

1. CITY OF ORINDA

1.1 HAZARD MITIGATION PLAN POINT OF CONTACT

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1.2 JURISDICTION PROFILE

The following is a summary of key information about the jurisdiction and its history:

- **Date of Incorporation**—1985
- **Current Population**—18,749 as of July 2016 (2016 Department of Finance Estimate)
- **Population Growth**—Based on the data tracked by the state Department of Finance, Orinda has experienced a nearly flat rate of growth in recent years. Population growth from 2015-2016 was 0.9 percent, and growth per year from 2011-2016 has averaged 1.0 percent.
- **Location and Description**—The City of Orinda is located in Contra Costa County, California. Situated in the San Francisco Bay Area, just east of the Oakland hills, Orinda is a 12.8 square mile, semi-rural community characterized by hilly oak woodlands and multiple creek tributaries which feed San Pablo Creek. The City is split in half by Highway 24 and BART, with the “Crossroads/Theatre District” commercial area and surrounding neighborhoods on the south and the “Village” commercial area and surrounding neighborhoods on the north.
- **Brief History**—Orinda was originally part of four large land grants, and the area was used primarily for ranching until Edward Ignacio de Laveaga established the Orinda town site in the 1920's. Drawing on new interest in the area spurred by the California and Nevada Railroad, De Laveaga began development of the Orinda Village commercial area and the surrounding residential neighborhoods with the Hacienda Homes real estate development company. The region blossomed when the Caldecott Tunnel opened in 1937. After the Orinda Theatre was constructed in 1941, Orinda soon enjoyed a reputation as a lively destination for dining, music, and film. With the post-war baby boom, the area expanded gently into a suburban environment. Orinda had great appeal to families ready to leave Oakland or San Francisco for a less intensely urban environment, more house for less money, and higher quality schools. With more families to serve, every sector continued to grow—the commercial district, the school districts, the housing market. BART opened in 1973, accelerating residential and business growth throughout Contra Costa County. Orinda incorporated as a City in 1985 following more than 100 years of gradual development.

- **Climate**— Orinda’s weather is typical of the Northern California coast, with mild summers and cool, wet winters.

Due to its inland location on the east side of the East Bay Hills, Orinda’s climate is somewhat less moderate than that of communities west of the hills along the San Francisco Bay. It occasionally freezes in the winter and there are occasional summer days with temperatures in the 90s. The July high is typically 82 degrees and the January low is typically 40 degrees. On average, there are 261 sunny days per year, and the City receives 28 inches of rain compared to the US average of 39 inches (Source: <http://www.bestplaces.net>).

- **Governing Body Format**—The City of Orinda is a general law city and functions as a Council-Manager form of government. Under the council-manager form, authority is concentrated in the elected council, which hires a professional administrator (City Manager) to implement its policies. The City Council is responsible for making policy, passing ordinances, voting appropriations, and having overall supervisory authority in the city government. In such a government, the Mayor acts as a member and presiding officer of the council. The Mayor serves a one-year term and performs various ceremonial duties on behalf of the City and Council. There are five elected officials who serve staggered 4-year terms. Their service is voluntary, with no monetary compensation. In addition to hiring the City Manager, the City Council also hires the City Attorney who serves as the City’s primary legal advisor. The City has a wide variety of Commissions, Committees, and Subcommittees that are appointed by the City Council and are comprised of Orinda residents.

The City employs 37 regular full-time and 3 regular part-time positions. Local police services are provided by contract with the Contra Costa County Sheriff's Department. Fire services are supplied by the Moraga Orinda Fire District. Building construction permits and inspections are provided by contract with the Contra Costa County Building Inspection division of the Department of Conservation and Development.

The City Council assumes responsibility for adoption of this plan, and the City Manager and Planning, Public Works/Engineering and Police Departments will oversee its implementation.

1.3 DEVELOPMENT TRENDS

Orinda is nearly built out with single family homes on low density lots. The California Department of Finance indicated there were 6,829 housing units in Orinda in 2014. Approximately 94 percent of the City’s housing stock is made up of single-unit, detached structures, and about 6 percent is multi-unit structures. There are a few active single-family subdivisions in progress in Orinda: Wilder (245 lots), J&J Ranch (13 lots), Lavenida Lane (8 lots), and 88 Sunnyside Lane (4 lots). In addition to these subdivisions, the City also receives applications for single lot custom home projects, although this is becoming less common as the City approaches build-out. In terms of commercial development, since the late 1980s when Theater Square was completed, the only new development has been an 18,500 sq. ft. retail/office project approved in 2016, not yet constructed. Table 1-1 summarizes development trends in the performance period since development of the previous hazard mitigation plan and expected future development trends.

Table 1-1. Recent and Expected Future Development Trends

Criterion	Response					
<p>Has your jurisdiction annexed any land since the development of the previous hazard mitigation plan?</p> <ul style="list-style-type: none"> If yes, give the estimated area annexed and estimated number of parcels or structures. 	No					
<p>Is your jurisdiction expected to annex any areas during the performance period of this plan?</p>	No					
<p>Are any areas targeted for development or major redevelopment in the next five years?</p> <ul style="list-style-type: none"> If yes, please briefly describe 	<p>Yes</p> <p>The City is in the beginning phase of evaluating our downtown area for future development options. In 2017, we expect to develop our vision for downtown and then based on that vision, we may revise our General Plan, Downtown Design Guidelines and other planning document(s). Other than that, we will continue to develop Wilder Ranch and the other active subdivisions in the City. There are active landslides within the J&J Ranch and 88 Sunnyside Lane subdivisions that must be repaired in order to proceed with development on those properties. Much of downtown Orinda is within the floodplain of San Pablo Creek.</p>					
<p>How many building permits were issued in your jurisdiction since the development of the previous hazard mitigation plan?</p>		2012	2013	2014	2015	2016
	Single Family	8	61	50	38	55
	Multi-Family	0	1	0	0	0
	Other (commercial, mixed use, etc.)	0	1	0	1	1
	<p><i>Data provided by Contra Costa County Department of Conservation & Development. This data reflects new construction only (including additions/renovations involving demolition of >50% existing structure).</i></p>					
<p>Please provide the number of permits for each hazard area or provide a qualitative description of where development has occurred.</p>	<ul style="list-style-type: none"> Special Flood Hazard Areas: 0 San Pablo Creek runs south to north through Orinda, and is fed by Lauterwasser Creek in northern Orinda and other creeks on the south side of the City. There are some existing homes that were built within the floodplain and in some cases even within the floodway. New development is not allowed within the floodway. Much of downtown Orinda is within the floodplain. <i>Source: FEMA (http://gis.abag.ca.gov/website/Hazards/).</i> Landslide: 114 Orinda has always been subject to landslides; in fact, landslides are the primary physical process that shapes the topography in this area. Landslides occur on hillsides throughout the City and generally occur in winter during high precipitation years. The Association of Bay Area Governments (ABAG)'s Resilience Program includes an interactive online landslide map based on data from 1997 and 1998 for known past landslide locations and potential debris flow sources that could be induced by high rainfall. <i>Source: USGS (http://gis.abag.ca.gov/website/Hazards/). Note: the City also has hard-copy comprehensive landslide reconnaissance maps which were completed in 1994 and may be more precise than the USGS data on the ABAG website but it is easier to cross reference the USGS data with building permit addresses.</i> High Liquefaction Areas: 0 There are not high liquefaction areas in Orinda. <i>Source: USGS (http://gis.abag.ca.gov/website/Hazards/).</i> Dam Failure Inundation Area: Unknown. Three dams regulated by the State of California are located in the Orinda area: San Pablo Dam, a hydraulic fill dam owned by EBMUD; Briones Reservoir, an earthen dam, owned by EBMUD, and Lake Cascade Dam, an earthen dam owned 					

Criterion	Response
	<p>by the Orinda Country Club. Inundation maps reproduced by Contra Costa County show that in the event of a dam failure at the Briones Reservoir, land south of Briones Dam to San Pablo Reservoir would flood, as would land immediately to the east of San Pablo Dam Road and Camino Pablo. If Lake Cascade Dam were also to fail, flooding would affect additional land, extending almost to downtown Orinda. Failure of the San Pablo Dam would not affect Orinda as flood waters would flow toward the San Pablo Bay.</p> <ul style="list-style-type: none"> Wildfire Risk Areas: 95 The entire community is considered “Wildland Urban Interface – Fire Threatened” according to CALFire. The northwestern and central northern portions of Orinda are considered Very High Hazard Severity Zones. Homes in the new Wilder subdivision on the southwestern portion of the City are also considered high fire risk per the development agreement for that subdivision. Homes in Very High Hazard Severity Zone areas must be built to 7A standards. <i>Source: Moraga-Orinda Fire District (http://www.mofd.org/fire-prevention).</i>

1.4 CAPABILITY ASSESSMENT

City of Orinda has performed an inventory and analysis of existing capabilities, plans, programs and policies that enhance its ability to implement mitigation strategies. The introduction at the beginning of this volume of the hazard mitigation plan describes the components included in the capability assessment and their significance for hazard mitigation planning. This section summarizes the following findings of the assessment:

- An assessment of legal and regulatory capabilities is presented in Table 1-2.
- Development and permitting capabilities are presented in Table 1-3.
- An assessment of fiscal capabilities is presented in Table 1-4.
- An assessment of administrative and technical capabilities is presented in Table 1-5.
- An assessment of education and outreach capabilities is presented in Table 1-6.
- Information on National Flood Insurance Program (NFIP) compliance is presented in Table 1-7.
- Classifications under various community mitigation programs are presented in Table 1-8.
- The community’s adaptive capacity for the impacts of climate change is presented in Table 1-9.

