



2024 Hazard Mitigation Plan

Contra Costa County,
California

A large, high-angle photograph of a town nestled in a valley. In the background, a range of mountains with snow-capped peaks rises against a sky filled with white, fluffy clouds. The town below is a mix of residential houses, larger apartment complexes, and industrial buildings. The foreground is dominated by green trees and bushes.

**Town of
Moraga
Annex**



TABLE OF CONTENTS

1. Introduction.....	1
2. Local Planning Team.....	1
3. Jurisdiction Profile	1
3.1. Population	1
3.1.1. Underserved Population	2
3.2. Brief History.....	3
3.3. Governing Body Format	3
4. Development Trends	3
4.1. Changes in Priority	4
5. Capability Assessment.....	5
5.1. Planning and Regulatory Capabilities	5
5.2. Administrative and Technical Capabilities.....	10
5.3. Financial Resources.....	12
5.4. Education and Outreach Capabilities.....	13
6. Hazard Mitigation Plan Integration	15
6.1. Past Plan Integration	15
6.2. Potential Future Integration	15
7. Significant Hazard Past Events	16
8. National Flood Insurance Program.....	17
8.1. Floodplain Manager.....	17
8.2. Participation Activities.....	17
8.2.1. Substantial Damage	17
8.2.2. Substantial Improvement.....	18
8.3. Repetitive Loss and Severe Repetitive Loss Properties.....	18
9. Hazard Vulnerability and Impact Assessment.....	18
9.1. FEMA National Risk Index.....	29
9.1.1. Expected Annual Loss	29
9.1.2. Social Vulnerability	30
9.1.3. Community Resilience	31
9.1.4. Annualized Frequency	31
10. Hazard Risk Ranking.....	32
11. Mitigation Actions	34
Appendix A. Hazard Maps.....	60
Appendix B. Stakeholder and Public Engagement	65
Appendix C. Hazard Risk Assessment Methodology	84

**2024 Hazard Mitigation Plan
Contra Costa County, California**



Appendix D. Hazard Risk Ranking Details.....	92
Appendix E. Plan Adoption	112



1. INTRODUCTION

This Annex details the hazard mitigation elements specific to the Town of Moraga, a participating jurisdiction to the 2024 Contra Costa County Hazard Mitigation Plan update. This Annex is not intended to be a standalone document but supplements the information contained in **Volume 1 (Planning Area-wide Elements)**. Therefore, all sections of **Volume 1 (Planning Area-wide Elements)** including the planning process, mitigation goals and objectives, hazard identification and risk assessment, mitigation strategy, and plan maintenance apply to and were met by the Town of Moraga. This Annex provides additional information specific to the Town, with a focus on providing additional details on the hazard risk assessment and mitigation strategy (i.e., mitigation actions) for this community.

2. LOCAL PLANNING TEAM

The Town of Moraga Local Planning Team was comprised of the members listed on **Table 1**.

Table 1. Town of Moraga Local Planning Team Members

Name	Title	Department
Sonia Urzua	Planning Director	Town of Moraga Planning Department
Chief Jon King	Chief of Police	Town of Moraga Police Department
Shawn Knapp	Director of Public Works / Town Engineer	Town of Moraga Public Works & Engineering Department
Brian Horn	Principal Planner	Town of Moraga Planning Department
Mio Mendez	Associate Planner	Town of Moraga Planning Department

3. JURISDICTION PROFILE

Moraga is a small town situated in the San Francisco Bay Area, just east of the Oakland Hills and approximately eight (8) miles east of Downtown Oakland. The Town is 9.4 square miles in area, and it is bordered by Lafayette, Orinda, and Unincorporated Contra Costa County, including the nearby community of Canyon. Moraga is mostly a single-family residential community with most of the development located in valleys surrounded by hillside areas. The Town has two (2) commercial centers, and Saint Mary's College of California, a private college with approximately 3,000 students, is located in the east side of Moraga.

3.1. Population

The Town of Moraga had a population of 16,707 as of July 1, 2022. Between 2010 and 2020, the population increased by approximately 5.3%; however, a slight population decrease of 1.0% occurred between 2020 and 2022. **Table 2** shows the Town of Moraga's population distribution between 2010 and 2022.¹

¹ United States Census Bureau. (2022). Quick Facts: Town of Moraga. Retrieved from <https://www.census.gov/quickfacts/fact/table/moragatowncalifornia/>.



Table 2. Population Estimates

Jurisdiction	2010	2020	2022	Population Change (2010 – 2022)
Town of Moraga	16,016	16,870	16,707	4.3%

3.1.1. Underserved Population

The 2023 California State Hazard Mitigation Plan identifies the Centers for Disease Control and Prevention (CDC) Social Vulnerability Index (SVI) as the most appropriate and authoritative dataset to identify areas where efforts can be prioritized to ensure equitable outcomes from mitigation planning and actions.

CDC's SVI combines 16 social factors, within four (4) themes (i.e., socioeconomic status, household characteristics, racial and ethnic minority status, and housing type and transportation), to identify areas of social vulnerability. **Table 3** outlines the SVI information for the Town of Moraga.

Note: ArcGIS mapping analysis was performed utilizing Census Tract data by overlaying Census Tracts with the Town of Moraga planning area boundary. The information outlined in this section includes data from the Census Tracts that intersect the jurisdiction.

Table 3. Social Vulnerability Index (2020)

Theme	Social Factors	Population	Percent
Socioeconomic Status	People below 150% poverty estimate	2,299	13.6%
	Unemployed (Civilian 16 years old and older)	594	3.5%
	Housing Cost Burden	1,661	9.8%
	No High School Diploma	221	1.3%
	No Health Insurance	396	2.3%
Household Characteristics	65 years old and older	5,970	35.4%
	17 years and younger	6,805	40.3%
	Civilian with a Disability	1,964	11.6%
	Single-Parent Household	364	2.2%
	English Language Proficiency	718	4.3%
Racial and Ethnic Minority Status	<ul style="list-style-type: none"> Hispanic or Latino (of any race) Black or African American Asian American Indian or Alaska Native Native Hawaiian or Pacific Islander Two or More Races Other Races 	9,433	55.9%



Theme	Social Factors	Population	Percent
Housing Type and Transportation	Multi-Unit Structures	757	4.5%
	Mobile Homes	8	0.0%
	Crowding	88	0.5%
	No Vehicle	145	0.9%
	Group Quarters	1,946	11.5%

3.2. Brief History

Moraga is named after Joaquin Moraga, the grandson of José Joaquin Moraga the founder of San Francisco. The first European development in the area occurred in 1841. In the early 1910s, the valley that is now Moraga developed as a community of cattle ranchers and farmers. The area was serviced by the Sacramento Northern Railroad with service between Chico and Oakland. In 1928, Saint Mary's College moved from Oakland to Moraga. Most of the homes, roads, and businesses in the present day were built in the 1960s and 1970s. The Town of Moraga was incorporated in November 1974.

3.3. Governing Body Format

The Town of Moraga is governed by a five (5) member Town Council and has seven (7) committees and commissions which advise the Town Council and membership appointed by the Council. The Town has six (6) departments – Town Manager's Office, Administrative Services, Parks and Recreation, Planning, Police, and Public Works and Engineering. The Town Council assumes responsibility for adoption of this Plan and the Town Manager oversees its implementation.

4. DEVELOPMENT TRENDS

California Law requires counties and cities to prepare and adopt a General Plan, a comprehensive long-range plan to guide community development. The General Plan must contain seven (7) state-mandated elements – land use, housing, circulation, safety, open space, conservation, and noise – and may contain additional elements as a jurisdiction sees fit. Additionally, the General Plan must comprise an integrated and internally consistent set of goals, policies, and implementation measures. The Town of Moraga adopted its General Plan under this law and has updated it several times over the years, it was most recently comprehensively updated in June 2002, with seven (7) amendments since that time including three (3) housing element updates. The last update was completed in January 2023 as part of consistency requirements for the sixth cycle Housing Element update

Since 2002, Moraga has experienced limited growth, with most of that development focused within residential areas. Between 2007 and 2015, 11 single-family housing units were constructed. Between 2016 and 2023 residential construction increased, which resulted in 116 new dwelling units comprised primarily of single-family residences and accessory dwelling units with 36 multifamily townhome units. In 2017, Saint Mary's College updated their Campus Master Plan that includes development of new facilities and remodel and expansion of others, principally to serve the existing campus population with no substantial increase in enrollment projected. Implementation of the 2010 Moraga Center Specific Plan is anticipated to lead to a greater quantity of infill development, moderate density housing units, and commercial development in the next decade. In 2020 the Town adopted new zoning regulations to implement the Moraga Center Specific Plan and allow more opportunities for housing development. In 2023, the Town updated its Housing Element in accordance with State law, which also included zoning amendments to further support an increase in the production of housing. The sixth cycle Housing Element



was certified by the State on September 14, 2023, and anticipates 1,118 new units over the next eight (8) years.

Table 4 summarizes development trends in the performance period since development of the previous hazard mitigation plan and expected future development trends.

Table 4. Recent and Expected Development Trends

Criteria	Response
Has your jurisdiction annexed any land since the development of the previous Hazard Mitigation Plan?	No
<i>If yes, give the estimated area annexed and estimated number of parcels or structures.</i>	N/A
Is your jurisdiction expected to annex any areas during the performance period of this Plan?	No
Has your jurisdiction had any major changes in development over the <u>past</u> five (5) years that have occurred in hazard prone areas?	No
<i>If yes, please briefly describe.</i>	N/A
Are any areas targeted for development or major redevelopment in the <u>next</u> five (5) years that will occur in hazard prone areas?	Yes
<i>If yes, please briefly describe.</i>	<ul style="list-style-type: none"> Moraga Center Specific Plan Area: Located in the central portion of Moraga is comprised of approximately 187 acres focused on development of a mixed-use village with local serving commercial and a range of residential opportunities. Most of the new multi-family or mixed use development is anticipated in Moraga Center with approximately 800 units. Rheem Park Specific Plan Area: Located in the northern portion of Moraga is comprised of approximately 60 acres of commercial, office, and residential. The vision for the area is to create a transit-oriented area, addressing important community needs, such as housing supply and local-serving retail. Most of the new multi-family or mixed-use development is anticipated in Rheem Center with approximately 450 units.
Please provide the number of permits for each hazard area or provide a qualitative description of where development has occurred.	The Town of Moraga does not have a database tracking the number of development permits issued in specific hazard areas. At the time an applicant proposes development in a specific location, if applicable, staff assesses hazard risk specific to individual projects. For example, areas with steep slopes/potential landslide hazards require a hillside development permit and soils/geotechnical report.

4.1. Changes in Priority

The overall hazard mitigation priorities have not significantly changed for the Town of Moraga since the last Plan update. However, mitigation actions from the previous Plan were updated, and a more concerted effort on achieving equitable outcomes for all communities, including underserved communities and socially vulnerable populations, has been implemented.



5. CAPABILITY ASSESSMENT

Federal regulations require hazard mitigation plans to identify goals for reducing long-term vulnerabilities to the identified hazards in the planning area (Section 201.6(c)(3)(i)). A critical step in the development of specific hazard mitigation actions and projects is assessing existing authorities, policies, programs, and resources and capabilities to use or modify local tools to reduce losses and vulnerability from profiled hazards.

A capability assessment was conducted for the Town of Moraga and participating jurisdictions' authorities, policies, programs, and resources. Goals and mitigation actions were developed using input from this assessment. Information regarding the Town's implementation of and continued participation in the National Flood Insurance Program (NFIP) can be found in Section 8 of this Annex.

The Local Planning Team assessed the Town's capabilities that can contribute to the reduction of long-term vulnerabilities to hazards. The capabilities include the following categories:

- Planning and Regulatory Capabilities
- Administrative and Technical Capabilities
- Financial Capabilities
- Education and Outreach Capabilities

Additionally, ways to expand on and improve these existing policies and programs to integrate hazard mitigation into the day-to-day activities and programs of the Town were considered.

5.1. Planning and Regulatory Capabilities

These include local ordinances, policies, and laws to manage growth and development (e.g., land use plans, capital improvement plans, transportation plans, emergency preparedness and response plans, building codes, and zoning ordinances). The Town of Moraga will adopt the approved 2024 Contra Costa County Hazard Mitigation Plan into the Town's General Plan Safety Element for AB 2140 compliance.

Table 5 contains a list of legal and regulatory capabilities. The description section of each Planning and Regulatory Capability includes a paragraph on expansion, implementation, and improvement.

Table 5. Planning and Regulatory Capabilities

Town Code, Title 7: Health and Safety <i>Includes: Mosquito and Vector Control</i>			
Lead Department	Town of Moraga Planning Department, Town of Moraga Public Works, Town of Moraga Police Department, Contra Costa County Department of Conservation and Development	Hazards Addressed	Climate Change



Town Code, Title 15: Buildings and Construction

Includes: Water Systems Codes, Stormwater Management and Discharge Control, Sewers Inspection

Town Building Regulations (incorporates by reference and is based upon the 2022 California Building Code, 2022 California Residential Code, 2022 California Green Building Standards Code, and 2022 California Existing Building Code [all codified in California Code of Regulations, Title 24]); adopted November 17, 2022.

Expansion, Implementation, and Improvement: The Buildings Codes will be reviewed based on developing trends in identified hazards and mitigation measures that can make them more effective at preventing losses. They will be updated to comply with the latest International and State building codes. This Hazard Mitigation Plan may support clarification of existing and de facto Codes not enumerated within Title 15.

As the Federal Emergency Management Agency (FEMA) develops new guidance for the National Flood Insurance Program (NFIP), it will be incorporated into the Town Code as appropriate and integrated as updates to this Hazard Mitigation Plan.

Lead Department	Town of Moraga Planning Department, Town of Moraga Public Works, Town of Moraga Police Department, Contra Costa County Department of Conservation and Development	Hazards Addressed	Climate Change, Dam and Levee Failure, Drought, Earthquake, Flood, Severe Weather, Wildfire
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Town Code, Title 8: Planning and Zoning

Title 8 provides directions for the Planning Commission and staff and the Zoning Administrator. The Planning Commission is designated as the Advisory Agency with respect to subdivisions and building standards.

Additionally, it addresses floodplain management including participation in the NFIP as the basis for establishing the special flood hazard areas (SFHA). It also designates and lists the duties and responsibilities of the Floodplain Manager.

Expansion, Implementation, and Improvement: Zoning should be modified and updated to support changes in land use development. It should be implemented to require adequate infrastructure to support residential area populations.

Lead Department	Town of Moraga Planning Department, Town of Moraga Public Works,	Hazards Addressed	Climate Change, Drought, Earthquake, Flood, Severe Weather, Wildfire
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Town General Plan

Includes: Land Use, Circulation, Housing, Open Space, Safety, Noise, Economic, Hazardous Waste, Growth

The Town's General Plan, updated in 2002, is the community's vision about how it will grow and reflects the community's priorities and values while shaping the future. As the legal underpinning for land use decisions within the Town, the General Plan consists of an introduction and nine (9) elements:

- Chapter 1: Introduction
- Chapter 2: Values and Guiding Principles
- Chapter 3: Land Use
- Chapter 4: Community Design
- Chapter 5: Housing
- Chapter 6: Circulation
- Chapter 7: Open Space and Conservation
- Chapter 8: Safety
- Chapter 9: Community Facilities and Services
- Chapter 10: Growth Management
- Chapter 11: Action Plan

An additional Chapter will be added to the updated General Plan 2040, titled Economic Vitality. The General Plan also includes an Environmental Impact Report, which is used to assess potential environmental impacts as a result of development or non-development. It is analogous to the Environmental Impact Assessments required by the 1969 national Environmental Policy Act.

Expansion, Implementation, and Improvement: This Hazard Mitigation Plan will be incorporated in the General Plan Chapter 6, Resources and Hazards. The General Plan will include specific actions that support mitigation throughout the Town and Chapter 6 will closely align with this Hazard Mitigation Plan. The opportunity to incorporate additional hazard mitigation and abatement measures will be contemplated for inclusion into the updated General Plan.

