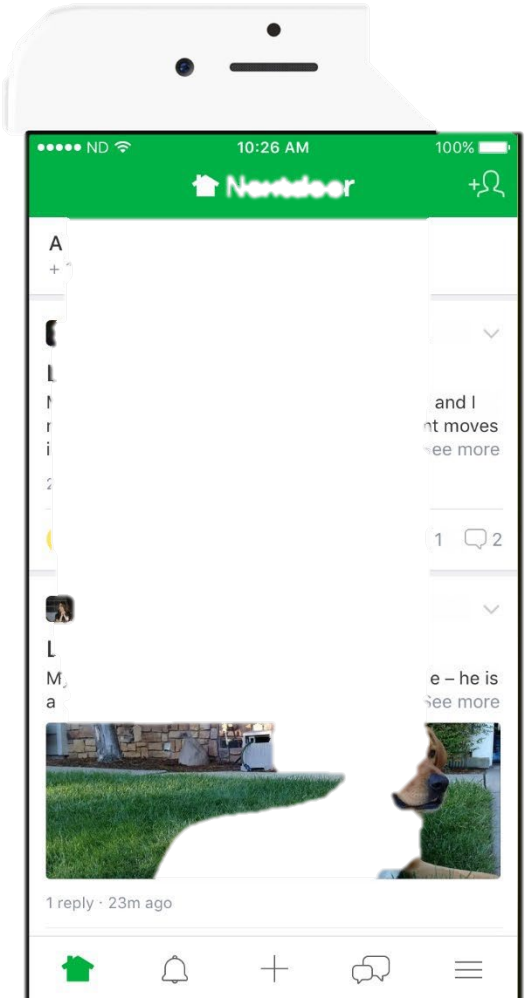
Nextdoor
*not an official resource

- A private social network/app for neighborhoods: meet your neighbors, get local tips, post about questions or events, buy and sell items, and more
- Get to know your neighbors!



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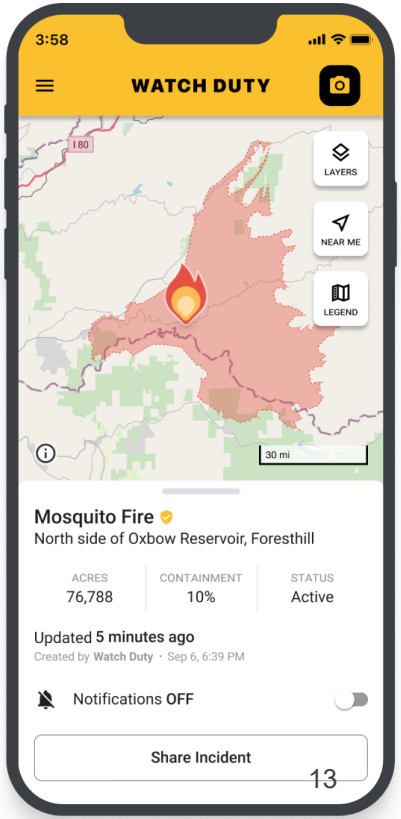
Watch Duty
*not an official resource

- Real-time updates and mapping on wildfires in participating communities
- Features a feed of updates with official emergency notifications and evacuation orders, images from fire cameras, and links to official resources
- 501(c)(3) nonprofit operated by trained volunteer reporters and scanners



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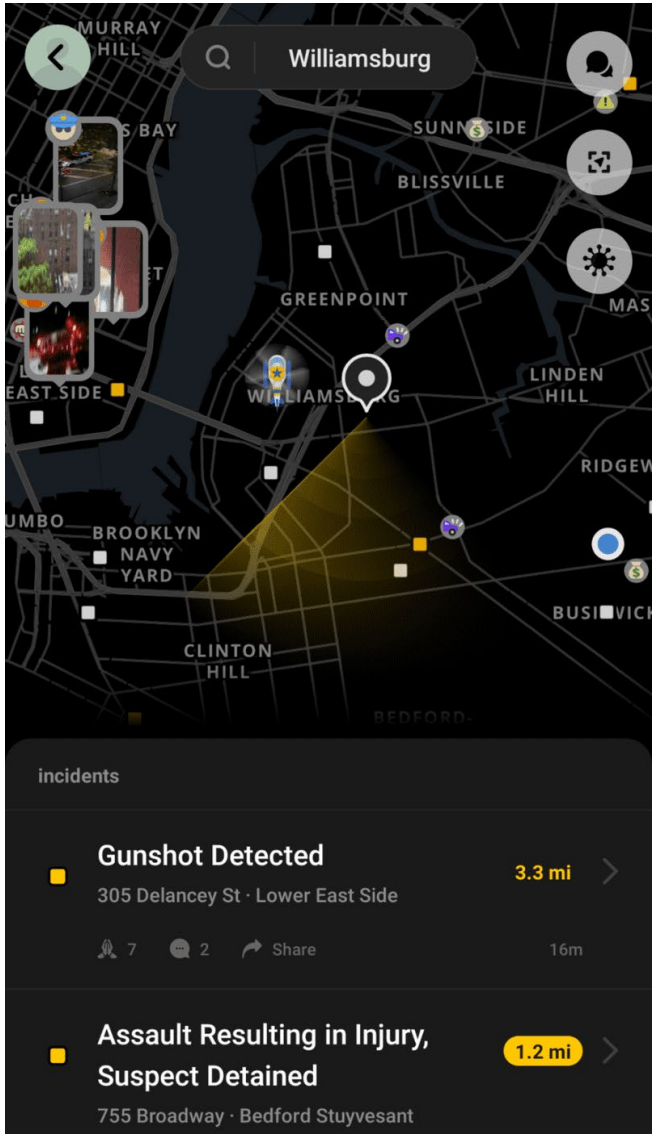
Citizen
*not an official resource

- An app that sends location-based public safety alerts in real-time. Pulls initial report data from publicly available radio traffic and CAD
- False reports and misleading comments from the public happen so take with a grain of salt



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American Red Cross

- A suite of apps with useful, updated information about First Aid, Pet First Aid, and emergency preparedness
- App names are “American Red Cross- First Aid”, “American Red Cross- Pet First Aid”, and “American Red Cross- Emergency!”

Thank you!

Leah Greenbaum
Emergency Services Coordinator
City of Berkeley, Office of Emergency Services
oes@berkeleyca.gov

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LHMP Hazard Presentation

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Agenda

- Background Information
  - What is the hazard?
  - Where is it in Berkeley?
  - What could be affected by it?
- Mitigation Strategy Actions
- Community Readiness Steps

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Points of Reference

- Hazard write-up: S:\Team-Folders\Local Hazard Mitigation Plan\2024\PLAN\2024\Element B Risk Assessment
  - Maps (in hazard write-up or elsewhere)
- PowerPoint from 2019 LHMP DFSC (REFERENCE)
- Proposed actions – 2 spreadsheets in here:
- S:\Team-Folders\Local Hazard Mitigation Plan\2024\PLAN\2024\Element C Mitigation Strategy\Status of Actions
- "Disaster Preparedness Presentation" – CERT: S:\Team-Folders\Local Hazard Mitigation Plan\2024\Outreach\Hazard Information Outreach Materials
- Public Outreach Content Highlights DRAFT
- S:\Team-Folders\Local Hazard Mitigation Plan\2024\Outreach\Hazard Information Outreach Materials

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Hello Winter Weather!

Flooding and High Winds:

The hazards, the City's work, and steps to stay safe

December 9, 2023

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Winter Weather Outlook

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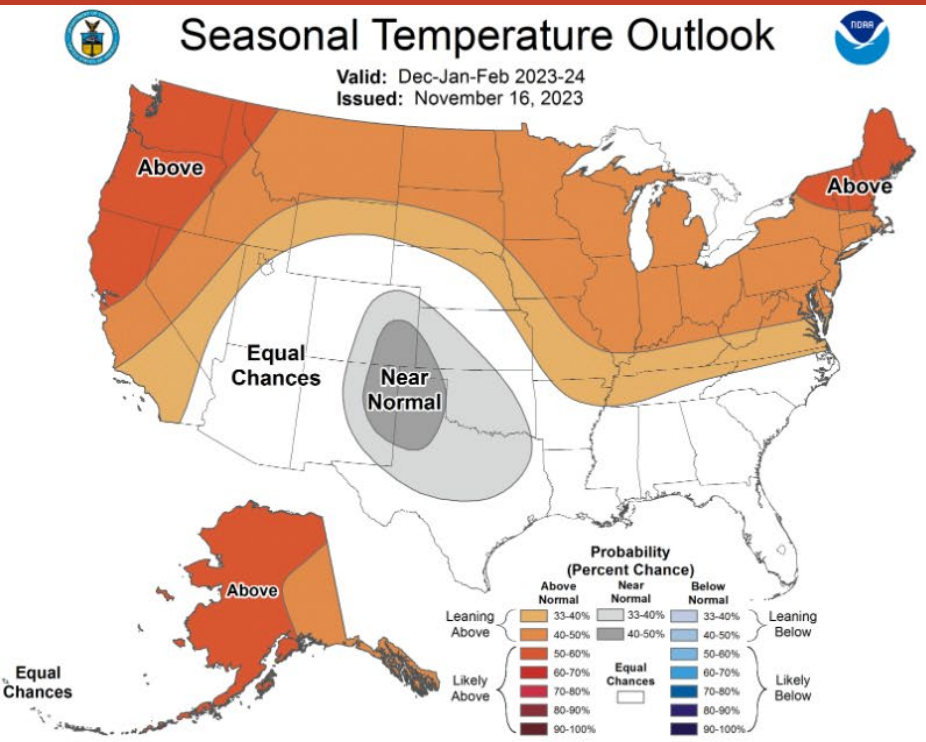
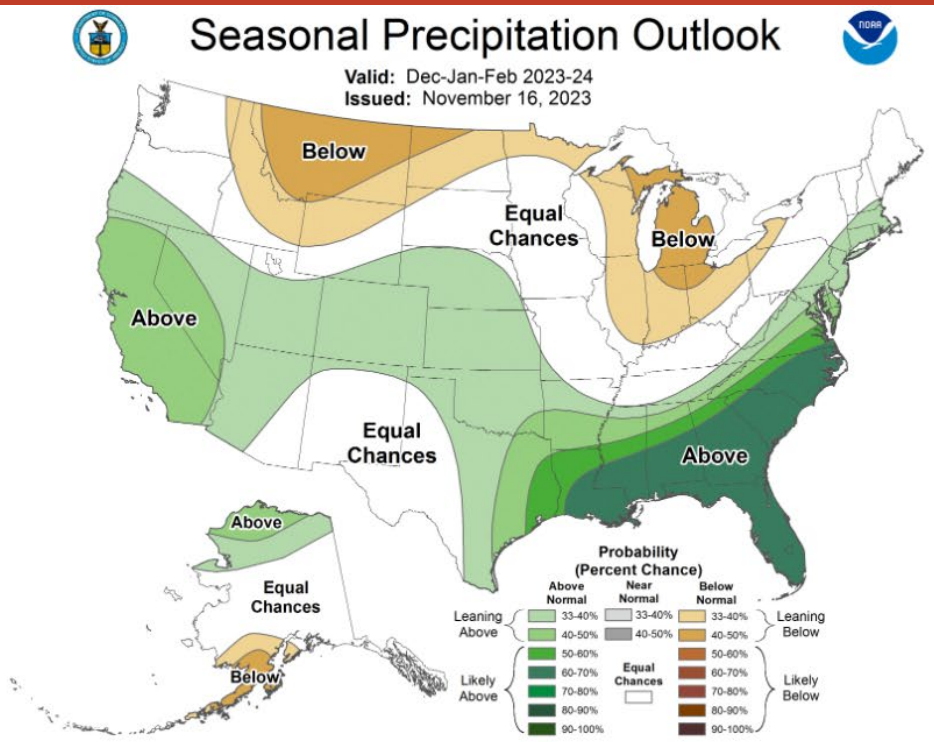
NOAA predicts “strong” El Niño conditions





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Flooding

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What is flooding?

Flooding on Parker Street near Longfellow School. Photo: Mark Coplan

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Creek Flooding

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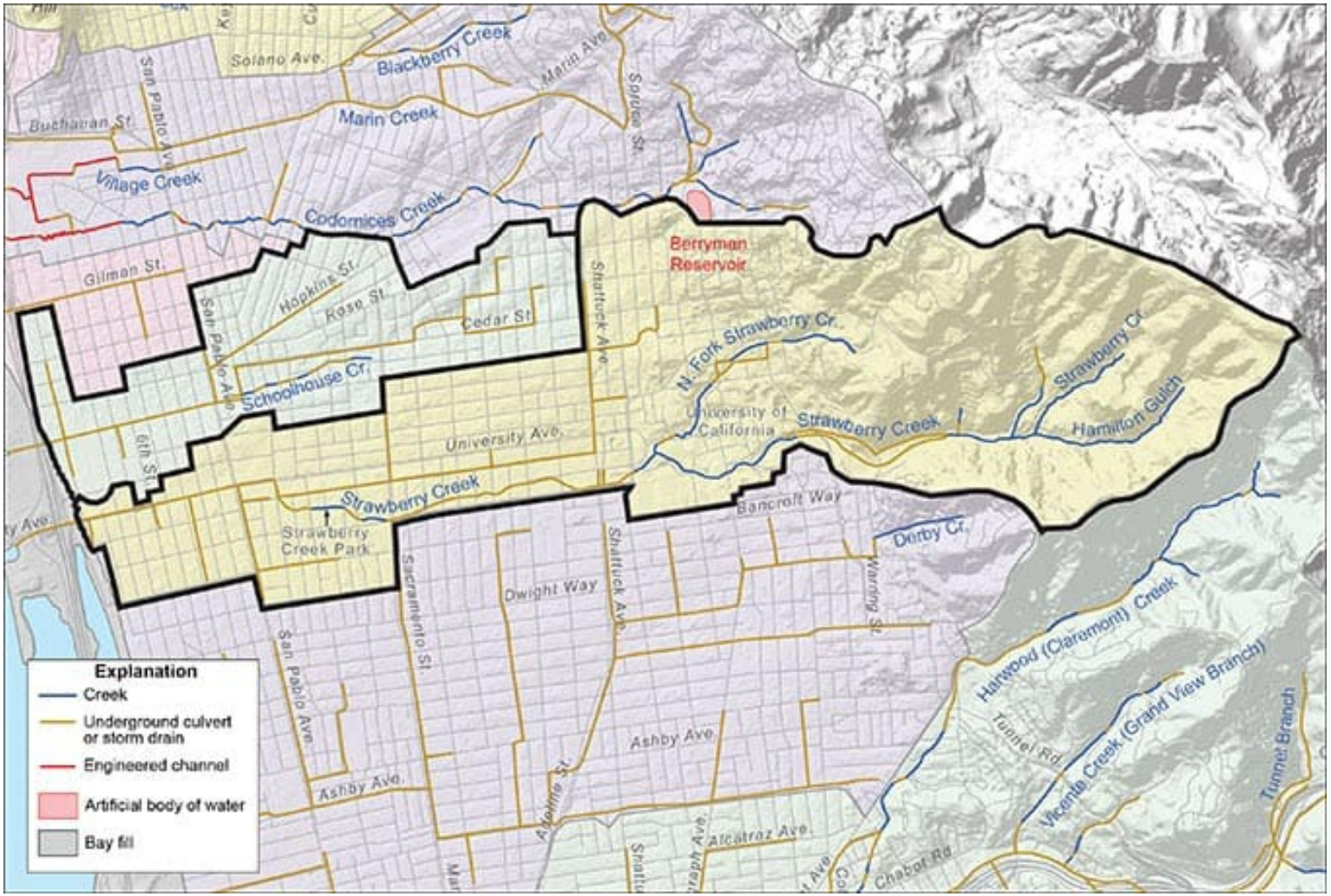
Creeks & Berkeley



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What is Creek Flooding?

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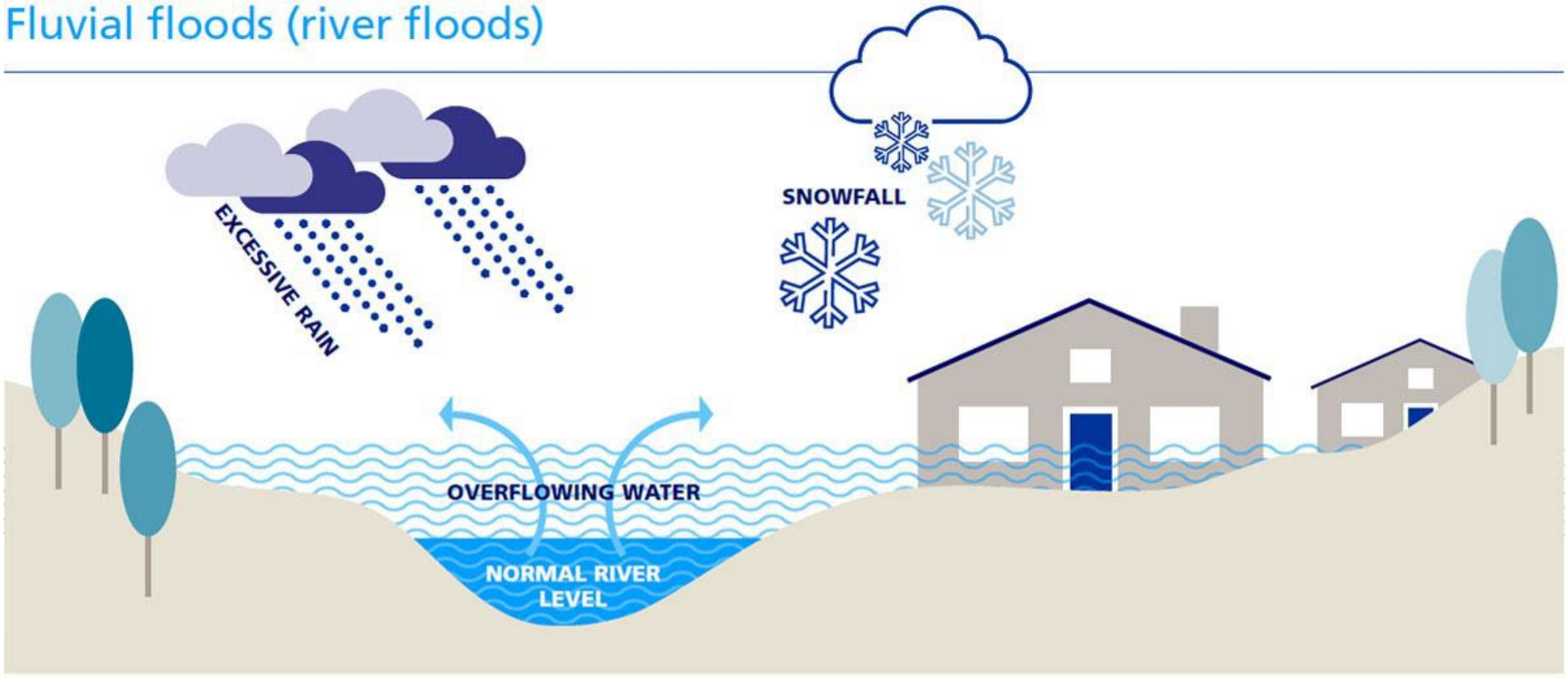
What is Creek Flooding?



