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 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.
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.

Name of Authority, Policy, Program, or Resource	Category				Ability to support mitigation activities
	Planning and Policy	Financial	Admin & Technical	Training & Outreach	
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.
Plan Set A	x			x	The City's adoption of Standard Plan Set Aeducates 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.

Name of Authority, Policy, Program, or Resource	Category				Ability to support mitigation activities
	Planning and Policy	Financial	Admin & Technical	Training & Outreach	
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.
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.

Name of Authority, Policy, Program, or Resource	Category				Ability to support mitigation activities
	Planning and Policy	Financial	Admin & Technical	Training & Outreach	
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.
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.

Name of Authority, Policy, Program, or Resource	Category				Ability to support mitigation activities
	Planning and Policy	Financial	Admin & Technical	Training & Outreach	
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.
Expanded Inventory of 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 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.

Name of Authority, Policy, Program, or Resource	Category				Ability to support mitigation activities
	Planning and Policy	Financial	Admin & Technical	Training & Outreach	
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.
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.

Name of Authority, Policy, Program, or Resource	Category				Ability to support mitigation activities
	Planning and Policy	Financial	Admin & Technical	Training & Outreach	
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.
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.
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.

Name of Authority, Policy, Program, or Resource	Category				Ability to support mitigation activities
	Planning and Policy	Financial	Admin & Technical	Training & Outreach	
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.
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.
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.

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 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.

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 1. *Berkeley Soft-Story Building Status as of September 2023*

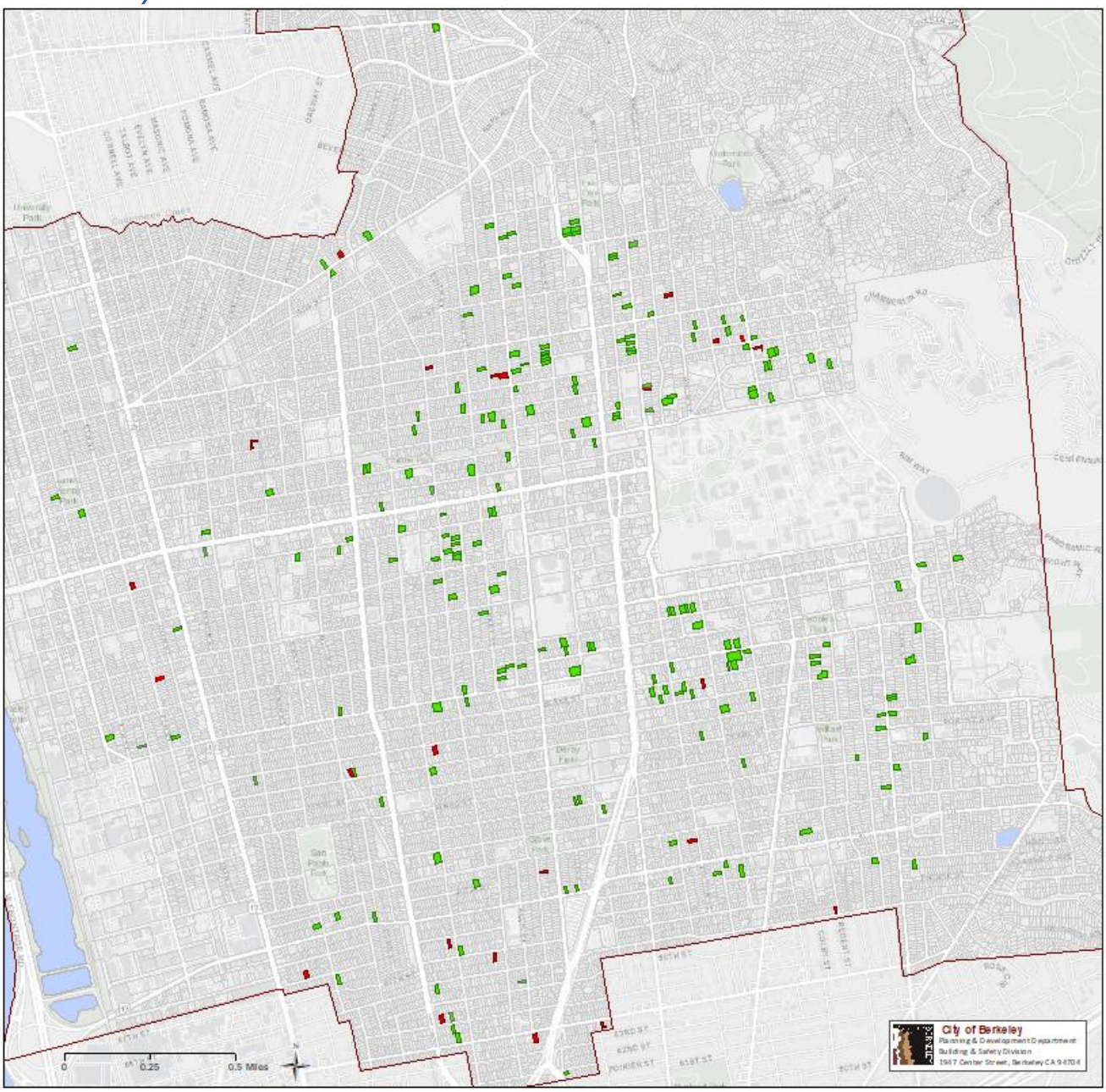
Number of buildings	**Percent***	**Status**
278	76	Retrofit Complete
7	2	Permit
12	3	Applied for Permit
5	1	Not Compliant or Newly Added
62	17	Removed from Inventory for Other Reasons
364	*100%*	*Total buildings identified as soft-story*

*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 1. ***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.