Lead Department	Town of Moraga Planning Department, Town of Moraga Public Works, Town of Moraga Police Department	Hazards Addressed	Climate Change, Drought, Earthquake, Flood, Severe Weather, Wildfire
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County Climate Action Plan

The Contra Costa County Climate Action Plan (CAP), adopted in December 2015, is the County's strategic approach to reduce greenhouse gas (GHG) emissions from sources throughout the unincorporated area. The CAP reflects the County's programs and actions to decrease energy use, improve energy efficiency, develop renewable energy, reduce vehicle miles traveled, increase multi-modal travel options, expand green infrastructure, reduce waste, and improve the efficiency of government operations.

Expansion, Implementation, and Improvement: The CAP will be updated in parallel with the General Plan as resources allow. The General Plan will provide the long-term resiliency framework of goals and policies, and the CAP will provide strategic implementation programs to show how the County will reduce GHG emissions in support of the State's adopted reduction targets for 2030 and 2050, reducing GHG emissions 40 percent below 1990 levels by 2030, with consideration of the State's long-term goal to reduce GHG emissions to 80 percent below 1990 levels by 2050.

Lead Department	Contra Costa County Department of Conservation and Development	Hazards Addressed	Climate Change, Drought, Flood, Sea Level Rise, Severe Weather, Wildfire
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Contra Costa Hazardous Materials Plan / Hazardous Material Business Plan

Addresses the storage, use, and emergency planning for hazardous materials and extremely hazardous substances in the community and businesses.

Expansion, Implementation, and Improvement: This Hazard Mitigation Plan will support mitigation measures compatible with the County Hazardous Materials Plan to reduce potential hazardous material releases. In addition, the Town will collaborate with partners at Moraga-Orinda Fire District and Moraga Police Department to get the best practices, equipment, and training necessary to respond to a hazardous materials incident. The Town will conduct potential studies, assessments, and mitigations for Hazardous Materials through subject matter experts to ensure correct treatment of these crucial issues.

Lead Department	Contra Costa Health Services, Hazardous Materials Program Office; Moraga-Orinda Fire District, Town of Moraga Police Department	Hazards Addressed	Hazardous Materials Incidents
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Emergency Operations Plan

The Emergency Operations Plan (EOP) describes what the local jurisdiction's actions will be during a response to an emergency; includes annexes that describe in more detail the actions required of the local jurisdiction's departments/agencies. Further, the EOP describes the role of the Emergency Operation Center (EOC) and the coordination between the EOC and the local/tribal jurisdictions. Lastly, the EOP describes how the EOC serves as the point of coordination between local, tribal, State, and Federal agencies during a disaster. This Hazard Mitigation Plan provides the basis for the hazard identification and risk analysis included and described in the EOP.

Expansion, Implementation, and Improvement: This Hazard Mitigation Plan will be used as an essential tool to update the Town EOP. California Office of Emergency Services (Cal OES) requires that EOPs describe applicable hazards as part of the Plan. The latest Hazard Mitigation Plan hazards descriptions will be included as they represent the most recent analysis of problematic situations and evacuation scenarios as well as the most recent best practices and training programs. Mitigation actions that are preparedness and response in nature will be analyzed for applicability for inclusion in the description of EOP processes and procedures.

Lead Department	Town of Moraga Police Department	Hazards Addressed	Climate Change, Dam and Levee Failure, Drought, Earthquake, Flood, Landslide, Sea Level Rise, Severe Weather, Tsunami, Wildfire
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Capital Improvement Plan

The Capital Improvement Plan (CIP) provides broad direction for development of Town facilities and infrastructure. It describes a strategy to maintain adequate support for the Town's communities and commerce. It addresses transportation, greenhouse gases, stormwater, and other environmental factors. One key for the Town will be the State's new emphasis on the difference between wildland and WUI (wildland urban interface). The two (2) types could both potentially affect the Town, but the focus has historically been on wildland fires, and along with other best practices, the State mitigation plan leads the way for local efforts.

Expansion, Implementation, and Improvement: The CIP should include mitigation measures that will be funded by the Town. The State Hazard Mitigation plan provides a helpful resource to residents who are interested in the hazard mitigation practices suggested by this Hazard Mitigation Plan.

Lead Department	Town of Moraga Town Council, Town of Moraga Planning Department, Town of Moraga Public Works Department, Town of Moraga Parks and Recreation Department	Hazards Addressed	Climate Change, Dam and Levee Failure, Drought, Earthquake, Flood, Landslide, Sea Level Rise, Severe Weather, Tsunami, Wildfire
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Continuity of Operations Plan

The Plan is under development.

Lead Department	Town of Moraga Police Department, Town of Moraga Town Council, Town of Moraga Town Manager/Department Directors	Hazards Addressed	Climate Change, Dam and Levee Failure, Drought, Earthquake, Flood, Landslide, Sea Level Rise, Severe Weather, Tsunami, Wildfire, Hazardous Materials Incidents, Utility Interruptions, Active Shooter Incidents, Terrorism
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Storm Drain Master Plan

The Storm Drain Mast Plan (SDMP) is responsible for ensuring that the Town complies with its municipal stormwater National Pollutant Discharge Elimination System (NPDES) permits. The NPDES Program is mandated by the Federal Clean Water Act and administered in California by the State Water Resources Control Board and the Regional Water Quality Control Boards on behalf of the U.S. Environmental Protection Agency.

Expansion, Implementation, and Improvement: Mitigation actions in this Hazard Mitigation Plan can inform updates and revisions to the SCP. Watershed protection processes are a useful source of information for developing mitigation activities. This Hazard Mitigation Plan should be aligned with the SCP.

Lead Department	Town of Moraga Public Works Department	Hazards Addressed	Flood
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Alameda and Contra Costa County Regional Wildfire Prevention Plan

The Contra Costa Resource Conservation District (CCRCD) and the Alameda City Resource Conservation District (ACRCD) worked jointly with funding from the Coastal Conservancy to develop a Regional Priority Plan (RPP) for Contra Costa and Alameda counties. The goal of the RPP process was to identify regional natural resource concerns that could be exacerbated by catastrophic wildfire and develop projects or other methods to remedy those issues ahead of the next wildfire event. The planning process started in November 2020 and completed in September 2022.

Expansion, Implementation, and Improvement: This Hazard Mitigation Plan and Regional Wildfire Prevention Plan should be aligned where mitigation actions in this Hazard Mitigation Plan support the goals of the Regional Wildfire Prevention Plan. The wildfire analysis in this Hazard Mitigation Plan can inform updates and revisions to the Wildfire Prevention Plan.

Lead Department	Contra Costa County Fire Protection District, Moraga-Orinda Fire District, Town of Moraga Planning Department	Hazards Addressed	Wildfire
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Contra Costa County Community Wildfire Protection Plan

The Contra Costa County Wildfire Protection Plan (CWPP), updated in 2019, provides an analysis of wildfire hazards and risk in the wildland urban interface (WUI) in Contra Costa County. The Plan follows the standards for CWPPs established by the Federal Healthy Forest Restoration Act.

Expansion, Implementation, and Improvement: This Hazard Mitigation Plan and County CWPP should be aligned with this Hazard Mitigation Plan. Mitigation actions in this Hazard Mitigation Plan should support the goals of the CWPP. Analysis of wildfire identified as part of this Hazard Mitigation Plan update process can inform updates and revisions to the CWPP as those occur. The plan is not originated or held by the Town but would include the Town as an annex jurisdiction or other partner in wildfire protection.

Lead Department	Contra Costa County Fire Protection District, Moraga-Orinda Fire District, Town of Moraga Planning Department,	Hazards Addressed	Wildfire
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5.2. Administrative and Technical Capabilities

The administrative and technical capabilities include community (i.e., public and private) staff and their skills and tools, which can be used for mitigation planning and implementation. This capability includes engineers, planners, emergency managers, GIS analysts, building inspectors, grant writers, and floodplain managers. Small communities may rely on other government entities, such as counties or special districts, for resources. These capabilities may be used to support mitigation activities. **Table 6** lists administrative and technical capabilities.

Table 6. Administrative and Technical Capabilities

Planners, Engineers, Building Officials, and Code Enforcement	
The planners, engineers, building officials, and code enforcement personnel issue building permits, review plans for new construction and improvements; conduct plan checks; work with architects, engineers, designers, and building owners during pre-construction; inspect all phases of residential and commercial/industrial construction for compliance; enforce municipal code violations. Planning duties are contained within the Town itself while Building Official and inspection duties are contracted to the Contra Costa County Department of Conservation and Development (DCD). This includes for most code violations; the County code officer is contracted to help declare unsafe or nuisance properties which must be retrofitted in order to maintain a safe condition.	
Expansion and Improvement: Provide opportunities for continued education to Community Development staff to maintain state of the art knowledge of new code and regulatory requirements.	
Department	Town of Moraga Planning Department, Town of Moraga Public Works, Town of Moraga Police Department, Contra Costa County Department of Conservation and Development
Planners, Engineers, Analysts, and General Staff	
The planners, engineers, analysts, and general staff plan future Town land use; develop and implement the General Plan, land use regulations through zoning and subdivision codes, and environmental review of development; administer the Community Development Block Grant Program (CDBG), conduct Code Compliance Program with the Building Division; conduct conditional use permits, variances, land subdivision, California Environmental Quality Act (CEQA) review, public hearings, noise permits, and zoning information in house at the Planning Department level.	
Expansion and Improvement: Provide opportunities for continued education to Maintenance staff to maintain state of the art knowledge of new code and regulatory requirements.	
Department	Town of Moraga Planning Department, Town of Moraga Public Works, Town of Moraga Police Department, Contra Costa County Department of Conservation and Development
Director, Assistant Director, Superintendent, Supervisor, Engineers, Analysts, General Staff	
Directors, assistant directors, superintendents, supervisors, engineers, analysts, and general staff oversee public and private improvements in the public right of way; develop and implement the Capital Improvement Program by providing staff support to the Town relative to Town streets, sanitary sewer, storm drains, water system facilities, traffic signals, park, and recreational facilities; maintain and upgrade public infrastructure; provide services related to traffic issues; monitors the street lighting system maintained by the Town and PG&E; keeps and maintains record drawings of Town owned infrastructure; conducts traffic committee meetings with the Police Department; and provides engineering support to other Town departments and divisions within the Public Works Department.	
Expansion and Improvement: Provide opportunities for continued education to Public Works staff on updates of new code and regulatory requirements.	
Department	Town of Moraga Public Works Department (Engineering Division)



Police Department – Emergency Services

The Town of Moraga is a “limited-service municipality”. Emergency services are primarily supported by the Town’s Police Department and the Moraga-Orinda Fire District. Significant emergency needs will be coordinated by the County.

The Police Department provides for the coordinated response and recovery from major emergencies and disasters; develop, administer and coordinate the emergency planning preparedness program in conformity with local, State, and Federal requirements; develop emergency management and hazard mitigation plans; provide training to Town staff in emergency planning and preparedness; develop, maintain, and coordinate the Town Emergency Operations Center (EOC); provide businesses and residents with emergency planning and preparedness material to help reduce the loss of life and property resulting from a disaster; coordinate with Town, County, State, and Federal counterparts; prepare emergency management grants; coordinate the efforts of volunteer organizations.

The Moraga-Orinda Fire District also facilitates emergency response and preparedness through the Emergency Operations Division. The District primarily responds to wildland fires, hazardous materials incidents, and search and rescue incidents. It also provides and augments incident management services.

Expansion and Improvement: Provide training to EOC staff, and other key personnel to better prepare for potential hazards and take action to report them.

Department	Town of Moraga Police Department; Moraga-Orinda Fire District; Contra Costa County Office of Emergency Services
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Community Emergency Response Team Training

Provides free disaster preparedness and Community Emergency Response Team (CERT) training to residents and businesses in the Town; provide an organizing framework and support to neighborhood CERT teams, which may volunteer in the event of a serious earthquake or other major disaster. General Education for people and businesses.

Expansion and Improvement: Include mitigation activities that enhance public awareness of hazards, advertise CERT, and contribute to individual/family preparedness.

	Lamorinda Community Emergency Response Team (CERT), Moraga-Orinda Fire District
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Floodplain Management Program

As a member of the NFIP, the Floodplain Administrator is responsible for collaborating with stakeholders to ensure the Floodplain Management Ordinance is followed within the Town.

Expansion and Improvement: Continue to manage the Town’s NFIP participation. Support the development of mitigation activities consistent with the best practices for floodplain management.

Department	Town of Moraga Public Works Department
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Community Relations

Community Relations conducts public affairs programs including public and internal communications, and community and media relations. They also produce Town News, other major publications, video productions and cable programming, and manage special programs and the Town’s website and social media channels.

Expansion and Improvement: Continue to use public information officers to promote awareness of this Hazard Mitigation Plan and activities associated with individual mitigation projects as they are implemented.

Department	Town of Moraga Town Manager
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Information Technology and Geographic Information System

Information technology (IT) and Geographic Information Systems (GIS) provide the technical resources and support necessary to operate all of the applications relating to the Town's information resources; respond to the service needs to all departments based on Townwide priorities as established by the Town Manager; responsible for the training and effective use of all Town technology computer hardware, software, and peripherals; provide internal coordination of technology efforts Townwide including substantial interface with all technology vendors to assure cost-effective, secure, and reliable technologies compatible with the long-range needs of the Town; provide high-quality spatial data to Town departments.

Expansion and Improvement: Acquire and conduct training for GIS technicians on the latest versions of ArcGIS.

Department	Town of Moraga Planning Department, Town of Moraga Public Works Department
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Risk Management

Risk Management provides services to assist Town departments in managing their risk of injury to employees, Town property, and the public at large; purchase insurance for Town departments and act in an advisory capacity with respect to workers' compensation, public liability, Town property, and Town contracts.

Expansion and Improvement: Continue to have the Risk Manager provide input to support the analysis of potential losses due to hazards. Update this Hazard Mitigation Plan based on current insurance values.

Department	Town of Moraga Administrative Services Department, Town of Moraga Public Works Department, Town of Moraga Parks and Recreation Department
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County Flood Control and Water Conservation District

The Contra Costa County Flood Control and Water Conservation District serves an advisory capacity to the Engineering Division and the Planning Commission relative to drainage and flood control problems.

Department	Contra Costa County Flood Control and Water Conservation District
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5.3. Financial Resources

Table 7 contains a list of financial capabilities available to the Town. These financial resources may be used to support mitigation activities based on procedures for each resource.

Table 7. Financial Resources

General Fund	
The General Fund Program funds operations and specific projects.	
Expansion and Improvement: Hazard mitigation projects may be considered during the annual budgeting process for funding from the General Fund.	
Administrator	Town of Moraga Administrative Services Department
Town Council Administered Special Funds	
Most special revenue funds were established to mitigate the impact of projects approved in certain areas of the Town and most funds have been intended for uses that will benefit the quality of life for the communities in which the project is approved and special revenue funds originated.	
Expansion and Improvement: Focus Administered Special Funds on projects that provide mitigation to natural hazards.	
Administrator	Town of Moraga Town Council



National Pollutant Discharge Elimination System

The NPDES is a joint effort of the Planning, Engineering, and Public Works departments through the Contra Costa County Clean Water Program. Since 1993, the Town has worked with Contra Costa County Flood Control and Water Conservation District, and 15 other cities within the County to meet federal mandates for minimizing pollutants in stormwater runoff. This revenue is used to fund its pro-rated share of the Clean Water Program's staffing, overhead costs, and local level activities necessary to comply with the joint Municipal Regional Permit (MRP) provisions.

Expansion and Improvement: Where permissible, the NPDES Fund may be considered during the annual budgeting process for funding mitigation projects.

Administrator	Town of Moraga Public Works Department
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Community Development Block Grant

The Community Development Block Grant (CDBG) Program provides funding for eligible senior activities such as in-home care, art classes, counseling, and home-delivered meals. The United States Department of Housing and Urban Development (HUD) also provides Disaster Recovery Assistance in the form of flexible grants to help cities, counties, and states recover from Presidentially Declared Disasters, especially in low income areas, subject to the availability of supplemental appropriations.

Expansion and Improvement: Where applicable, CDBG should be used to fund mitigation projects that enhance the resiliency of low income and underserved communities.

Administrator	United States Department of Housing and Urban Development, Town of Moraga Planning Department, Town of Moraga Parks and Recreation Department, Town of Moraga Public Works Department
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Hazard Mitigation Grant Program

The Hazard Mitigation Grant Program (HMPG) provides support for post-disaster mitigation plans and projects.