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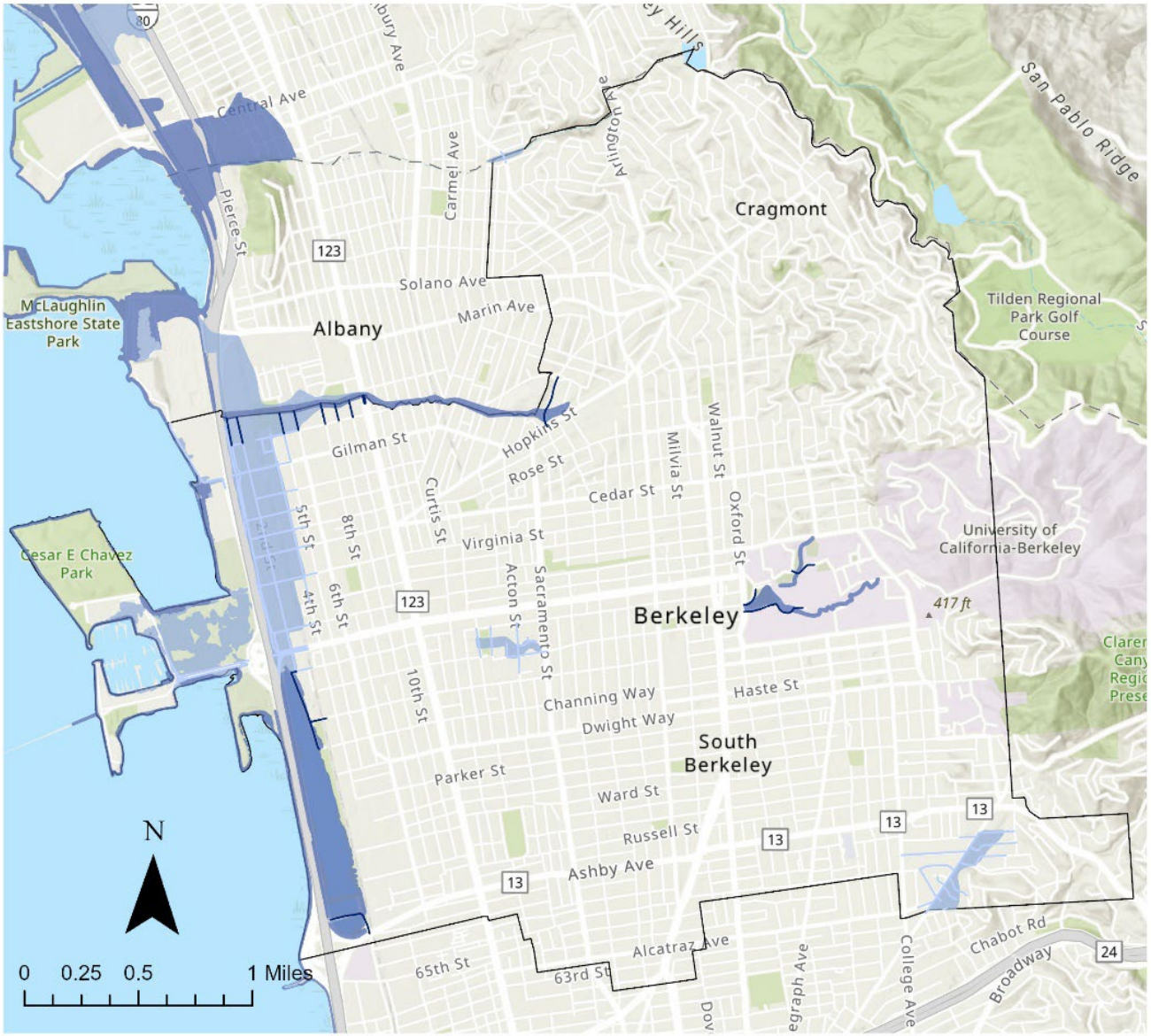
Berkeley Floodplains



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Storm Drain Overflow

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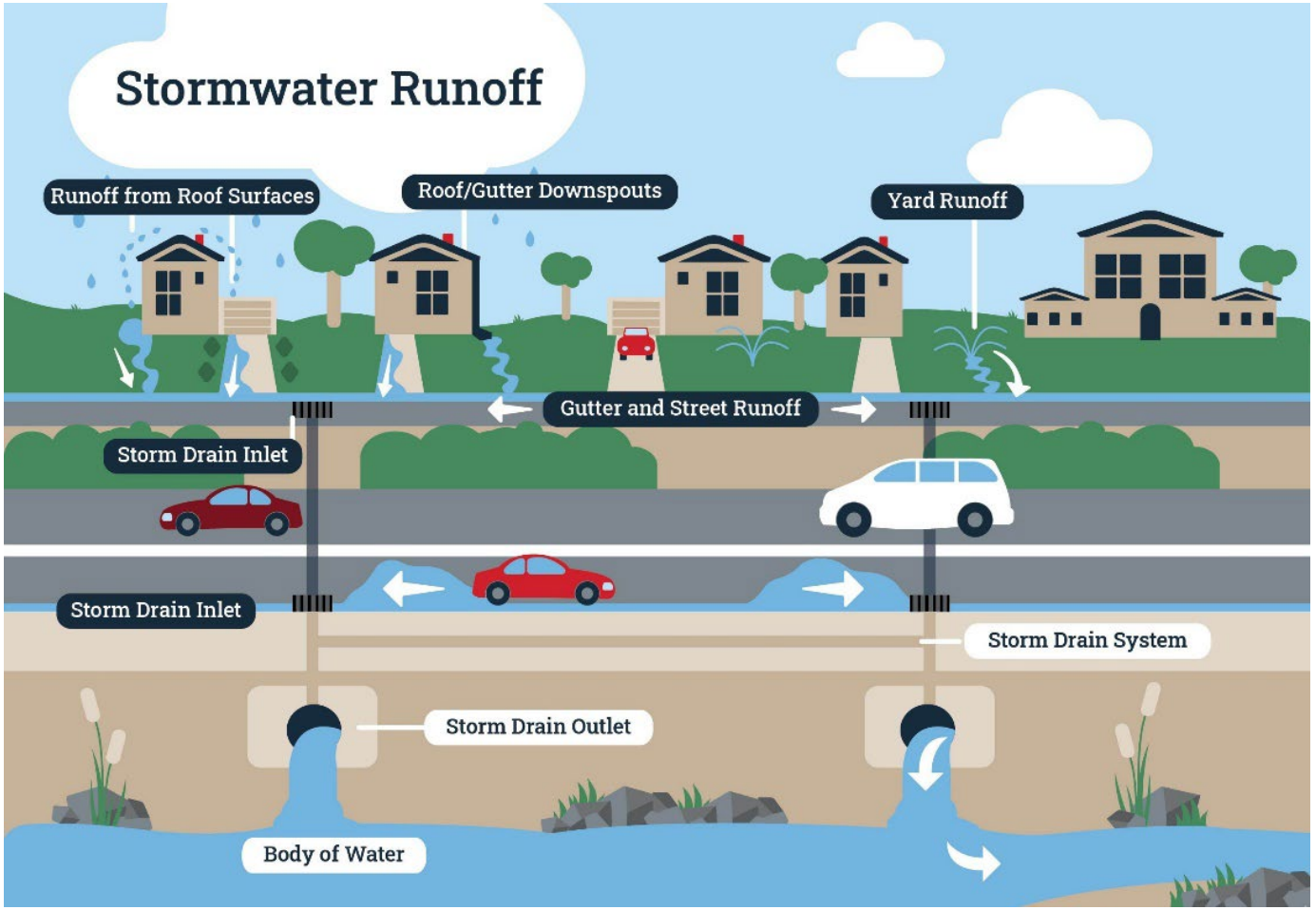
What is Storm Drain Overflow?



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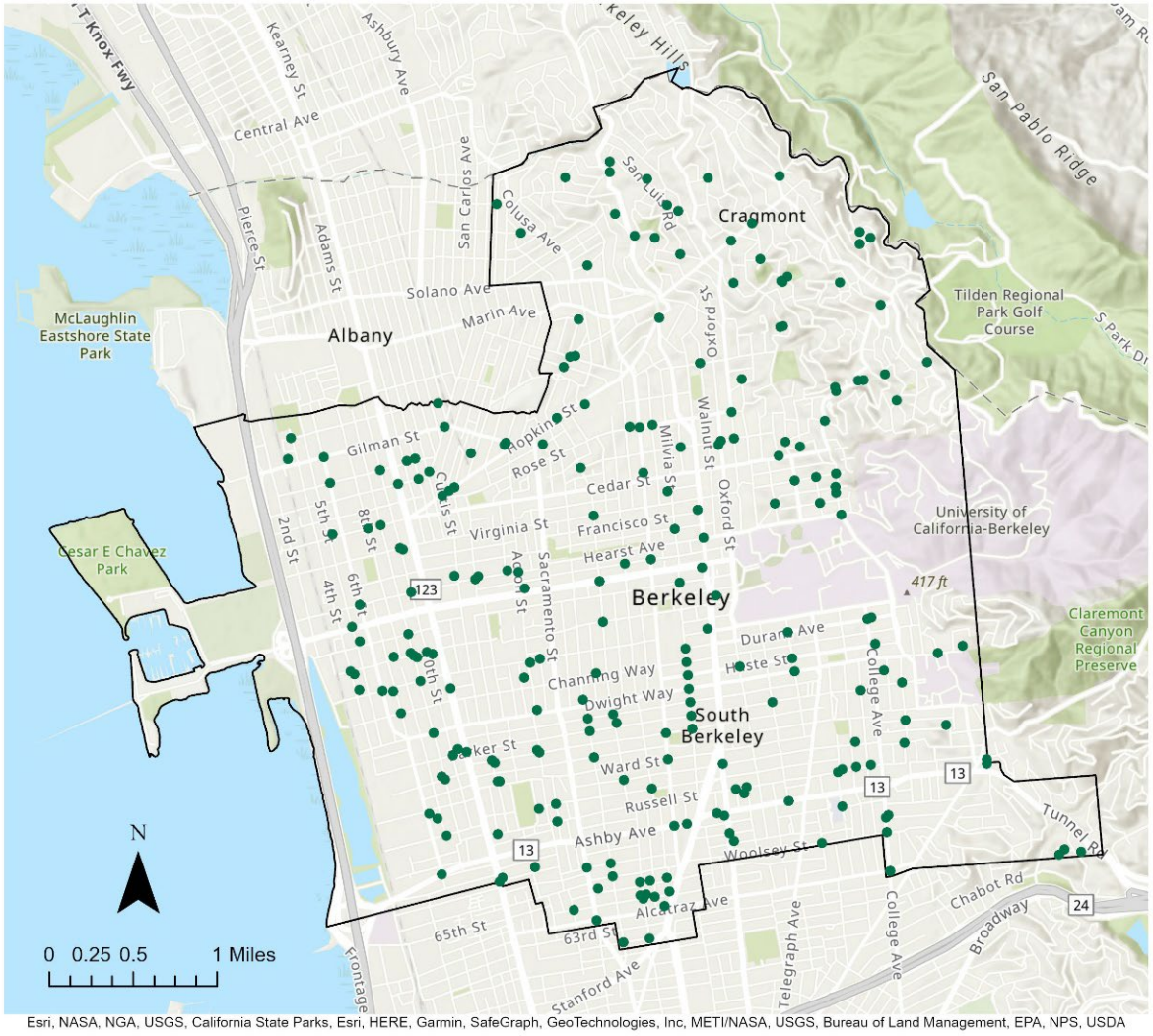
Storm Drain Infrastructure

- Designed to handle 2 inches in 6 hours
- Some components of Berkeley's storm drain infrastructure are over 90 years old

Flooding in Southwest Berkeley during last October's record-breaking storm.
Credit: Guillaume Pierre

Storm Drain Issues



Esri, NASA, NGA, USGS, California State Parks, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA

Storm Drain System Issues, Jan-June 2023

- Areas of Observed Storm Drain Overflow

2024 Draft Mitigation Plan: Flooding Strategy

Maintain City participation in the National Flood Insurance Program.

- Use updated FEMA maps
- Incorporate FEMA guidance into City plans and procedures

Development Standards

- Use development standards to ensure that new development does not contribute to an increase in flood potential.

Stormwater Master Plan

Complete a Stormwater Master Plan for all City stormwater infrastructure, to:

- Identify system deficiencies
- Establish a capital stormwater improvement plan, and
- Identify funding mechanisms.

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Tide Tubes

- Renovate the tide tubes that remove storm water from Berkeley Aquatic Park and Potter Street to the Bay.

Designing Public Improvements

- Design public improvements such as streets, parks and plazas, for retention and infiltration of stormwater by diverting urban runoff to bio-filtration systems.

Bioswale at Rose and Hopkins

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What can you do about flooding?

Protect your neighborhood

- Flooding often occurs due to storm drain blockage. Keep water flowing by participating in the adopt a drain program.

Protect your home

- Direct water away from your building.
- Watch how water flows or accumulates around your home to identify potential trouble spots.

Flood Insurance

- Consider **flood insurance,** since typical homeowners insurance policies do not cover flooding.

FEMA

NATIONAL FLOOD INSURANCE PROGRAM

Are sandbags right for you?

Do you live near a Berkeley creek?

Have you experienced flooding in the past?

- Learn how to sandbag
- Learn whether sandbags will be protective for your property

Make your sandbag plan

- If you are unable to sandbag, connect with neighbors and friends who can assist you in sandbagging to protect your home during severe storms
- Make a plan for where you'll get sandbags in significant storms.

Where to get sandbags?

- Local hardware stores
- City's Corporation Yard
  - 10 free bags during storm season
  - Monday-Friday, 8 am - 4 pm
  - Berkeley residents and businesses only; bring ID or a business card).

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During heavy rains

- Elevate important items, if possible, especially from first floor/garage.
- Do not walk, swim or drive through flooded waters. Turn around, don’t drown.
- Be ready for power/internet outage
- If your home floods, be ready for cleanup.

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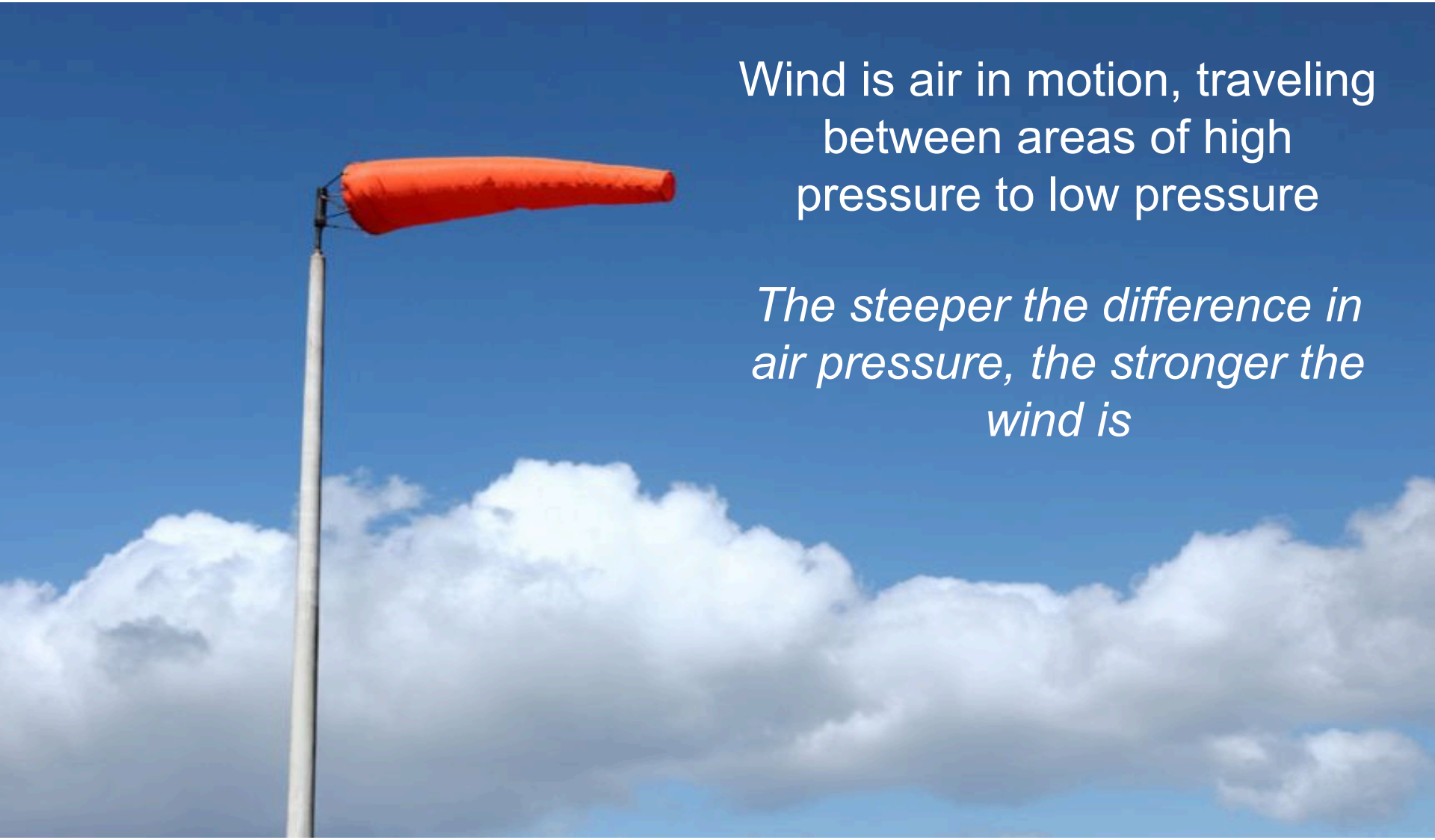
High Wind Events

How is Wind formed?



Wind is air in motion, traveling between areas of high pressure to low pressure

The steeper the difference in air pressure, the stronger the wind is

Wind in Berkeley

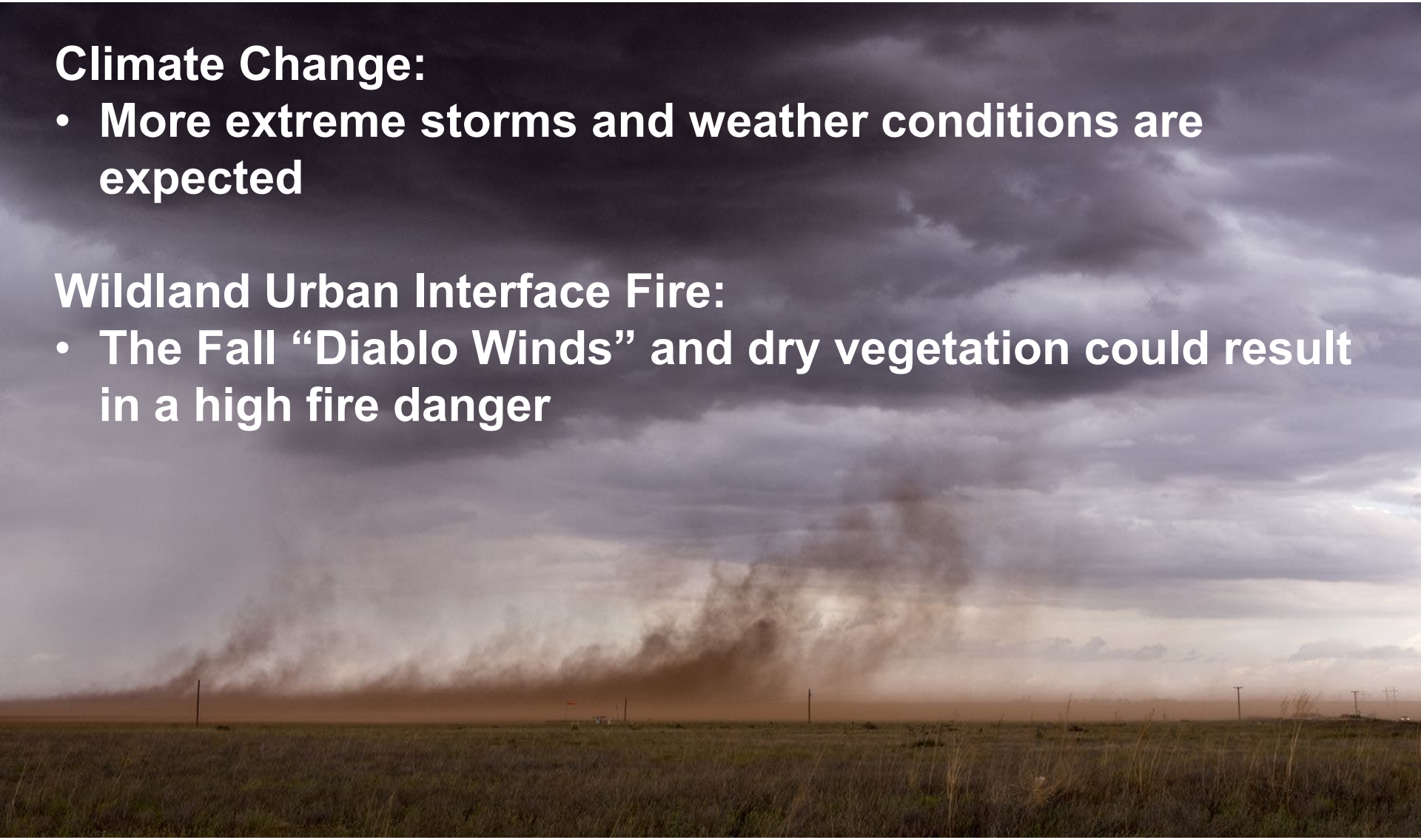
In Berkeley, high wind events are associated with the seasons

- **Winter**: weather systems and cold fronts

- **Summer**: temperature and pressure differences between the Pacific Ocean and the interior valleys to the east create strong winds from the west

- **Spring & Fall**: warm, dry offshore winds from the northeast, known as “Diablo Winds”

Related Hazards



Climate Change:

- More extreme storms and weather conditions are expected

Wildland Urban Interface Fire:

- The Fall “Diablo Winds” and dry vegetation could result in a high fire danger

What is “high wind”?