Table 1-2. Legal and Regulatory Capability

	Local Authority	Other Jurisdiction Authority	State Mandated	Integration Opportunity?
Codes, Ordinances, & Requirements				
Building Code	Yes	Yes	Yes	Yes
Comment: The City adopted the 2016 California Building Code on January 24, 2017 (Ordinance 17-01). The building code is Section 15.04 of the City's municipal code. The Contra Costa County Building Inspection Department serves under contract to implement the building code. The City could amend Section 15.04 of the municipal code to incorporate elements of the LHMP as needed.				
Zoning Code	Yes	No	Yes	Yes
Comment: The City's zoning code is Section 17 of the municipal code. This code was last comprehensively updated in 1999 and was most recently amended in 2015. The City could amend Section 17 of the municipal code to incorporate elements of the LHMP as needed.				
Subdivisions	Yes	No	Yes	Yes
Comment: The City Council reviews and approves subdivisions, after prior review and approval by the Planning Commission. Subdivision rules are noted in Section 16 of the municipal code. The City could amend Section 16 of the municipal code to incorporate elements of the LHMP as needed.				
Stormwater Management	Yes	Yes	Yes	Yes
Comment: Section 18.02 of the Orinda Municipal Code pertains to stormwater management and discharge control. The intent of this section of the municipal code is to protect and enhance the water quality in the City's watercourses pursuant to, and consistent with the Porter-Cologne Water Quality Control Act (Water Code Section 13000 et seq) and the Federal Clean Water Act (33 USC Section 1251 et seq). This code also carries out the conditions in the City's National Pollutant Discharge Elimination System (NPDES) permit, which require implementation of appropriate source control and site design measures, as well as stormwater treatment measures for development projects. The City could amend Section 18.02 of the municipal code to incorporate elements of the LHMP as needed, as long as there is no conflict with the Federal and State-mandated portions of this chapter.				
Post-Disaster Recovery	Yes	No	Yes	Yes
Comment: Section 2.32 of the Orinda Municipal Code addresses Emergency Management. Section 2.32.110 directs the Orinda Emergency Management Group to develop the Orinda Emergency Plan. This plan, which was adopted in 2012 and has a draft update scheduled for adoption in 2017, details the post-disaster recovery process. Please see discussion under "Planning Documents" below.				
Real Estate Disclosure	Yes	No	Yes	Yes
Comment: Section 19.04.120 of the Orinda Municipal Code addresses real estate disclosure statements. Anyone selling an interest in real property must provide a written statement to the buyer before the sale is completed describing the effect of certain City regulations which restrict property use and construction in Orinda. The specific form for these disclosure statements is provided in Section 17.49.2 of the municipal code. Section 17.49.2 of the Orinda Municipal Code could potentially be modified to incorporate elements of the LHMP as needed, as long as the code still reflects state legal requirements.				
Growth Management	Yes	Yes	Yes	Yes
Comment: The Growth Management Element is chapter 5 of the City's General Plan. The purpose of this chapter is to establish policies and standards for traffic levels of service, and performance standards for parks, fire, police, sanitary facilities, water and flood control in order to ensure generally that public facilities are provided consistent with the standards adopted. This chapter was amended in 2009 via City Council Resolution 19-09 per Measure J requirements. Measure J created a new requirement for a voter-approved Urban Limit Line. The City adopted the portions of the proposed county-wide Urban Limit Line that apply to Orinda. The City could potentially amend the Growth Management Element to incorporate the LHMP as needed.				
Site Plan Review	Yes	Yes	Yes	Yes
Comment: The Planning Department staff is responsible for reviewing site plans for compliance with zoning requirements (Section 17 of the Orinda Municipal Code). The City's Engineering Department staff also reviews site plans when there is grading or drainage work proposed, or work proposed within a creek setback and/or floodplain. The City contracts out building services to Contra Costa County. The County's Department of Conservation and Development, Building Inspection Department reviews plans for compliance with the building code (Section 15 of the Orinda Municipal Code). The Moraga-Orinda Fire				

	Local Authority	Other Jurisdiction Authority	State Mandated	Integration Opportunity?
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District and Contra Costa County Sanitary District also review plans for compliance with their agency standards. The City could potentially amend the site plan review process to incorporate the LHMP as needed.

Environmental Protection	Yes	Yes	Yes	No
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Comment: All projects in Orinda are required to comply with the California Environmental Quality Act. Single family homes and many other small projects are categorically or statutorily exempt from CEQA, but non-exempt projects must demonstrate compliance with CEQA via an Initial Study or an Environmental Impact Report. The City is generally the lead agency for environmental review but for some projects the city consults with other agencies such as the California Department of Fish and Game, the Army Corps of Engineers, and the Regional Water Quality Control Board.

Flood Damage Prevention	Yes	Yes	Yes	Yes
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Comment: Section 18.05, Article 4 of the Orinda Municipal Code addresses Flood Hazard Reduction. Specific flood damage prevention measures addressed in this code section are anchoring, construction materials and methods, and standards for material and equipment storage, utilities, subdivisions, manufactured homes, recreational vehicles, and construction in floodways. FEMA has jurisdiction regarding construction in floodplains and floodways. The City could potentially amend Section 18.05 of the municipal code to incorporate the LHMP as needed.

Emergency Management	Yes	No	Yes	Yes
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Comment: Section 2.32 of the Orinda Municipal Code addresses Emergency Management and provides for the preparation and utilization of emergency operations plans; direction of the emergency organization; and coordination of emergency functions of the city with all other public agencies, corporations, organizations and affected private persons. The Emergency Operations Plan (EOP) details how this municipal code section is implemented. The City could potentially amend Section 2.32 of the municipal code and/or the EOP to incorporate the LHMP as needed.

Climate Change	Yes	Yes	Yes	No
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Comment: Climate change is referenced in Section 15.10.010 of the Orinda Municipal Code, regarding the City's adoption of the California Green Building Standards Code (CalGreen). The purpose of this code is to cause a reduction in greenhouse gas emissions from buildings; promote environmentally responsible, cost-effective, healthier places to live and work; reduce energy and water consumption; and respond to the Governor's directives. The Contra Costa County Department of Conservation and Development, Building Inspection Division, is responsible for implementation of Section 15 of the Orinda Municipal Code. The City does not currently have a Climate Action Plan so it is unlikely that Climate Change would be integrated into other sections of the municipal code.

Per California Senate Bill 379, climate adaptation strategies will be included in Orinda's General Plan Safety Element upon the next revision of the Housing Element.

Planning Documents

General Plan	Yes	No	Yes	Yes
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Is the plan compliant with Assembly Bill 2140? Yes. The Safety Element incorporates the City's Local Hazard Mitigation Plan.

Comment: The City adopted its general plan in 1987. The Housing Element has been modified periodically as required by state law; the current Housing Element is Cycle 5 (2015-2023). The Growth Element was amended in 2002 to incorporate Measure J and the Urban Limit Line; and the Safety Element was amended in 2011 to incorporate the City's Local Hazard Mitigation Plan. The Safety Element should be further amended to incorporate the new Local Hazard Mitigation Plan. Per SB 379, the Safety Element must be updated to incorporate climate adaptation and resiliency strategies at the time of the next Housing Element update, and incorporating the new Local Hazard Mitigation Plan into the Safety Element would meet this requirement.

Capital Improvement Plan	Yes	No	Yes	Yes
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How often is the plan updated? There is an overall five-year plan which is updated annually.

Comment: The Capital Improvement Plan is updated annually by the City Manager and Public Works/Engineering Department with assistance from the Finance Director, Parks & Recreation Director and Planning Director, and is adopted by the City Council. The current plan was adopted May 16, 2017 and is for fiscal years 2017-2021. Projects are distributed into three main categories: infrastructure management (roads, drainage, bridges, bikeways/walkways and traffic signals), general community improvements, and park improvements, with infrastructure making up about 95% of the CIP budget. The next iteration of the CIP could potentially incorporate priorities from the LHMP as necessary.

	Local Authority	Other Jurisdiction Authority	State Mandated	Integration Opportunity?
Floodplain or Watershed Plan	Yes	Yes	Yes	Yes

Comment: The City does not have a Floodplain or Watershed Plan. However, Chapter 4.1 of the General Plan is the Conservation Element. This element considers flood hazard and control in addition to other natural resources. Chapter 4.2 of the General Plan is the Safety Element, which also addresses flood hazard. The Division of Safety of Dams within the CA Department of Water Resources has broad responsibilities over the three dams in Orinda (Briones and San Pablo dams, owned by EBMUD, and Lake Cascade dam, owned by the Orinda Country Club). The Department of Water Resources carries out periodic inspections to ensure that these dams meet adequate standards for public safety consistent with potential earthquake motions. Dam inundation maps indicate that failures of both the Briones or Lake Cascade Dams would impact property in Orinda.

Regarding flooding from creeks, there is some Zone A (100-year flood potential) land adjacent to San Pablo Creek, Lauterwasser Creek and Lake Cascade. FEMA has jurisdiction within Zone A areas. The California Department of Fish and Wildlife has jurisdiction within creek banks. General Plan implementing policies 4.1.2E and 4.2.2M pertain to flood hazard mitigation. The Conservation Element of the General Plan could potentially be updated to incorporate policies or actions from the LHMP as necessary.

Stormwater Plan	Yes	Yes	Yes	Yes
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Comment: The City is in a Program Agreement with the Contra Costa County Flood Control and Water Conservation District, along with other county jurisdictions, as a holder of a Joint Municipal National Pollutant Discharge Elimination System (“NPDES”) Permits issued by the San Francisco Bay and/or Central Valley Regional Water Quality Control Board. The current agreement extends to June 30, 2025. The Contra Costa Clean Water Program administers the NPDES permits and implements activities carried out pursuant to the Program Agreement. It is possible that the Program Agreement could be updated to incorporate policies or actions from the LHMP, but this integration would likely occur at the County level.