Expansion and Improvement: Train staff on notice of intent (NOI) procedures and track opportunities on the Cal OES mitigation website to initiate applications for grant funding.

Administrator	Federal Emergency Management Agency
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Building Resilient Infrastructure and Communities

Building Resilient Infrastructure and Communities (BRIC) provides support for pre-disaster mitigation plans and projects.

Expansion and Improvement: Train staff on notice of intent (NOI) procedures and track opportunities on the Cal OES mitigation website to initiate applications for grant funding.

Administrator	Federal Emergency Management Agency
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Flood Mitigation Assistance Grant Program

The Flood Mitigation Assistance (FMA) Grant Program mitigates structures and infrastructure with repetitive losses.

Expansion and Improvement: Train staff on notice of intent (NOI) procedures and track opportunities on the California OES mitigation website to initiate applications for grant funding.

Administrator	Federal Emergency Management Agency
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5.4. Education and Outreach Capabilities

Table 8 lists the Town's financial and public outreach capabilities. These capabilities include fire safety programs, hazard awareness campaigns, public information, and communications offices. Education and outreach capabilities can be used to inform the public about current and potential mitigation activities.



Table 8. Education and Outreach Resources

Town Emergency Website https://www.moraga.ca.us/178/Police	
The Town of Moraga is a “limited-service municipality”, and therefore has fewer resources than some other Towns and Cities. The Town’s Emergency Preparedness Website on the Public Works Department’s page provides an “Emergency Services List” that enumerates local suppliers and contractors.	
<p>Expansion and Improvement: Provide links to the Town and County websites. Post material on social media accounts that provide a link to the appropriate FEMA website page. Expand the “Emergency Preparedness” website into a more robust resource page.</p>	
Lead Organization	Town of Moraga Police Department; Town of Moraga Public Works Department
Town Social Media Accounts	
<p>Facebook: https://www.facebook.com/townofmoraga/ https://www.facebook.com/MoragaPolice/</p> <p>X (formerly Twitter): https://twitter.com/MoragaPolice</p> <p>Instagram: https://www.instagram.com/townofmoraga/</p>	
The Town uses its social media accounts to post information to collect input on updating this Hazard Mitigation Plan. These social media accounts can have links to other Town webpages that provide details on mitigation projects and activities. They can also provide information and links to County, State and Federal emergency preparedness sites that provide information on individual and family preparedness.	
<p>Expansion and Improvement: Develop a comprehensive program to utilize social media to reach out to communities in the Town to provide information on mitigation activities. Conduct an annual survey to solicit input. Provide information and conduct the survey in English and Spanish.</p>	
Lead Organization	Town of Moraga Administrative Services Department
County Public Safety and Emergency Information	
<p>https://www.contracosta.ca.gov/5435/Public-Safety-Emergency-Info</p>	
Provides resources and links for public safety and emergency information in Contra Costa County.	
<p>Expansion and Improvement: Provide additional links to other organizations such as FEMA and PG&E.</p>	
Lead Organization	Contra Costa County Office of Emergency Services
Lamorinda Community Emergency Response Team Coalition	
The CERT Program is a 20-hour all risk, all hazard training offered by the County’s Fire Department. This valuable course is designed to help you protect yourself, your family, your neighbors, and your neighborhood before, during, and after an emergency.	
<p>Expansion and Improvement: Conduct coordinated training and exercises with all County CERTs to improve interoperability.</p>	
Lead Organization	Lamorinda CERT, Moraga-Orinda Fire District
Community Warning System	
The Community Warning System (CWS) can alert residents and businesses within Contra Costa County that are impacted by or are in danger of being impacted by an emergency. The CWS message will include basic information about the incident and what specific protective actions (e.g., shelter in place, lockdown, evacuate, avoid the area) are necessary for life safety and health.	
<p>Expansion and Improvement: Coordinate community evacuation drills using the CWS to implement the exercise. Conduct post exercise information fairs at evacuation collection points.</p>	
Lead Organization	Contra Costa County Office of the Sheriff, Town of Moraga Police Department



6. HAZARD MITIGATION PLAN INTEGRATION

The information on hazards, risk, vulnerability, and mitigation contained in this Hazard Mitigation Plan is based on the best available data at the time of the Plan update. Plan integration consists of the incorporation of hazard mitigation into other relevant planning mechanisms (e.g., general planning and capital improvement 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 collaborative hazard mitigation planning. This section describes the Town's process for integrating information from this Hazard Mitigation Plan into other planning mechanisms.

6.1. Past Plan Integration

In the performance period since the adoption of the previous Hazard Mitigation Plan, Town of Maraga made progress on integrating components of the hazard mitigation strategy (e.g., goals, objectives, and actions) into the planning initiatives listed in **Table 9**.

Table 9. Past Plan Integration

Planning Initiative	Description
Town General Plan	Upon each revision of the Housing Element or the Hazard Mitigation Plan, the Safety Element is revised (no less than every eight (8) years). The Hazard Mitigation Plan is utilized to identify new information that was not available during the previous revision of the Safety Element, relating to hazards (i.e., wildfire, earthquake, flooding, and landslide), and climate adaptation and resiliency strategies.
California Environmental Quality Act	The Town enforces the requirements of California Environmental Quality Act (CEQA), which, since 1988, requires mitigation for identified natural hazards in the Hazard Mitigation Plan.

6.2. Potential Future Integration

As the Hazard Mitigation Plan is implemented, the Town of Moraga will use information from the Plan as the best available science and data on hazards. The capability assessment presented in Section 5 of this Annex identifies codes, plans, and programs that provide opportunities for integration. The Townwide and local action plans developed for this Hazard Mitigation Plan are related to plan integration. The capability assessment identified plans and programs, listed in **Table 10**, that do not currently integrate goals and recommendations of this Plan but provide opportunities to do so in the future.

Table 10. Potential Future Integration

Planning Initiative	Description
Town General Plan	Opportunities to integrate additional hazard mitigation policies into the overall General Plan and integrate wildfire hazard and climate adaptation policies compliant with State legislation as part of a Safety Element update.
Town Building and Construction Code	Mitigation actions and the hazard risk assessment in this Hazard Mitigation Plan can inform updates and revisions to the Town Municipal Code. For example, the Building and Construction Code (Title 15) will be reviewed based on development trends in identified hazards and mitigation measures that can make them more effective at preventing losses.
Design Guidelines	There are opportunities to integrate new hazard mitigation guidelines and standards for the next update of the Town's Design Guidelines.



Planning Initiative	Description
Capital Improvement Plan	The Town will ensure consistency between this Hazard Mitigation Plan and future updates of the Capital Improvement Plan. The Hazard Mitigation Plan may identify new possible funding sources for capital improvement projects and may result in modifications to proposed projects based on results of the risk assessment.
Debris Management Plan	This Hazard Mitigation Plan should be used as an essential tool to update the Debris Management Plan with information and estimates.
Public Outreach	Hazard mitigation information provided in this Hazard Mitigation Plan can be utilized to expand outreach channels and integrate hazard mitigation messaging as part of routine communications.
Emergency Operations Plan	This Hazard Mitigation Plan will remain an essential tool to update the Town EOP. The latest Hazard Mitigation Plan hazards descriptions will be included. Mitigation actions that are preparedness and response in nature will be analyzed for applicability and for inclusion in the description of EOP processes and procedures.
Town Climate Action Plan	The Town will integrate the CAP with this Hazard Mitigation Plan.
Facilities Plan	Integrate hazard mitigation into the Town's facilities planning.

The Town's Local Planning Team will identify all relevant planning initiatives that are scheduled to be updated in the next year and during the annual update process of the Hazard Mitigation Plan. Additionally, opportunities to integrate key elements of the Hazard Mitigation Plan, specifically any relevant strategies, into the planning initiatives will be identified by the Local Planning Team. Mitigation actions were identified to promote plan integration in future revisions of this Plan.

7. SIGNIFICANT HAZARD PAST EVENTS

A complete risk assessment, including past incidents, for each identified hazard of concern can be found in **Volume 1 (Planning Area-wide Elements)** of this Plan. **Table 11** provides information on significant past events that uniquely impacted the Town of Moraga.

Table 11. Significant Past Events

Date	Event Type	Description
January 2023	Flooding, Landslide	Heavy rainfall resulted in damage to Town owned properties with landslides along Mulholland Ridge and flooding at the Hacienda de las Flores property.
October 2019	Wildfire	An early morning fire burned approximately 40 acres within and adjacent to the Sanders Ranch subdivision near the intersection of Merrill Circle North and Merrill Drive.
March 2019	Flooding	Significant storms caused a sink hole along Center Street near Rheem Boulevard, which was due to a failure of different portion of the same storm drainpipe that caused the 2016 sink hole.
2017	Landslides	Heavy rainfall resulted in landslides on the south side of the Town on East Bay Municipal Utility District property and in the Moraga Country Club. A deep seated landslide led to the Canyon Bridge being structurally compromised and forced to close. Replacement of the bridge was required.
2016	Flooding	Significant storms resulted in a sink hole at the corner of Rheem Boulevard and Moraga Road due to the collapse of a 96-inch storm drainpipe.



Date	Event Type	Description
2006	Flooding	Significant storm related damage occurred throughout the Town. (DR-1628).
1986	Landslide	Landslides in the hills of the north side of the Town, including one (1) on Rheem Boulevard which closed the roadway.

8. NATIONAL FLOOD INSURANCE PROGRAM

The Town of Moraga is a member of the National Flood Insurance Program (NFIP) but has chosen to not participate in the NFIP's Community Rating System (CRS). The Town's NFIP participation information is listed in **Table 12**.

Table 12. NFIP Participation Information

CID	Community Name	NFIP Participation Date	Current Effective FIRM Date	CRS Entry Date	CRS Current Effective Date	CRS Class
060637	Town of Moraga	11/19/1976	6/16/2009	N/A	N/A	N/A

8.1. Floodplain Manager

As an NFIP participating jurisdiction, the Town of Moraga has a designated Floodplain Manager that is charged with enforcing floodplain regulations, routinely monitoring the floodplains, and providing community assistance such as encouraging owners to maintain flood insurance. The Town's Floodplain Manager information is listed in **Table 13**.

Table 13. Floodplain Manager

Jurisdiction	Department	Name	Title	Phone Number
Town of Moraga	Public Works	Shawn Knapp	Town Engineer	(925) 888-7027

8.2. Participation Activities

The Town of Moraga NFIP participation activities over the last five (5) years include the following:

- Provides the following services – permit review, GIS, inspections, and engineering capability.
- The Town's Floodplain Manager is a Certified Floodplain Manager (CFM).
- The Town educates private owners and other stakeholders about the importance of flood insurance through public outreach events, workshops, and/or seminars.
- Enforces local floodplain regulations and monitors compliance.
- Floodplain management regulations meet or exceed FEMA or State minimum requirements.

8.2.1. Substantial Damage

Substantial damage means one (1) of the following:

- Damage of any origin sustained by a structure by which the cost of restoring the structure to its before damaged condition would equal or exceed 50% of the market value of the structure before the damage occurred.
- Flood-related damages sustained by a structure on two (2) separate occasions during a 10-year period for which the cost of repairs at the time of each such event, on the average, equals or



exceeds 25% of the market value of the structure before the damage occurred. This is also known as repetitive loss. (*Municipal Code Title 8, Chapter 8.108 – Flood Hazard Area Regulations*)

8.2.2. **Substantial Improvement**

Substantial improvement means any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50% of the market value of the structure before the “start of construction” of the improvement. This term includes structures which have incurred *substantial damage*, regardless of the actual repair work performed. The term does not, however, include either:

- Any project for improvement of a structure to correct existing violations or state or local health, sanitary, or safety code specifications which have been identified by the local code enforcement official and which are the minimum necessary to assure safe living conditions.
- Any alteration of a historic structure, provided that the alteration will not preclude the structure’s continued designation as a historic structure. (*Municipal Code Title 8, Chapter 8.108 – Flood Hazard Area Regulations*)

8.3. **Repetitive Loss and Severe Repetitive Loss Properties**

The Federal Emergency Management Agency (FEMA) defines a Repetitive Loss property as an NFIP insured structure with two (2) or more claims of more than \$1,000 each within any rolling 10-year period, since 1978.²

A Severe Repetitive Loss property is defined by FEMA as any NFIP insured structure for which either of the following is true when at least two (2) of the claims are within 10 years of each other (claims made within 10 days will be counted as one (1) claim):³

- That has incurred flood related damage for which four (4) or more separate claims payments have been made, with the amount of each claim (including buildings and contents payments) exceeding \$5,000, and with the cumulative amount of such claims exceeding \$20,000.
- For which at least two (2) separate claims payments (building payments only) have been made under such coverage, with the cumulative amount of such claims exceeding the market value of the building.

Repetitive loss records from the Town of Moraga are listed in **Table 14**.

Table 14. Repetitive Loss Properties

Jurisdiction	Repetitive Loss Properties	Severe Repetitive Loss Properties	Mitigated Properties
Town of Moraga	0	0	0

9. HAZARD VULNERABILITY AND IMPACT ASSESSMENT

Exposure and vulnerability to certain hazards affect the entire County and others are geographically defined. Although the entire County may be vulnerable to these hazards, their impacts may vary based

² Federal Emergency Management Agency. (2020). Repetitive Loss Structure. Retrieved from <https://www.fema.gov/node/405233>.

³ Federal Emergency Management Agency, National Flood Insurance Program. (2022). Flood Insurance Manual: Risk Rating 2.0: Equity in Action Edition. Retrieved from https://www.fema.gov/sites/default/files/documents/fema_nfip-flood-insurance-full-manual_102022.pdf.



on existing community conditions (e.g., underserved, or functional access needs populations may be more susceptible based on certain conditions, vulnerabilities, or needs).

The Local Planning Team identified ***unique vulnerabilities and impacts*** to the following natural hazards, based on the hazards profiled in **Volume 1 (Planning Area-wide Elements)**.

- Climate Change
- Dam and Levee Failure
- Drought
- Earthquake
- Flood (*riverine/creek, urban/flash flood*)
- Landslide
- Severe Weather (*heavy rainfall, severe thunderstorms, strong winds/damaging winds, heat wave/extreme heat, tornado*)
- Wildfire

It was determined that the planning area did not have unique vulnerabilities and impacts to the following natural hazards; rather, its vulnerability and impacts are consistent with those experienced throughout the County.

- Sea Level Rise
- Tsunami

Note: Severe weather and flooding are profiled as the two (2) hazards. However, in an effort to have a more thorough risk assessment, the sub hazards (i.e., heavy rainfall, severe thunderstorms, strong winds/damaging winds, heat wave/extreme heat, tornado, riverine/creek flooding, and urban/flash flooding) were ranked individually. The hazard risk assessment methodology can be found in **Appendix C** of this Annex.

Table 15 provides information on several key vulnerabilities and impacts for the Town of Moraga and only addresses the hazards that are relevant and unique to the jurisdiction. A complete risk assessment for each identified hazard of concern is in **Volume 1 (Planning Area-wide Elements)** of this Plan. Hazard mapping can be found in **Appendix A** of this Annex.