- ***Sustained wind*** *of 40 mph or more, lasting for 1 hour or more*

or

- ***Wind gust*** *(usually 20-30 seconds) of 58 mph or higher*

Vulnerabilities

Direct

- Trees
- Utility lines
- Heavy objects
- High-profile vehicles and RVs

Indirect

- People

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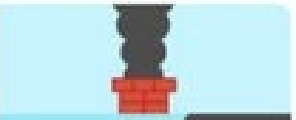
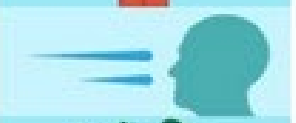
Beaufort Wind Scale

< 1 mph	Calm	Smoke rises vertically	
1-3 mph	Light air	Direction shown by smoke drift	
4-7 mph	Light breeze	Wind felt on face	
8-12 mph	Gentle breeze	Leaves and small twigs in constant motion	
13-18 mph	Moderate breeze	Raises dust and loose paper	
19-24 mph	Fresh breeze	Small trees and leafs begin to sway	
25-31 mph	Strong breeze	Large branches in motion	
32-38 mph	High wind, moderate gale, near gale	Whole trees in motion	
39-46 mph	Gale, fresh gale	Twigs break off trees	
47-54 mph	Strong/severe gale	Slight structural damage	
55-63 mph	Storm, whole gale	Trees uprooted, considerable structural damage	
64-72 mph	Violent storm	Widespread damage	
>73 mph	Hurricane force	Devastation	

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What can you do about high winds?

Keep Trees Maintained

City trees

Call 311

Email

trees@berkleyca.gov

Private trees

Trim, prune and talk to arborist

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Before a wind event…

Secure outdoor items

Be ready for power outages

During high winds…

Stay inside if you can

Stay away from trees

If you see a downed power line, call 9-1-1

Credit: Berkeleyside, Benji Friedman, March 2023 at Berkeley Marina

During high winds…

If you see a downed power line, stay away and call 9-1-1

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Recap & Next Steps

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Recap

- **Creek flooding** and **storm drain issues** cause most flooding in Berkeley
- Infrastructure improvements can reduce risks
- Residents can protect their neighborhoods and homes
- **High winds** can create dangerous situations – get ready and then stay out of the way if you can!

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Next Steps Today!

- Mitigation plan:
  - Share your top mitigation actions and other ideas
  - Full draft plan available in 2024
  - Mitigation@BerkeleyCA.gov

- Learn more at today's event!
  - Adopt a storm drain
  - Learn how to sandbag and if it will protect your property

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Sea Level Rise

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Agenda

- Hazard Info
  - What is sea level rise?
  - Where is it in Berkeley?
  - What could be affected by sea level rise?
- Mitigation Strategy Actions

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What is Sea Level Rise?

- Sea level rise is an increase in the level of the world's oceans.
- Warmer temperatures associated with climate change are causing global sea levels to rise through two processes.
  - Ice Melt
  - Thermal Expansion

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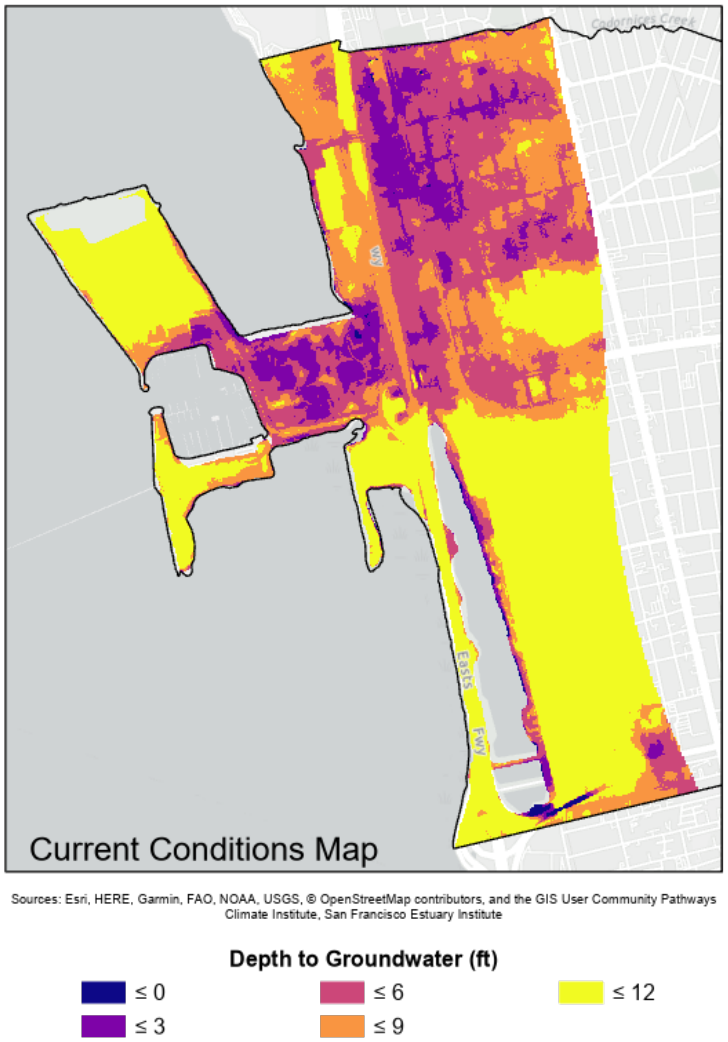
Where is it in Berkeley?

- Low-lying inland areas could flood from below by **emergent groundwater** long before coastal floodwaters overtop the shoreline
- **Emergent groundwater** is when the groundwater surfaces and the depth is less than zero.



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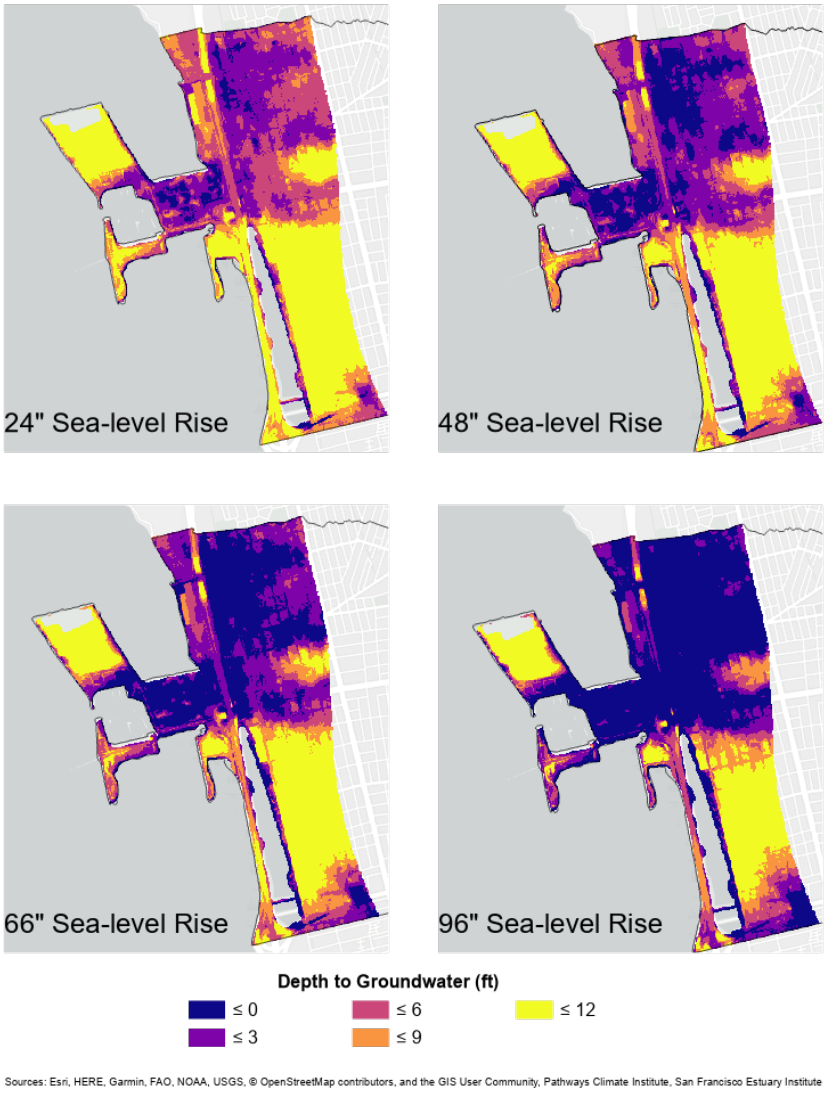
Where is it in Berkeley?

- At 24” sea-level rise, we begin to see “emergent” groundwater.
  - As the sea-level rises, the more emergent groundwater is projected.
- At 96” sea-level rise a large portion of West Berkeley is covered by emergent groundwater.



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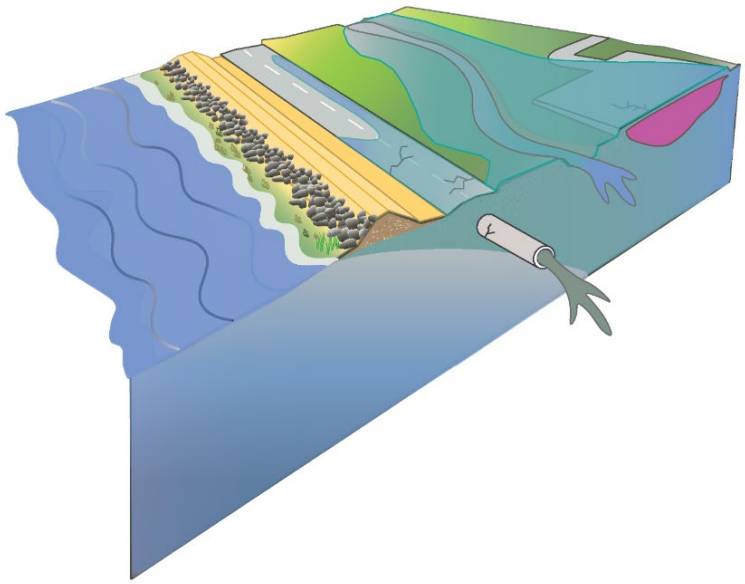
What could be affected by Sea Level Rise?



- Increased infiltration rates into sewer systems, flooding of basements, and damage to underground infrastructure.
- Increased risk that toxic materials could be raised and moved
- Rising groundwater will increase liquefaction hazards in response to earthquakes, particularly in former open water, mudflat, marsh, and floodplain areas that have been filled for development.

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Mitigation Strategy Actions

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Actions

- Mitigate the impacts of sea level rise in Berkeley.
  - Continue to ensure new and existing public and private developments and infrastructure are protected from floods due to sea-level rise through the permitting process for new development and conditions.
  - Identify funding and nature based solutions to adapt to sea level rise at Berkeley Waterfront areas at risk of future inundation

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Actions

- Marina Blvd Shoreline at Virginia Street Extension

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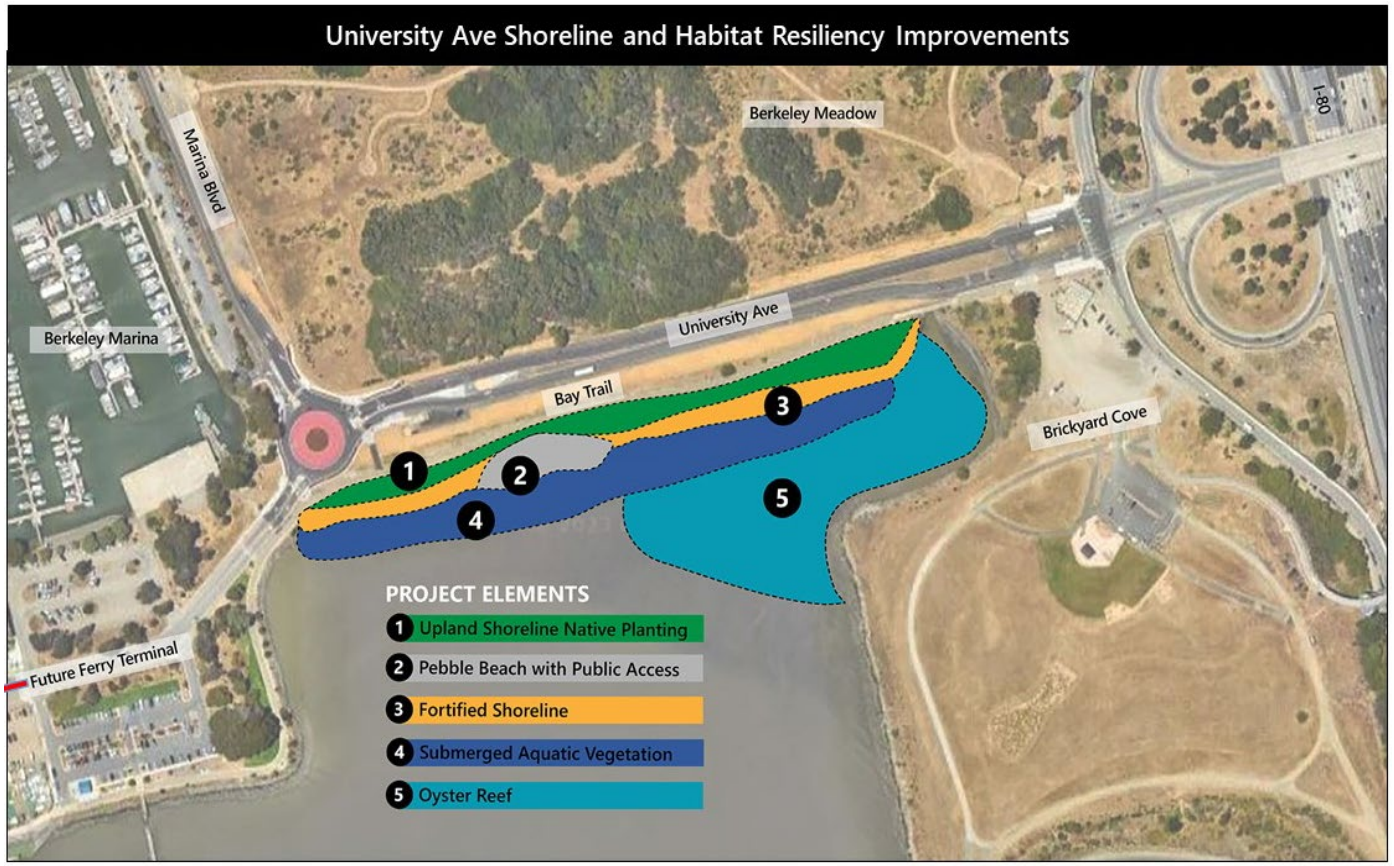
Actions

- South of University Avenue between West Frontage Road and Marina Blvd.



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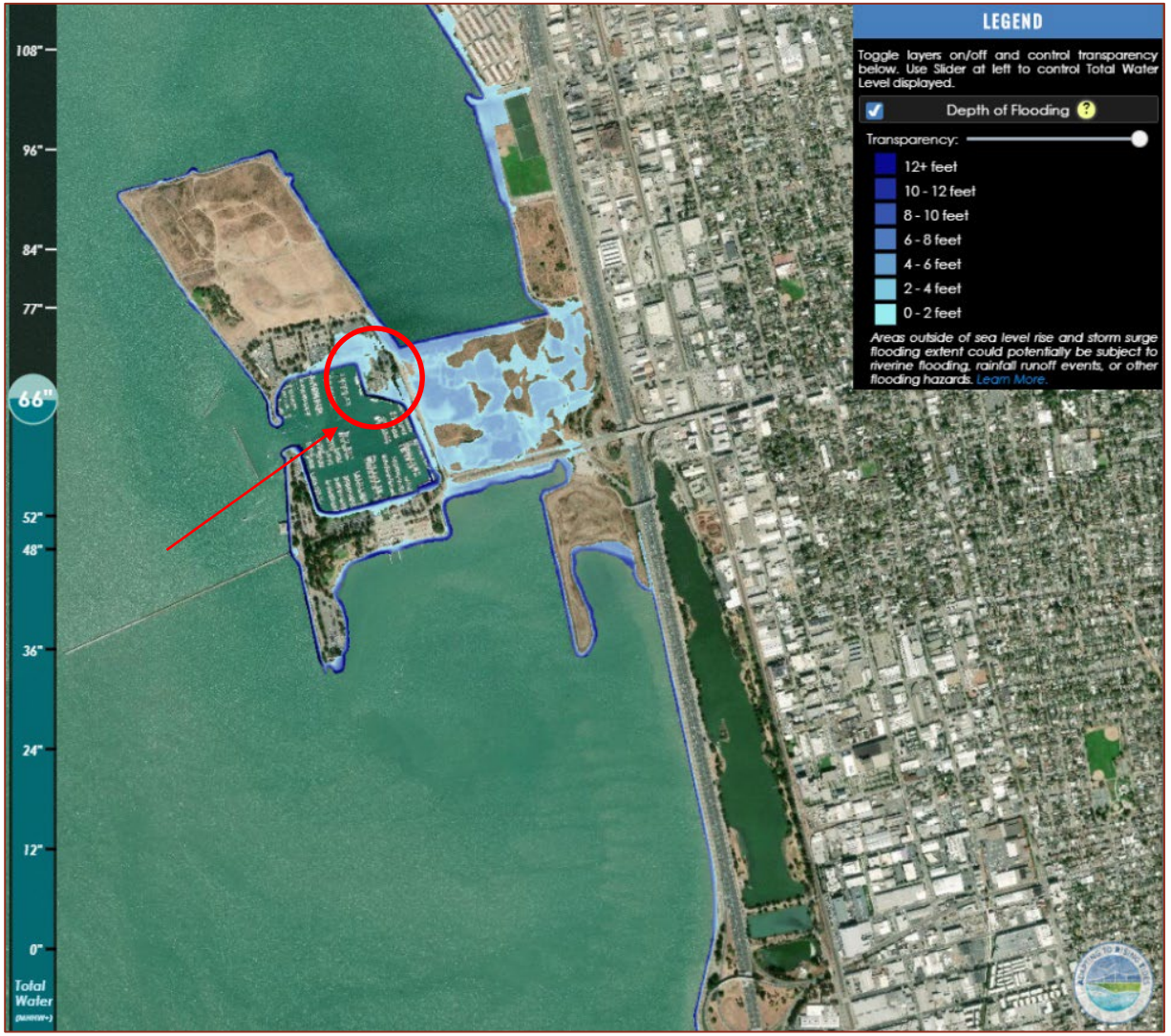
Actions