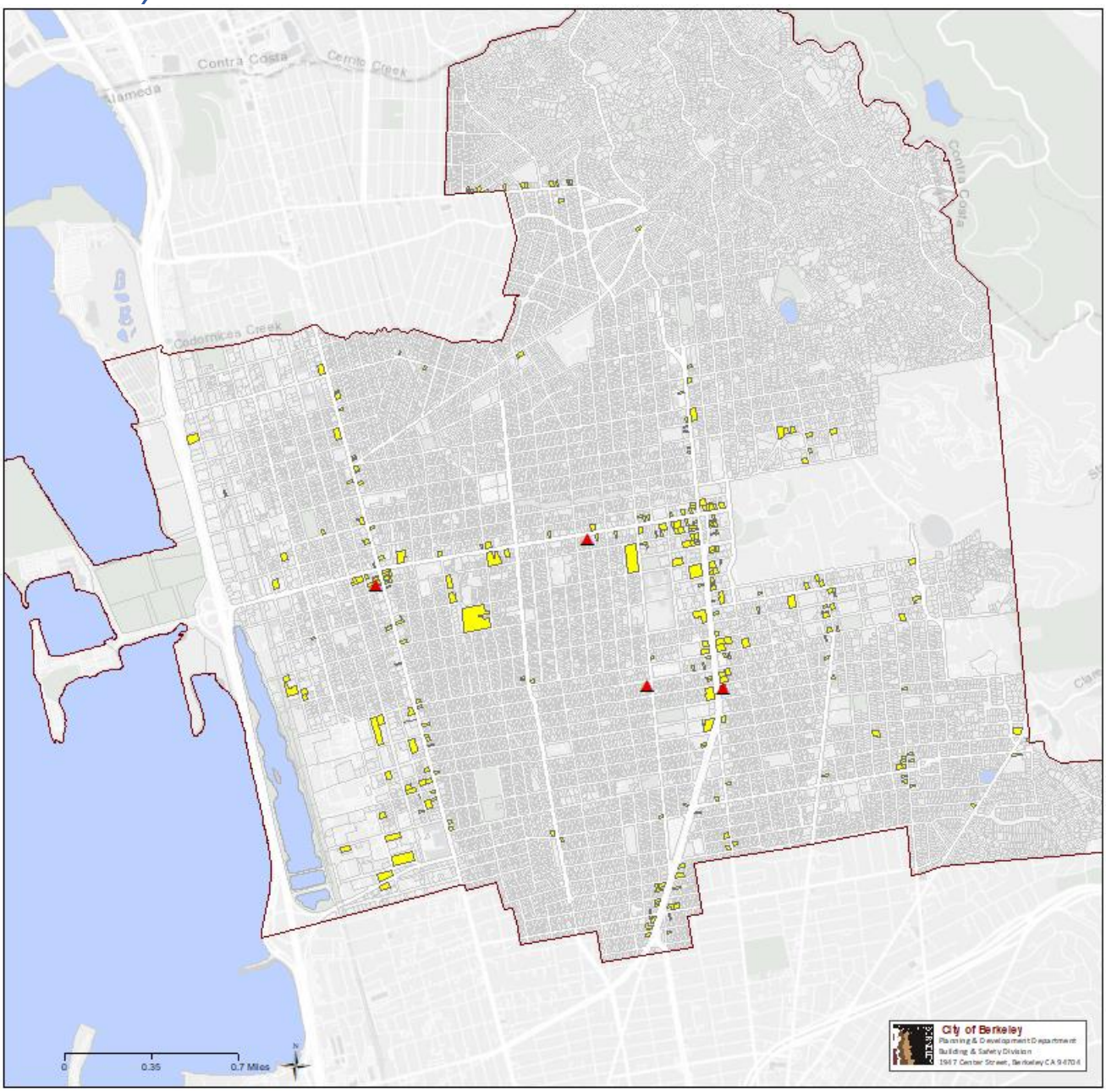
In response to State law, the City of Berkeley compiled an inventory of unreinforced masonry buildings in 1989, identifying approximately 700 residential and commercial URM buildings that were built prior to 1956. In 1991, the City adopted the Unreinforced Masonry Ordinance 6088-N.S. Subsequent amendments 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 2. ***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 2. *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 Seismically Vulnerable Buildings