Table 15. Hazard Vulnerability and Impact Assessment

Hazards	Vulnerabilities and Impacts
Climate Change	<p>Changing climate and drying fuel loads increase susceptibility to wildfires and weather impacts, thereby increasing the impact of other hazards. In addition, as the Town borders Very High Fire Hazard Zone state responsibility areas, these dangers are increased as climate change continues to take effect later into the 21st century. The Town is also susceptible as it is contiguous, and reliant upon, the cities of Orinda and Lafayette for a link to a freeway, thus meaning that in an emergency the exits would be less available and more likely to be subject to closure or rerouting.</p> <p>Further, these existing exit routes are only one (1) lane each way, so a total of two (2) lanes if used as reverse direction exit routes, but also traverse near creeks, large trees, and aboveground powerlines that would be affected by earthquake or other disaster, meaning that the effects of a changing climate directly and negatively affect the Town due to its location.</p> <p>Moraga's most vulnerable communities will be directly affected by the effects of climate change. Approximately, 21.0% of the population in the Town is elderly (65 years old and older) living in assisted living facilities, retirement homes, or independently. The Town of Moraga has multiple senior care facilities including Aegis Living Moraga, Moraga Royales, and a number of recovery centers that house individuals that require additional attention and for daily living. Although elderly healthcare facilities are required, by law, to develop and maintain emergency plans (e.g., evacuation plans), these residents remain uniquely vulnerable during emergencies. The elderly, especially those with access and functional needs, who live alone face increased overall vulnerability compared to others as they lack access to social connections and community support to assist in preparing for and responding to emergency events, evacuating, improving home resiliency, managing medical needs, and locating support services. Furthermore, the elderly population is expected to be uniquely impacted during heat wave/extreme heat, severe weather, droughts, and wildfire events. This population is naturally more susceptible to climate change effects and requires more resources (e.g., food, energy, clean drinking water, and safety shelters) during a catastrophic event.</p> <p>The younger population (under 18 years old) comprises 20.8% of the population in the Town of Moraga. This population is naturally more susceptible to the adverse effects of climate change and requires more resources to safely evacuate during climate-related events compared to other groups. The strain on local resources during an event will vary depending on whether it occurs when children are at home or in school.</p> <p>The Town of Moraga has numerous day care facilities, charter schools, and private schools located throughout the Town – Lamorinda Montessori, Creative Montessori Preschool, Growing Tree Preschool, Saklan School, Donald L. Rheem Elementary School, Los Perales Elementary School, Campolindo High School, Joaquin Moraga Intermediate School, Camino Pablo Elementary School, and the Growing Light Montessori School. The school system in Moraga is a combination of both public and private schools and two (2) different school districts (i.e., Moraga School District – managing pre-kindergarten, kindergarten, elementary and middle schools, and Acalanes School District – managing Campolindo High School).</p>



Hazards	Vulnerabilities and Impacts
Dam and Levee Failure	<p>There is a large East Bay Municipal Utility District (EBMUD) water reservoir tank located in a residential neighborhood of Moraga that is classified as a dam failure with high downstream hazard potential, and if the dam is breached it would directly flood between 15 to 30 homes.</p> <p>The Town would be affected by severe dam or levee failures in other areas of the County as well, especially if that failure were to occur in Orinda or Lafayette. If the dam were to fail it also would lead to the closure of one (1) or more significant roadways. In the event of a main failure, Saint Mary's Road would be partially blocked and Rheem Boulevard impassable; and if the saddle dam broke, that scenario would result in the flooding of Draeger and portions of Moraga Road.</p> <p>Both scenarios would also flood a large number of residences and result in significant damage. Further, although not within Town limits, the Lafayette reservoir owned and operated by EBMUD has a very high likelihood of downstream damage and would severely affect multiple key evacuation and access routes for the Town, as a failure of the Lafayette reservoir would flood major portions of that City and also affect multiple other communities that rely on access and throughput of those freeways.</p> <p>The adjacent homes to the Moraga reservoir tank would have the potential to be most severely impacted by a failure. Based on the Town's population mix, it is likely that some of these single-family homes house members of the Town's most vulnerable populations (i.e., the elderly, and those younger than 18 years old) which can be directly and indirectly impacted during a dam and levee failure. The elderly and those with access and functional needs are uniquely vulnerable because physical limitations may make it harder for this population to evacuate in the event of a dam or levee failure. Additionally, limited financial resources in these communities may add to the strain of recovery and their ability to access clean drinking water.</p>
Drought	<p>Agricultural uses are a historical driver of the Town's initial success and several heritage groves from previous tree farming efforts are present within the Town, and these are recognized by residents as an important part of the community. The Town hosts a number of small-batch wineries which would be negatively affected by any drought.</p> <p>In the event of a drought event, the quality of drinking water will be impacted. As a result, the elderly and younger (under 18 years old) population are the most vulnerable to a change in access to clean drinking water. Furthermore, the elderly physiology makes them especially vulnerable to the health effects associated with poor air quality and extreme temperatures that usually accompany a drought event.</p>



Hazards	Vulnerabilities and Impacts
Earthquake	<p>Moraga's most vulnerable communities will be directly affected if a major earthquake were to take place. The entry and exit routes to the Town are narrow and subject to failure; in 2017, the Canyon Road Bridge was closed for months due to a large landslide, with single lane temporary traffic restored later the same year and two (2) way traffic not restored until 2020. In the event of an earthquake, these entry and exit routes to the Town can become impassible which can create significant issues for evacuation and access to emergency services.</p> <p>The Town also would suffer from significant issues during a major earthquake as the majority of power, water, and other utilities services rise and fall over the hills that help make the Town a desirable home site; meaning that a major earthquake would sever those lines and the Town would likely be cut off from any assistance for three (3) to four (4) days. In that event, homes and businesses will need to be resilient and strengthen roadways in order to effectively evacuate the Town in a partial closure.</p> <p>The elderly population and those with access and functional needs would be uniquely vulnerable during a major earthquake event because physical limitations may make it harder for this population to evacuate in the event of an earthquake. Additionally, during an earthquake evacuation event, the elderly population requires more assistance with obtaining resources (e.g., food, clean drinking water, energy, safety shelters, and medical supervision). The younger population is also uniquely vulnerable during an earthquake and the degree of response would be dependent upon whether an earthquake occurs during school hours versus outside of school hours. Outside of school hours, the younger population is most likely with a parent or guardian that can directly assist and provide access to necessary resources. However, if an earthquake were to occur during school hours, the younger population would be exposed to a different set of vulnerabilities. For example, they would have to rely on the resources and evacuation plans set by the school (e.g., transportation, shelter, supervision, access to clean drinking water and food). Furthermore, reunification between students and their parents or guardians after an earthquake adds another layer of vulnerability to the younger population.</p>



Hazards	Vulnerabilities and Impacts
Flood <i>(urban/flash flood, riverine/creek)</i>	<p>The Town is built along the watersheds of a multitude of creeks, with the largest running along Moraga Road and Moraga Way, and branches running through most of the main neighborhoods. FEMA flood maps illustrate that during 100-year storm conditions these creeks would likely flood, although the impact is limited by the use of creek setback buffering in line with required flood readiness programs.</p> <p>Additionally, in 500-year floods or above, the Town would be critically impacted, and all main creek channels would flood their surrounding neighborhoods, making the Town vulnerable to large scale flooding.</p> <p>As most of Moraga's creeks run parallel to some of the major arterials of the Town (i.e., Moraga Road, Saint Mary's Road, Rheem Boulevard and parts of Moraga Way) major flooding events not only have the capability to damage both public and private property, but a major flooding event can also become catastrophic on Moraga's transportation system and major egress routes. Flooding of this magnitude can hinder the supply chain line that the elderly and younger groups would need for everyday life. For example, access to food and clean drinking water could be hindered and the power grid could be impacted. The indirect effects of flooding could also affect the Town's ability to serve the most vulnerable communities. The elderly population (i.e., seniors), especially those with access and functional needs, may have physical limitations that make it harder to evacuate in the event of a flood and may lack access to social connections and community support that can assist in preparing for and responding to emergency events. Furthermore, those that are electrically dependent can be severely impacted in the event of a power outage.</p>
Landslides	<p>The Town is constructed almost entirely on slopes and valley floors which have historically been subject to significant movement. If subjected to significant rainfall or other conditions due to the geological makeup of the area and its expansive soils these respond poorly to saturation and can sluff off more easily than non-expansive soils. The Town has multiple neighborhoods which were constructed after remediation from significant landslides. While this means those treated areas are safe for use, recent rainfall events have continuously exposed the dangers of landslides, and the Town has been witnessing landslides during the 2022 and 2023 heavy rainfall events.</p> <p>A large portion of Moraga residences have been built within hillside areas. The elderly population (i.e., seniors), especially those with access and functional needs, living in these areas may have physical limitations that make it harder to evacuate in the event of a landslide and may lack access to social connections and community support that can assist in preparing for and responding to emergency events. Furthermore, if landslides affect the roadways that provide access to their homes, this can cause significant delays in emergency services reaching this population. Landslide events can impact Moraga's transportation system and major egress routes and obstruct roadways which could hinder the supply chain line that Moraga's community, including Moraga's elderly and younger population, would need for everyday life. Access to food, clean drinking water, shelter, and the power grid could be affected by landslides.</p>
Sea Level Rise	<p>The Local Planning Team determined that the Town does not have unique vulnerabilities and impacts to sea level rise; rather, the Town's vulnerability and impacts are consistent with those experienced throughout the County.</p>



Hazards	Vulnerabilities and Impacts
Severe Weather <i>(heavy rainfall, severe thunderstorms, strong winds/damaging winds, heat wave/extreme heat, tornado)</i>	<p>The limited entryways to the Town and significant hillsides in the area increase the likelihood of weather induced landslides. The Town's housing stock is largely older than 1980 and would be susceptible to hazards at an equivalent level.</p> <p>The elderly population (i.e., seniors), especially those with access and functional needs, may have physical limitations that make it harder to evacuate in the event of a flood, as a result of a heavy rainfall event, and may lack access to social connections and community support that can assist in preparing for and responding to emergency events. Furthermore, power outages during heat wave/extreme heat events will disproportionately impact the District's elderly population because air conditioning may not be available and those with mobility issues may have challenges traveling to a local cooling center. The elderly population is especially vulnerable to the health effects associated with heat wave/extreme heat events.</p>
Tsunami	The Local Planning Team determined that the Town does not have unique vulnerabilities and impacts to tsunamis; rather, the Town's vulnerability and impacts are consistent with those experienced throughout the County.



Hazards	Vulnerabilities and Impacts
Wildfire	<p>Changing climate and drying fuel loads increase susceptibility to wildfires. In addition, as the Town borders Very High Fire Hazard Zone state responsibility areas, these dangers are increased as climate change continues to take effect later into the 21st century. Additionally, the Town is surrounded on three (3) sides by wildlands and park areas, which also function as the Wildland Urban Interface (WUI) zones in the event of a significant wildfire. The Town has very limited escape and evacuation routes, and some areas have limited cellphone reception, meaning that during an emergency some residents would not be able to get traditional phone-based alerts and would require to be assistance during an evacuation. The Town is also susceptible as it is contiguous, and reliant upon, the cities of Orinda and Lafayette for access to Highway 24, increasing the risk that emergency egress routes would be less available and more likely to be subject to closure or rerouting. Further, the existing primary access routes are only one (1) lane each way, so a total of two (2) lanes if used as reverse direction exit routes. The cell sites in Town have been reinforced to increase their resilience, and areas are preemptively burned in a prescribed manner, but the Town and its residents remain at risk from a large wildfire incident. The Town is taking proactive steps to increase its readiness but recognizes that the large areas of High and Very High Fire Hazard Zones must be recognized as vulnerable.</p>
	<p>The elderly population (i.e., seniors), especially those with access and functional needs, may have physical limitations that make it harder to evacuate when a wildfire evacuation is issues and may lack access to social connections and community support that can assist in preparing for and responding to emergency events. Additionally, during a wildfire evacuation, the elderly population requires more assistance with obtaining resources (e.g., food, clean drinking water, energy, safety shelters, and medical supervision). The younger population is also uniquely vulnerable during an earthquake and the degree of response would be dependent upon whether a wildfire evacuation occurs during school hours versus outside of school hours. Outside of school hours, the younger population is most likely with parents or guardians that can directly assist and provide access to necessary resources. However, if a wildfire evacuation were to occur during school hours, the younger population would be exposed to a different set of vulnerabilities. For example, they would have to rely on the resources and evacuation plans set by the school (e.g., transportation, shelter, supervision, access to clean drinking water and food). Furthermore, reunification between students and their parents or guardians after a wildfire adds another layer of vulnerability to the younger population.</p>
Active Shooter Incidents	<p>The Local Planning Team determined that the Town does not have unique vulnerabilities and impacts to active shooter incidents; rather, the Town's vulnerability and impacts are consistent with those experienced throughout the County.</p>
Cybersecurity Threats	<p>The Town has limited resources/staffing. As a small community of 16,000 to 17,000 people, with very limited service staff, the Town is vulnerable to cybersecurity threats and has limited resources to address..</p>
Hazardous Materials Incidents	<p>The Town is bisected by a jet fuel pipeline that runs through residential and light commercial (restaurants) area. The pipeline is vulnerable to natural, human-caused, and technological events.</p>
Terrorism (Weapons of Mass Destruction)	<p>The Local Planning Team determined that the Town does not have unique vulnerabilities and impacts to terrorism; rather, the Town's vulnerability and impacts are consistent with those experienced throughout the County.</p>



Hazards	Vulnerabilities and Impacts
Utility Interruptions	<p>The steep hillsides of the Town and limited access points into the area mean that during a major disaster, the Town is likely to be cut off from one (1) or more utilities; for example, large pipelines that convey water and sewage may be affected by a major disaster, and these would interrupt the service to homes and businesses; and due to the limited access points and limited size of the community it is assumed that the population may be disconnected from one (1) or more utilities for days or weeks in worst case scenarios.</p> <p>The Town also experienced significant issues during recent wind events where branches or trees fell on powerlines and roads, causing power outages, and a direct hazard to motorists and requiring rerouting of traffic. In disaster situations these issues may compound or complicate response and recovery efforts.</p>

The Town evaluated whether vulnerability and impact in hazard prone areas had increased, decreased, or remained the same for each natural hazard identified in this Hazard Mitigation Plan. Climate change, changes in population, infrastructure expansion, and economic shifts that can affect vulnerability were considered. For example, if planned development is in an identified hazard areas or is not built to the updated building codes, it may increase the community's vulnerability to future hazards and disasters. On the other hand, if development occurred with mitigation practices in place, the vulnerability may have remained the same or decreased. Additionally, shifting demographics (e.g., underserved population) were taken into consideration.

Table 16 outlines if climate change has increased or decreased the Town's vulnerability (i.e., exposure) and impact to each natural hazard over the past five (5) years, and the effect of climate change in the future probability of occurrence and impacts from each natural hazard.

Table 16. Climate Change Current and Future Vulnerability and Impact

Hazard	Vulnerability and Impact
Current Vulnerability and Impact	
Climate Change	Increased
Dam and Levee Failure	Remained the Same
Drought	Remained the Same
Earthquake	Remained the Same
Flood (<i>urban/flash flood, riverine/creek</i>)	Increased
Landslide	Increased
Sea Level Rise	Remained the Same
Severe Weather (<i>heavy rainfall, severe thunderstorms, strong winds/damaging winds, heat wave/extreme heat, tornado</i>)	Increased
Tsunami	Remained the Same
Wildfire	Increased
Future Vulnerability and Impact	
Climate Change	Increase
Dam and Levee Failure	No Change is Anticipated



Hazard	Vulnerability and Impact
Drought	Increase
Earthquake	No Change is Anticipated
Flood (urban/flash flood, riverine/creek)	Increase
Landslide	Increase
Sea Level Rise	No Change is Anticipated
Severe Weather (heavy rainfall, severe thunderstorms, strong winds/damaging winds, heat wave/extreme heat, tornado)	Increase
Tsunami	No Change is Anticipated
Wildfire	Increase

Table 17 outlines if changes in population within the Town over the past five (5) years have increased or decreased the vulnerability (i.e., exposure) and impact to these natural hazards, and the anticipated effects changes in population may have on the future probability of occurrence and impacts from these natural hazards.

Table 17. Changes in Population Current and Future Vulnerability and Impact

Hazard	Vulnerability and Impact
Current Vulnerability and Impact	
Climate Change	Remained the Same
Dam and Levee Failure	Remained the Same
Drought	Remained the Same
Earthquake	Remained the Same
Flood (urban/flash flood, riverine/creek)	Remained the Same
Landslide	Remained the Same
Sea Level Rise	Remained the Same
Severe Weather (heavy rainfall, severe thunderstorms, strong winds/damaging winds, heat wave/extreme heat, tornado)	Remained the Same
Tsunami	Remained the Same
Wildfire	Remained the Same
Future Vulnerability and Impact	
Climate Change	No Change is Anticipated
Dam and Levee Failure	No Change is Anticipated
Drought	Increase
Earthquake	Increase
Flood (urban/flash flood, riverine/creek)	Increase
Landslide	Increase
Sea Level Rise	No Change is Anticipated



Hazard	Vulnerability and Impact
Severe Weather (heavy rainfall, severe thunderstorms, strong winds/damaging winds, heat wave/extreme heat, tornado)	Increase
Tsunami	No Change is Anticipated
Wildfire	Increase

Table 18 outlines if development over the past five (5) years has increased or decreased the jurisdiction's vulnerability (i.e., exposure) and impact to these natural hazards, and the anticipated effects changes in development may have on the future probability of occurrence and impacts from these natural hazards.