The City will be preparing a Green Infrastructure Plan from 2017-2019. The Plan is required as part of the NPDES permit and must be submitted to the California Regional Water Quality Control Board for the San Francisco Bay Region by September 2019. A Green Infrastructure Plan Framework was adopted on June 20, 2017 (Resolution 53-17) and outlines staff coordination and public outreach; mapped and prioritized areas for potential and planned projects; impervious surface retrofit targets, a project tracking system, guidelines for project design, standard designs and specifications, requirements for sizing green infrastructure projects, integration with existing planning documents, methods for estimating the load reductions to be achieved, and evaluation of funding options.

Also, the Friends of Orinda Creeks, a local non-profit organization, is interested in updating and further refining the preliminary San Pablo Creek Restoration Plan which was completed in 2001 for restoration of the creek through downtown Orinda. The creek is daylight through much of downtown but is channelized and separated from downtown activities. The idea behind this restoration plan is to restore some or all of the original curvature of the creek and create a walking path along the creek tying into existing walkways to businesses and hiking trails. The proposed restoration would reduce the risk of creek flooding during storm events.

Urban Water Management Plan	Yes	Yes	No	Yes
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Comment: The City does not have an Urban Water Management Plan. However, Chapter 4.1 of the General Plan is the Conservation Element. This element considers water quality in addition to other natural resources. The San Pablo and Briones EBMUD reservoirs are just north of the City. In order to minimize the risk of reservoir pollution from urban development, EBMUD has acquired much of the surrounding watershed. General Plan policies support the concept of keeping much of the land on the north and west of the city which drains into these reservoirs designated as parks, very low-density residential and watershed land. The Conservation Element of the General Plan could potentially be updated to incorporate policies or actions from the LHMP as necessary.

Habitat Conservation Plan	No	No	No	Yes
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Comment: The City does not have a habitat conservation plan. However, Chapter 4.1 of the General Plan is the state-mandated Conservation Element. This element considers wildlife in addition to other natural resources. Regarding wildlife, there are several rare or endangered species in or near the Orinda Planning Area, and the General Plan policies seek to maintain the wide variety of wildlife in the Planning Area by preserving habitats. This is achieved through the CEQA review process and by the General Plan designation of some parcels as open space and parks. Implementing policies 4.1.2C and 4.1.2D pertain

	Local Authority	Other Jurisdiction Authority	State Mandated	Integration Opportunity?
<i>to habitat conservation. The Conservation Element of the General Plan could potentially be updated to incorporate policies or actions from the LHMP as necessary.</i>				
Economic Development Plan	No	No	No	No
Comment: <i>The City does not have an economic development plan.</i>				
Shoreline Management Plan	No	No	No	No
Comment: <i>The City does not have a shoreline.</i>				
Community Wildfire Protection Plan	No	Yes	Yes	Yes
Comment: <i>The City's fire code is the 2016 California Fire Code and by extension the 2015 International Fire Code, with certain local amendments, as detailed in City Council Resolution 54-16. The Moraga-Orinda Fire District enforces this code in Orinda. The Community Wildfire Protection Plan for this area was prepared by the Diablo Fire Safe Council and covers all of Contra Costa County. The CWPP is required by the Healthy Forest Restoration Act, as well as National and State Fire Plans, the Federal Emergency Management Agency Disaster Mitigation Act of 2000. The current CWPP dates from 2009. A revised CWPP is currently in development and there is potential for coordination with the LHMP at the County level.</i>				
Forest Management Plan	Yes	Yes	No	Yes
Comment: <i>The City does not have a Forest Management Plan. However, Section 17.21 of the Orinda Municipal Code addresses protected trees and requires that property owners obtain a tree removal permit from the Planning Department prior to removal of any protected tree. The Moraga-Orinda Fire District does not have a Forest Management Plan but does require that vegetation be cut back at urban wildland/interface areas for fire safety. Appendix G of the CWPP is a Best Management Practices Handbook for fuel reduction. Section 17.21 of the municipal code and/or Moraga-Orinda Fire District policies could potentially be modified to incorporate LHMP policies and actions as necessary.</i>				
Climate Action Plan	No	No	No	Yes
Comment: <i>The City does not have a Climate Action Plan, although a greenhouse gas inventory was conducted by ICLEI in 2009 based on 2005 data. If a CAP is prepared in the future, there is opportunity to integrate this plan with the LHMP.</i>				
Comprehensive Emergency Management Plan	Yes	No	Yes	Yes
Comment: <i>The City's EOP is prepared by the City's Police Department in cooperation with the Moraga-Orinda Fire District and is periodically updated as required to keep abreast of the most current procedures, protocols and standards. The current EOP was approved in 2012; a new draft EOP is in progress and is expected to be approved by City Council in August 2017. The EOP meets the requirements of the County's policies on Emergency Response and Planning, the Standardized Emergency management System (SEMS) Operational Area Response, the National Incident Management System (NIMS) and defines the primary and support roles of City agencies and departments in after-incident damage assessment and reporting requirements. The 2017 draft EOP incorporates LHMP's HAZUS risk assessment and focuses on better integrating Orinda's emergency policies and procedures with the neighboring communities of Moraga and Lafayette. Future versions of the EOP could be updated to further incorporate elements of the LHMP as needed.</i>				
Threat & Hazard Identification & Risk Assessment (THIRA)	Yes	No	No	Yes
Comment: <i>The City has not conducted a formal THIRA using FEMA's four-step process. However, the City's draft 2017 EOP notes that THIRA is one of the resources used to identify, assess and track hazards in the City, along with Digital Sandbox and HAZUS.</i>				
Post-Disaster Recovery Plan	Yes	No	Yes	Yes
Comment: <i>Post-disaster recovery is detailed in Section IV of the City's draft 2017 EOP. Short-term recovery includes stabilizing the situation and restoring services; long term recovery focuses on community restoration and includes reconstruction of facilities and infrastructure, housing plans, implementation of waivers, zoning changes and other land use laws and assistance to displaced families. During recovery, local assistance centers will provide a centralized location for services and resource referrals. The Finance Department will coordinate and support cost analysis surrounding an emergency. The City will implement plans for continuity of operations and will document damages and repair work. After recovery, an After Action Report will be prepared to document the City's successes and areas needing improvement. Future iterations of the recovery portion of the EOP could be updated to incorporate elements of the LHMP as needed.</i>				
Continuity of Operations Plan	Yes	No	No	Yes
Comment: <i>The City has not conducted a formal COOP using FEMA's four-phase process. However, the City's Emergency Operations Plan includes a description of the Emergency Operations Center location, organization and activation, which ensures</i>				

	Local Authority	Other Jurisdiction Authority	State Mandated	Integration Opportunity?
<p><i>continuity of operations in the event of a disaster. The draft 2017 EOP Section 2.5 is dedicated to Continuity of Government and specifically identifies ranked successors to members of the City Council. Information regarding continuity of operations could be updated in the next version of the EOP to incorporate elements of the LHMP as needed.</i></p>				
Public Health Plan	No	No	No	No
<p>Comment: <i>The City does not have a public health plan.</i></p>				

Table 1-3. Development and Permitting Capability

Criterion	Response
<p>Does your jurisdiction issue development permits?</p> <ul style="list-style-type: none"> If no, who does? If yes, which department? 	<p>No</p> <p>Contra Costa County Building Inspection Department</p>
<p>Does your jurisdiction have the ability to track permits by hazard area?</p>	<p>No</p> <p>We are not currently tracking permits in this way in our permit database but we are generally able to manually verify this information.</p>
<p>Does your jurisdiction have a buildable lands inventory?</p> <ul style="list-style-type: none"> If yes, please briefly describe. If no, please quantitatively describe the level of buildout in the jurisdiction. 	<p>No</p> <p>We do not have a “buildable lands inventory” but we do have a listing of vacant parcels in the city. According to this listing, which is based on both city and county data, there are 565 vacant lots in Orinda. The City is nearly built-out. Many of the vacant lots are located in the Wilder subdivision in southwest Orinda which is being actively developed. Another cluster of vacant lots is located in western Orinda in the El Toyonal neighborhood, where Contra Costa County Sanitary District has a moratorium on new septic tanks and there has consequently been little new development in recent years.</p>

Table 1-4. Fiscal Capability

Financial Resource	Accessible or Eligible to Use?
Community Development Block Grants	Yes
Capital Improvements Project Funding	Yes
Authority to Levy Taxes for Specific Purposes	Yes
User Fees for Water, Sewer, Gas or Electric Service	No
Incur Debt through General Obligation Bonds	Yes
Incur Debt through Special Tax Bonds	Yes
Incur Debt through Private Activity Bonds	No
Withhold Public Expenditures in Hazard-Prone Areas	No
State-Sponsored Grant Programs	Yes
Development Impact Fees for Homebuyers or Developers	Yes
Other	N/A

Table 1-5. Administrative and Technical Capability

Staff/Personnel Resource	Available?	Department/Agency/Position
Planners or engineers with knowledge of land development and land management practices	Yes	Drummond Buckley, Planning Director Larry Theis, Public Works/Engineering Director Planning Department and Public Works/Engineering Staff
Engineers or professionals trained in building or infrastructure construction practices	Yes	Drummond Buckley, Planning Director Larry Theis, Public Works/Engineering Director Planning Department and Public Works/Engineering Staff
Planners or engineers with an understanding of natural hazards	Yes	Drummond Buckley, Planning Director Larry Theis, Public Works/Engineering Director Planning Department and Public Works/Engineering Staff
Staff with training in benefit/cost analysis	Yes	Larry Theis, Public Works/Engineering Director
Surveyors	Yes	Contract for Service
Personnel skilled or trained in GIS applications	Yes	Mayank Patel, Associate Planner Daisy Allen, Associate Planner
Scientist familiar with natural hazards in local area	Yes	Contract for Service
Emergency Manager	Yes	The City Manager is the Emergency Manager per the City's EOP
Grant writers	Yes	Drummond Buckley, Planning Director Larry Theis, Public Works/Engineering Director Planning Department and Public Works/Engineering Staff