- Northeast corner of inner-harbor



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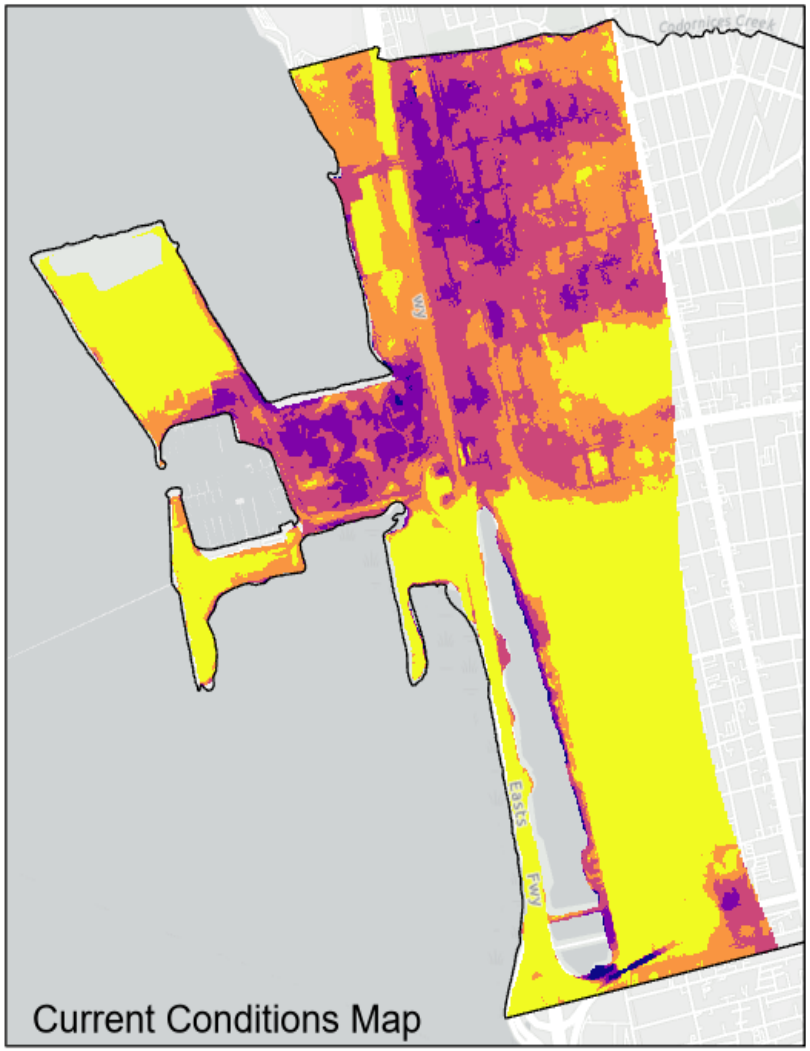
Actions

- Conduct a groundwater study on impacts of groundwater rise combined with sea level rise on underground toxic materials



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Thank You for Watching!

More information on the Local Hazard Mitigation Plan

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Tsunami

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Agenda

- Tsunami Information
  - What is a tsunami?
  - Where is it in Berkeley?
  - What could be affected by a tsunami?
- Mitigation Strategy Actions
- Community Readiness Steps

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What is a Tsunami?

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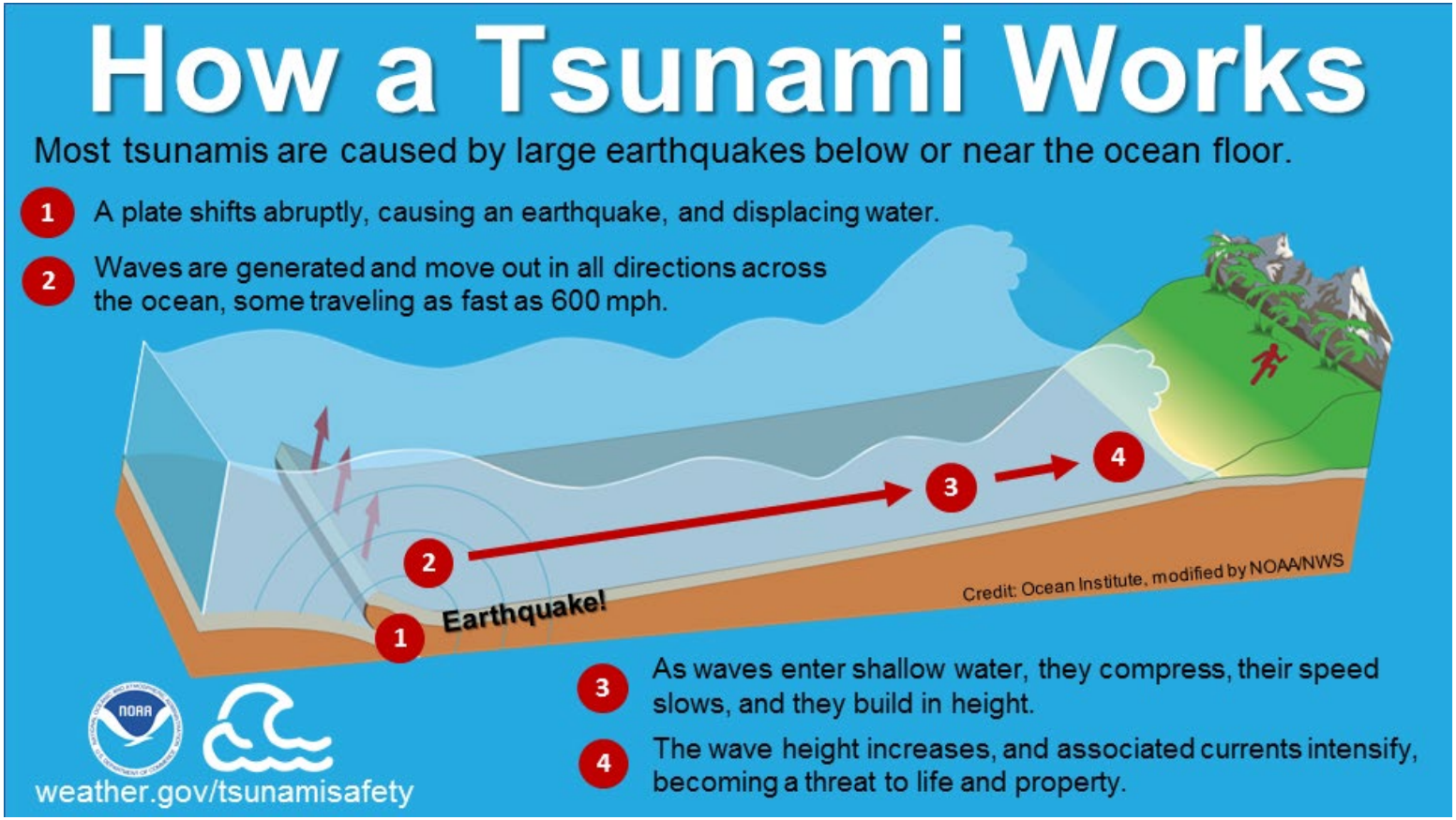
What is a Tsunami?



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Berkeley Marina Tsunami

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Tonga tsunami surge into the Berkeley Marina

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Tsunami Wrecks Marina in Santa Cruz California

WDEF News 12
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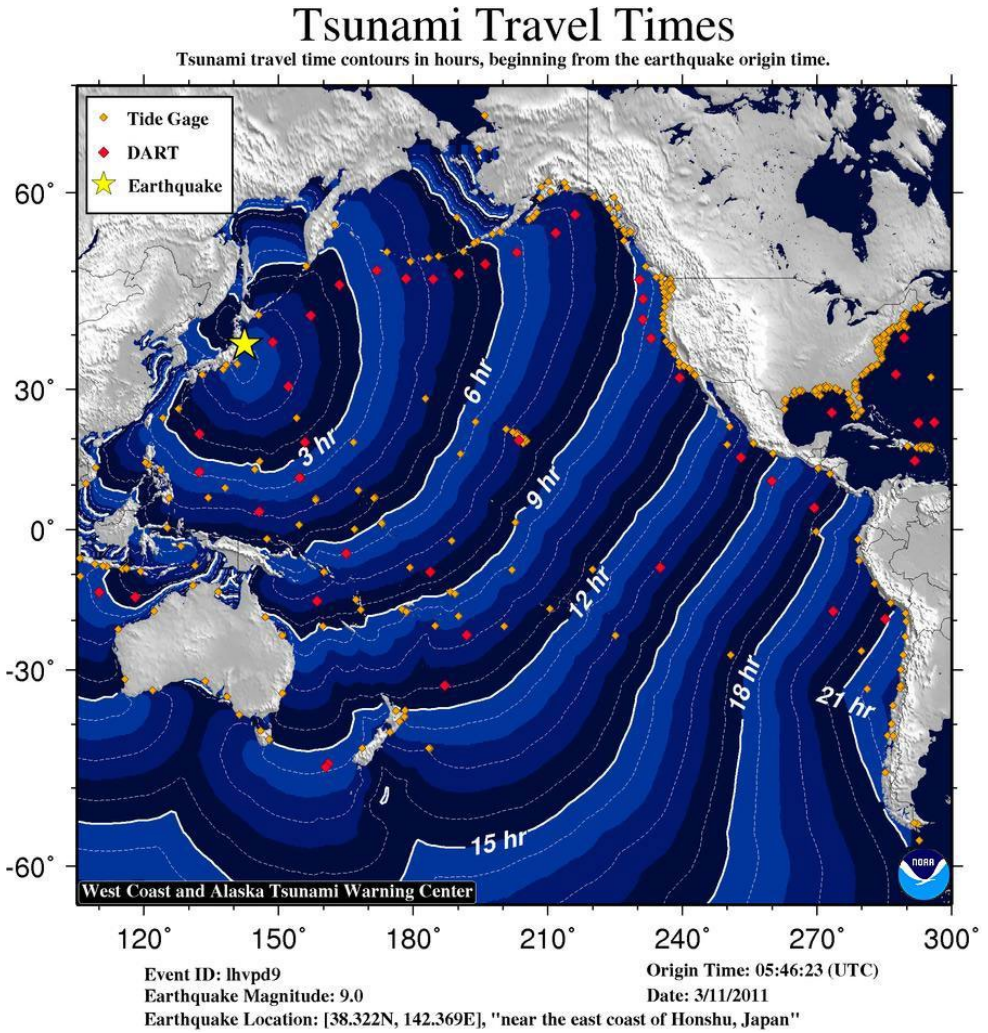
What is a Tsunami?

- Tsunamis affecting the Bay Area can result from **offshore earthquakes within the Bay Area, or from very distant events.**
- Tsunamis impacting the Bay Area are usually generated by faults in Washington and Alaska.



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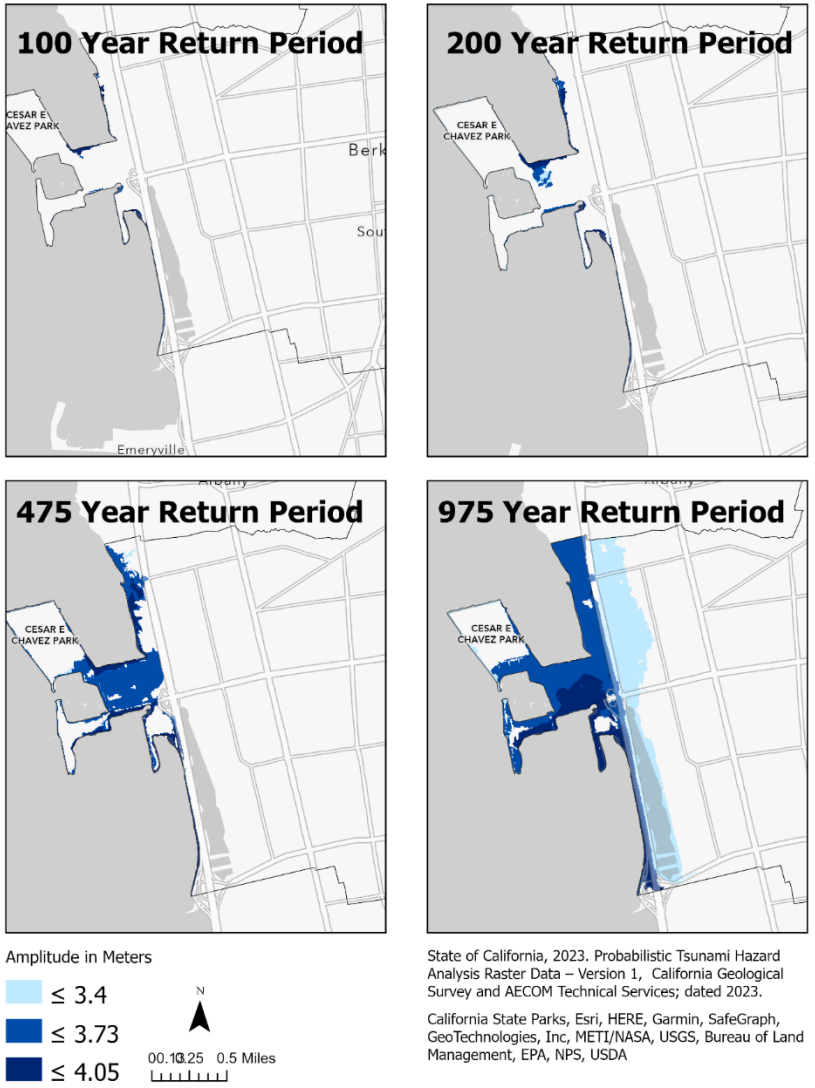
Where is it in Berkeley?

Tsunamis would mostly impact the areas of Berkeley near the Bay. From the coast to about sixth street is considered the tsunami zone. The area that we watch the most is the marina and the maritime community.



State of California, 2023. Probabilistic Tsunami Hazard Analysis Raster Data – Version 1, California Geological Survey and AECOM Technical Services; dated 2023.

California State Parks, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA

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Mitigation Strategy Actions

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Mitigation Strategy Actions

- Continue to repair and replace damaged finger docks.
  - Complete the demolition and replacement of D&E docks.
  - Consider reconstruction or repairs to J L M N and O docks as funding becomes available.

A look back: A broken dock in the marina after the March 11, 2011, tsunami entered the bay. Credit: Betsy Dorsett

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Mitigation Strategy Actions

- Collaborate with the California Office of Emergency Services, the California Geological Survey, and the Federal Emergency Management Agency to **document and explore additional tsunami hazard mitigation measures for Berkeley's maritime communities.**

FEMA

Cal OES
GOVERNOR'S OFFICE
OF EMERGENCY SERVICES

California
Department of
Conservation

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Community Readiness Steps

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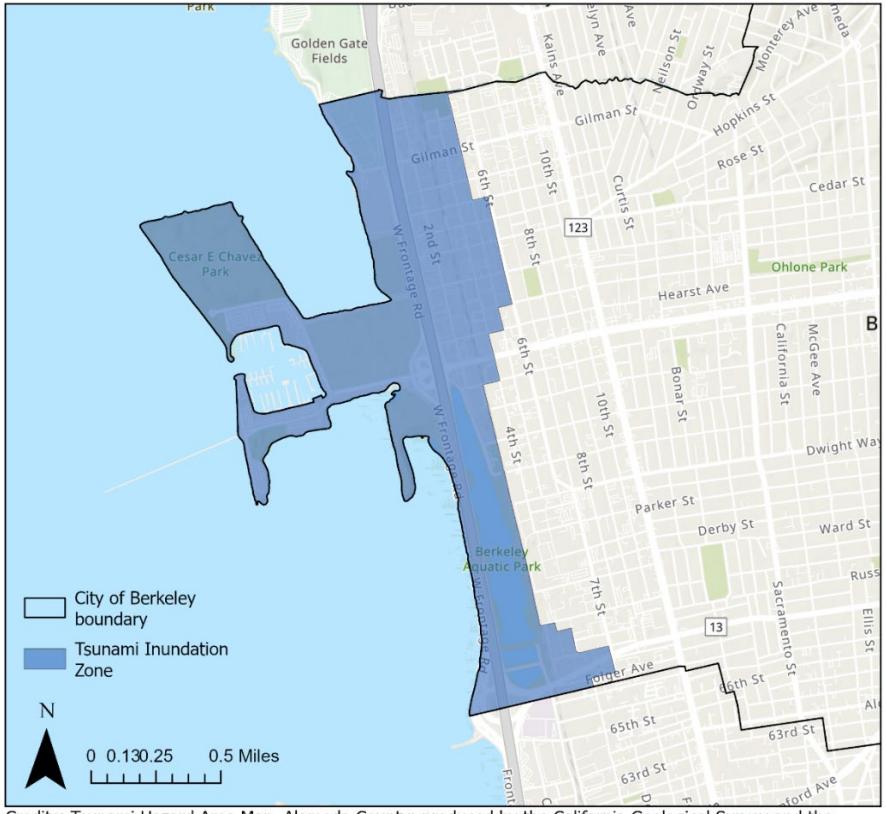

Credits: Tsunami Hazard Area Map, Alameda County; produced by the California Geological Survey and the California Governor's Office of Emergency Services; 2021, mapped at multiple scales.