Table 18. Changes in Development Current and Future Vulnerability and Impact

Hazard	Vulnerability and Impact
Current Vulnerability and Impact	
Climate Change	
Dam and Levee Failure	Remained the Same
Drought	Remained the Same
Earthquake	Remained the Same
Flood (urban/flash flood, riverine/creek)	Remained the Same
Landslide	Remained the Same
Sea Level Rise	Remained the Same
Severe Weather (heavy rainfall, severe thunderstorms, strong winds/damaging winds, heat wave/extreme heat, tornado)	Remained the Same
Tsunami	Remained the Same
Wildfire	Remained the Same
Future Vulnerability and Impact	
Climate Change	No Change is Anticipated
Dam and Levee Failure	No Change is Anticipated
Drought	No Change is Anticipated
Earthquake	Increase
Flood (urban/flash flood, riverine/creek)	No Change is Anticipated
Landslide	Increase
Sea Level Rise	No Change is Anticipated
Severe Weather (heavy rainfall, severe thunderstorms, strong winds/damaging winds, heat wave/extreme heat, tornado)	No Change is Anticipated
Tsunami	No Change is Anticipated
Wildfire	No Change is Anticipated

See **Table 4** for anticipated future major assets that may be exposed or vulnerable to any of the natural hazards identified in this Hazard Mitigation Plan. Any new assets (e.g., new construction in hazard prone areas) will be constructed to adhere to the latest building codes and standards, and mitigation to protect



them from identified and anticipated hazards, especially those that are expected to increase due to climate change.

Refer to **Appendix C** and **Appendix D** of this Annex for the hazard risk assessment methodology and jurisdiction specific details, which includes the vulnerability and impacts to population and life safety, underserved/equity, property damage, future development, and climate change.

9.1. FEMA National Risk Index

In the National Risk Index (NRI), risk is defined as the potential for negative impacts as a result of a natural hazard. The Risk Index is based on three (3) components – a natural hazards component (Expected Annual Loss), a consequence enhancing component (Social Vulnerability), and a consequence reduction component (Community Resilience). Using these components, the composite and hazard type Risk Index values are calculated for each community (county and Census Tract). Risk Index values form an absolute basis for measuring Risk within the NRI and are used to generate Risk Index percentiles and ratings across communities.⁴ **Table 19** illustrates the Risk Index rating and score for the Town of Moraga.

Note: ArcGIS mapping analysis was performed utilizing Census Tract data by overlaying Census Tracts with the Town of Moraga planning area boundary. The information outlined in this section includes data from the Census Tracts that intersect the jurisdiction.

Table 19. Risk Index Score (FEMA National Risk Index)

Jurisdiction	Rating	Score
Town of Moraga	Very High	88.0

Risk Index scores are calculated using an equation that combines scores for Expected Annual Loss due to natural hazards, Social Vulnerability and Community Resilience (Expected Annual Loss x Social Vulnerability / Community Resilience = Risk Index).

9.1.1. Expected Annual Loss

The FEMA NRI Expected Annual Loss (EAL), the natural hazards component of the NRI, represents the average economic loss in dollars resulting from natural hazards each year. It is calculated for each hazard type and quantifies loss for relevant consequence types – buildings, people, and agriculture. The EAL score and rating represent a community's relative level of expected losses each year when compared to all other communities at the same level. Since the score is associated to a community's risk; the higher EAL score results in a higher Risk Index score.⁵ **Table 20** illustrates each hazard EAL for the Town of Moraga.

Table 20. Expected Annual Loss (FEMA National Risk Index)

Hazard	Population Equivalence	Building Value	Agriculture Value	Total Expected Annual Loss	Expected Annual Loss Score	Rating
Coastal Flooding (Sea Level Rise)	\$0	\$0	n/a	\$0	0.0	No Expected

⁴ Federal Emergency Management Agency. (2023). Determining Risk. Retrieved from <https://hazards.fema.gov/nri/determining-risk>.

⁵ Federal Emergency Management Agency. (2023). Expected Annual Loss. Retrieved from <https://hazards.fema.gov/nri/expected-annual-loss>.



Hazard	Population Equivalence	Building Value	Agriculture Value	Total Expected Annual Loss	Expected Annual Loss Score	Rating
						Annual Losses
Drought	n/a	n/a	\$0	\$0	0.0	No Expected Annual Losses
Earthquake	\$636,681	\$2.0 Million	n/a	\$2.7 Million	97.8	Very High
Hail (Severe Weather)	\$49	\$241	\$0	\$290	29.1	Relatively Low
Heat Wave (Severe Weather)	\$12,292	\$3	\$0	\$12,295	57.5	Relatively Moderate
Landslide	\$127	\$1,158	n/a	\$1,286	68.4	Relatively High
Riverine Flooding (Flood)	\$15,906	\$16,531	\$0	\$32,437	63.5	Relatively High
Strong Winds (Severe Weather)	\$69	\$31	\$0	\$99	5.9	Very Low
Tornado (Severe Weather)	\$1,714	\$5,155	\$0	\$6,869	19.6	Very Low
Tsunami	\$0	\$0	n/a	\$0	0.0	No Expected Annual Losses
Wildfire	\$3,319	\$97,085	\$0	\$100,405	93.8	Very High
Expected annual loss scores are calculated utilizing an equation that combines values for exposure, annualized frequency, and historic loss ratios (Expected Annual Loss = Exposure x Annualized Frequency x Historic Loss Ratio).						

An EAL score and rating is calculated independently for each consequence type (i.e., buildings, population, and agriculture) for each county and Census Tract. The population EAL is measured in fatalities and injuries while the building and agriculture values are measured in dollars. However, for consistency in the unit of measurement, the population EAL was monetized into population equivalence using a value of statistical life (VSL) approach where each fatality or 10 injuries is treated as \$11.6 Million of economic loss.

9.1.2. Social Vulnerability

Social vulnerability, the consequence enhancing risk component of the NRI, measures the susceptibility of social groups to the adverse impacts of natural hazards, including disproportionate death, injury, loss, or disruption of livelihood. The Social Vulnerability score and rating represent the relative level of a community's social vulnerability compared to all other communities at the same level. A higher Social Vulnerability score results in a higher Risk Index score.⁶ **Table 21** illustrates the Social Vulnerability rating and score for Town of Moraga.

⁶ Federal Emergency Management Agency. (2023). Social Vulnerability. Retrieved from <https://hazards.fema.gov/nri/social-vulnerability>.



Table 21. Social Vulnerability (FEMA National Risk Index)

Jurisdiction	Rating	Score
Town of Moraga	Very Low	17.4
<i>Social Vulnerability is measured using the Social Vulnerability Index (SoVI) published by the University of South Carolina's Hazards and Vulnerability Research Institute (HVRI).</i>		

9.1.3. Community Resilience

Community resilience, the consequence reduction risk component, measures the ability of a community to prepare for anticipated natural hazards, adapt to changing conditions, and withstand and recover rapidly from disruptions. The Community Resilience score and rating represent the relative level of a community's resilience compared to all other communities at the same level. Since the score is inversely proportional to a community's risk; the higher Community Resilience score results in a lower Risk Index score.⁷ **Table 22** illustrates the Community Resilience rating and score for the Town of Moraga.

Table 22. Community Resilience (FEMA National Risk Index)

Jurisdiction	Rating	Score
Town of Moraga	Relatively High	66.4
<i>Community Resilience is measured using the Baseline Resilience Indicators for Communities (HVRI BRIC) published by the University of South Carolina's Hazards and Vulnerability Research Institute (HVRI).</i>		

9.1.4. Annualized Frequency

Annualized frequency is defined as the expected frequency or probability of a hazard occurrence per year. It is a natural hazard incidence factor for Expected Annual Loss, the natural hazards component of the National Risk Index. A higher annualized frequency value results in higher Expected Annual Loss and Risk Index scores. The annualized frequency is derived from either the number of recorded hazard occurrences each year over a given period or the modeled probability of a hazard occurrence each year (e.g., earthquake).⁸ **Table 23** outlines the annualized frequency for each hazard, based on FEMA NRI data, for the Town of Moraga.

Table 23. Hazard Annualized Frequency (FEMA National Risk Index)

Hazard	Period of Record	Events on Record	Annualized Frequency
Coastal Flooding (Sea Level Rise)	Various datasets	n/a	0.0 events per year
Drought	22 years	1,038	47.2 events per year
Earthquake	2021 dataset	n/a	0.010% chance per year
Hail (Severe Weather)	34 years	2	0.0 events per year
Heat Wave (Severe Weather)	16 years	30	1.9 events per year
Landslide	12 years	0	0.0 events per year

⁷ Federal Emergency Management Agency. (2023). Community Resilience. Retrieved from <https://hazards.fema.gov/nri/community-resilience>.

⁸ Federal Emergency Management Agency. (2023). Annualized Frequency. Retrieved from <https://hazards.fema.gov/nri/annualized-frequency>.



Hazard	Period of Record	Events on Record	Annualized Frequency
Riverine Flooding (Flood)	24 years	31	1.3 events per year
Strong Winds (Severe Weather)	34 years	2	0.0 events per year
Tornado (Severe Weather)	72 years	0	0.0 events per year
Tsunami	222 years	0	0.0 events per year
Wildfire	2021 dataset	n/a	0.004% events per year

10. HAZARD RISK RANKING

Table 24 presents the local hazard ranking for the Town of Moraga of all hazards of concern listed in **Volume 1 (Planning Area-wide Elements)** of this Plan. This ranking summarizes how hazards vary for this jurisdiction. As described in detail in **Volume 1 (Planning Area-wide Elements)** and **Appendix C** of this Annex, 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. For further details on how the probability, extent, vulnerability, and impact factors in **Table 24** were calculated, please refer to **Appendix D** of this Annex.

It is important to note that the sub hazards for severe weather hazards (i.e., heavy rainfall, severe thunderstorms, strong winds/damaging winds, heat wave/extreme heat, and tornado) and flood hazards (i.e., riverine/creek flooding and urban/flash flooding) were individually ranked in the hazard risk ranking; however, flood and severe weather are each considered as the main hazard throughout this Annex and **Volume 1 (Planning Area-wide Elements)**.

Table 24. Hazard Risk Ranking

Hazard Event	Probability Factor	Sum of Weighted Extent Factors	Sum of Weighted Vulnerability Factors	Sum of Weighted Impact Factors	Consequence Score	Total Risk Score (Probability x Consequence)
Earthquake	2	18	17	36	71	68
Landslide	3	12	11	20	43	62
Wildfire	2	15	17	27	59	58
Heavy Rainfall (Severe Weather)	3	9	14	15	38	56
Flood (Urban/Flash Flood)	2	15	12	29	56	55
Strong Winds/ Damaging Winds (Severe Weather)	3	9	11	16	36	54
Severe Thunderstorm (Severe Weather)	3	6	16	14	36	54
Utility Interruptions	3	9	7	18	34	51
Heat Wave/Extreme Heat	3	9	10	15	34	51
Drought	2	18	12	20	50	50

2024 Hazard Mitigation Plan Contra Costa County, California



Hazard Event	Probability Factor	Sum of Weighted Extent Factors	Sum of Weighted Vulnerability Factors	Sum of Weighted Impact Factors	Consequence Score	Total Risk Score (Probability x Consequence)
Flood (Riverine/Creek)	2	12	7	27	46	47
Hazardous Materials Incidents	2	15	9	16	40	41
Climate Change	2	9	12	15	36	38
Cybersecurity Threats	2	12	7	13	32	34
Dam and Levee Failure	1	15	11	32	58	32
Active Shooter Incidents	2	9	5	15	29	32
Terrorism (Weapons of Mass Destruction)	1	18	11	27	56	31
Tornado (Severe Weather)	1	6	6	14	26	16
Sea Level Rise	0	0	0	3	3	0
Tsunami	0	0	0	1	1	0

Consequence: Sum of all weighted factors.

Extent: Sum of the weighted Extent factors.

Vulnerability: Sum of the weighted Vulnerability factors.

Impact: Sum of the weighted Impact factors.

Total Risk Score* = Probability x Consequence

* Normalized to 100

Total Risk Score Legend

Classification	Probability Factor	Extent	Vulnerability	Impact	Consequence Score	Total Risk Score
Low (L)	1	0 – 6	0 – 6	0 – 12	0 – 24	0 – 24
Medium (M)	2	7 – 12	7 – 12	13 – 26	25 – 50	25 – 54
High (H)	3	13 – 18	13 – 18	27 – 39	51 – 75	55 and above

The legend—specifically the assignment of low, medium, and high—provides an additional means to qualitatively assess the probability factor, sum of weighted factors, and the total risk scores for each hazard. The **Consequence Score** represents the sum of the Extent, Vulnerability, and Impact Factors. The **Total Risk Score** is a measure of Probability and Consequence.



11. MITIGATION ACTIONS

This section includes the mitigation actions that were developed to address identified risks and vulnerabilities to hazards identified in this Plan. This Plan serves only to recommend mitigation measures based on the potential for risk reduction and available funding. Implementation of mitigation actions is dependent on risk reduction priorities, feasibility, and available funding. It is also dependent on the cooperation and support of the jurisdiction and/or department responsible for each action item.

The Town of Moraga agreed upon **22** mitigation actions that apply to the jurisdiction's properties where they have jurisdictional responsibility and authority. One (1) mitigation action was completed. A summary of the Town's mitigation actions status is listed in **Table 25**.

Table 25. Town of Moraga Mitigation Actions Summary

Status		Mitigation Action Total	
Ongoing		9	
In Progress/In Work		6	
Not Started		0	
Delayed/Deferred		2	
New		5	
TOTAL		22	
Completed		1	
Deleted/No Longer Needed		0	
Mitigation Actions per Hazard			
Climate Change	4	Landslide	14
Dam and Levee Failure	10	Sea Level Rise	10
Drought	10	Severe Weather	13
Earthquake	13	Tsunami	10
Flood	11	Wildfire	13

These shared actions, some of which address all hazards, help to meet the following requirements:

- Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure?
- Does the Plan include one (1) or more action(s) per jurisdiction for each hazard identified within the risk assessment?

A detailed explanation of the Mitigation Strategy can be found in Chapter 5 of **Volume 1 (Planning Area-wide Elements)**.



Mitigation Action	Where appropriate, support retrofitting or relocation of structures in high hazard areas, prioritizing structures that have experienced repetitive losses.				
Action Number	MG-1	Year Initiated / Anticipated Year of Initiation	2011	Prioritization Score	Medium
Goal(s) / Objective(s) Addressed		Goals: 1, 2, 3, 4, 5 Objectives: 1, 4, 7, 9, 12, 14, 15, 17	Hazard(s) Mitigated	Dam and Levee Failure, Drought, Earthquake, Flood, Landslide, Sea Level Rise, Severe Weather, Tsunami, Wildfire	
Project Status		Ongoing	<i>If Deleted/No Longer Needed, provide reason.</i>	N/A	
Benefits (Loss Avoided)		High			
Lead Agency / Organization	Town of Moraga Planning Department, Contra Costa County Building and Planning Department		Supporting Agency / Organization (If applicable)	N/A	
Additional Participating Jurisdictions (If applicable)	N/A				
Project Duration	Short Term		Estimated Cost	High	
Potential Funding Source	Local Budgeted Funds, HMGP, FMA, BRIC		If Other, you <u>must</u> identify a funding source.	N/A	
			Please provide further detail on Potential Funding Source.	General Fund (Staff Time)	
Implementation Priority	Medium	Integration Ideas (Optional)			



Mitigation Action	Integrate the Hazard Mitigation Plan into other Town plans, ordinances, and programs that dictate land use decisions in the community, including the General Plan Safety Element for compliance with Assembly Bill 2140 (2006) regarding local hazard mitigation, Senate Bill 1241 (2012) regarding wildfire safety, and Senate Bill 379 (2015) regarding climate adaptation and resiliency strategies.				
Action Number	MG-2	Year Initiated / Anticipated Year of Initiation	2018	Prioritization Score	High
Goal(s) / Objective(s) Addressed		Goals: 1, 2, 3, 4, 5 Objectives: 1, 4, 5, 7, 11, 12, 14, 17	Hazard(s) Mitigated	Climate Change, Dam and Levee Failure, Drought, Earthquake, Flood, Landslide, Sea Level Rise, Severe Weather, Tsunami, Wildfire	
Project Status		In Progress/In Work	<i>If Deleted/No Longer Needed, provide reason.</i>	N/A	
Benefits (Loss Avoided)		High			
Lead Agency / Organization	Town of Moraga Planning Department		Supporting Agency / Organization (If applicable)	N/A	
Additional Participating Jurisdictions (If applicable)	N/A				
Project Duration	Ongoing		Estimated Cost	High	
Potential Funding Source	Local Budgeted Funds		If Other, you <u>must</u> identify a funding source.	N/A	
			Please provide further detail on Potential Funding Source.	General Fund (Staff Time)	
Implementation Priority	High	Integration Ideas (Optional)	Continue to implement new bills/laws as they are adopted.		