Table 1-6. Education and Outreach Capability

Criterion	Response
<p>Do you have a Public Information Officer or Communications Office?</p>	<p>Yes Tonya Gilmore, Senior Management Analyst</p>
<p>Do you have personnel skilled or trained in website development?</p>	<p>Yes Tonya Gilmore, Senior Management Analyst Mayank Patel, Associate Planner</p>
<p>Do you have hazard mitigation information available on your website?</p> <ul style="list-style-type: none"> If yes, please briefly describe. 	<p>Yes The City posts information on current hazards and disasters on the City’s home webpage. Additionally, there is information on storm water management and creek protection and maintenance on the Public Works/Engineering Department webpage. The Moraga-Orinda Fire District website has information about fire prevention best practices.</p>
<p>Do you utilize social media for hazard mitigation education and outreach?</p> <ul style="list-style-type: none"> If yes, please briefly describe. 	<p>Yes The City circulates the Orinda Outlook letter to citizens every week. Citizens can sign up to receive this letter on the City’s website.</p>
<p>Do you have any citizen boards or commissions that address issues related to hazard mitigation?</p> <ul style="list-style-type: none"> If yes, please briefly describe. 	<p>Yes The Citizen’s Infrastructure Oversight Commission is an advisory body to the City Council on matters relating to the City’s streets, storm drains and bridges. The Traffic Safety Advisory Council reviews traffic safety incidents and concerns and recommends safety mitigation measures. The Orinda Geologic Hazard Abatement District Board of Directors consists of the City Council and reviews any requested changes to the Wilder subdivision GHAD. NextDoor and Nixle are active online community boards that the City uses to disseminate information regarding public safety and other important announcements.</p>
<p>Do you have any other programs already in place that could be used to communicate hazard-related information?</p> <ul style="list-style-type: none"> If yes, please briefly describe. 	<p>No N/A</p>
<p>Do you have any established warning systems for hazard events?</p> <ul style="list-style-type: none"> If yes, please briefly describe. 	<p>Yes County Community Warning System</p>

Table 1-7. National Flood Insurance Program Compliance

Criterion	Response
What local department is responsible for floodplain management?	Engineering/Public Works
Who is your floodplain administrator? (department/position)	Larry Theis (Engineering/Public Works Director)
Are any certified floodplain managers on staff in your jurisdiction?	No
What is the date that your flood damage prevention ordinance was last amended?	1/4/2005
Does your floodplain management program meet or exceed minimum requirements? • If exceeds, in what ways?	Meets N/A
When was the most recent Community Assistance Visit or Community Assistance Contact?	Prior to 2013 (date unknown)
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? • If so, please state what they are.	No N/A
Do your flood hazard maps adequately address the flood risk within your jurisdiction? • If no, please state why.	Yes N/A
Does your floodplain management staff need any assistance or training to support its floodplain management program? • If so, what type of assistance/training is needed?	Yes Certification, Training
Does your jurisdiction participate in the Community Rating System (CRS)? • If yes, is your jurisdiction interested in improving CRS Classification? • Is your jurisdiction interested in joining the CRS program?	No N/A Yes
How many Flood Insurance policies are in force in your jurisdiction? ^a • What is the insurance in force? • What is the premium in force?	129 \$39,615,400 \$ 119,895
How many total loss claims have been filed in your jurisdiction? ^a • How many claims were closed without payment/are still open? • What were the total payments for losses?	47 23/0 \$245,178

a. According to FEMA statistics as of December 31, 2016

Table 1-8. Community Classifications

	Participating?	Classification	Date Classified
Community Rating System	No	N/A	N/A
Building Code Effectiveness Grading Schedule	Yes	2	May 2016
Public Protection	Yes	2	4/1/17
Storm Ready	No	N/A	N/A
Firewise	No	N/A	N/A

Table 1-9. Adaptive Capacity for Climate Change

Criterion	Jurisdiction Rating
Technical Capacity	
Jurisdiction-level understanding of potential climate change impacts	Medium
<i>Comments/Additional Information:</i> A greenhouse gas inventory was conducted by ICLEI in 2009 using 2005 data. There has not been additional inventory or development of a Climate Action Plan since that time.	
Jurisdiction-level monitoring of climate change impacts	Medium
<i>Comments/Additional Information:</i> The City does not have a Climate Action Plan in place and as such, is not monitoring climate change impacts. However, hazards are being monitored via this Local Hazard Mitigation Plan.	
Technical resources to assess proposed strategies for feasibility and externalities	Low
<i>Comments/Additional Information:</i> Any additional inventory or assessment of climate change impacts would need to be conducted by an outside consultant due to staff time and expertise limitations.	
Jurisdiction-level capacity for development of greenhouse gas emissions inventory	Medium
<i>Comments/Additional Information:</i> There is an existing greenhouse gas emissions inventory developed based on 2005 data.	
Capital planning and land use decisions informed by potential climate impacts	Medium
<i>Comments/Additional Information:</i> Capital planning and land use decisions are not explicitly guided by potential climate impacts, but the City does have a creek setback ordinance (Orinda Municipal Code Section 17.4.6) which restricts development within certain setback distances from Type I, II and III creeks. Also, development of this Local Hazard Mitigation Plan addresses risk related to climate change.	
Participation in regional groups addressing climate risks	Medium
<i>Comments/Additional Information:</i> Planning Department staff participates in EnergyWatch and Contra Costa County Climate Leaders (4CL).	
Implementation Capacity	
Clear authority/mandate to consider climate change impacts during public decision-making processes	Low
<i>Comments/Additional Information:</i> There is no clear authority or mandate to consider climate change impacts during public decision-making.	
Identified strategies for greenhouse gas mitigation efforts	Medium
<i>Comments/Additional Information:</i> The greenhouse gas inventory completed by ICLEI in 2009 identified sectors with the greatest reduction potential and established a baseline to measure ongoing environmental programs. Specifically, the inventory revealed that energy use in vehicular travel presented the greatest challenge and required the most urgent action in order for Orinda to reduce emissions. However, no specific greenhouse gas reduction strategies were identified.	
Identified strategies for adaptation to impacts	Medium
<i>Comments/Additional Information:</i> Development of this Local Hazard Mitigation Plan provides a first step in identifying actions to adapt to climate change impacts.	
Champions for climate action in local government departments	Low
<i>Comments/Additional Information:</i> There is staff with some experience in environmental planning and climate action planning (Derek Farmer, Senior Planner, and Daisy Allen, Associate Planner) but without direction from City Council, staff is not addressing climate action planning at this time.	
Political support for implementing climate change adaptation strategies	Medium
<i>Comments/Additional Information:</i> City Council is generally supportive of resilient infrastructure projects, especially in light of the current 2017 local disaster (sink hole on Miner Road). However, the Council is financially constrained.	
Financial resources devoted to climate change adaptation	Low
<i>Comments/Additional Information:</i> None provided	

Criterion	Jurisdiction Rating
Local authority over sectors likely to be negative impacted Comments/Additional Information: <i>The City has authority over the City's public roads and infrastructure and coordinates with EBMUD, CCCSD, CalTrans, MOFD, CDFW, USACE, and the Regional Water Board regarding disaster mitigation.</i>	Medium
Public Capacity	
Local residents knowledge of and understanding of climate risk Comments/Additional Information: <i>Orinda's citizens are highly educated, many with higher education degrees in various sciences related to climate change.</i>	High
Local residents support of adaptation efforts Comments/Additional Information: <i>None provided</i>	Medium
Local residents' capacity to adapt to climate impacts Comments/Additional Information: <i>Orinda's citizens are generally able to afford to install measures on their properties as necessary to mitigate hazards related to climate impacts.</i>	Medium
Local economy current capacity to adapt to climate impacts Comments/Additional Information: <i>None provided</i>	Medium
Local ecosystems capacity to adapt to climate impacts Comments/Additional Information: <i>None provided</i>	Medium

1.5 INTEGRATION WITH OTHER PLANNING INITIATIVES

The information on hazards, risk, vulnerability and mitigation contained in this hazard mitigation plan is based on the best available data. Plan integration is the incorporation of this information into other relevant planning mechanisms, such as general planning and capital facilities planning. It includes the integration of natural hazard information and mitigation policies, principles and actions into local planning mechanisms and vice versa. Additionally, plan integration is achieved through the involvement of key staff and community officials in collaboratively planning for hazard mitigation.

1.5.1 Existing Integration

In the performance period since adoption of the previous hazard mitigation plan, City of Orinda made progress on integrating hazard mitigation goals, objectives and actions into other planning initiatives. The following plans and programs currently integrate components of the hazard mitigation strategy:

- **Orinda Emergency Operations Plan**—The EOP identifies the City's emergency planning, organization and response policies and procedures. Hazard Identification, Continuity of Operations and Post-Disaster Recovery plans are included within the EOP. The hazard analysis summary (section 1.3 of the draft 2017 EOP) specifically indicates the top seven hazards that were identified in the LHMP process and uses this hazard analysis as a framework for the EOP. The EOP will be reviewed and updated annually, so action items from the LHMP can be integrated into annual updates of the EOP as necessary.
- **Orinda General Plan, Safety Element**—The 2011 LHMP is included as an appendix to the Safety Element. Per SB 379, the Safety Element must be updated to incorporate climate adaptation and resiliency strategies at the time of the next Housing Element update, and the City can incorporate the new LHMP into the Safety Element to meet this requirement.
- **Orinda Capital Improvement Plan**—Identifies, prioritizes and budgets capital improvement projects. The CIP includes projects that can help mitigate potential hazards. The City acts to ensure consistency between the LHMP and the current and future CIP. Fiscal Year 2018 CIP Projects include some projects directly related to high risk hazards, including slope stabilization on Camino Sobrante and City Hall, storm drainage facilities improvement, and Miner Road culvert replacement (to repair a sinkhole caused

by storm events). The LHMP can identify new possible funding sources for capital improvement projects and may result in modifications to proposed projects based on results of the risk assessment.