California State Parks, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, US Census Bureau, USDA, Esri, NASA, NGA, USGS, FEMA

Community Readiness Steps

- Understand Berkeley's tsunami inundation area to **identify whether you might find yourself in the tsunami inundation zone**

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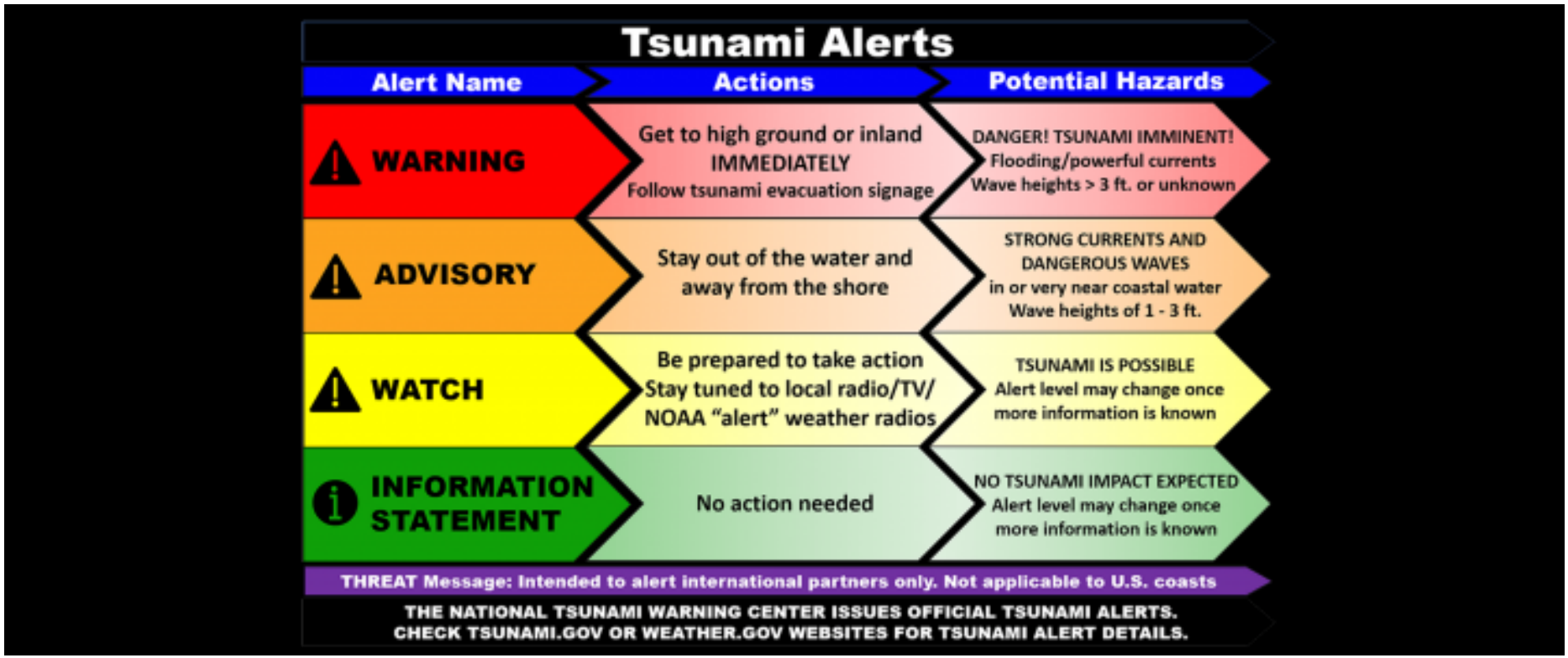
Community Readiness Steps



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Community Readiness Steps

- Bookmark and get familiar with **Berkeley's Emergency Map**

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Community Readiness Steps

- **Personal Preparedness**
  - Sign up for **AC Alert.**
  - Get familiar with the emergency tones from **Berkeley's Outdoor Warning System.**

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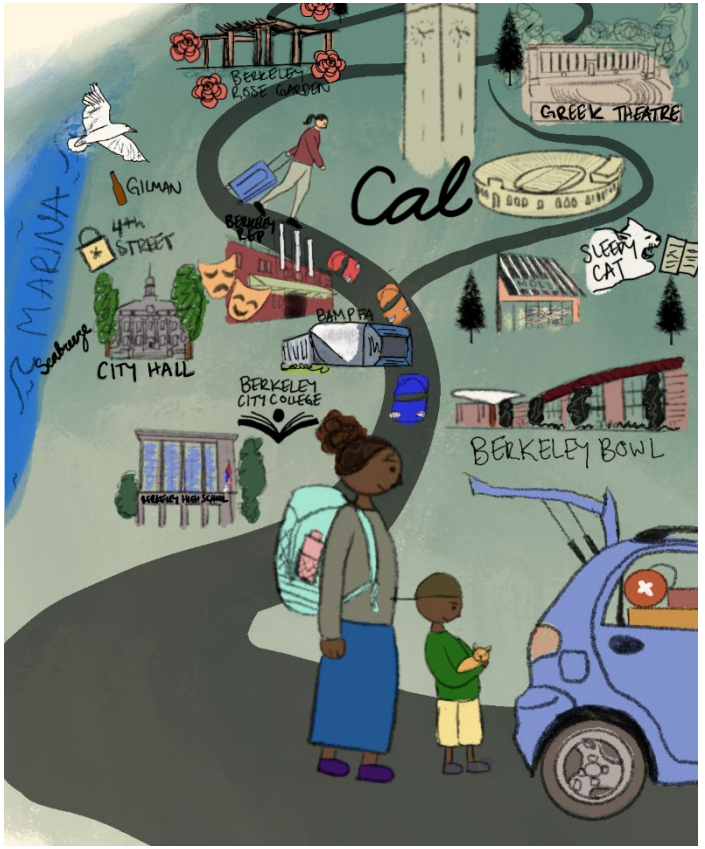
Community Readiness Steps

- If you live in the tsunami inundation zone**, make your household evacuation plan for tsunami**, including:
  - Where will you go – east, out of the tsunami zone
  - What will you pack
  - How will you get there, using which routes
  - Who can help if you need it



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My household will pack…

Distant Source Tsunami

- Items to be safe and comfortable while you are away
- Medications, prescriptions, and medical devices
- Computers, electronics & chargers
- Irreplaceable items (family treasures, art, photo albums)
- Other Valuables

Near Source Tsunami

- **Go-bag (backpack)** with basic items:
  - Flashlight/headlamp
  - Area map, marked with driving/ walking evacuation routes
  - printed list of phone numbers and email addresses for important contacts
  - battery-powered radio and extra batteries
  - prescriptions or critical medications
  - extra eyeglasses or contact lenses
  - extra set of keys
  - cell phone charger
  - copies of important documents
  - toiletries and change of clothing
  - hand sanitizer
- **As you leave, grab**: Wallet, cell phone

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Community Readiness Steps

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Maritime Community

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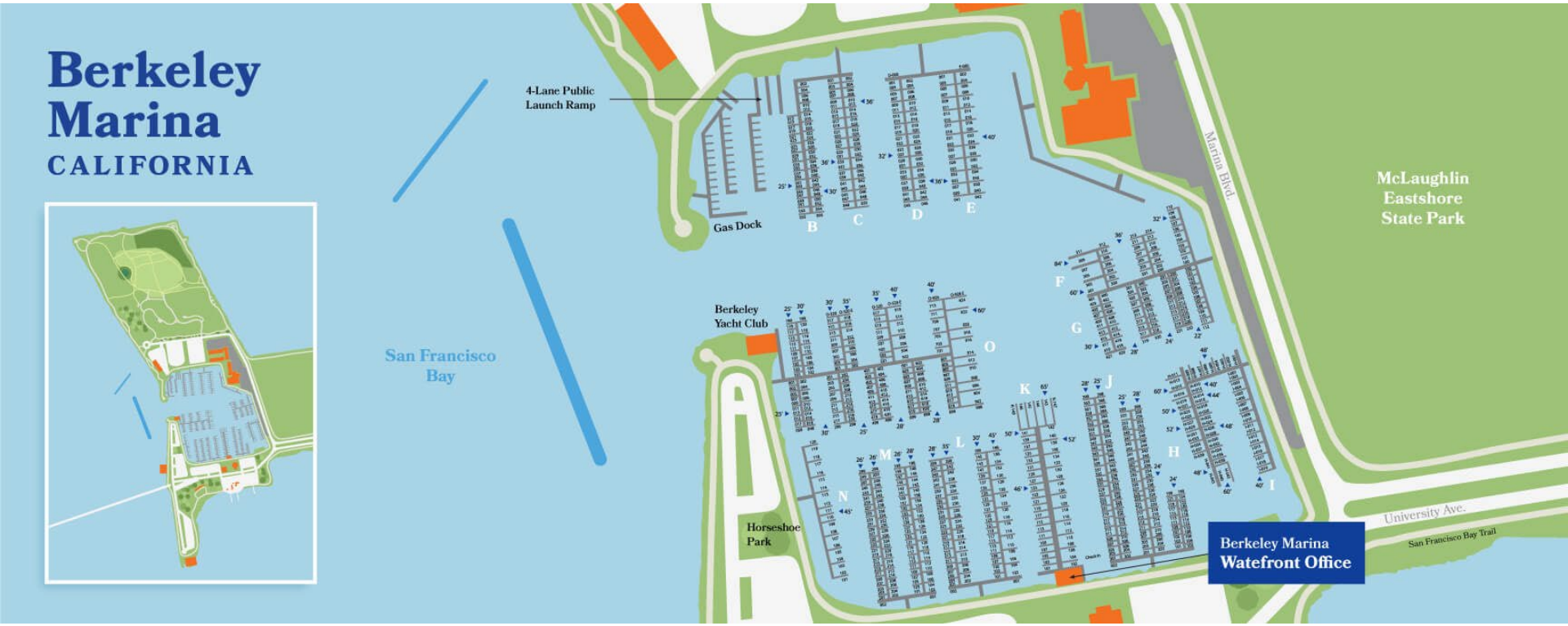
Maritime Community

The City of Berkeley will evacuate docks and shut them down within 1 hour of a tsunami's estimated arrival.



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Maritime Community

Make sure your boat is secured and ready. Keep in mind that the City will shut down the dock 1 hour before the tsunami's anticipated arrival time.

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Maritime Community

Make sure your boat is secured and ready. Keep in mind that the City will shut down the dock 1 hour before the tsunami's anticipated arrival time.

- Secure your boat to the dock and tie down any loose gear.
- Check your dock line condition and replace any worn dock lines.
- Do not install fendering to the dock.
- Remove as much loose boating gear onboard as possible, especially electronics and important documents. Any gear that will remain on your boat should be secured.
- Turn off and disconnect shore power cords, water supply hoses and propane or other gas valves.
- Secure and lock all hatches and port holes. Check for leaks, and seal them as necessary.

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LHMP Hazard Presentation

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Utility Interruption

Possible Utility Interruption

- Natural Gas
- Electrical Services
- Water and Wastewater Services
- Telecommunications

Always Remember…

In an emergency, you should *only turn off* **gas** and **electricity** *if instructed* to do so by the utility company or fire department,

or

if you suspect a gas leak (smell or sound)

Do not try to turn the gas and electricity back on yourself

Ask a qualified professional or PG&E

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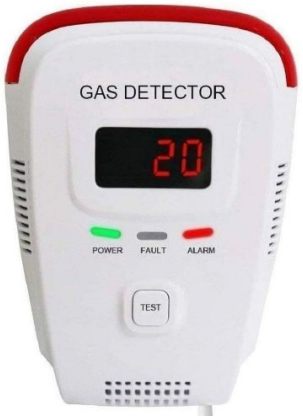
Gas Safety

Gas

- Natural gas is *lighter than air* and is likely *to not be felt* in the event of a leak
- Natural gas detectors are a *must*!
  - Place them in the house and test regularly



Gas (PG&E)

How to secure your home?

1. Locate and clearly label the gas shutoff valve(s)

2. Know how to shut off the gas

3. Have proper non-sparking tools for shutting off gas

4. Have your building and appliances inspected to make sure they can withstand an earthquake

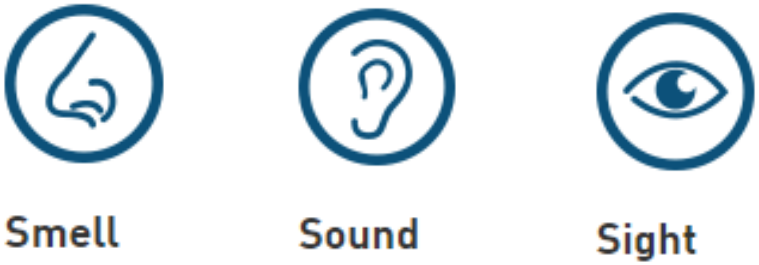
5. If you are unsure of how to shut off the gas properly and safely, you should never attempt to do so!!

Gas (PG&E)

Gas Safety Tips

- Never use a flashlight, match or candle to look for gas leaks
- Do not store flammable materials near any gas appliance
- Do not store combustible materials near any gas appliance
- Stock your house with a fire extinguisher

Signs of a natural gas leak



Gas (PG&E)

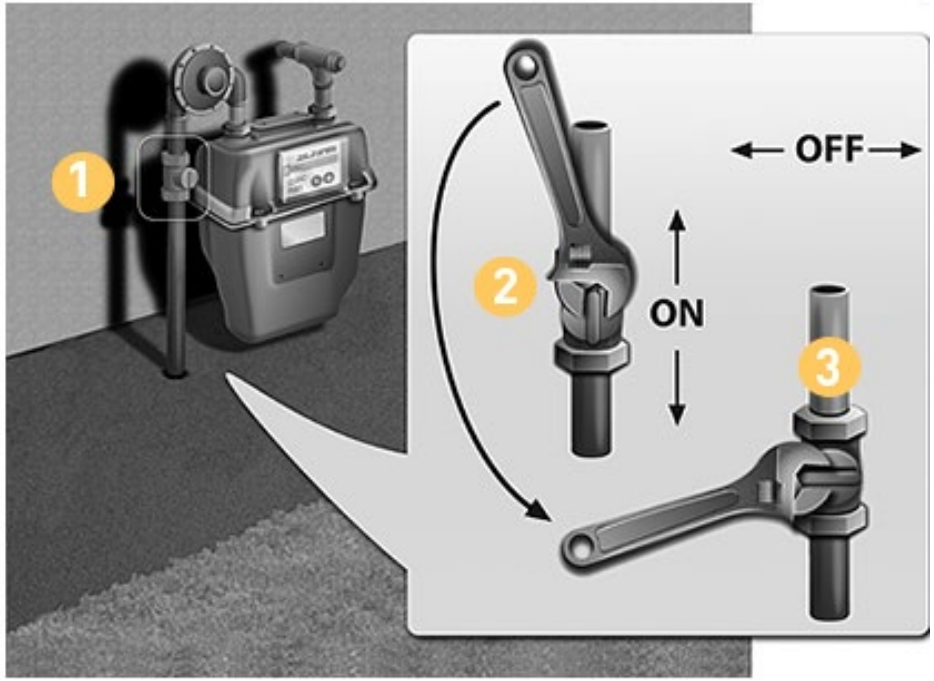
Gas Safety during an *earthquake*

- Turn off the stove if you're cooking before you take cover
- Stay away from buildings and power lines if you're outdoors

Gas (PG&E)

How to turn off your gas

1. Locate the main gas shutoff valve
2. Have a wrench handy
3. Give the valve a quarter turn



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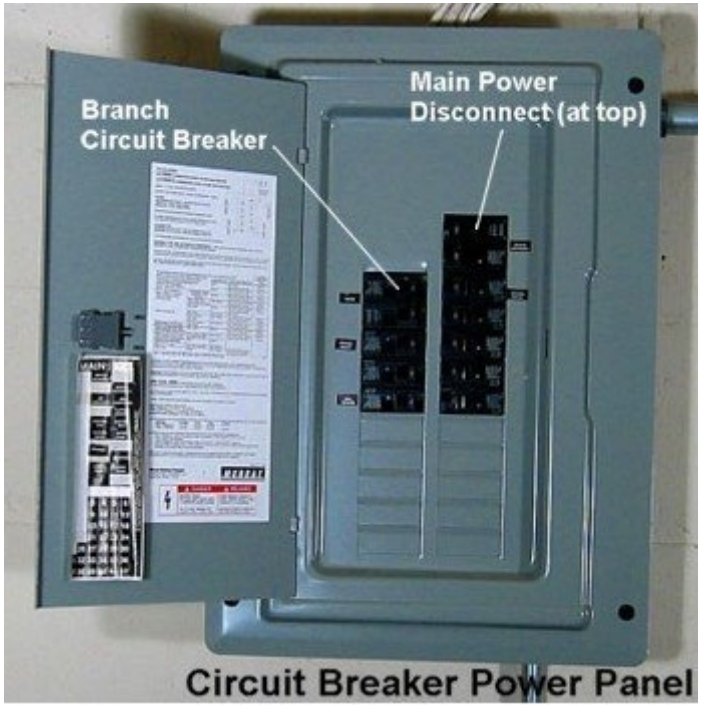
Electrical Emergency

Electrical Emergency

Prior to a disaster…

- Locate & Label your electrical panel
- Remember to always shut off all the individual circuits before shutting off the main circuit breaker



Electrical Emergency

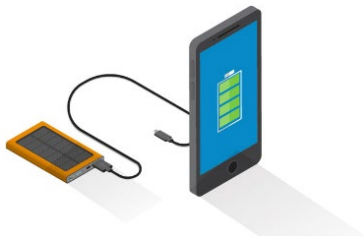
During and right after the disaster…

- Unplug major appliances
- Locate the circuit breakers or fuses and know how to shut off the power
- Turn on the main switch or breaker first, then screw in the fuses or switch on the smaller breakers, one at a time
- Never step in water to turn off the electricity, *call a professional*

Tips to Prepare for a Power Outage

- Make sure PG&E can reach you to alert you of a possible power outage by calling 1-800-743-5000 and updating your contact information

- Pack an emergency supply kit
  - Food, water (1 gal/person/day), medications, flashlights, batteries, and important documents
  - Fully charge your phone and consider having a battery-powered portable charger



Tips to Prepare for a Power Outage

- Practice opening and closing your garage door manually
- If you have a car, be sure to fill the tank
- If you own an electric vehicle, make sure you have enough charge
- Keep cash on hand

How to Protect Yourself and Others During a Power Outage

- Turn off or disconnect appliances, equipment or electronics
- Use food supplies that do not require refrigeration
- Use alternate plans for refrigerating medicines or power-dependent medical devices
- Go to a community location with power
- Avoid carbon monoxide poisoning

How to Protect Yourself and Others During a Power Outage

Make a plan to stay safe and comfortable during power outages

- Think about: What will you need to stay warm? To keep food cool? To operate any medical devices?
- Think of family, friends, or a hotel you could stay with when your home is affected by a long-term power outage

Downed Power Lines

If you see a downed power line, stay away and call 9-1-1.

Do **not touch** them. Do **not touch anything** that is touching the lines. Do **not drive** over them.

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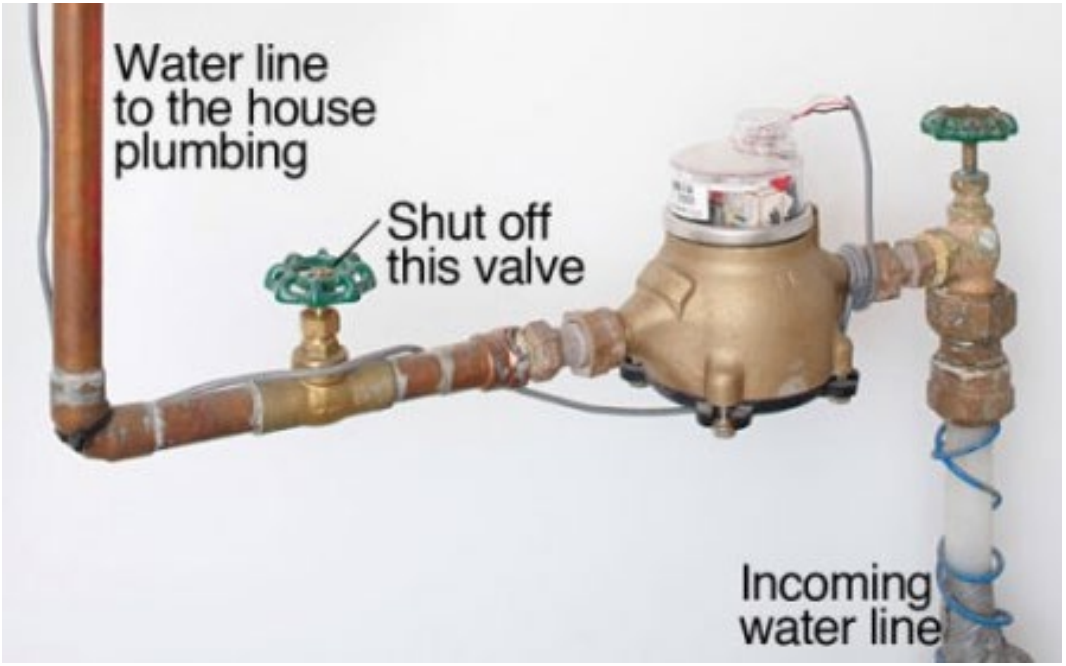
Water

Water in an Emergency

How to shut off water…



Locate your valve and learn how to shut it off

Water Storage for Emergencies

Goal: 1-2 gallons per person per day for 2 weeks

Family of 3: 2 gallons x 3 people x 14 days = 84 gallons total

Family of 4 = 112 gallons

Water Storage Options

To consider:

- Cost
- Easy for storage or moving
- Required maintenance
- How easy it is to get and to use the water in an emergency

Options:

- Gallons of Water
- Water Barrel
- Water Cubes
- Canned Water

Water Storage Options

Option 1: Gallons of Water from the Dollar Store

- Very low cost
- Easy storage/moving
  - Store this water in a cool, dark place
- Frequent refreshing required
  - Has an expiration date (12 - 18 months)
  - After expiration is still good for handwashing and other sanitation
- Easy to use in an emergency

Water Storage Options

Option 2: Water Barrel (55 gallons is standard size)

- Medium cost
  - Example is $120
- Larger storage space required/challenging to move
  - Optional drum dolly is $65
- Refreshing not frequently required
- More challenging to use in an emergency

Water Storage Options

Option 3: Water Cubes

- High cost
  - Examples: $132 for 27 gallons and $180 for 35 gallons
- Easy storage/moving
- Refreshing not frequently required
- Easy to use in an emergency

Water Storage Options

Option 4: Canned Water

- Very high cost
  - $30 - $45 for 24 12-oz cans (2.25 gallons)
- Easy storage/moving (but requires more space)
- No refreshing required
- Very easy to use in an emergency

Useful Tips for Water Storage

Other items to consider having on hand

- Collapsible Water Storage
- Camp Stove
- Bleach

Disposal of "Expired" Water

When disposing water from any kind of jug, use it to water plants or fill your pool or it's not legal to pour clean water down a storm drain

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Wastewater

Wastewater System Disruption

Plan for **alternative bathroom** options

- Flush out any water still in the bowl, put some kitty litter/ peat moss/ lime to absorb liquid and reduce odors into the inner bag, and **go to the bathroom in the inner bag.**

Or

- Use a **large bucket**. A toilet seat can be added.