Mitigation Action	Actively participate in the Hazard Mitigation Plan maintenance protocols outlined in Volume 1 of the Contra Costa County Hazard Mitigation Plan.				
Action Number	MG-3	Year Initiated / Anticipated Year of Initiation	2011	Prioritization Score	High
Goal(s) / Objective(s) Addressed		Goals: 1, 2, 3, 4, 5 Objectives: 3, 8,16	Hazard(s) Mitigated	Climate Change, Dam and Levee Failure, Drought, Earthquake, Flood, Landslide, Sea Level Rise, Severe Weather, Tsunami, Wildfire	
Project Status		Ongoing	<i>If Deleted/No Longer Needed, provide reason.</i>	N/A	
Benefits (Loss Avoided)		High			
Lead Agency / Organization	Town of Moraga Planning Department, Town of Moraga Public Works Department		Supporting Agency / Organization (If applicable)	N/A	
Additional Participating Jurisdictions (If applicable)	N/A				
Project Duration	Short Term		Estimated Cost	High	
Potential Funding Source	Local Budgeted Funds		If Other, you <u>must</u> identify a funding source.	N/A	
			Please provide further detail on Potential Funding Source.	General Fund (Staff Time)	
Implementation Priority	High	Integration Ideas (Optional)			



Mitigation Action	<p>Continue to maintain good standing and compliance under the National Flood Insurance Program (NFIP) through implementation of floodplain management programs that, at a minimum, meet the NFIP requirements. These include:</p> <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. • Continue to collaborate with other agencies such as utilities, the Contra Costa County Flood Control and Water Conservation District, and neighboring jurisdictions on flood control measures. 				
	Action Number	MG-4	Year Initiated / Anticipated Year of Initiation	2011	Prioritization Score
Goal(s) / Objective(s) Addressed		Goals: 1, 2, 3, 4, 5 Objectives: 3, 5, 6, 9, 10, 11, 15	Hazard(s) Mitigated	Flood, Severe Weather	
Project Status		Ongoing	If Deleted/No Longer Needed, provide reason.	N/A	
Benefits (Loss Avoided)		High			
Lead Agency / Organization	Town of Moraga Public Works Department		Supporting Agency / Organization (If applicable)	N/A	
Additional Participating Jurisdictions (If applicable)	N/A				
Project Duration	Ongoing		Estimated Cost	High	
Potential Funding Source	Local Budgeted Funds		If Other, you <u>must</u> identify a funding source.	N/A	
			Please provide further detail on Potential Funding Source.	General Fund (Staff Time)	
Implementation Priority	High	Integration Ideas (Optional)			



Mitigation Action	Complete the Hillside and Ridgeline project which includes targeted amendments to the General Plan, Zoning Code, and Design Guidelines intended to reduce exposure to landslide and wildfire hazards in the Town and to other known hazards which could impact hillside areas in the community.				
Action Number	MG-5	Year Initiated / Anticipated Year of Initiation	N/A	Prioritization Score	N/A
Goal(s) / Objective(s) Addressed		Goals: 1, 2, 3, 4, 5 Objectives: 4, 5, 11, 12, 14, 17	Hazard(s) Mitigated	Landslide	
Project Status		Completed	If Deleted/No Longer Needed, provide reason.	N/A	
Benefits (Loss Avoided)		N/A			
Lead Agency / Organization	Town of Moraga Planning Department		Supporting Agency / Organization (If applicable)	N/A	
Additional Participating Jurisdictions (If applicable)	N/A				
Project Duration	N/A		Estimated Cost	N/A	
Potential Funding Source	N/A		If Other, you <u>must</u> identify a funding source.	N/A	
			Please provide further detail on Potential Funding Source.	N/A	
Implementation Priority	N/A	Integration Ideas (Optional)	Continue to integrate projects with hillside best practices.		



Mitigation Action	Mitigate hazards by integrating restoration of natural processes and systems into infrastructure upgrades such as daylighting Laguna Creek at the Hacienda Pavilion, or streambank restoration projects.				
Action Number	MG-6	Year Initiated / Anticipated Year of Initiation	2011	Prioritization Score	Medium
Goal(s) / Objective(s) Addressed		Goals: 1, 2, 3, 4 Objectives: 10, 15, 17	Hazard(s) Mitigated	Flood	
Project Status		Ongoing	<i>If Deleted/No Longer Needed, provide reason.</i>	N/A	
Benefits (Loss Avoided)		High			
Lead Agency / Organization	Town of Moraga Public Works Department		Supporting Agency / Organization (If applicable)	N/A	
Additional Participating Jurisdictions (If applicable)	N/A				
Project Duration	Short Term		Estimated Cost	High	
Potential Funding Source	HMGP, FMA		If Other, you <u>must</u> identify a funding source.	N/A	
			Please provide further detail on Potential Funding Source.	N/A	
Implementation Priority	Medium	Integration Ideas (Optional)			



Mitigation Action	Identify and replace critical infrastructure (e.g., roads and bridges) that have the potential to be impacted by future hazards such as landslides, earthquakes, and flooding. Replace the Canyon Road bridge with a permanent bridge.				
Action Number	MG-7	Year Initiated / Anticipated Year of Initiation	2011	Prioritization Score	High
Goal(s) / Objective(s) Addressed		Goals: 1, 2, 3, 4, 5 Objectives: 1, 6, 10, 15	Hazard(s) Mitigated	Dam and Levee Failure, Drought, Earthquake, Flood, Landslide, Sea Level Rise, Severe Weather, Tsunami, Wildfire	
Project Status		In Progress/In Work	<i>If Deleted/No Longer Needed, provide reason.</i>	N/A	
Benefits (Loss Avoided)		High			
Lead Agency / Organization	Town of Moraga Public Works Department		Supporting Agency / Organization (If applicable)	N/A	
Additional Participating Jurisdictions (If applicable)	N/A				
Project Duration	Long Term		Estimated Cost	High	
Potential Funding Source	Local Budgeted Funds, HMGP, FMA, FEMA PA, BRIC		If Other, you <u>must</u> identify a funding source.	N/A	
			Please provide further detail on Potential Funding Source.	General Fund (Staff Time)	
Implementation Priority	High	Integration Ideas (Optional)	The Canyon Road Bridge project has been completed and should be separated from a long term review of critical infrastructure.		



Mitigation Action	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. Pursue passage of a storm drain revenue measure to repair and replace the highest priority storm drain infrastructure based on the 2015 Storm Drain Master Plan.				
Action Number	MG-8	Year Initiated / Anticipated Year of Initiation	2011	Prioritization Score	Medium
Goal(s) / Objective(s) Addressed		Goals: 1, 2, 3, 4, 5 Objectives: 6, 13, 15	Hazard(s) Mitigated	Flood	
Project Status		Ongoing	<i>If Deleted/No Longer Needed, provide reason.</i>	N/A	
Benefits (Loss Avoided)		High			
Lead Agency / Organization	Town of Moraga Public Works Department, Town of Moraga Administrative Services Department		Supporting Agency / Organization (If applicable)	N/A	
Additional Participating Jurisdictions (If applicable)	N/A				
Project Duration	Long Term		Estimated Cost	High	
Potential Funding Source	Local Budgeted Funds, HMGP, FMA, Other		If Other, you <u>must</u> identify a funding source.	Revenue Measure/Grant Funding	
			Please provide further detail on Potential Funding Source.	Capital Improvement Programming.	
Implementation Priority	Medium	Integration Ideas (Optional)			



Mitigation Action	Continue to make information publicly available to the community related to hazard mitigation, available funding resources for retrofits, energy efficiency upgrades, insurance, disaster preparedness, and disaster response; conduct public outreach through the <i>About Town</i> newsletter, Nextdoor, press releases, and Nixle; and add information to the Town of Moraga website (Police and Public Works departments) regarding the information on maintenance of privately owned creek and storm drain systems, and coping with disrupted storm drains, sewage lines, and wastewater treatment (e.g., that developed by ABAG's Sewer Smart Program).				
Action Number	MG-9	Year Initiated / Anticipated Year of Initiation	2011	Prioritization Score	Medium
Goal(s) / Objective(s) Addressed		Goals: 1, 2, 3, 4, 5 Objectives: 3, 4, 6, 9, 11, 16	Hazard(s) Mitigated	Dam and Levee Failure, Drought, Earthquake, Flood, Landslide, Sea Level Rise, Severe Weather, Tsunami, Wildfire	
Project Status		In Progress/In Work	<i>If Deleted/No Longer Needed, provide reason.</i>	N/A	
Benefits (Loss Avoided)		High			
Lead Agency / Organization	Town of Moraga Police Department		Supporting Agency / Organization (If applicable)	N/A	
Additional Participating Jurisdictions (If applicable)	N/A				
Project Duration	Ongoing		Estimated Cost	High	
Potential Funding Source	Local Budgeted Funds		If Other, you <u>must</u> identify a funding source.	N/A	
			Please provide further detail on Potential Funding Source.	General Fund (Staff Time)	
Implementation Priority	Medium	Integration Ideas (Optional)	Coordination with CCCSD, MOFD, PG&E regarding utility resilience.		



Mitigation Action	Enter into on-call service agreements with vendors for emergency response purposes.				
Action Number	MG-10	Year Initiated / Anticipated Year of Initiation	2011	Prioritization Score	Low
Goal(s) / Objective(s) Addressed		Goals: 1, 2, 3, 4, 5 Objectives: 1, 2, 6	Hazard(s) Mitigated	Dam and Levee Failure, Drought, Earthquake, Flood, Landslide, Sea Level Rise, Severe Weather, Tsunami, Wildfire	
Project Status		Ongoing	<i>If Deleted/No Longer Needed, provide reason.</i>	N/A	
Benefits (Loss Avoided)		High			
Lead Agency / Organization	Town of Moraga Public Works Department, Town of Moraga Administrative Services Department		Supporting Agency / Organization (If applicable)	N/A	
Additional Participating Jurisdictions (If applicable)	N/A				
Project Duration	Ongoing		Estimated Cost	High	
Potential Funding Source	Local Budgeted Funds		If Other, you <u>must</u> identify a funding source.	N/A	
			Please provide further detail on Potential Funding Source.	General Fund (Staff Time)	
Implementation Priority	Low	Integration Ideas (Optional)			



Mitigation Action	Implement measures included in the Town of Moraga Climate Action Plan (2014) to reduce Greenhouse Gas (GHG) emissions. Update GHG emission inventory and adopt an update of the 2014 Climate Action Plan which includes climate adaptation measures.				
Action Number	MG-11	Year Initiated / Anticipated Year of Initiation	2026	Prioritization Score	Low
Goal(s) / Objective(s) Addressed		Goals: 1, 2, 3, 4, 5 Objectives: 3, 6, 18	Hazard(s) Mitigated	Climate Change, Dam and Levee Failure, Drought, Earthquake, Flood, Landslide, Sea Level Rise, Severe Weather, Tsunami, Wildfire	
Project Status		Delayed/Deferred	If Deleted/No Longer Needed, provide reason.	N/A	
Benefits (Loss Avoided)		High			
Lead Agency / Organization	Town of Moraga Planning Department		Supporting Agency / Organization (If applicable)	N/A	
Additional Participating Jurisdictions (If applicable)	N/A				
Project Duration	Long Term		Estimated Cost	High	
Potential Funding Source	Local Budgeted Funds, BRIC		If Other, you <u>must</u> identify a funding source.	N/A	
			Please provide further detail on Potential Funding Source.	General Fund (Staff/Consultant Time)	
Implementation Priority	Low	Integration Ideas (Optional)			



Mitigation Action	Update key emergency response/preparedness policy documents and plans. Work collaboratively with agencies including FEMA, Contra Costa County Office of Emergency Services (OES), California OES, and public utilities regarding emergency preparedness and emergency response. Continue citizen engagement through reactivation of the Citizen Corps Council, Community Emergency Response Team (CERT), Moraga Neighborhood Emergency Preparedness (MNEP) group, Radio Amateur Civil Emergency Service (RACES) group. Work with the Lamorinda Emergency Preparedness Coordinator to improve disaster preparedness and response capabilities.				
Action Number	MG-12	Year Initiated / Anticipated Year of Initiation	2011	Prioritization Score	High
Goal(s) / Objective(s) Addressed		Goals: 1, 2, 3, 4, 5 Objectives: 1, 2, 6, 13, 16	Hazard(s) Mitigated	Dam and Levee Failure, Drought, Earthquake, Flood, Landslide, Sea Level Rise, Severe Weather, Tsunami, Wildfire	
Project Status		Ongoing	<i>If Deleted/No Longer Needed, provide reason.</i>	N/A	
Benefits (Loss Avoided)		High			
Lead Agency / Organization	Town of Moraga Police Department		Supporting Agency / Organization (If applicable)	N/A	
Additional Participating Jurisdictions (If applicable)	N/A				
Project Duration	Ongoing		Estimated Cost	High	
Potential Funding Source	Local Budgeted Funds, HMGP, EMPG		If Other, you must identify a funding source.	N/A	
			Please provide further detail on Potential Funding Source.	General Fund (Staff/Consultant Time)	
Implementation Priority	High	Integration Ideas (Optional)			



Mitigation Action	Improve the efficiency and sustainability of Town owned property (e.g., buildings, vehicles) through upgrades. Examples include, but are not limited to, placing solar on town buildings or property, energy efficiency upgrades to the Town Offices, Council Chambers, Library and Hacienda, increasing the average fuel efficiency of municipal fleet vehicles, increasing emergency power generation capacity.				
Action Number	MG-13	Year Initiated / Anticipated Year of Initiation	2011	Prioritization Score	Low
Goal(s) / Objective(s) Addressed		Goals: 1, 2, 3, 4, 5 Objectives: 1, 2, 13	Hazard(s) Mitigated	Earthquake	
Project Status		Ongoing	If Deleted/No Longer Needed, provide reason.	N/A	
Benefits (Loss Avoided)		High			
Lead Agency / Organization	Town of Moraga Public Works Department		Supporting Agency / Organization (If applicable)	N/A	
Additional Participating Jurisdictions (If applicable)	N/A				
Project Duration	Ongoing		Estimated Cost	High	
Potential Funding Source	Local Budgeted Funds, Other		If Other, you <u>must</u> identify a funding source.	Electrification/small site resiliency grant programs, the Town of Moraga does not qualify for formula funding, must apply competitively	
			Please provide further detail on Potential Funding Source.	General Fund (Staff Time)	
Implementation Priority	Low	Integration Ideas (Optional)			



Mitigation Action	Improve functionality of key intersections and critical evacuation routes through signage, wayfinding, signalization, and roundabouts. These could include, but are not limited to, the roundabout projects on St. Mary's Road at Rheem Boulevard and Bollinger Canyon Road, Corliss signalization project at Moraga Road, and Townwide Wayfinding Signage Project.				
Action Number	MG-14	Year Initiated / Anticipated Year of Initiation	2011	Prioritization Score	Medium
Goal(s) / Objective(s) Addressed		Goals: 1, 2, 3, 4, 5 Objectives: 1, 2, 6	Hazard(s) Mitigated	Dam and Levee Failure, Drought, Earthquake, Flood, Landslide, Sea Level Rise, Severe Weather, Tsunami, Wildfire	
Project Status		In Progress/In Work	<i>If Deleted/No Longer Needed, provide reason.</i>	N/A	
Benefits (Loss Avoided)		Medium			
Lead Agency / Organization	Town of Moraga Planning Department, Town of Moraga Public Works Department		Supporting Agency / Organization (If applicable)	N/A	
Additional Participating Jurisdictions (If applicable)	N/A				
Project Duration	Ongoing		Estimated Cost	High	
Potential Funding Source	Local Budgeted Funds, HMGP, BRIC		If Other, you <u>must</u> identify a funding source.	N/A	
			Please provide further detail on Potential Funding Source.	General Fund (Staff Time)	
Implementation Priority	Medium	Integration Ideas (Optional)	Include in the General Plan 2040 as a goal and priority for moving forward; St Mary's, Canyon, Rheem roundabout not agreed, funded.		