- **Building Code and Fire Code**—The City’s adoption of the 2016 California Building and Fire codes incorporated local modifications to account for the climatic, topographic and geographic conditions that exist in the City. Specifically, the adopted code reflects risks related to seismicity and soils, as well as Orinda’s hilly terrain and risk of drought and wildfire. As a result of these specific conditions, the approved code modified state code by adding more restrictions for concrete foundations and gypsum wallboard to better withstand earthquakes; requiring fire treatment for wood shakes or shingles; requiring installation of a smoke detector when flat roofs are pitched, and requiring electric vehicle charging stations for multifamily and non-residential buildings.

Resources listed in Section □ were used to provide information for this annex on hazard events and local capabilities within the jurisdiction.

1.5.2 Opportunities for Future Integration

As this hazard mitigation plan is implemented, City of Orinda will use information from the plan as the best available science and data on natural hazards. The capability assessment presented in this annex identifies codes, plans and programs that provide opportunities for integration. The area-wide and local action plans developed for this hazard mitigation plan in actions related to plan integration, and progress on these actions will be reported through the progress reporting process described in Volume 1. New opportunities for integration also will be identified as part of the annual progress report. The capability assessment identified the following plans and programs that do not currently integrate goals or recommendations of the hazard mitigation plan but provide opportunities to do so in the future:

- **Orinda General Plan – Conservation and Growth Management Elements**—The LHMP will be reviewed and incorporated as appropriate at the next update of these General Plan elements, especially as related to flood control, urban watershed management, habitat conservation and growth control. Also, the City is considering updates to the downtown section of the Land Use element, and there is an opportunity to incorporate flood hazard mitigation concepts into this section.
- **Orinda Municipal Code**—Sections 2 (administration), 15 (building code), 16 (subdivisions), 17 (zoning), 18 (drainage), 19 (code compliance). The LHMP will be reviewed and incorporated as appropriate in future Orinda Municipal Code updates, especially Section 2.32 (Emergency Management).
- **Site Plan Review**—Upon adoption of the LHMP, Staff will evaluate site plan review processes for compliance with this plan. For instance, Staff does not currently track the number of permit applications that come in with projects located on high risk sites for hazards such as earthquakes, wildfire, landslides, or flooding. The Contra Costa County Department of Conservation and Development reviews plans for compliance with California Building and Fire Code in terms of earthquake and fire safety. In addition, the Moraga-Orinda Fire District reviews plans for larger projects at both the design review and building permit stage for fire safe building, access and landscape design. The City’s Public Works and Engineering Department as well as the County’s Grading Department assist the City’s Planning Department in reviewing plans and give feedback on project design as related to landslide and flooding risk. This process could be better documented and standardized.
- **Environmental Protection**—Non-exempt projects must demonstrate compliance with CEQA via an Initial Study or Environmental Impact Report. These environmental documents explore potential impacts along a variety of issue areas, including the following issues directly related to the LHMP: Geology/Soils, Greenhouse Gas Emissions, Hazards and Hazardous Materials, Hydrology/Water Quality, Land Use/Planning, Public Services and Utilities/Service Systems. Staff will ensure that future environmental documents prepared for Orinda projects will consult the LHMP and EOP while analyzing potential significant impacts from proposed projects.

- **Stormwater Management**—The LHMP will be reviewed and incorporated as appropriate at the next update of Orinda Municipal Code Sections 18.02 (stormwater management and NPDES permit requirements) and 18.05 (flood hazard reduction). As noted in Table 1.2, modifications to the NPDES Program Agreement would likely occur at the County rather than the City level. The Green Infrastructure Plan to be prepared from 2017 – 2019 and the proposed update to the San Pablo Creek Restoration Plan will meet flood mitigation objectives of the LHMP.
- **Community Wildfire Protection Plan**—As noted in Table 1.2, the LHMP should be reviewed and incorporated as appropriate in the current draft and future updates of the Community Wildfire Protection Plan, but the opportunity for integration exists at the County rather than the City level. At the local level, Moraga-Orinda Fire District policies could potentially be modified to incorporate LHMP policies and actions as necessary.
- **Climate Action Plan**—The City does not currently have a Climate Action Plan, but a greenhouse gas inventory was conducted by ICLEI in 2009. As the City moves forward with a CAP in the future, LHMP policies and actions will be integrated with that document.
- **Economic Development Plan**—The City does not currently have an Economic Development Plan, but the City is currently exploring various options related to planning for the future of downtown. One option being considered is economic strategy for downtown; if an economic strategy document or economic development plan is created for downtown Orinda, LHMP policies and actions will be integrated with that document as appropriate.

1.6 JURISDICTION-SPECIFIC NATURAL HAZARD EVENT HISTORY

Table 1-10 lists past occurrences of natural hazards dating from 1985 (City incorporation) for which specific damage was recorded in City of Orinda. Other hazard events that broadly affected the entire planning area, including City of Orinda, are listed in the risk assessments in Volume 1 of this hazard mitigation plan. The 2017 winter storm events caused major damage in Orinda, including a sinkhole on Miner Road and multiple landslides and tree damage throughout the City. Note that although the City has not experienced a major wildfire, the City is located directly east of the Oakland Hills, which in 1991 suffered one of the worst wildland-urban firestorm disasters to ever strike the United States with 25 deaths, 150 injuries and losses in excess of \$1.5 Billion.

Table 1-10. Past Natural Hazard Events

Type of Event	FEMA Disaster # (if applicable)	Date	Damage Assessment
Storms, Flooding, Landslides	4308-DR-CA 4301-DR-CA Local Emergency (Resolution 10-17)	2/1/2017 – 2/23/2017 1/3/2017 – 1/12/2017 1/7/2017 – (ongoing)	\$3 million Sinkhole at Miner Road causing San Pablo Creek culvert failure, damage to utility lines and flooding of adjacent private properties. Additional storm damage throughout Orinda, including downed trees, flooding and landslides.
Storms and Flooding	Local Emergency (Resolution 71-12)	12/2/2012	\$125,000 (temporary repairs) \$160,000 (permanent repairs) Storm drain failure at Tarabrook and Evergreen Drives leading to sinkhole, sewer and road collapse and private property flooding; compromised storm drain at Lavenida Lane. Additionally, downed trees and landslides reported to City’s Public Works Department at 69 properties from December 2-5 (damages not recorded).

Type of Event	FEMA Disaster # (if applicable)	Date	Damage Assessment
Flooding		3/13/2012	\$50,000 Data provided by Contra Costa County NOAA Storm Events records.
Storms and Flooding		3/24/2011	Flooding, landslides, culvert and storm drain damage reported to Public Works Department at 10 properties. Monetary damages not available.
Flooding		1/10/2010	Data provided by Contra Costa County NOAA Storm Events records. Damages not available.
Storms		5/10/2006	Roadway damage. Damages not available.
Landslide		2008	\$2 million The Zander Drive landslide reactivated 10 years after residential development encroached onto lands underlain by the landslide. The landslide measured 200 feet across, extended 1,000 feet from Zander Drive down to San Pablo Creek and had a maximum depth of 115 feet. Three properties were impacted; two homes were demolished, and the City purchased and remediated one of the properties.
Storms, Flooding and Landslides	1628-DR-CA Local Emergency (Resolution 03-06)	12/17/2005 – 1/12/2006 12/31/2005 - 1/1/2006	\$1.053 million Clogged storm drain under North Lane; landslides at Canon Drive, Diablo View Road, Camino Don Miguel and Wagner Ranch School; mudslides onto public roadways; potholes on Moraga Way. Additionally, reports of tree, landslide, flooding, sewer break damages at 22 private properties.
Flooding		2/13/2000	\$100,000 Data provided by Contra Costa County NOAA Storm Events records indicates a flash flood in Orinda on 2/13/2000. Some of the damages may have been in adjoining municipalities
Flooding and Landslides	1203-DR-CA	2/2/1998	Severe flooding and landslides throughout the Bay Area totaling \$550 million in damages. Local damages not available.
Storms, Flooding and Landslides	Local Emergency (Resolution 01-97)	1/1/1997 – 1/5/1997	\$63,900 Slide damage repair on Mansanita Drive. Severe flooding and associated evacuations throughout Northern California totaling \$1.8 billion in damages. Local damages not available beyond the Manzanita slide repair.
Storms and Flooding		12/22/1996	Data provided by Contra Costa County NOAA Storm Events records indicates a flash flood in Orinda on 12/22/1996. Damages not available.
Storms, Flooding, Landslides	1046-DR-CA 1044-DR-CA	1/10/1995	Severe storms, flooding, landslides, mudflows throughout Northern California. Over 100 stations recorded their greatest 1-day rainfall in history. Overall \$741.4 million in damages. Local damages not available.

Type of Event	FEMA Disaster # (if applicable)	Date	Damage Assessment
Rain and High Winds	979-DR-CA	1/25/1993	Severe weather throughout Northern California caused \$600 million in overall damages. Local damages information is not available.
Earthquake	845-DR-CA	10/17/1989	Magnitude 7.1 earthquake. Overall impact in Northern California was \$5.9 billion in damages, including \$25 million in Contra Costa County. Local damages not available.
Storms	758-DR-CA	3/4/1986	Rains, winds, flooding and mud slides totaling \$407.5 million in damages throughout California. Local damages not available.

1.7 JURISDICTION-SPECIFIC VULNERABILITIES

Volume 1 of this hazard mitigation plan provides complete risk assessments for each identified hazard of concern. This section provides information on a few key vulnerabilities for the jurisdiction.