Wastewater System Disruption

Avoid contact with the sewage as it may contain harmful pathogens

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Telecommunications

Telecommunication Disruptions

How to prepare

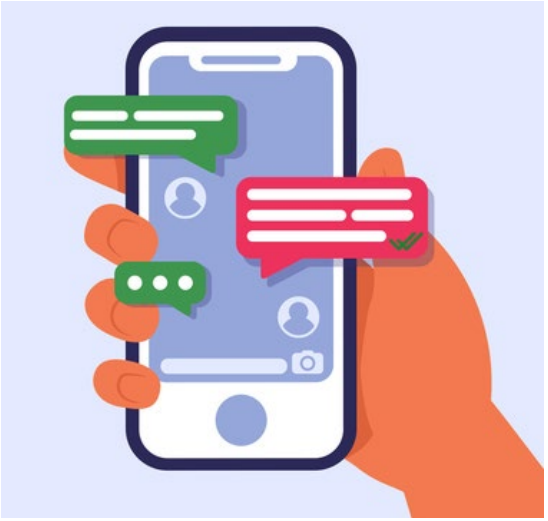
- Establish a backup communication with your family
  - Choose a meeting place and time
- Explore alternative sources of information and entertainment
  - Battery-powered AM/FM radio
- Print important documents or save them to a thumb drive

Telecommunication Disruptions

During an emergency

- Texts over Phone Calls
  - A text message may go through when voice calls cannot because it require less bandwidth from the cellular network

- If internet still works, switch your phone's settings to turn on "Wi-Fi" calling to make calls through the internet



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Next Steps

Next Steps Today!

- Mitigation plan:
  - Share your top mitigation actions and other ideas
  - Full draft plan available in 2024
  - Mitigation@BerkeleyCA.gov

- https://www.phlush.org/set-up-and-use-your-emergency-toilet/
- https://madisonparktimes.com/news/2023/sep/10/after-an-earthquake-the-art-of-managing-pee-and-poop/#:~:text=Simple%20twin%20bucket%20toilets&text=Create%20two%20makeshift%20toilets%20from,bowel%20movements%20(poop%20bucket).

Check This Out

- Gas Safety Tips (PG&E) https://www.pge.com/en_US/safety/gas-safety/gas-safety-tips.page#p3
- Gas Safetyu during an Earthquake (PG&E) https://www.pge.com/en_US/safety/emergency-preparedness/natural-disaster/earthquakes/earthquakes.page
- Emergency Preparedness Kit (PG&E) https://www.pge.com/en_US/safety/emergency-preparedness/preparedness-kit/emergency-preparedness-kit.page
- Emergency Tips (PG&E) https://www.pge.com/en_US/safety/emergency-preparedness/emergency-preparedness.page
- Evaluate your building (PG&E) https://www.pge.com/en_US/safety/emergency-preparedness/natural-disaster/earthquakes/earthquake-safety-evaluate-your-home.page
- Gas Shut Off devices https://www.pge.com/en_US/residential/outages/planning-and-preparedness/safety-and-preparedness/gas-shutoff-devices/gas-shutoff-devices.page
- Electrical Safety (PG&E) https://www.pge.com/en_US/safety/electrical-safety/turning-your-electricity-on-and-off/turning-your-electricity-on-and-off.page

Check This Out

- Water SMART (EBMUD) pdf
  https://www.ebmud.com/index.php/download_file/force/9214/0/

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Hazard Presentation

Wildland-Urban Interface Fire

The hazard, the City's work, and steps to stay safe

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Wildland Urban Interface (WUI) Fire

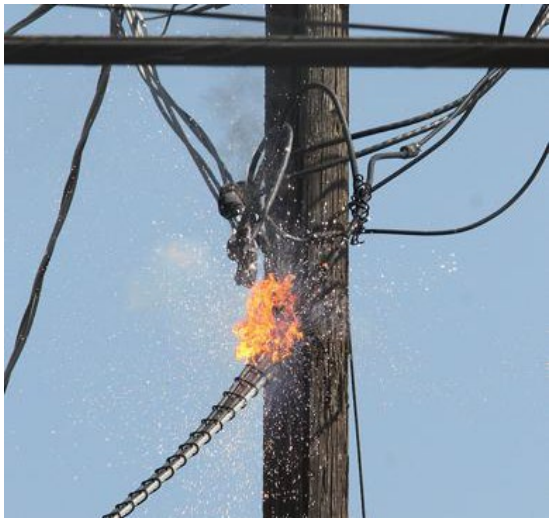
What is a WUI Fire?

It occurs where the **natural landscape** and **urban-built environment** meet or intermix

Sources of Ignition

HUMAN activity and NATURAL causes:

- Power lines
- Sparks from campfires
- Fireworks
- Cigarettes
- Arson
- Lightning strikes



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Dangerous Conditions for WUI Fire Spread

- **Weather:**
  - Fall Time
  - High Sustained Winds
  - Offshore Winds
  - Low Humidity
  - Hot Temperatures
- **Fuel**
  - Dry Vegetation

Climate Change

longer and drier summer conditions

increasing frequency and duration of wildfires

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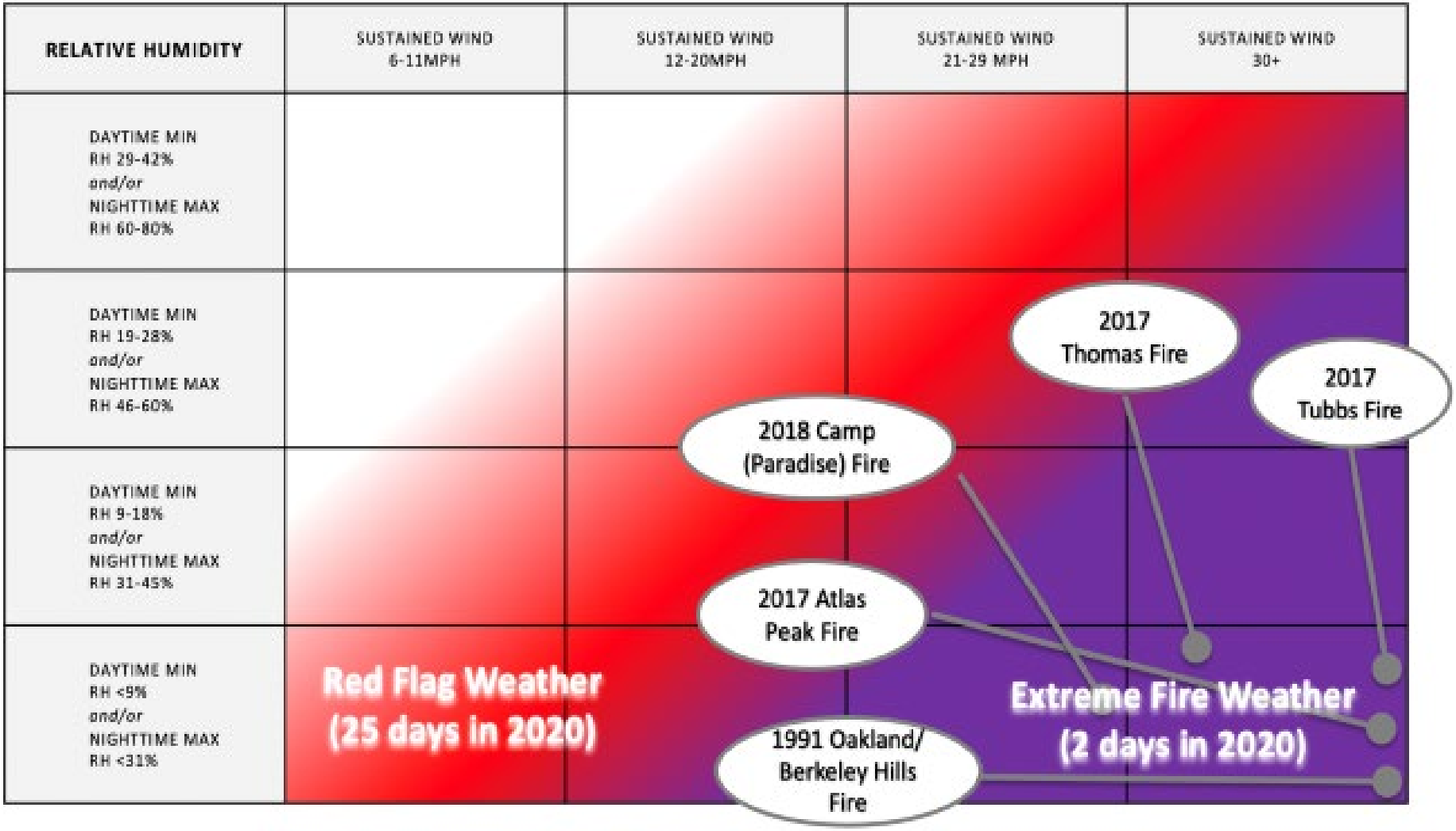
Fire Weather: Know When to Go



WUI Fires:

- Increase landslide risk
- Increase air pollution
- Can lead to power outages

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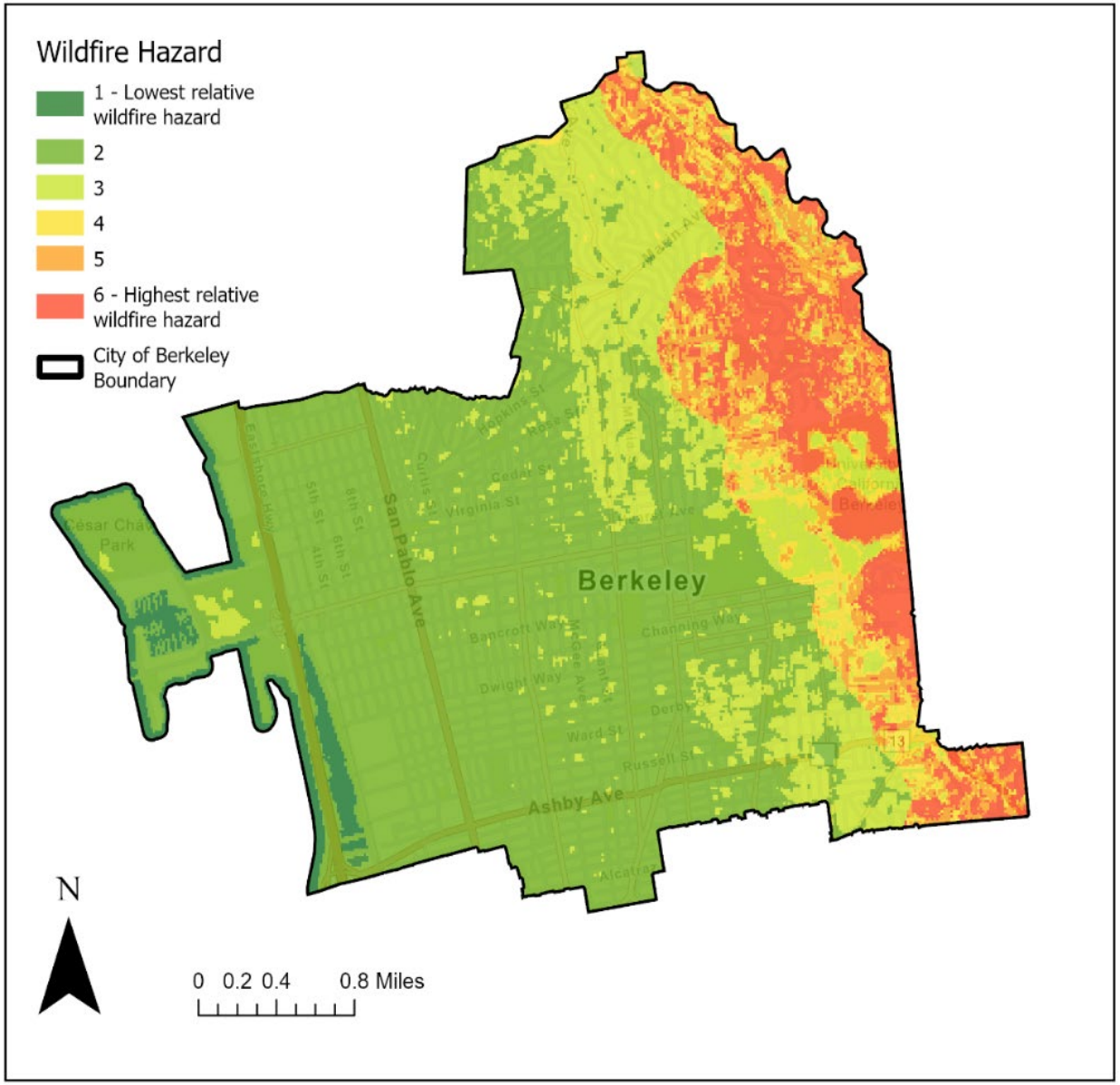
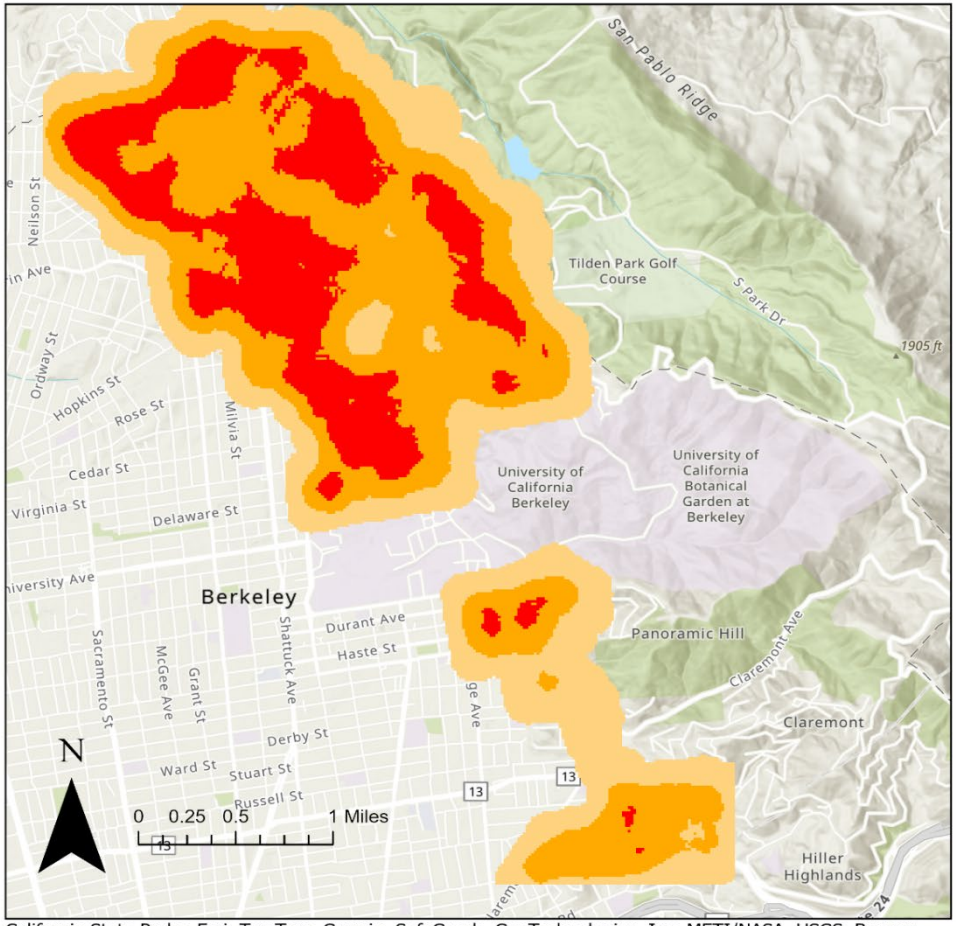
Wildfire Hazard



Sources: 2020 Alameda and Contra Costa County Wildfire Risk to Structures and Wildfire Hazard Maps for Fire Prevention Planning, East Bay Regional Parks, et al.
California State Parks, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA, USFWS

Structure Density in Berkeley Fire Zones 2 & 3

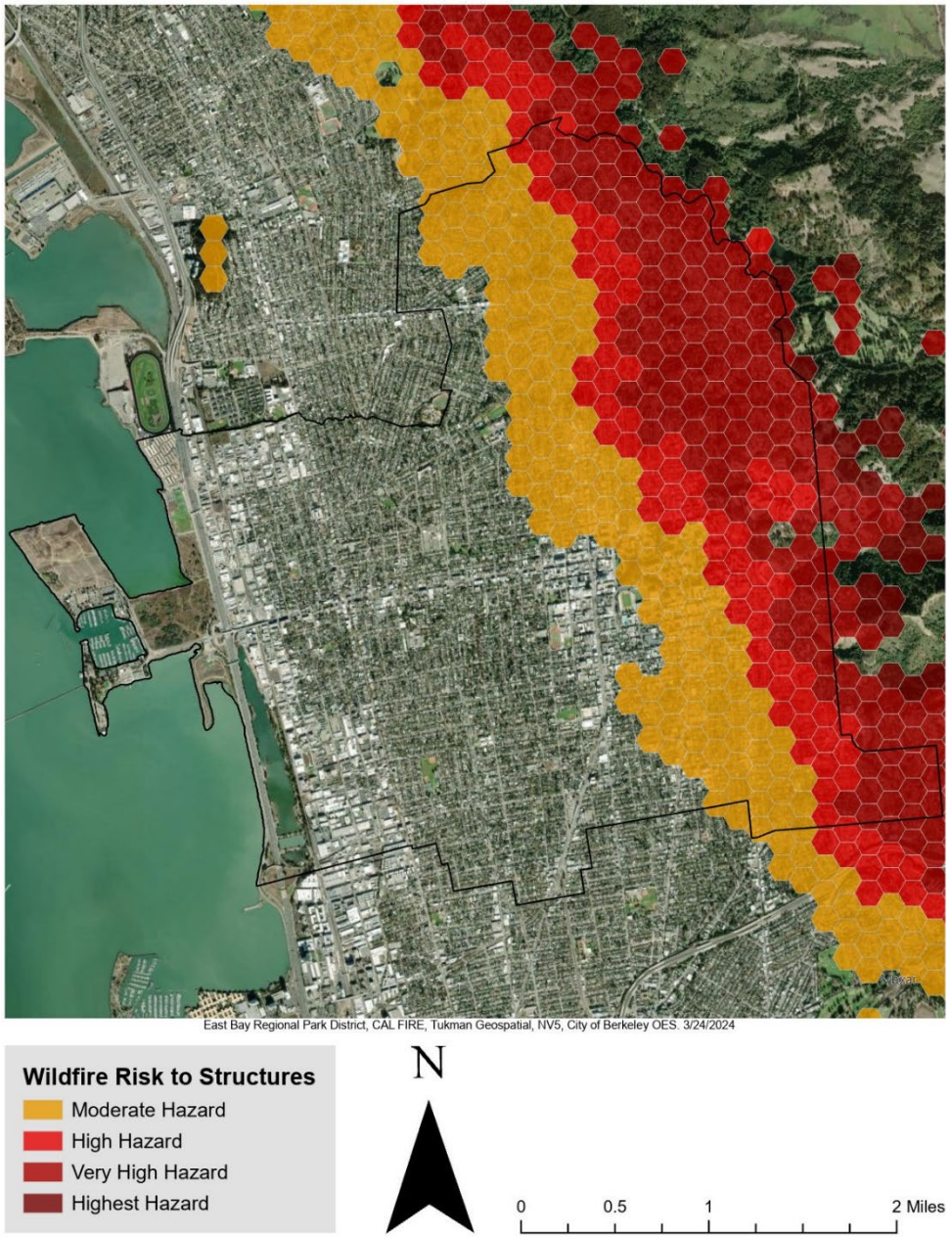


California State Parks, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA, USFWS, Esri, NASA, NGA, USGS, FEMA

Structure density per acre

- 0.001 - 2
- 2.001 - 4
- Greater than 4

Wildfire Risk to Structures in the Berkeley Hills



2024 Draft Mitigation Plan: WUI Fire Strategy

City Mitigation Actions

Coordinate regional wildfire mitigation strategies with key partners and stakeholders

- East Bay Hills Wildfire Prevention Coordination Group
- Hills Emergency Forum

Improve responder access and community evacuation in Fire Zones 2 and 3 through roadway maintenance and appropriate parking restrictions.