Mitigation Action	Continue replacing above ground electric and phone wires and other structures with underground facilities and use the planning-approval process to ensure that all new phone and electrical utility lines are installed underground.				
Action Number	MG-15	Year Initiated / Anticipated Year of Initiation	2011	Prioritization Score	Low
Goal(s) / Objective(s) Addressed		Goals: 1, 2, 3, 4, 5 Objectives: 6, 13, 15	Hazard(s) Mitigated	Earthquake, Landslide, Severe Weather, Wildfire	
Project Status		In Progress/In Work	<i>If Deleted/No Longer Needed, provide reason.</i>	N/A	
Benefits (Loss Avoided)		High			
Lead Agency / Organization	Town of Moraga Planning Department, Town of Moraga Public Works Department		Supporting Agency / Organization (If applicable)	N/A	
Additional Participating Jurisdictions (If applicable)	N/A				
Project Duration	Ongoing		Estimated Cost	High	
Potential Funding Source	Local Budgeted Funds, HMGP, BRIC		If Other, you <u>must</u> identify a funding source.	N/A	
			Please provide further detail on Potential Funding Source.	General Fund (Staff Time)	
Implementation Priority	Low	Integration Ideas (Optional)			



Mitigation Action	Identify landslide hazards that may threaten key arterials and take corrective actions to stabilize hillsides to the extent feasible, including working with private property owners to require appropriate property maintenance. An example includes, but it is not limited to, hillside stabilization above Bollinger Canyon Road.				
Action Number	MG-16	Year Initiated / Anticipated Year of Initiation	2011	Prioritization Score	High
Goal(s) / Objective(s) Addressed		Goals: 1, 2, 3, 4, 5 Objectives: 1, 2, 6	Hazard(s) Mitigated	Landslide	
Project Status		In Progress/In Work	<i>If Deleted/No Longer Needed, provide reason.</i>	N/A	
Benefits (Loss Avoided)		High			
Lead Agency / Organization	Town of Moraga Public Works Department		Supporting Agency / Organization (If applicable)	N/A	
Additional Participating Jurisdictions (If applicable)	N/A				
Project Duration	Long Term		Estimated Cost	High	
Potential Funding Source	Local Budgeted Funds, HMGP, BRIC		If Other, you <u>must</u> identify a funding source.	N/A	
			Please provide further detail on Potential Funding Source.	General Fund (Staff Time)	
Implementation Priority	High	Integration Ideas (Optional)			



Mitigation Action	Continue to work with the Moraga-Orinda Fire District to reduce fire hazard by maintaining roadside vegetation in the public right of way, and by encouraging vegetation maintenance on private property.				
Action Number	MG-17	Year Initiated / Anticipated Year of Initiation	2011	Prioritization Score	High
Goal(s) / Objective(s) Addressed		Goals: 1, 2, 3, 4, 5 Objectives: 2, 3, 4, 6, 13, 16	Hazard(s) Mitigated	Wildfire	
Project Status		Ongoing	<i>If Deleted/No Longer Needed, provide reason.</i>	N/A	
Benefits (Loss Avoided)		High			
Lead Agency / Organization	Town of Moraga Public Works, Moraga-Orinda Fire District		Supporting Agency / Organization (If applicable)	N/A	
Additional Participating Jurisdictions (If applicable)	N/A				
Project Duration	Ongoing		Estimated Cost	Medium	
Potential Funding Source	Local Budgeted Funds		If Other, you <u>must</u> identify a funding source.	N/A	
			Please provide further detail on Potential Funding Source.	General Fund (Staff Time)	
Implementation Priority	High	Integration Ideas (Optional)			



Mitigation Action	Explore adoption of ordinances to increase seismic resiliency. Examples include, but are not limited to, a reconstruction ordinance to ensure that damaged buildings are repaired in an appropriate and timely manner and retrofitted concurrently; and an ordinance to modify parking standards to allow for parking waivers (or other incentives) related to seismic retrofits of soft-story buildings.				
Action Number	MG-18	Year Initiated / Anticipated Year of Initiation	2026	Prioritization Score	Medium
Goal(s) / Objective(s) Addressed		Goals: 1, 2, 3, 4, 5 Objectives: 4, 6, 7, 15	Hazard(s) Mitigated	Dam and Levee Failure, Drought, Earthquake, Flood, Landslide, Sea Level Rise, Severe Weather, Tsunami, Wildfire	
Project Status		Delayed/Deferred	<i>If Deleted/No Longer Needed, provide reason.</i>	N/A	
Benefits (Loss Avoided)		Medium			
Lead Agency / Organization	Town of Moraga Planning Department, Contra Costa County Building and Planning		Supporting Agency / Organization (If applicable)	N/A	
Additional Participating Jurisdictions (If applicable)	N/A				
Project Duration	Short Term		Estimated Cost	Low	
Potential Funding Source	Local Budgeted Funds		If Other, you <u>must</u> identify a funding source.	N/A	
			Please provide further detail on Potential Funding Source.	General Fund (Staff Time)	
Implementation Priority	Medium	Integration Ideas (Optional)			



Mitigation Action	<p>Increase the resilience of the existing older housing stock through the encouragement of existing renovation and improvement programs through the County and State</p> <p>Specific activities include, but are not limited to:</p> <ul style="list-style-type: none"> • Lighting hazard vulnerability and response actions, including an assessment of critical facilities updated at a regular interval to maintain currency. • Responding to strong wind (58 miles per hour or greater) events as its own separate disaster (or as part of a larger storm system), which may bring other impacts like flooding, by continuing to maintain an updated building code by reference and using the Town's local resources and experts to determine potential risk. • Responding to severe winter weather, although not common in the Town, as it occurs through resource sharing and online tracking for unusual weather events that impact the community. • Assist vulnerable populations by assessing where they live and conducting specific outreach to determine the best ways to assist those populations. • Assess and improve continuity of operations. The Town relies on access to freeways through its neighboring communities and is reliant on the provision of utilities and services from outside of its borders. Severe weather and storms have the potential to severely impact the Town and cut it off from first responders for as much as a week or more until service can be restored. 				
Action Number	MG-19	Year Initiated / Anticipated Year of Initiation	2024	Prioritization Score	39/40
Goal(s) / Objective(s) Addressed		Goals: 1, 2, 3, 5	Hazard(s) Mitigated	Climate Change, Severe Weather	
Project Status		New	If Deleted/No Longer Needed, provide reason.	N/A	
Benefits (Loss Avoided)		High			
Lead Agency / Organization	General Government, Town of Moraga Planning Department, Town of Moraga Public Works		Supporting Agency / Organization (If applicable)	Moraga-Orinda Fire District, Contra Costa County Sanitary District, California Office of Emergency Services, Lamorinda CERT	
Additional Participating Jurisdictions (If applicable)	N/A				



Project Duration	Ongoing	Estimated Cost	Low
Potential Funding Source	Local Budgeted Funds, CDBG	If Other, you <u>must</u> identify a funding source.	N/A
Implementation Priority		Please provide further detail on Potential Funding Source.	General Fund (Staff Time), Existing budgeted items to adopt building code and review for consistency with codes that help protect against severe weather; focus on mitigation will help direct efforts
Implementation Priority	High	Integration Ideas <i>(Optional)</i>	



Mitigation Action	Identify potential high-risk landslide areas near residential and sensitive populations by using Geographic Information Systems (GIS) to identify and map landslide hazard areas; and develop and maintain a database to track community vulnerability to landslides.				
Action Number	MG-20	Year Initiated / Anticipated Year of Initiation	2027	Prioritization Score	40/40
Goal(s) / Objective(s) Addressed		Goals: 1, 2, 3, 4, 5	Hazard(s) Mitigated	Landslide	
Project Status		New	If Deleted/No Longer Needed, provide reason.	N/A	
Benefits (Loss Avoided)		High			
Lead Agency / Organization	Town of Moraga Planning Department		Supporting Agency / Organization (If applicable)	N/A	
Additional Participating Jurisdictions (If applicable)	N/A				
Project Duration	Ongoing		Estimated Cost	High	
Potential Funding Source	HMGP, BRIC, CDBG, FEMA PA		If Other, you must identify a funding source.	N/A	
			Please provide further detail on Potential Funding Source.	N/A	
Implementation Priority	High	Integration Ideas (Optional)			



Mitigation Action	Mitigate landslides by creating a plan to implement reinforcement measures in high-risk areas. Actions include but are not limited to: <ul style="list-style-type: none"> Creating a plan to implement reinforcement measures in high-risk areas. Defining steep slope/high-risk areas in land use and comprehensive plans and creating guidelines or restricting new development in those areas. Creating or increasing setback limits on parcels near high-risk areas. Applying soil stabilization measures, such as planting soil-stabilizing vegetation on steep, publicly owned slopes. Using debris-flow measures that may reduce damage in sloping areas, such as stabilization, energy dissipation, and flow control measures. 				
	Action Number	MG-21	Year Initiated / Anticipated Year of Initiation	2027	Prioritization Score
Goal(s) / Objective(s) Addressed		Goals: 1, 2, 3, 4, 5	Hazard(s) Mitigated	Landslide	
Project Status		New	If Deleted/No Longer Needed, provide reason.	N/A	
Benefits (Loss Avoided)		High			
Lead Agency / Organization	Town of Moraga Planning Department, Town of Moraga Public Works Department		Supporting Agency / Organization (If applicable)	N/A	
Additional Participating Jurisdictions (If applicable)	N/A				
Project Duration	Ongoing		Estimated Cost	High	
Potential Funding Source	HMGP, BRIC, CDBG, FEMA PA		If Other, you <u>must</u> identify a funding source.	N/A	
			Please provide further detail on Potential Funding Source.	N/A	



Implementation Priority	High	Integration Ideas <i>(Optional)</i>	
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Mitigation Action	Implement measures to protect critical facilities and infrastructure from future seismic events. This includes, but is not limited to: <ul style="list-style-type: none"> Conducting seismic retrofitting for critical public facilities most at risk to earthquakes Require bracing of generators, elevators and other vital equipment Use flexible piping when extending water and sewer lines 				
	Action Number	MG-22	Year Initiated / Anticipated Year of Initiation	2026	Prioritization Score
Goal(s) / Objective(s) Addressed		Goals: 1, 2, 3, 4, 5	Hazard(s) Mitigated	Earthquake	
Project Status		New	If Deleted/No Longer Needed, provide reason.	N/A	
Benefits (Loss Avoided)		High			
Lead Agency / Organization	Town of Moraga Planning Department, Town of Moraga Public Works		Supporting Agency / Organization (If applicable)	N/A	
Additional Participating Jurisdictions (If applicable)	N/A				
Project Duration	Ongoing		Estimated Cost	High	
Potential Funding Source	HMGP, BRIC, CDBG		If Other, you <u>must</u> identify a funding source.	N/A	
			Please provide further detail on Potential Funding Source.	N/A	
Implementation Priority	High	Integration Ideas (Optional)			



Mitigation Action	Continue to work on existing building codes and fire code information to direct projects and encourage the use of spark exclusion and ignition resistant materials in project construction (consistent with Moraga-Orinda Fire District recommendation); and direct applicants to the Fire District for review of their projects to ensure their consistency with best practices of fire-safe construction. Additionally, the Town will continue to update its codes and policies to reflect the latest science. This includes, but is not limited to, a current and ongoing effort in concert with our neighboring municipalities to conduct an evacuation study, and incorporate the recommendations derived from that study into future evacuation outreach and into planning new developments. These studies will need to be updated per state law as budget allows in order to continue to represent the most recent and most effective fire science and best practices for evacuation.				
	Action Number	MG-23	Year Initiated / Anticipated Year of Initiation	2024	Prioritization Score
Goal(s) / Objective(s) Addressed		Goals: 1, 2, 3, 4, 5	Hazard(s) Mitigated	Wildfire	
Project Status		New	If Deleted/No Longer Needed, provide reason.	N/A	
Benefits (Loss Avoided)		High			
Lead Agency / Organization	Town of Moraga Planning Department, General Government		Supporting Agency / Organization (If applicable)	Moraga-Orinda Fire District, Contra Costa County Sanitary District, California Office of Emergency Services, Contra Costa County Office of Emergency Services, Lamorinda CERT	
Additional Participating Jurisdictions (If applicable)	Town of Moraga Public Works Department, Town of Moraga Police Department				
Project Duration	Ongoing		Estimated Cost	High	
Potential Funding Source	Local Budgeted Funds, State Special Funds, HMGP, BRIC, CDBG		If Other, you <u>must</u> identify a funding source.	N/A	
			Please provide further detail on Potential Funding Source.	Integrated Climate Adaptation and Resiliency Program (ICARP) Regional Resilience Planning and Implementation Grant (RRPG)	
Implementation Priority	High	Integration Ideas (Optional)			



APPENDIX A. HAZARD MAPS

The following hazards were mapped for the Town of Moraga – earthquakes, floods, landslides, and wildfires.

- **Figure 1** illustrates the liquefaction susceptibility, which helps assess potential damage from earthquakes in the Town.
- **Figure 2** illustrates the Town of Moraga Special Flood Hazard Area (SFHZ), including each Flood Zone, and the 500-year floodplain. Flood Insurance Rate Maps (FIRMs) show the flood zones, floodplain boundaries, and Base Floor Elevation (BFE) and are used for floodplain management, flood insurance ratings, and to determine flood insurance requirements. FIRMs show areas with a 1% chance of flooding each year, commonly known as the 100-year floodplains, and are illustrated as the SFHA.⁹ The 500-year floodplains show areas with a 0.2% chance of flooding each year.
- **Figure 3** illustrates landslide susceptibility in the Town. Landslide susceptibility maps describe the relative likelihood of future land sliding based solely on the intrinsic properties of a location or site. There are three (3) site factors that most determine susceptibility – prior failure, rock or soil strength, and steepness of slope.¹⁰
- **Figure 4** illustrates the California Fire Hazard Severity Zones (FHSZ) in the State Responsibility Area (SRA) within the Town.

⁹ Federal Emergency Management Agency. (2017). Flood Insurance Study: Contra Costa County, California and Incorporated Areas. Retrieved from <https://www.contracosta.ca.gov/DocumentCenter/View/77626/Volumes-I-V?bidId=>.

¹⁰ California Department of Conservation. (n.d.). Landslides. Retrieved from <https://www.conservation.ca.gov/cgs/landslides>.