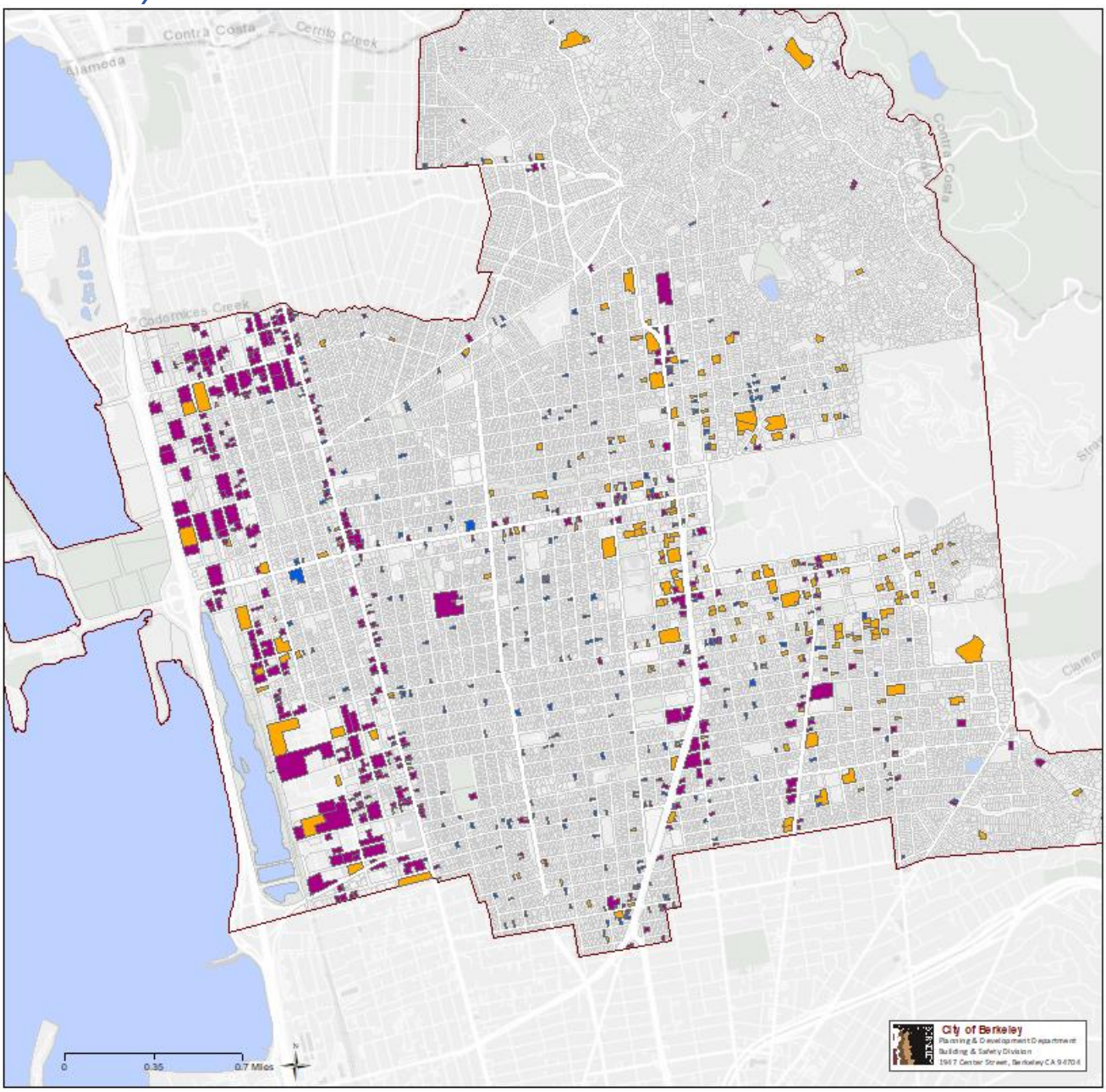
Previously, the City identified 1,047 potentially seismically vulnerable buildings that did not already appear on the soft story or URM inventories, including 230 potentially non-ductile buildings and nearly 550 buildings that may be rigid wall-flexible diaphragm, including tilt-ups. The City also added 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 3. ***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.

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.

- 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 incentivizes 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 3. *State Mitigation Requirement and Berkeley Implementation*

Statewide Requirements	**Berkeley Implementation**
Mandatory Building Code. The State requires all communities to enforce the 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	Berkeley enforces the State building code with additional local provisions for seismic 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.

early codes have characteristics that make them vulnerable to collapse in catastrophic earthquakes.	
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 inspectors following State guidelines.	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.
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 of hazards on development and the resulting consequences for the environment. On occasion, certain emergency safety projects are exempted from the CEQA process.	The City of Berkeley complies with State CEQA requirements.
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	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

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.	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	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.

disasters.	
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 System (SEMS), a uniform approach to disaster response based on the fire service's Incident Command System (ICS).	The City complies with all State requirements.

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.

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 4. *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 5. *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
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 6. *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 7. *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.