Repetitive loss records are as follows:

- Number of FEMA-identified Repetitive-Loss Properties: 2
- Number of FEMA-identified Severe-Repetitive-Loss Properties: 1
- Number of Repetitive-Loss Properties or Severe-Repetitive-Loss Properties that have been mitigated: Unknown

Other noted vulnerabilities include the following:

- **Landslides.** Orinda has always been subject to landslides; in fact, landslides are the primary physical process that shapes the topography in this area. Landslides occur on hillsides throughout the City and generally occur in winter during high precipitation years. Multiple critical communication, power, water, wastewater, bridges, fire district and school facilities are at moderate to high risk for landslide. During the 2016-2017 winter season, at least six new landslides occurred on public and private property and a large sinkhole developed under the Miner Road bridge across San Pablo Creek, leading to road closure for six months while the bridge, culvert and utility lines were repaired.
- **Wildfire.** The entire community is considered “Wildland Urban Interface – Fire Threatened” according to CALFire. The northwestern and central northern portions of Orinda are considered Very High Hazard Severity Zones. Many of these high risk areas are also the most difficult to access, as they are at the end of winding roads bordering undeveloped hillsides. Also, there is not sufficient water pressure to support the fire hydrants in some parts of the city, so the Moraga-Orinda Fire District must be prepared to bring 2,500-gallon water trucks when responding to fires in those parts of the city. The hydrants with insufficient water pressure have all been identified and color-coded red. Voters rejected bond measures in 2002 and 2007 that would have paid for water pipe upgrades to fix this problem.
- **FEMA Floodway and Floodplain.** San Pablo Creek runs through downtown Orinda, and much of downtown is within the FEMA floodplain. Also, many older homes in Orinda were built along San Pablo, Lauterwasser and Moraga Creeks in what is now considered the FEMA floodway or floodplain and are vulnerable to flooding.
- **Limited Neighborhood Access Options.** Due to the hilly topography and suburban cul-de-sac design throughout the City, some neighborhoods have only one or two access points. As a result, access can easily be compromised during an emergency. In particular, the Sleepy Hollow and El Toyonal neighborhoods are particularly isolated. This is not a robust or resilient design.

- **Localized Flooding.** The City’s stormwater infrastructure is aging and some culverts and pipes are undersized, which can lead to localized flooding during major rain events.
- **Dam Failure.** Dam inundation maps indicate that failure of both the Lake Cascade and Briones Dams would cause damage in Orinda. The Department of Water Resources carries out periodic inspections to ensure that these dams meet adequate standards for public safety consistent with potential earthquake motions, but the City does not review these inspection reports.
- **Earthquakes.** The City lies in close proximity to many faults and, along with other Contra Costa communities, is at risk for major damage in the event of an earthquake.

1.8 HAZARD RISK RANKING

Table 1-11 presents a local ranking for City of Orinda of all hazards of concern for which Volume 1 of this hazard mitigation plan provides complete risk assessments. This ranking summarizes how hazards vary for this jurisdiction. As described in detail in Volume 1, the ranking process involves an assessment of the likelihood of occurrence for each hazard, along with its potential impacts on people, property and the economy.

Rank	Hazard Type	Risk Rating Score (Probability x Impact)	Category
1	Earthquake ^b	54	High
1	Landslide ^e	54	High
2	Wildfire ^e	39	High
3	Severe weather	30	Medium
4	Flood ^c	18	Medium
5	Drought	9	Low
6	Dam and levee failure ^a	6	Low
7	Sea level rise ^d	0	None
7	Tsunami	0	None

- a. Based on the level of detail conducted in the risk assessment, the risk ranking for this hazard is focused solely on dam failure impacts. See Chapter 6.4 of Volume 1 for combined dam inundation list on which this assessment is based.
- b. Haywired M7.05 event was used to assign probability and impacts
- c. 1-percent annual chance event was used to assign probability and impacts
- d. 2100 upper range estimates and extreme tide are used to assign probability and impacts
- e. Very High and High severity zones were used to assign probability and impacts

1.9 STATUS OF PREVIOUS PLAN ACTIONS

Table 1-12 summarizes the actions that were recommended in the previous (2011) hazard mitigation plan and their implementation status at the time this update was prepared.

Table 1-12. Status of Previous Plan Actions				
Action Item	Completed	Removed; No Longer Feasible	Carried Over to Plan Update	
			Check if Yes	Enter Action #
<p>Radio Communication Upgrades – A P25 compliant communications system with region wide interoperability with the San Francisco Bay Area Super Urban Area Security Initiative (UASI).</p> <p><i>Comment: Per the draft 2017 EOP, the East Bay Regional Communications System is a P25 compliant digital radio communication system and provides fully interoperable communications to all public agencies within Alameda and Contra Costa Counties.</i></p>	Completed			
<p>North Lane Storm Water Improvement Project – Installation of a new 60 inch drainage facility within City of Orinda right-of-way and through EastBay Municipal Utility District (EBMUD) Water Treatment Facility property.</p> <p><i>Comment: The North Lane Storm Water Improvement Project was completed in April 2017.</i></p>	Completed			
<p>Manzanita Drive Bridge Replacement Project - The Manzanita Drive Bridge Replacement project replaces a bridge that will be compliant with current seismic standards and raises the bridge deck above the flood elevation.</p> <p><i>Comment: The Manzanita Drive Bridge Replacement Project was completed in November 2014.</i></p>	Completed			
<p>El Toyonal Slope Stabilization – Slope stabilization of a road in a residential area in Orinda, which is also a designated emergency evacuation route. Geotechnical study and design by licensed geotechnical engineer.</p> <p><i>Comment: The El Toyonal Slope Stabilization Project was completed in January 2012.</i></p>	Completed			
<p>(Housing Mitigation Strategies) Wildfire and Structural Fires - Participate with the Moraga Orinda Fire Department (MOFD) in the “Ready Set Go” program to improve coordination and communication between emergency response agencies and the community.</p> <p><i>Comment: The MOFD Emergency Preparedness Coordinator has set up Ready Set Go for Orinda, Lafayette and Moraga based on a grant received from Cal Fire in July 2014. Ready Set Go is an educational component of a larger wildland fire management program called “Ready for Wildfire.” Orinda is engaged in the Ready Set Go program. The City’s Police Department will be working with a consultant, through MOFD, to develop evacuation routes in the City as a program element. The Sleepy Hollow neighborhood went through the process of becoming a “FireWise Community” but the designation was dropped a few years ago when the required designation maintenance activities were not carried out. Other actions taken include:</i></p> <ul style="list-style-type: none"> • Community volunteers from the Lamorinda Radio Interest Group (LARIG) assist the Fire District with fire watch in Orinda on high fire danger days (principally July 4th- during the fireworks displays) • LARIG volunteers are being trained to staff radio operator positions in the Orinda Emergency Operations Center. A select group will have access to the Radio Operator and Communications Unit Leader boards in the Orinda version of WebEOC. • LARIG volunteers purchased, built and maintain a General Mobile Radio System (GMRS) radio repeater for Orinda as part of the CERT program. The radio system can communicate directly into the City’s Emergency Operations Center during a disaster. CERT basic training includes operation of the system by neighborhood leaders. 	Completed			

Action Item	Completed	Removed; No Longer Feasible	Carried Over to Plan Update	
			Check if Yes	Enter Action #
<p>In addition to these specific actions, the following are ongoing programs listed in Orinda’s 2011 LHMP that incorporate mitigation goals and objectives. Most of these programs will be continued, but most are not associated with specific actions targeting FEMA funding.</p>				
<p>Assess the vulnerability of critical facilities owned by infrastructure operators subject to damage in natural disasters or security threats.</p> <p><i>Comment:</i> Bridges are assessed by Caltrans at yearly or multi-year intervals based on bridge type. East Bay Municipal Utility District conducts assessments of water lines; PG&E assesses electric and gas infrastructure; Contra Costa Central Sanitary District assesses sewer lines, and the Orinda Unified School District Facilities Department assesses school facilities. The City’s Public Works/Engineering Department assesses drainage facilities, and the Parks and Recreation Department assesses City owned buildings and parks to determine maintenance needs.</p>	Ongoing			
<p>Retrofit or replace critical lifeline infrastructure facilities and/or their backup facilities that are shown to be vulnerable to damage in natural disasters.</p> <p><i>Comment:</i> The City participates in the Highway Bridge Program (HBP).</p>	Ongoing		✓	1
<p>Coordinate with the State Division of Safety of Dams to ensure that the City is aware of the timeline for the maintenance and inspection of dams whose failure would impact their jurisdiction.</p> <p><i>Comment:</i> The City does not own any dams. Dam property owners coordinate directly with the State Division of Dams for annual inspections. If the Division deems a dam unsafe, they may direct the dam owner to implement their emergency action plan in coordination with the City. However, the City has not yet proactively coordinated with the State Division of Dams to obtain dam inspection reports.</p>			✓	16
<p>Develop interoperable communications for first responders from cities, counties, special districts, state, and federal agencies.</p> <p><i>Comment:</i> Per the draft 2017 EOP, the East Bay Regional Communications System is a P25 compliant digital radio communication system and provides fully interoperable communications to all public agencies within Alameda and Contra Costa Counties.</p>	Ongoing			
<p>Coordinate services through the Contra Costa County’s Standardized Emergency Management System Plan.</p> <p><i>Comment:</i> The draft 2017 EOP establishes an Emergency Management Organization and assigns functions and tasks consistent with California’s Standardized Emergency Management System (SEMS). It provides for integration and coordination of planning efforts of multiple jurisdictions.</p>	Complete			
<p>Participate in general mutual-aid agreements and agreements with adjoining jurisdictions for cooperative response to fires, floods, earthquakes, and other disasters.</p> <p><i>Comment:</i> The California Disaster and Civil Defense Master Mutual Aid Agreement (MMAA) was developed in 1950. The agreement obligates each signatory entity to provide aid to the others during an emergency without expectation of reimbursement. Orinda is located within the Coastal Region (Mutual Aid Region II). MMAA covers fire, police, medical, communication and transportation services and facilities. Alameda County is the Regional Mutual Aid Coordinator for Law and Emergency Medical Services, and Contra Costa county is the Regional Mutual Aid Coordinator for Fire. Orinda also participates in state and local mutual aid agreements for the following services: emergency management, coroner, petrochemical mutual aid, Red Cross, California Resiliency Alliance, Volunteer Center of the East Bay, and Contra Costa Crisis Center.</p>	Ongoing			
<p>Participate in FEMA’s National Flood Insurance Program.</p> <p><i>Comment:</i> The City continues to participate in this program, but there are no certified floodplain managers on staff. Staff will investigate training options for this certification, and will also investigate joining the Community Rating System.</p>	Ongoing		✓	4
<p>Develop printed materials, utilize existing materials (such as developed by FEMA and the American Red Cross), conduct workshops, and/or provide outreach encouraging employees of critical health care facilities to have family disaster plans and conduct mitigation activities in their own homes.</p>		✓		18