- Enforce requirement for fire fuel clearance on public roadways.
- Clear hazardous vegetation along evacuation routes in Fire Zone 2.

Improve responder access and community evacuation in Fire Zones 2 and 3 through roadway maintenance and appropriate parking restrictions.

- Increase parking enforcement in fire-vulnerable areas during fire weather.
- Maintain and improve roadways in Fire Zones 2 and 3.

Manage and promote pedestrian evacuation routes in Fire Zones 2 and 3.

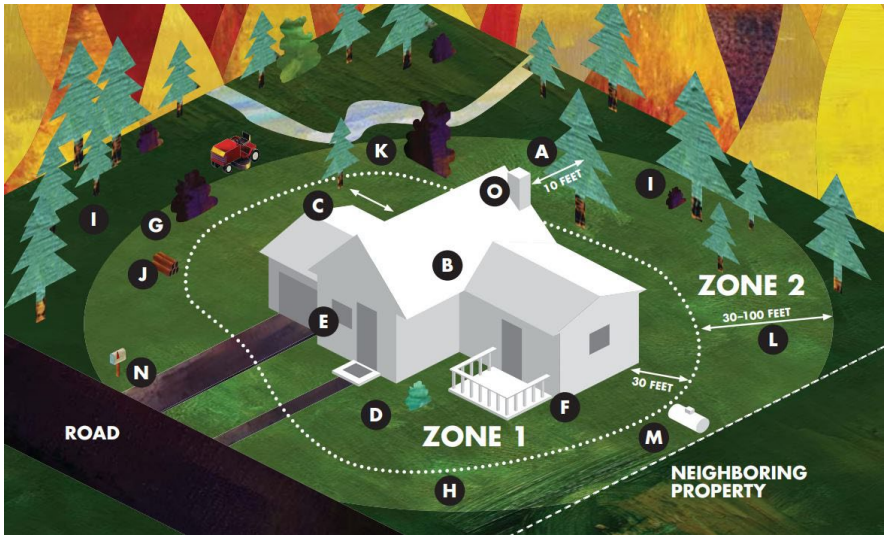
- Publicize up-to-date maps of all emergency access and evacuation routes.
- Maintain signage and paths as-needed
- Coordinate with the Berkeley Path Wanderers
- Install handrails

Mitigate wildfire risk to Berkeley's overnight camps.

- Analyze fire risk at overnight camps and identify appropriate mitigation actions.

Reduce fire risk in existing development through fire code updates and enforcement.

- Adjust inspection cycle annually based on climate change
- Annual building inspections in all Fire Zones.
- Defensible Space Inspections in Fire Zones 2 and 3.



Reduce fire risk in existing development through fire code updates and enforcement.

- YouthWorks to staff Defensible Space inspections in Fire Zones 2 and 3.

Reduce fire risk in existing development through fire code updates and enforcement.

- Update the Fire Code with more stringent local amendments

Reduce fire risk in existing development through vegetation management.

- Explore options on private and public property.
- Maintain Weekly Curbside Plant Debris Collection
- Pursue external funding for vegetation management work and community education

Reduce fire risk in existing development through vegetation management.

- Maintain Fire Fuel Debris Bin Program
- Maintain Fire Fuel Abatement Program on Public Land with technical assistance from WUI Division
- Continue to allocate UC Settlement Funding to do vegetation management projects on UC Berkeley properties.
- Maintain citywide fire fuel chipper program

Reduce fire risk through residential assistance program.

- Continue to implement Resident Assistant Program pilot to provide home hardening materials and defensible space materials and instructions to low income residents in targeted high fire risk areas.

Reduce fire risk through utility undergrounding.

- Urge PG&E to undergrounding line in Berkeley's Very High Fire Hazard Severity Zone (VHFHSZ) to mitigate wildfire risk and limit evacuation and ingress obstruction. Coordinate efforts with the State of CA Public Utilities Commission, and elected officials.

Reduce wildfire risk throughout Berkeley by implementing the Action Plan identified in the Community Wildfire Protection Plan (CWPP).

- Implement the Action Plan in the CWPP.

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Household Risk Reduction

For Berkeley Hills residents (Fire Zone 2 & 3)

- Review home's **Defensible Space Report** and follow the instructions on defensible space and home hardening.

Protect your home

Create a defensible space buffer around your home

Watch videos and learn how to establish Defensible Space:
BerkeleyFireSafe.org/dspace

Harden your home to protect it against fire

- Install a fire resistive roof
- Clear and maintain decks and covered porches
- Non-combustible gutter guards
- Ensure exterior vents will block wind-blown embers

Learn about Home Hardening:
BerkeleyFireSafe.org/Harden

All Berkeley residents

Use the free Citywide Berkeley Chipper Day Program

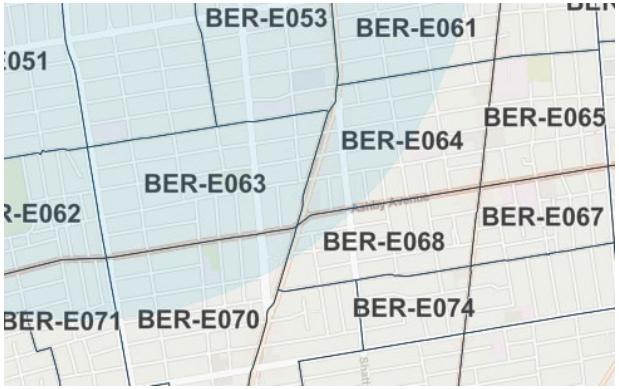
- Curbside pickup
- Chipping
- Disposal of vegetation material

Be ready for emergency alerts

Cell phone alerts
AC Alert.org

Berkeley's Emergency Map
Protect.Genasys.com

Berkeley's Outdoor Warning Siren System
Soundcloud.com/cityofberkeley



Plan for Fire Weather

- Everyone: plan to stay out of the hills during extreme fire weather

- Hills residents: Make your household fire weather plan.
  - When will you leave?
  - Where will you go?
  - What will you pack?
  - Who can help you?

Make your Household Fire Weather Plan:
BerkeleyCA.gov/Wildfire

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Next Steps

Next Steps Today!

- Mitigation plan:
  - Full draft plan available at BerkeleyCa.gov/Mitigation
  - Share your top mitigation actions and other ideas: Mitigation@BerkeleyCA.gov

Summary of Changes to the City of Berkeley's 2024 First Draft Local Hazard Mitigation Plan

This document outlines the revisions made to Berkeley's 2024 First Draft Local Hazard Mitigation Plan (2024 First Draft) that are present in the 2024 Final Draft Local Hazard Mitigation Plan.

1. In the Executive Summary, on page ES-5, the following information has been added about the link between growing WUI fire risk and climate change:

   Climate change is resulting in longer and drier summer conditions leading to wildfires of greater frequency and duration. Increased drought conditions cause fuels to become extremely dry and more fire prone. Additionally, climate change causes more frequent bouts of extreme weather, including low humidity and high winds associated with fire weather.

2. In the Executive Summary, on page ES-6, the following information has been added:

   The fire risk facing the people and properties in the eastern hills is compounded by the area's mountainous topography, hazardous vegetation, minimal access and egress routes, and location, overlaid upon the Hayward Fault. Berkeley's flatlands are also exposed to a fire that spreads west from the hills.

3. In Element A: Planning Process, on page A-3 the following information has been added about the Public Review of the First Draft Plan:

   In response to this offer, Council Members suggested a presentation to the Safety Committee, which staff gave in July 2024.

4. In Element B: Risk Assessment, on page B-57 the following text was added:

   Locations of WUI Fires and Related Hazards.

5. In Element B: Risk Assessment, on page B-68, the following text was added:

   ## Hazardous Vegetation

   Certain plant species, including native and non-native species, have characteristics that make them ignite readily and burn intensely contributing to wildfire risk. Characteristics may include being biologically prone to burn due to chemical composition, being difficult to maintain in a fire-resistant state, presenting challenges to routine maintenance, having high surface area to volume ratio, or being prone to rapid changes in moisture content in response to environmental conditions. While these characteristics make some plants more fire-hazardous, all plants can burn if they are dead, poorly maintained, or drought stressed.[i]

Historically, the East Bay Hills ecosystem burned regularly. Researchers have proposed that under indigenous land management, fires due to both natural and anthropogenic ignitions occurred every 5-15 years.[ii] Fire is this ecosystem's natural way of clearing dead vegetation and maintaining forest health. Many California native plant species present in the East Bay Hills also need fire in order to reproduce.

Living in a fire-prone area means taking steps to mitigate risks while also recognizing that it's infeasible to remove all of our vegetation. The mere presence of a certain fire hazardous species does not always mean it must be removed. Other factors, such as maintenance and placement, are more important than the plant itself. For property owners thinking about their own landscaping, it's great to focus on California native or other pollinator friendly plants that require little water and are easy to maintain. However, "There are no published fire-wise or fire-resistant plant lists that are science based or peer reviewed. Design and maintenance are more important than plant selection."[iii]

To protect life and property, the Berkeley Fire Department inspects all properties in the Very High Fire Danger Severity Zone for Defensible Space, which is the buffer created between a structure on your property and the grass, trees, shrubs, or other vegetation that surrounds it. This may include the removal of certain vegetation within 100 feet from any structure. These mitigation measures, along with home hardening, are the scientifically validated actions that have the most impact on reducing the ignition potential of homes. Failure to comply with recommendations results in citations and fines.

The City, often in collaboration with regional partners, works to remove and or clean up the understory of hazardous trees that are likely to burn and potentially impact people and infrastructure. For more information on these programs, review Element C: Mitigation Strategy.

6. In Element B: Risk Assessment, on page B-87, the following section was deleted and added to Element C: Mitigation Strategy, C.5 Household Mitigation Actions (see # below for what was added):

   B.3.i Berkeley Household Risk Reduction

7. In Element B: Risk Assessment, on page B-111, the following section was deleted and added to Element C: Mitigation Strategy, C.5 Household Mitigation Actions (see # below for what was added):

   B.4.h Berkeley Household Risk Reduction

8. In Element B: Risk Assessment, on page B-126, the following section was deleted and added to Element C: Mitigation Strategy, C.5 Household Mitigation Actions (see # below for what was added):

B.5.h Berkeley Household Risk Reduction

9. In Element B: Risk Assessment, on page B-138, the following section was deleted and added to Element C: Mitigation Strategy, C.5 Household Mitigation Actions (see 21 below for what was added):

   B.6.h Berkeley Household Risk Reduction

10. In Element B: Risk Assessment, on page B-151, the following section was deleted and added to Element C: Mitigation Strategy, C.5 Household Mitigation Actions (see 21 below for what was added):

    B.7.h Berkeley Household Risk Reduction

11. In Element B: Risk Assessment, on page B-167, the following section was deleted and added to Element C: Mitigation Strategy, C.5 Household Mitigation Actions (see 21 below for what was added):

    B.8.h Berkeley Household Risk Reduction

12. In Element B: Risk Assessment, on page B-210, the following section was deleted and added to Element C: Mitigation Strategy, C.5 Household Mitigation Actions (see 21 below for what was added):

    B.10.h Berkeley Household Risk Reduction

13. In Element B: Risk Assessment, on page B-220, the following section was deleted and added to Element C: Mitigation Strategy, C.5 Household Mitigation Actions (see 21 below for what was added):

    B.11.h Berkeley Household Risk Reduction

14. In Element C: Mitigation Strategy, on page C-5, the following text was added:

    Measure T1 provides $100 million of funding from bond revenue to pay for improvements to City infrastructure and facilities. Berkeley voters passed Measure T1 in November 2016. Measure T1 funds are used for a variety of infrastructure improvements, including upgrading Senior Centers and Community Centers to immediate occupancy and increase their ability to serve the community regularly and during disasters. Future mitigation actions could include upgrading additional buildings and or building new ones.

15. In Element C: Mitigation Strategy, on page C-10 for Expanded Inventory of Potentially Seismically Vulnerable Buildings, the following text was added:

    With the launch of the Retrofit Grants Program, staff conducted extensive research to update and refine the City's inventory of potentially seismically vulnerable buildings. In

addition to soft story buildings not currently subject to mandatory retrofit such as those with 3-4 residential units or commercial uses, Berkeley has numerous non-ductile concrete and tilt-up or other rigid wall-flexible diaphragm (RWFD) buildings. Future expansion includes conducting research to determine other hazardous buildings that should be inventoried and exploring additional mandatory retrofit ordinances.

16. In Element C: Mitigation Strategy, on page C-12 for Fire Department: WUI Division, the following text was added:

    City of Berkeley Fire Department instituted a WUI division in 2021 supported with funding from Measure FF. The WUI Division is primarily responsible for the coordination of wildland mitigation efforts and related inspection activities. The ability for the Division to expand on mitigation activities is outlined in the Action Plan of the Community Wildfire Protection Plan (CWPP).

17. In Element C: Mitigation Strategy, on page C-26 the following text was deleted:

    Currently, the City is identifying funding to upgrade the MLK Junior Youth Services Center, the Willard Clubhouse, the African American Holistic Resources Center, and the South Berkeley Senior Center.

    This text was replaced with:

    Currently, the City is using T1 Funds on the MLK Jr. Youth Services Center Retrofit and Renovation project and the Willard Park Clubhouse and Restroom Replacement Project. Both of these facilities will be upgraded to immediate occupancy status, meaning that post earthquake, only limited structural damage will have occurred. The Willard Park Clubhouse is currently under construction and the MLK Jr. Youth Services Center is in the design part of the process. Using T1 and General Funds, the African American Holistic Resource Center is currently in the design part of the process. The African American Holistic Resource Center (AAHRC) will be a facility to house culturally relevant services to help eliminate inequities within Berkeley's African American Community. The vision for the African American Holistic Resource Center is to host services to benefit the community with education, employment, health, mental health, and housing advocacy and supports. It will be built to immediate occupancy status.

    Using funds from Measure T1 and funding from a FEMA grant, the South Berkeley Senior Center is being renovated to include disaster preparedness, electrification, energy efficient building systems, and other enhancements to the community building. It's in the design phase.

    The City is currently seeking opportunities for funding and grants to develop the design and complete construction for the Frances Albrier Community Center.

18. In Element C: Mitigation Strategy, on page C-39, the following text was added

Inventory of Potentially Seismically Vulnerable Buildings

19. In Element C: Mitigation Strategy, on page C-43, the following text was added under Resident Assistance Program:

    In 2024 CalFIRE announced that the BFD was awarded a grant to fund its Defensible Space Resident Assistance Program (RAP) in the VHFHSZ over a three-year period to interrupt the contiguous vegetative fuel in these pathways and inhibit the transmission of wildfires. The RAP will provide financial assistance to Berkeley Hills residents who are low-income, senior citizens 65 years or older, and those with physical disabilities to help achieve defensible space within Zone 0, Zone 1

20. In Element C: Mitigation Strategy, on page C-44, the following text was added under Vegetation Management Programs:

    The Eucalyptus Understory Cleanup is a program that provides a one-time service to bring properties into compliance with best practice hazardous vegetation management practices. Planted in plantations over 100 years ago, eucalyptus groves can produce between 10 to 30 tons of dry matter per acre per year, increasing the potential to spread a ground fire. Eucalyptus trees can be extremely expensive to remove due to their size and age. Following participation in this program, residents will be required to maintain properties in adherence with the Fire Code.

21. In Element C: Mitigation Strategy, on page C-66, the following section and text was added:

    C.5 Household Mitigation Actions

    The Local Hazard Mitigation Plan is designed to address and recognize how the whole community can and does work together to mitigate Berkeley's natural hazards. The following steps are ways that individual community members and households reduce their own risks and contribute to Berkeley's collective mitigation efforts:

    ## Earthquakes

    ### Secure your home

    - Store heavy and breakable objects on low shelves
    - Bolt bookshelves and heavy furniture to the wall
    - Move or secure hanging objects over beds, sofas, and chairs
    - Use quake gel or putty to secure breakable objects in place

For homeowners

- Assess your home by hiring a structural engineer
- Retrofit your home if needed
- Understand available retrofit grants, including the City's Brace and Bolt program
- Consider earthquake insurance

For renters

- Talk to your landlord:
- When was the house built?
- What materials were used?
- Is the building retrofitted?
- Does it require retrofitting?
- Consider earthquake insurance

Prepare to be safe at home

- Store water (enough for 1 gallon per person per day for 3 days)

Practice what to do during an earthquake

- Drop, cover, and hold on
- Do not stand in a doorway, run, or get into the "triangle of life". The 'Triangle of Life' is a misguided idea about the best location a person should try to occupy during an earthquake. Based on observations of past earthquakes, this idea doesn't apply to buildings constructed within the United States. Please do not consider this as a safe hiding spot.
- Learn how to turn off gas, electricity, and water at your house. If you rent, check in with your landlord.

- If after an earthquake you small gas, contact PG&E and tell them to shut it off or call 9-1-1

Wildland-Urban Interface Fire

Berkeley hills residents (Fire Zone 2 & 3):

- Review home's Defensible Space Report and follow the instructions on defensible space and home hardening.

- Create Defensible Space: Understand that all of Berkeley is at risk of wildland-urban interface fire. Further, 95% of property in Berkeley is privately owned, meaning that owners have to act to make their properties defensible.

- Defensible space is the area around a home where vegetation has been specifically maintained, and flammable items have been specifically positioned, in order to reduce the spread of wildfire.