Action Item	Completed	Removed; No Longer Feasible	Carried Over to Plan Update	
			Check if Yes	Enter Action #
<p>Comment: The following printed materials have been developed and are available to customers at the Administration and Planning Department front counters: Disaster Assistance (CalOES and FEMA); Hazardous Materials and Earthquakes (CalOES); Lamorinda Ready, Set, Go! 4th Edition; Firescape – Landscaping to Reduce Fire Hazard (EBMUD); The Homeowner’s Guide to Wildfire Prevention (Robert Sieben, provided courtesy of MOFD); EBMUD watering and drought safety handouts; and “Caring for Our Creeks” (a Creekside property owner’s manual developed by City of Orinda and revised in 2009). Most of these materials are not yet available on the City’s website. There are additional educational materials available from the Moraga-Orinda Fire District both electronically and in hard copy. More of these materials could be provided at City Hall.</p>				
<p>Sponsor the formation and training of Community Emergency Response Teams (CERT) through partnerships with local businesses</p>	N/A	✓		
<p>Comment: CERT is identified in the draft 2017 EOP as a partnership organization that educates people about disaster preparedness and trains them in basic disaster response skills such as fire safety, light search and rescue, team organization and disaster medical operations. Lamorinda CERT serves Lafayette, Moraga, Orinda and surrounding unincorporated communities and offers basic CERT classes three times each year. The Lamorinda CERT Foundation was formed in 2014 and pays the day to day operating expenses of the CERT. The Foundation is sponsored by MOFD.</p>				
<p>Incorporate FEMA guidelines and suggested activities into local government plans and procedures for managing flood hazards.</p>	Ongoing		✓	21
<p>Comment: Planning and Public Works/Engineering staff consult FEMA floodplain and floodway maps during project review.</p>				
<p>Increase efforts to reduce landslides and erosion in existing and future development through continuing education of design professionals on mitigation strategies.</p>	Ongoing		✓	22
<p>Comment: The City’s Engineering staff provides feedback on draft grading, drainage and landscape repair plans.</p>				
<p>Conduct an inventory of existing or suspected soft-story residential, commercial and industrial structures.</p>	Ongoing		✓	
<p>Comment: The City has not yet conducted this inventory..</p>				
<p>Continue to repair and make structural improvements to storm drains, pipelines, and/or channels to enable them to perform to their design capacity in handling water flows as part of regular maintenance activities.</p>	Ongoing		✓	7
<p>Comment: The current five-year Capital Improvement Plan allocates \$850,000 to develop and implement minor repairs and replacement of City-maintained drainage facilities as problems are identified during the storm season or through ongoing inspections. Project locations are coordinated with the annual paving project and reviewed by the Citizens Infrastructure Oversight Commission.</p>				

1.10 HAZARD MITIGATION ACTION PLAN AND EVALUATION OF RECOMMENDED ACTIONS

Table 1-13 lists the actions that make up the City of Orinda hazard mitigation action plan. Table 1-14 identifies the priority for each action. Table 1-15 summarizes the mitigation actions by hazard of concern and mitigation type.

Table 1-13. Hazard Mitigation Action Plan Matrix

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
OR #1 —Where appropriate, support retrofitting or relocation of structures in high hazard areas, prioritizing structures that have experienced repetitive losses.						
Existing	Flood, Landslide	1, 4, 7, 9, 12, 14, 15, 17	City of Orinda	High	HMGP, PDM, FMA	Short-term
OR #2 —Integrate the hazard mitigation plan into other plans, ordinances and programs that dictate land use decisions in the community, including the General Plan, Orinda Municipal Code, Capital Improvement Plan, Emergency Operations Plan and Wildfire. Per SB 379, at the time of the next General Plan Housing Element update (2023), update the General Plan Safety Element to incorporate the LHMP.						
New and Existing	Dam & Levee Failure, Drought, Earthquake, Flood, Landslide, Sever Weather, Wildfire	1, 4, 5, 7, 11, 12, 14, 17	City of Orinda	Low	Staff Time, General Funds	Ongoing
OR #3 — Actively participate in the plan maintenance protocols outlined in Volume 1 of this hazard mitigation plan.						
New and Existing	Dam & Levee Failure, Drought, Earthquake, Flood, Landslide, Sever Weather, Wildfire	3, 8, 16	City of Orinda	Low	Staff Time, General Funds	Short-term
OR #4 —Continue to maintain good standing and compliance under the NFIP through implementation of floodplain management programs that, at a minimum, meet the NFIP requirements:						
<ul style="list-style-type: none"> • Enforce the flood damage prevention ordinance. • Participate in floodplain identification and mapping updates. • Provide public assistance/information on floodplain requirements and impacts. 						
New and Existing	Flood	3, 5, 6, 9, 10, 11, 15	City of Orinda	Low	Staff Time, General Funds	Ongoing
OR #5 —Camino Sobrante Slope Stabilization to repair a landslide next to Camino Sobrante at the vicinity of 252 Camino Sobrante.						
Existing	Landslide	1, 2, 7, 15	City of Orinda	Medium	Capital Fund (General Fund), FEMA Emergency Grant	Short-Term
OR #6 —Santa Maria Park & Ride and City Hall Parking Lots. These parking lots are experiencing slope stability issues evidenced in large transverse cracks in the parking spaces.						
Existing	Landslide	1, 2, 7, 15	City of Orinda	Medium	Road/Drainage Stabilization Fund, Transportation Impact Fees, CCTA	Short-Term
OR #7 —Annual Drainage Facilities Improvement Program. Develop and implement minor repairs and replacement of City-maintained drainage facilities as problems are identified through the storm drain plan and inventory completed in 2016, during the storm season or through ongoing inspections.						

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
Existing	Flood, Severe Weather	1, 2, 6, 7, 10, 15	City of Orinda	Medium	Drainage Impact Fees, Capital Fund (General Fund)	Ongoing
OR #8 —Oak Springs/Candlestick Road Storm Water Improvements. Reduce potential future erosion from the flow that currently discharges from a culvert outfall conveying stormwater from an inlet at the end of Candlestick Road. Connect a new pipe at the outfall of the existing drop inlet and terminate the pipe at an existing inlet within Highway 24 ROW.						
Existing	Severe Weather, Landslide	1, 2, 6, 7, 10, 15	City of Orinda	High	Road/Drainage Stabilization Fund, MPA/CARMA	Short-Term
OR #9 —Miner Road Bridge over San Pablo Creek: Bridge Replacement with Sidewalk. Classify bridge as obsolete, complete design, environmental review and agency consultation processes which were previously started but were halted in 2014, and construct replacement bridge. This project concerns a different portion of Miner Road than the 2017 sinkhole location.						
Existing	Earthquake, Severe Weather	1, 2, 6, 7, 10, 15	City of Orinda*, Caltrans	High	Federal Grants (HBP), Transportation Impact Fees	Short-Term
OR #10 —Consider hazard mitigation in the annual update to the Capital Improvement Plan. Identify specific unfunded capital improvement projects as high priority based on hazard risk reduction potential and identify grant funding opportunities to fund these projects. Current CIP unfunded projects include but are not limited to: Bear Creek Bridge Seismic Retrofit, Camino Sobrante Slope Stabilization, Happy Valley Road Embankment Repair & Guardrail, and Miner Road at Camino Lenada Slope Stabilization.						
New and Existing	Flood, Wildfire, Landslide, Severe Weather	1, 2, 7, 15	City of Orinda	Low (CIP) High (project funding)	HMGP, PDM, FMA	Ongoing
OR #11 —Continue to allocate time and funding to Public Works staff to trim and remove trees along city right of ways where trees are overhanging roadway or power lines and in danger of falling during storms.						
Existing	Severe Weather	1, 2	City of Orinda	Low	Public Works & Engineering Staff Time	Ongoing
OR #12 —Prepare a Green Infrastructure Plan per the approved Green Infrastructure Plan Framework (City Council Resolution 53-17).						
New and Existing	Flood, Severe Weather, Drought	1, 2, 6, 9, 10, 12, 14, 17	City of Orinda	Medium	General Fund or other City budget allocation; possibly HMGP and CDBG-DR	Short-Term; 2017 - 2019
OR #13 —Update the San Pablo Creek Restoration Plan. A preliminary plan was prepared in 2001 and needs to be updated and expanded to be an actionable plan. Required steps to complete in updating the plan include: hydraulic modeling; installing gauges to monitor water flows; confirming proposed natural creek design; developing accurate topographical map; and, most challenging, gaining consensus of property owners and regulatory agencies to obtain right-of-way along the creek. As preliminary steps in this right-of-way acquisition process, the City may identify and evaluate opportunities and constraints to repurpose creekside property; formulate and test incentives to stimulate reinvestment; and demonstrate the City’s commitment to creek restoration in order to obtain external funding.						
New and Existing	Flood, Severe Weather, Drought	1, 2, 6, 9, 10, 12, 14, 17	City of Orinda	Medium	Possibly FSR, HMGP, CDBG-DR as well as local grants such as EBMUD Measure WW Urban Creeks Grant Program and CDFW Ecosystem & Watershed Restoration Grant Program.	Short-Term
OR #14 —Investigate certification and training cost and class timing options for Floodplain Manager certification for Public Works/Engineering Department staff. If it is determined that class cost and timing is feasible, enroll at least one Public Works/Engineering staff person in this certification program using current fiscal year training budget or allocate budget for training for next fiscal year.						
New and Existing	Flood	6, 9, 10, 12, 17	City of Orinda	Low	Staff Time, General Funds (Staff Training Budget)	Short Term

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
OR #15 —Investigate what is required to join the Community Rating System, which is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. Flood insurance premium rates are discounted to reflect flood risk resulting from the community actions meeting flood risk reduction goals. The City will join this program if the City can reasonably meet CRS program requirements.						
New and Existing	Flood	1, 4, 5, 6, 9, 10, 12, 17	City of Orinda	Low	Staff Time, General Funds	Short-Term
OR #16 —Coordinate with the State Division of Safety of Dams to ensure that the City is aware of the timeline for the maintenance and inspection of dams whose failure would impact their jurisdiction.						
Existing	Dam & Levee Failure	1, 3, 6, 7, 12	City of Orinda	Low	Staff Time, General Funds	Ongoing
OR#17 —Conduct an inventory of soft-story structures in downtown Orinda. Identify potential sources of grant funding for retrofitting these structures. Inventory would be conducted in partnership with Contra Costa County Building Inspection Department and/or consultant(s).						
Existing	Earthquake	1, 3, 6, 15	City of Orinda*, Contra Costa County Building Inspection Department	Medium	Staff Time, General Funds	Ongoing
OR#18 – Review the Municipal Code regarding seismic requirements and review the seismic safety ordinances of nearby cities and report the findings to Council.						
Existing	Earthquake	6, 11, 12	City of Orinda	Low	Staff Time, General Funds	Short-Term
OR#19 – Coordinate with MOFD to understand all available options and costs associated with upgrading water pipes to increase water pressure at certain fire hydrants in Orinda.						
Existing	Wildfire	1, 2	City of Orinda	Low	Staff Time, General Funds	Short-Term
OR #20 —Develop and update worksheets and resources for the public regarding building in high hazard areas, and train permit counter staff to direct the public to these materials.						
New and Existing	Dam & Levee Failure, Drought, Earthquake, Flood, Landslide, Sever Weather, Wildfire	3, 5, 6, 7, 12	City of Orinda	Low	Staff Time, General Funds	Ongoing
OR #21 —Prepare a Climate Action Plan. Investigate the cost of preparing a Climate Action Plan and identify grant funding opportunities to supplement General Funds. Retain a consultant to update the existing greenhouse gas inventory which was conducted in 2009 based on 2005 data, and use the inventory to prepare a Climate Action Plan.						
New and Existing	All Hazards	1, 3, 6, 17, 18	City of Orinda	High	Staff time for investigation of cost and funding options. Grant funding for plan preparation may include HMGP, CDBG-DR.	Short-Term
OR #22 —Downtown Development coordination – As guidelines, plans and codes are developed and updated regarding development in downtown Orinda, incorporate hazard mitigation concepts into these Planning documents, especially regarding flood mitigation along San Pablo Creek.						
New and Existing	Dam & Levee Failure, Drought, Earthquake, Flood, Landslide, Sever Weather, Wildfire	1, 3, 6, 11, 17, 18	City of Orinda	Medium	General Plan Funds	Short-Term

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
OR #23 —Evaluate site plan review processes, train staff on content of LHMP and investigate ways to better train staff to consistently give feedback on project design as related to landslide and flooding risk during plan review and environmental review.						
New and Existing	Landslide, Flood	3, 5, 6, 7, 12	City of Orinda	Low	Staff Time, General Funds	Short-Term
OR #24 —Coordinate with Orinda Union School District regarding next update of Local Hazard Mitigation Plan to ensure that agency efforts are synced or complimentary. .						
New and Existing	Dam & Levee Failure, Drought, Earthquake, Flood, Landslide, Sever Weather, Wildfire	1, 2, 6, 12, 16	City of Orinda*, Orinda Union School District	Low	Staff Time, General Funds	Short-Term

Note: * = Identified lead agency

Table 1-14. Mitigation Action Priority

Action #	# of Objectives Met	Benefits	Costs	Do Benefits Equal or Exceed Costs?	Is Project Grant-Eligible?	Can Project Be Funded Under Existing Programs/Budgets?	Implementation Priority ^a	Grant Pursuit Priority ^a
OR-1	8	High	High	Yes	Yes	No	Medium	High
OR-2	8	Medium	Low	Yes	No	Yes	High	Low
OR-3	3	Low	Low	Yes	No	Yes	High	Low
OR-4	7	Medium	Low	Yes	No	Yes	High	Low
OR-5	4	High	Medium	Yes	Yes	Yes	High	High
OR-6	4	Medium	Medium	Yes	Yes	Yes	High	Medium
OR-7	6	Medium	Medium	Yes	Yes	Yes	High	Medium
OR-8	6	Medium	High	No	Yes	Yes	High	Low
OR-9	6	High	High	Yes	Yes	No	High	Medium
OR-10	4	High	High	Yes	Yes	No	Medium	Medium
OR-11	2	Medium	Low	Yes	No	Yes	High	Low
OR-12	8	Medium	Medium	Yes	Yes	No	Medium	High
OR-13	8	Medium	Medium	Yes	Yes	No	Medium	High
OR-14	5	Low	Low	Yes	No	Yes	High	Low
OR-15	8	Medium	Low	Yes	No	Yes	Medium	Low
OR-16	5	Low	Low	Yes	No	Yes	Medium	Low
OR-17	4	Medium	Low	Yes	No	Yes	Medium	Low
OR-18	3	Low	Low	Yes	No	Yes	Medium	Low
OR-19	2	Low	Low	Yes	No	Yes	Medium	Low
OR-20	5	Low	Low	Yes	No	Yes	High	Low
OR-21	5	Medium	Medium	Yes	Yes	No	Medium	High
OR-22	6	Low	Medium	No	No	Yes	Medium	Low
OR-23	5	Low	Low	Yes	No	Yes	Medium	Low
OR-24	5	Low	Low	Yes	No	Yes	Medium	Low

a. See the introduction to this volume for explanation of priorities.

Table 1-15. Analysis of Mitigation Actions

Hazard Type	Action Addressing Hazard, by Mitigation Type ^a							
	Prevention	Property Protection	Public Education and Awareness	Natural Resource Protection	Emergency Services	Structural Projects	Climate Resilient	Community Capacity Building
All hazards	OR-21						OR-21	OR-21
Dam and Levee failure	OR-2, 3, 16, 22, 24		OR-20				OR-22	OR-3, 16, 20, 22, 24
Drought	OR-3, 12, 13, 22, 24		OR-20	OR-12, 13			OR-12, 13, 22	OR-3, 12, 13, 20, 22, 24
Earthquake	OR-2, 3, 17, 22, 24	OR-9	OR-17, 20	OR-9	OR-9	OR-9		OR-3, 17, 18, 20, 22, 24
Flood	OR-2, 3, 4, 7, 10, 12, 13, 15, 22, 23, 24	OR-1,7	OR-4, 20, 23	OR-12, 13		OR-1, 7	OR-12, 13, 22, 23	OR-3, 4, 7, 10, 12, 13, 14, 15, 20, 22, 23, 24
Landslide	OR-1, 2, 3, 10, 22, 23, 24	OR-1, 5, 6, 8	OR-20, 23	OR-8		OR-1, 5, 6, 8	OR-1, 22, 23	OR-3, 10, 20, 22, 23, 24
Severe weather	OR-2, 3, 7, 10, 12, 13, 22, 24	OR-7, 8, 9, 11	OR-20	OR-8, 9, 12, 13	OR-9	OR-7, 8, 9	OR-12, 13, 22	OR-3, 7, 10, 12, 13, 20, 22, 24
Tsunami								
Wildfire	OR-2, 3, 10, 22, 24		OR-20				OR-22	OR-3, 10, 19, 20, 22, 24

a. See the introduction to this volume for explanation of mitigation types.

1.11 FUTURE NEEDS TO BETTER UNDERSTAND RISK/VULNERABILITY

1.11.1 Critical Facilities and Infrastructure

During the course of the plan update process, it was determined that a number of critical facilities and infrastructure located in the City of Orinda were not included in the Contra Costa County Critical Infrastructure Key Resource data set. City staff will work with County Office of Emergency Services staff to ensure that these missing assets are added.

1.11.2 Additional Landslide Hazard Information

A number of landslides in the City became active while the risk assessment was being conducted. The City has developed a list of the location of these slides, which will be incorporated into the risk assessment during the next update of the hazard mitigation plan.

1.12 REVIEW AND INCORPORATION OF RESOURCES FOR THIS ANNEX

The following technical reports, plans, and regulatory mechanisms were reviewed to provide information for this annex.

- **ABAG Resilience Project**—The hazard mapping tool was utilized to cross-reference building permit projects with known hazard areas in Orinda. <http://gis.abag.ca.gov/website/Hazards>
- **City of Orinda Capital Improvement Plan**—This plan was evaluated for the full capability assessment and for identifying opportunities for action plan integration.
- **City of Orinda Emergency Operations Plan**—This plan was evaluated for the full capability assessment and for identifying opportunities for action plan integration.
- **City of Orinda General Plan**—The Conservation, Safety, and Growth Elements were evaluated for the full capability assessment and for identifying opportunities for action plan integration.
- **City of Orinda Greenhouse Gas Emissions Analysis: 2005 Community Emissions Inventory**—This inventory was reviewed to understand potential greenhouse gas reduction strategies for the City.
- **City of Orinda Municipal Code**—The municipal code was reviewed for the full capability assessment and for identifying opportunities for action plan integration.
- **Contra Costa County Community Wildfire Protection Plan**—This plan was evaluated for the full capability assessment and for identifying opportunities for action plan integration.
- **Technical Reports and Information**—The following outside resources and references were reviewed:
 - **Hazard Mitigation Plan Annex Development Tool-kit**—The tool-kit was used to support the development of this annex including past hazard events, noted vulnerabilities, risk ranking and action development.

Tetra Tech Will Insert Jurisdiction-Specific Hazard Maps Prepared for This Plan