- Keep Zone 0, or the first five feet from your home, clear of combustible materials. Use hardscape like gravel or concrete, remove dead or dying plants, remove branches from chimneys, limit combustible items like patio furniture, relocate firewood, replace any combustible fencing, and consider relocating garbage containers outside this zone.

- In Zone 1, or five to 30 feet around your home, remove all dead plants and dry leaves, and trim trees regularly. Create a separation between items like shrubs and items that catch fire like patio furniture and swing sets.

- In Zone 2, or 30 to 100 feet from your home, reduce potential fuel within 100 feet of the property line. This includes cutting annual grass, creating space between shrubs and trees, removing fallen leaves, and keeping clearance around exposed wood piles.

- Harden your home to decrease the likelihood of fire igniting the structure. The highest priority items are:

    - Install a fire resistive roof

    - Clear and maintain decks and covered porches

    - Regularly clear tree debris

- Remove large rugs and combustible wood, wicker, or plastic furniture
- Ensure any small items like cushions are small enough to be moved inside on Red Flag or Extreme Weather days
- Remove anything stored under the deck or stairs
- Include a five-foot noncombustible buffer around deck and stairs
- Install non-combustible gutter guards to keep tree debris out
- Ensure the vents to your attic, basement, and crawlspace will block wind-blown embers from entering your home. You can install ember-resistant vents or cover Be ready to receive emergency information.

For all Berkeley residents:

- Use the free Berkeley Chipper Day Program for curbside pickup, chipping, and disposal of vegetation material from your residential property.
- Sign up for AC Alert
- Bookmark and get familiar with Berkeley's Emergency Map
- Get familiar with the test and emergency tones from Berkeley's Outdoor Warning System
- Make your household fire weather plan.
- Stay out of the hills during extreme fire weather days.

Extreme Heat

Prepare to be safe at home

- Gather supplies to keep yourself cool, including:
  - Ice – fill up all your ice trays and freeze them and any ice packs overnight

  - Spray bottle – to spray mist on yourself to keep cool
  - Personal fan – fan to point at yourself
  - Towel – to wet and put on your body

- Plan to keep your home cool on hot days without air conditioning, using:
  - A larger fan – to move hot air out of your home
  - An indoor/outdoor thermometer – set this up to know when to let cooler outside air into your home
  - Be ready to block sunlight and heat, using blackout curtains, reflective film, solar blankets or cardboard. Blocking your windows with a light-colored sheet facing out, followed by a dark-colored sheet facing in, can help to reflect light away and keep your home cooler.
- Prepare for potential power outages *(see utility disruption section)*

Make a plan for where to go (and how to get there) if your home gets too hot.

- Consider locations you could visit that have air conditioning, like malls, stores, or community cooling centers.
- Make a transportation plan – consider using friends and family, public transit, carpooling, or using a taxi or rideshare service.
- If you use a wheelchair or other mobility device, you may also consider:
- Pre-scheduling a paratransit trip to a cool location before the hottest hours of the day
- Using Easy Does It for a Rescue Ride or Routine Transportation (BRSD members only)

Buddy up with your friends, family, and neighbors:

- Make a plan to check on friends, family and neighbors at least twice a day during a heat wave. Check to see if people are developing signs of heat exhaustion or heat stroke. Remember that people who live alone are at the

greatest risk in a heat wave because no one will notice if they develop heat stroke.

- Think about how to work together to get to a location with air conditioning or a community cooling center if someone's home gets too hot.

Monitor the heat

- The Occupational Health and Safety Administration (OSHA) Heat Safety Tool helps you understand how hot it is where you are located.

During a heat wave

- Get Plenty to Drink: Sweating removes needed salt and minerals from the body. When it is hot, drink more water, juice and sports drinks. Avoid drinks with caffeine (tea, coffee, and cola) and alcohol. Be sure to eat regularly.

- Stay safe in your home:

    - Wear as little clothing as possible when you are at home. Choose lightweight, loose-fitting clothing.

    - Spray yourself with water or make your skin wet with towels, then stand in front of a fan. When the water evaporates it will pull heat away from your body.

    - Keep windows open at night to capture the cool air. Closing windows to trap the cool air in the morning can be helpful before the heat of the day comes. If you have an indoor/outdoor thermometer, monitor temperatures inside and outside your home. When it is cooler outside, open windows and doors to let in cool air. When temperatures are equal, close windows and doors to keep cool air in as the outdoors heats up.

- If you must go outside:

    - Choose lightweight, light-colored, loose-fitting clothing. In the hot sun, a wide-brimmed hat will keep the head cool. If you will be in direct sun, use a sunscreen with a sun protection factor (SPF) of 15 or higher and follow package directions. Reapply every 2 hours while in the sun.

    - Schedule Outdoor Activities Carefully: Try to be less active during

the hottest part of the day, late afternoon. If you must be out in the heat, plan your activities so that you are outdoors either before noon or in the evening. While outdoors, rest often in a shady area.

- Never leave children or pets in a parked car.

- Pace Yourself: If you are not used to working or exercising in hot weather, start slowly and pick up the pace gradually. Take frequent, regularly scheduled breaks. If activity in the heat makes your heart pound or leaves you gasping for breath, stop activity, get into a cool or shady area, and rest. Especially if you become lightheaded, confused, weak or feel faint.

Poor Air Quality

Get air quality information

- Be familiar with the Air Quality Index

- Bookmark websites with key air quality information:

- Forecasts: AirNow.gov

- Real-time readings: US EPA/US Forest Service Fire and Smoke Map

Prepare your home for poor air quality

- Keep outside pollution outside by replacing or sealing leaky windows and doors. This will also make your home more energy efficient and comfortable.

- People on limited incomes should check out California Weatherization Assistance Program services offered by Spectrum Community Services.

- Purchase equipment to clean the air inside your home, with filters for your HVAC system or portable air cleaners.

- HVAC system filters: If properly configured and maintained, air cleaners and specialized filters designed for use in HVAC systems may have the greatest potential to improve your entire home's air quality because most HVACs circulate very large volumes of filtered air throughout the home.

- Install a high-efficiency filter (MERV 13 rating or higher) with a MERV rating

as high as your system can handle, based on manufacturer recommendations.

- Portable air cleaners: These units are usually best for single room use, rather than multiple room or whole-house use, because of their limited capacity to circulate large volumes of filtered air.

- Purchase one or more California Certified Air Cleaners for room(s) in your home. Make sure your cleaner is on this certified list so you can be sure it will not emit harmful ozone when you use it.

- Use the "Clean Air Delivery Rate" (CADR) to calculate the correct size portable air cleaner for the room.

- If an air cleaner is out of your price range, you can construct one with a box fan for a cost of $45-$75.

Key Actions during poor air quality events (see the California Air Resources Board's Smoke Ready California site for details)

- **Stay inside**: The best way to prevent breathing harmful particles is to stay indoors with windows and doors closed.

- If you have a central-ducted heating/air conditioning and heating system, be sure to set the system to "on" to ensure air is being filtered constantly, rather than "auto," which runs the system intermittently.

- If your system brings fresh air into the home, close the fresh-air intake so that it operates in in recirculation mode to prevent outdoor smoke from getting inside.

- Filter the air: Use a CARB-certified portable air cleaner and run continuously on the highest setting. This can greatly reduce indoor particle levels to further reduce impacts from smoke.

- Gather people in a room with the air purifier. A portable air cleaner will clean the air around it, but cannot is not designed to clean the air in your whole home.

- Do not run whole house fans or swamp coolers.

- Avoid activities that increase indoor pollution, such as burning candles, using gas stoves and vacuuming.

- Use a damp cloth or mop to trap settled dust and particles.

- Stay cool. Run fans, or run air conditioning on “recirculate” setting with a new filter. NOTE: If poor air quality happens at the same time as extreme heat, do whatever you need to stay cool, even if it means opening windows and doors. Heat will kill more quickly than air pollution.

- **If you must go outdoors** for long periods of times in areas of heavy smoke, you may want to wear a NIOSH-certified N95 respirator mask. Those with existing respiratory, lung or heart conditions should limit their exposure by staying indoors. Since wearing a respirator can make it harder to breathe, those with lung or heart conditions should check with their doctor before using one.

- If you purchase N95 masks, make sure they are NIOSH-approved. Choose a size and model that fits your face and has no gaps. Test it by doing a seal check.

- Keep a very close eye on children, who are less likely to notice or report symptoms than adults, even when they are affected.

- Look out for signs that you or those around you need cleaner air. Symptoms can include:

    - Coughing

    - Throat irritation

    - Pain, burning, or discomfort in the chest when taking a deep breath

    - Chest tightness, wheezing, or shortness of breath

High Wind

Keep trees properly maintained.

- City trees:

  City trees grow between the sidewalk and the street, in a street median, in

a public park, or on any other property owned by the City of Berkeley. View a map of Berkeley City trees.

- To submit a request for pruning or removal of a City tree, call 311 or email trees@berkeleyca.gov.

Privately owned trees

- All other trees are privately owned, and maintenance is the responsibility of the owner. Similarly, if a private tree or limb falls, cleanup and damages are also the responsibility of the homeowner.

- Get a professional arborist assessment to identify any signs of decay, dead branches, or other structural issues that could lead to problems in the future.

Before a wind event

- Bring any loose outdoor items such as holiday decorations and chairs inside, or securely tie them up. Beside the risk of these items being blown away or damaged, airborne debris can be dangerous.

- Be ready for power outages. In winter months, consider raising the temperature on your thermostat, in case you lose power for a few hours or longer.

During high winds

- If you must be outdoors, keep your distance from trees.

- Avoid driving during the strongest winds, especially in high-profile vehicles. Your vehicle could be blown off the road. Trees could fall in the road ahead of you, which could be hard to see at night until it's right in front of you, or they could fall on your vehicle.

Landslide

Protect your home

- Have flexible pipe fittings installed to avoid gas or water leaks, as flexible fittings are more resistant to breakage. (Note, only PG&E or other professionals should install gas fittings).

- Plant ground cover on slopes and build retaining walls.

- In mudflow areas, build channels or deflection walls to direct the flow around buildings. Remember: If you build walls to divert debris flow and the flow lands on a neighbor's property, you may be liable for damages.

- If you live in an area susceptible to landslide (See Maps 23 and 24), familiarize yourself with Landslide Warning Signs and preparedness/response actions.

- Remember that landslide damage on private property is the homeowner's responsibility. Homeowner's insurance does not typically cover landslide damage. A Difference in Coverage Insurance Policy can help cover this gap, if you live in an area susceptible to landslide.

Tsunami

For all Berkeley residents

- Understand Berkeley's tsunami inundation area (Map 25in the Risk Assessmen) to identify whether you might find yourself in the tsunami inundation zone

- If your home or business is in the tsunami inundation zone, consider purchasing flood insurance.

- Be ready to act on tsunami alerts

- Sign up for AC Alert

- Bookmark and get familiar with Berkeley's Emergency Map

- Get familiar with the test and emergency tones from Berkeley's Outdoor Warning System

If you live in the tsunami inundation zone, make your household evacuation plan for tsunami, including:

  - Where will you go – east, out of the tsunami zone

  - What will you pack

  - How will you get there, using which routes
  - Who can help if you need it

- Know nature's warning signs of a near-source tsunami:
  - Earthquake with strong ground shaking for 20 seconds or more (making it difficult to stand or walk)
  - Loud ocean roar
  - Quickly receding water
  - If you are near the water and see these signs, move inland and to higher ground immediately. If there is time (a distant source tsunami) officials will send out alerts and instructions.

- If a tsunami alert is issued
  - Monitor your phone, the Outdoor Warning System, Berkeley's Emergency Map, and TV and radio for updates
  - Follow evacuation orders – as scientists get more information about what created the tsunami, the area that needs to evacuate will become more clearly defined
  - Do not go towards the tsunami – it makes things harder for first responders and for your fellow residents.

Maritime Community

- The City of Berkeley will evacuate docks and shut them down within 1 hour of a tsunami's estimated arrival.
- Make a plan for your boat
- Should you take your boat OFFSHORE?
- Generally, it is safer to keep your boat docked during a tsunami because most tsunamis are relatively small. On the rare occasion when a larger tsunami is expected (Warning level), you may consider taking your boat offshore. Berkeley's Harbormaster may provide the best advice,

considering

- The SIZE of the tsunami,
- How much TIME until it arrives onshore, and
- The PREPAREDNESS of the boat and its captain.
- You may consider hauling your boat out of the water when possible for smaller events. Expect congested boat ramps and remember that you have to get your boat out of the water and to the trailer, and out of the tsunami zone before the tsunami arrives (or before officials close the docks).
- Understand whether or not your boat insurance will cover damage caused by a tsunami. Tsunami coverage is entirely dependent on your policy and how much comprehensive coverage you have purchased.
- Make sure your boat is secured and ready. Keep in mind that the City will shut down the dock 1 hour before the tsunami's anticipated arrival time.
- Secure your boat to the dock and tie down any loose gear.
- Check your dock line condition and replace any worn dock lines.
- Do not install fendering to the dock.
- Remove as much loose boating gear onboard as possible, especially electronics and important documents. Any gear that will remain on your boat should be secured.
- Turn off and disconnect shore power cords, water supply hoses and propane or other gas valves.
- Secure and lock all hatches and port holes. Check for leaks, and seal them as necessary.
- Prepare a go-bag or backpack that you can grab and bring with you if you need to evacuate quickly for a near-source tsunami. Include:
    - Flashlight/headlamp

- Area map, marked with driving/walking evacuation routes
- Printed list of phone numbers and email addresses for important contacts
- Battery-powered radio and extra batteries
- Prescriptions or critical medications
- Extra eyeglasses or contact lenses
- Extra set of keys
- Cell phone charger
- Copies of important documents
- Toiletries and change of clothing
- Hand sanitizer
- As you leave, grab your wallet and cell phone
- Make a list of the other items you will want to bring if you have more time to prepare to evacuate. Consider:
- Items to be safe and comfortable while you are away
- Medications, prescriptions, and medical devices
- Computers, electronics and chargers
- Irreplaceable items (family treasures, art, photo albums)
- Other valuables

Floods

For all Berkeley residents, protect your home and neighborhood

- Flooding often occurs due to storm drain blockage. Protect your neighborhood and keep water flowing by participating in the adopt a drain program.
- Direct water away from your building.
- Routinely clean and maintain gutters, downspouts, and splash blocks so that rainwater from your roof flows easily away from your home.
- During an average rainstorm, watch how water flows or accumulates around your home to identify potential trouble spots. If stormwater does not drain away from the building, change your landscaping to improve runoff. This may include building up any sunken areas around the foundation, digging small depressions to properly channel water, and otherwise improving the yard so that it slopes away from your home.
- If you have a sump pump, make sure it has a battery-operated backup in case of power failure during a rainstorm.

Residents near Berkeley creeks, or who have experienced flooding in the past

- Implement low-cost projects to reduce your flooding risk
- Make your sandbag plan
- Learn how to sandbag and whether sandbags will be protective for your property
- If you are unable to sandbag, connect with neighbors and friends who can assist you in sandbagging to protect your home during severe storms
- Make a plan for where you'll get sandbags in significant storms. The City usually offers sandbags, and they are also available at a low cost from hardware stores.
- Consider flood insurance, since typical homeowners insurance policies do not cover flooding.
- During heavy rains

- Elevate important items, if possible, during heavy rains, especially from first floor/garage.
- Do not walk, swim or drive through flooded waters. Turn around, don't drown.
- experienced flooding in the past

After a flood

- If your home floods, review this Field Guide for Flooded Home Cleanup.

Utility Interruption

Power Outage

- Know the location of your circuit breakers and/or fuse boxes and how to check them.
- Make sure PG&E can reach you and alert you of an outage by calling 1-800-743-5000 and updating your contact information.
- Make a plan to stay safe and comfortable during power outages.
- First, think about your household's emergency power needs. What will you need to stay warm? To keep food cool? To operate any medical devices?
- Determine the power draw of the devices that you want to keep operating, and how long you want to operate them.
- Consider purchasing a power bank or generator to provide the power you need to stay safe in your home in short-duration outages.
- Make a plan to stay with family, friends, or at a hotel if your home is affected by a long-term power outage.
- When power outages are planned or likely (for example, severe storms or heat waves are forecast):
- Fully charge your phone and any chargeable devices including battery

packs and even electric vehicles.

- Make sure you have flashlights and fresh batteries close at hand.

- Prepare to use your alternate plans for refrigerating medicines or operating power-dependent medical devices.

- When a power outage occurs:

    - Unplug all electric appliances to avoid overloading circuits or damaging devices when the power turns back on.

    - Leave 1 lamp plugged in with the switch “on.” When the lamp turns back on you’ll know your home has power again. Turn your appliances back on one at a time when power is restored.

    - If you encounter a downed power line, always stay away and call 9-1-1 immediately. Do not touch anything that touching the lines or drive over them.

Water Outage

- Each person in your household will need 1-2 gallons of water daily for drinking, washing, and cooking. Store as much water as you can. At minimum, store water for 3 days (3-6 gallons per person).

- Options for storing water include: single gallons of water, water barrels, water cubes, or canned water. When choosing the best option for your household, consider cost, ease of storage, required maintenance, and how easy it will be to access and use during an emergency.

Wastewater Outage

If you don't have water to flush with or your sewage system isn't working:

- Modify your own toilet to collect waste without flushing. Turn the water valve to off. Flush out any water still in the bowl (the toilet shouldn't refill). Put some kitty litter, peat moss, lime, or something similar that will absorb liquid and help reduce odors into the inner bag. Go to the bathroom in the inner bag. You may be able to use the same bag more than once before replacing. Once the inner bag is full or you feel it needs to be replaced, tie it up. Insert a new inner bag and add absorbent/odor reducer for the next use.

- Use a 5-gallon bucket. You can add a toilet seat and set it up as described above.

- If sewage from plumbing fixtures backs up into your home, avoid contact with the sewage as it may contain harmful pathogens.

Telecommunications Outage

- Establish a backup communication with your family. Choose a meeting place and time in case you can't call each other.

- Keep a battery-powered AM/FM radio handy to receive emergency alerts if internet, phone, and television aren't working.

- Print important documents or save them to a thumb drive in case of internet outage.

- During emergencies or large events, high demand for cellular networks can make it hard to place a call. A text message may go through when voice calls cannot, because text messages require less bandwidth from the cellular network.

- If you lose cellular service completely to your phone but the internet is still working, you can switch your phone's settings to turn on "Wi-Fi" calling to make calls through the internet.

22. In the 2024 Strategy Actions Spreadsheet, the following action was added:

    Reduce fire risk in existing development through vegetation management: Manage the Eucalyptus Understory Cleanup Program.

23. In the 2024 Strategy Actions Spreadsheet, the following action was added:

    Evaluate potential land use controls impacts on emergency services: Ensure that Fire Department staff have the opportunity to review any proposed revisions to land use controls that would increase allowed densities, evaluate how the revised land use controls could impact the provision of emergency services, and convey that information to City Council prior to final action.

24. In Element G: Community Education, on page G-1, the following text was deleted and added:

    To support this work further, ~~each hazard section~~ the end of Element C: Mitigation Strategy has a list of individual and household actions to reduce risks associate with that hazard.

[1] https://firesafemarin.org/

[2] Stanford B, Grossinger RM, Askevold RA, Whipple AW, Leidy RA, Beller EE, Salomon MN, Striplen CJ. 2011. East Contra Costa County Historical Ecology Study. Prepared for Contra Costa County and the Contra Costa Watershed Forum. A Report of SFEI's Historical Ecology Program, SFEI Publication #648, San Francisco Estuary Institute, Oakland, CA.

[3] https://firesafemarin.org/create-a-fire-smart-yard/plants/fire-hazardous-plants/