Figure 1. Liquefaction Susceptibility (Earthquake)

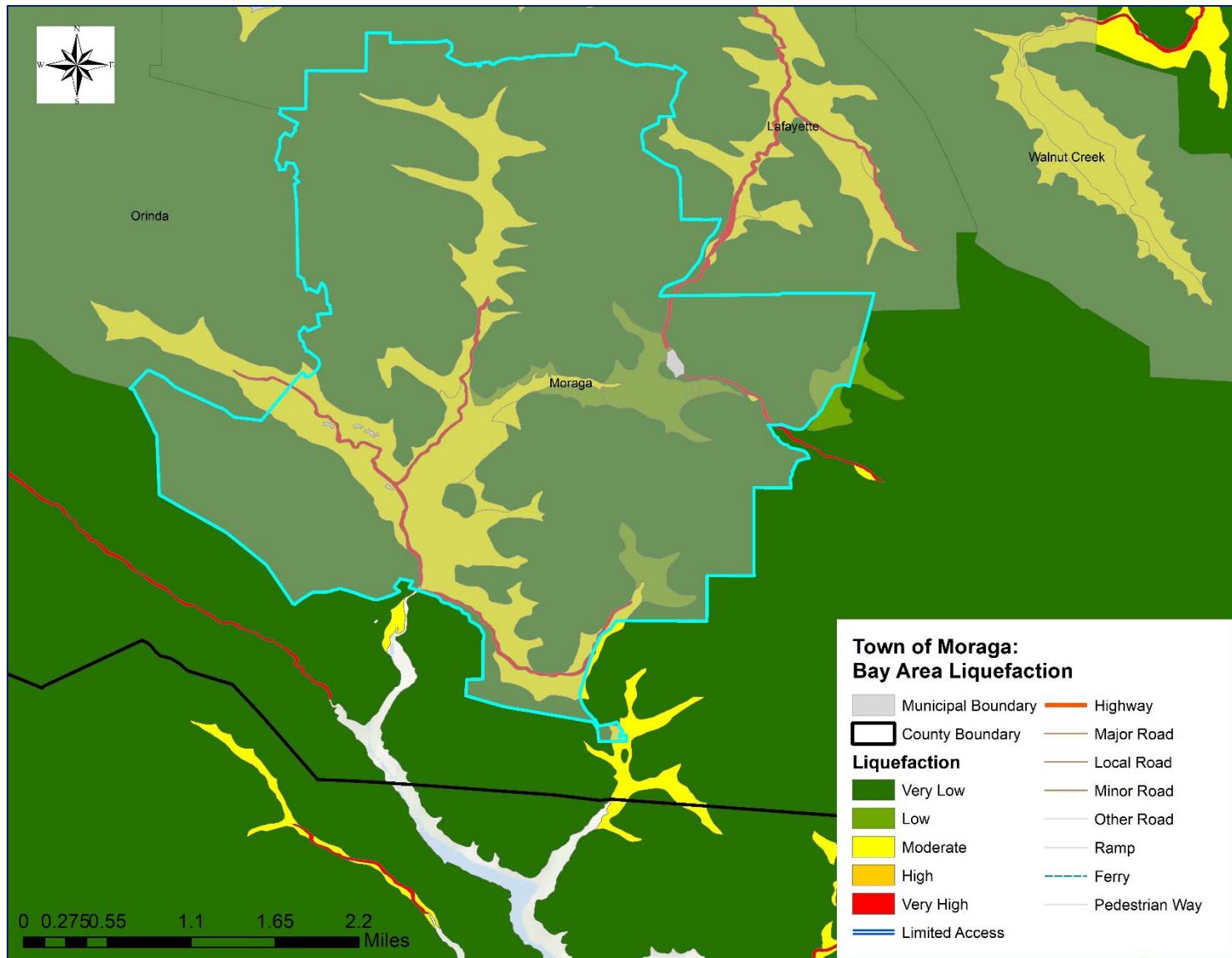




Figure 2. Special Flood Hazard Area

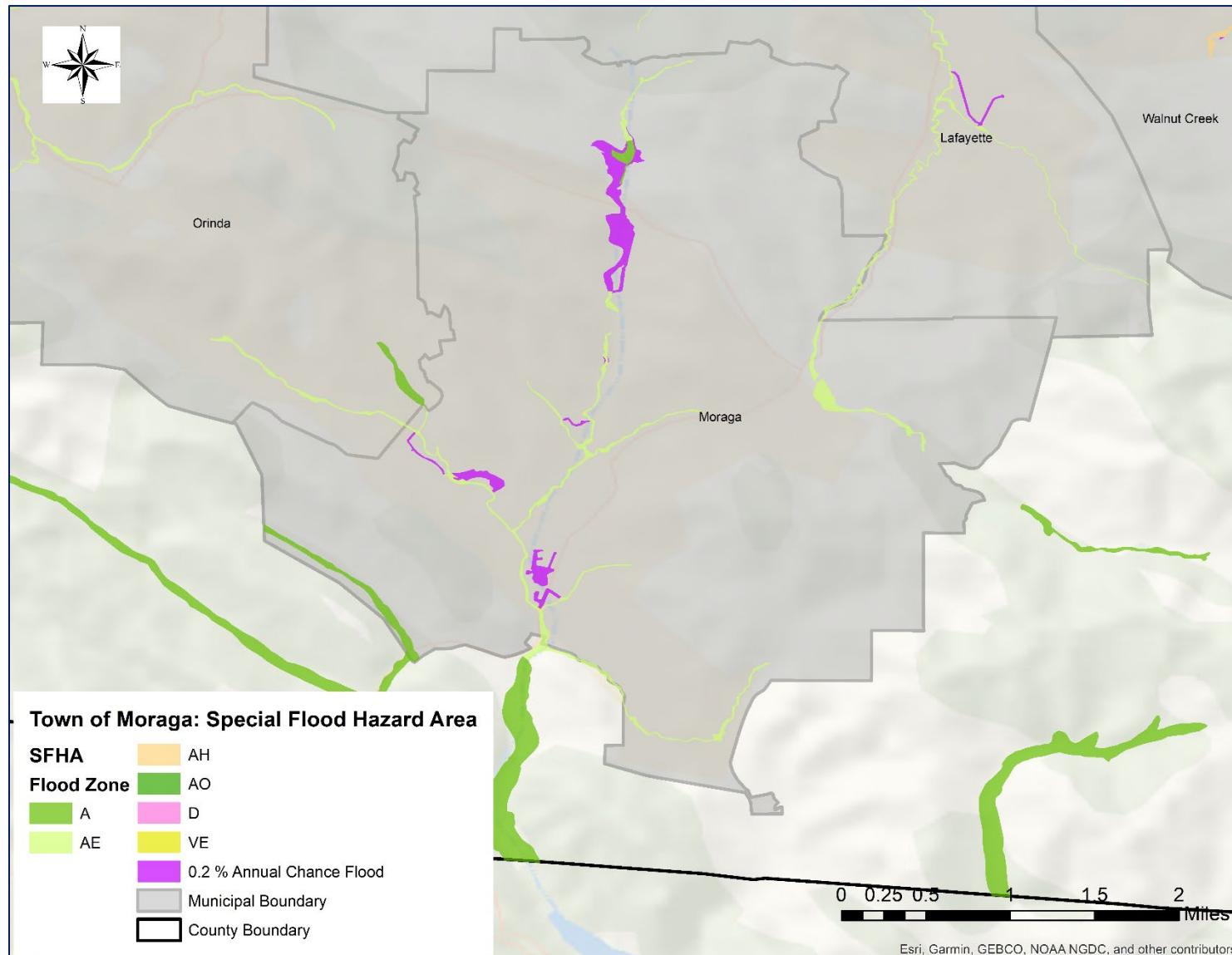




Figure 3. Landslide Susceptibility

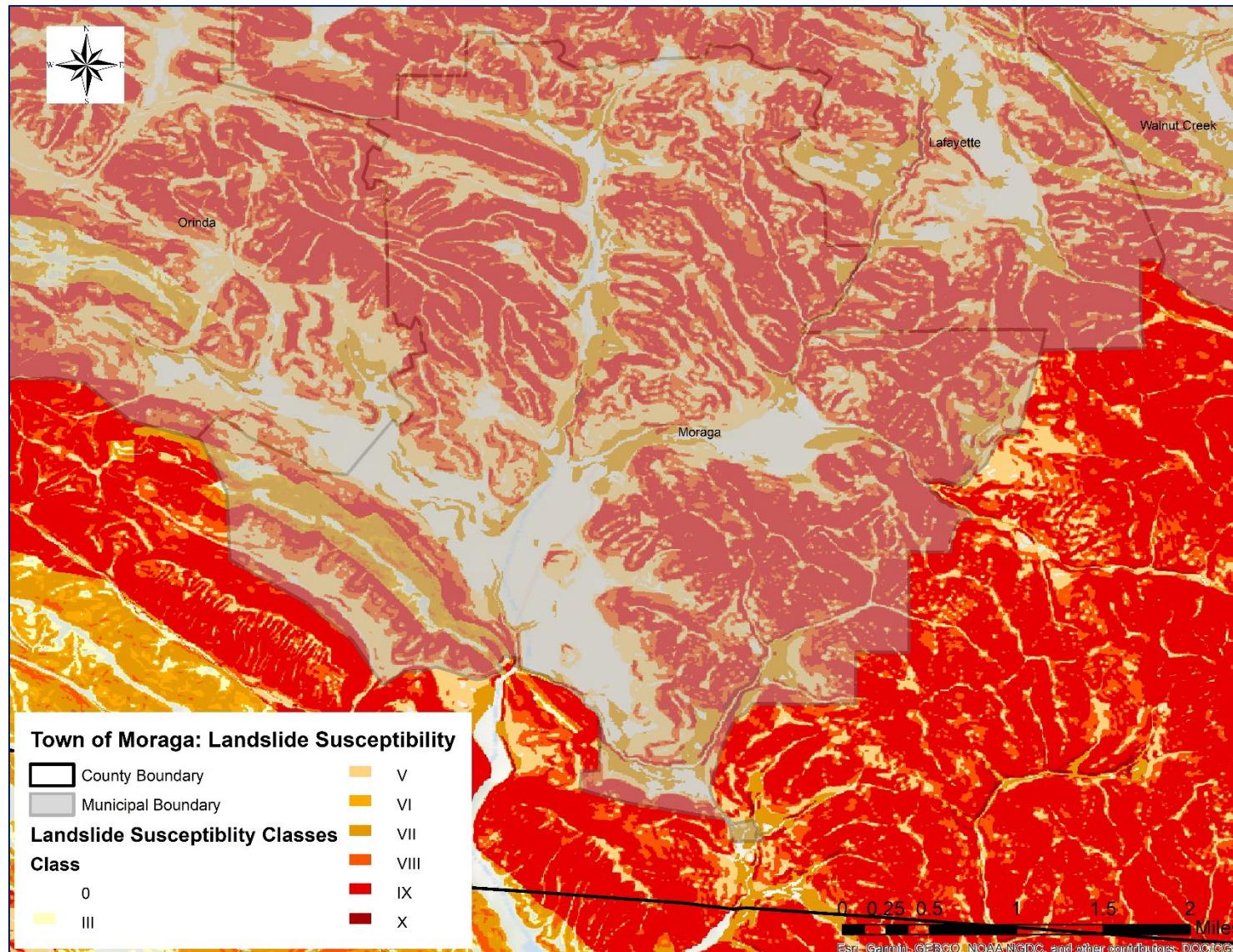
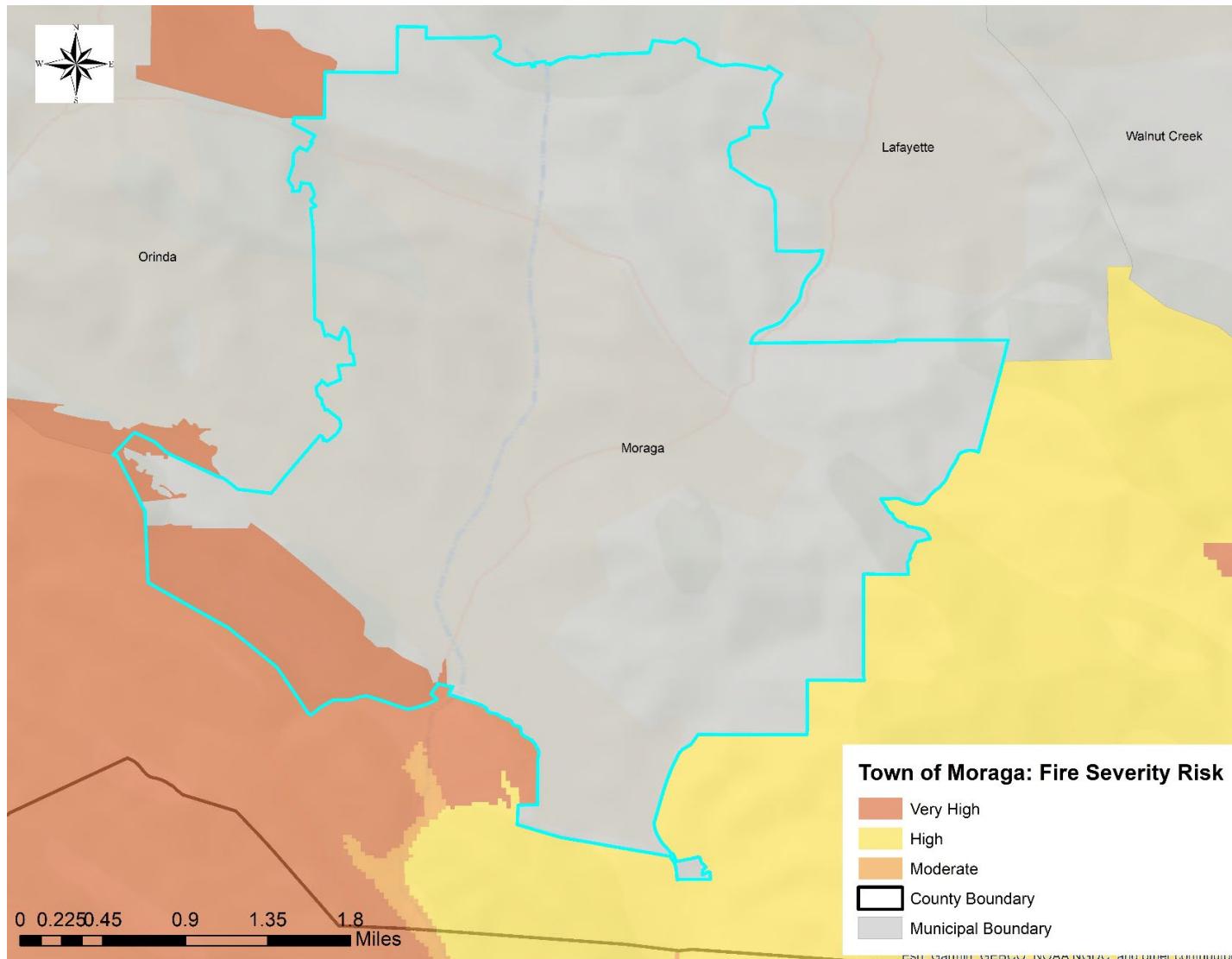




Figure 4. Fire Hazard Severity Zones*



*On January 22, 2025, the Moraga LHMP Annex received an approval pending adoption by the Federal Emergency Management Agency. On February 24, 2025, the California Department of Forestry and Fire Protection released Phase 2 State Fire Hazard Severity Zone Mapping, which changed mapped fire severity risk areas within Moraga. The updated mapping will be reflected in the next LHMP update.



APPENDIX B. STAKEHOLDER AND PUBLIC ENGAGEMENT

The mitigation planning process promotes awareness of hazard risks and continues the conversation about the community's safety and resilience. A hazard mitigation plan generates additional community support when it accurately reflects the values and priorities of the community which will lead to successfully implementing the mitigation actions and projects identified in this Plan.

Federal regulations for mitigation plan approval require that stakeholders and the general public are given opportunities to be involved in the plan's development and update process. Input from community members can strengthen the content and outcomes of the hazard mitigation plan. Furthermore, the Plan must state continued public engagement as the Plan is carried out during its lifetime. A public outreach strategy outlines what the community intends to achieve throughout the outreach efforts. Additionally, it identifies who to involve in the process, and how and when to effectively engage the community. Contra Costa County and the Town of Moraga worked together to ensure that the stakeholder and public engagement was meaningful and productive. Refer to **Volume 1 (Planning Area-wide Elements)** for further information on how stakeholders and the general public were given opportunities to be involved throughout the planning process. However, every plan participant employed a slightly tailored engagement strategy that suits the community's demographics, including the underserved population, and needs in addition to the lead jurisdiction's engagement strategy.

Town of Moraga stakeholders and the public were given a number of opportunities to be involved throughout the planning process. Opportunities were provided via a public survey, in person and virtual public meetings, and public engagement activities to review the Plan draft (i.e., public comment period). The public meetings allowed the County to introduce the Plan update, identify additional hazards of concern that should be included, if any, and to provide input for the various mitigation measures intended to eliminate or reduce the negative impact to those hazards. Language translation assistance in Spanish was available in all public meetings. The public survey asked community representatives and members of the public to rate each of the hazards in terms of perceived risk. Furthermore, they were asked to rate "mitigation importance" for each of the identified hazards in the Plan. The information gathered from this survey was used to inform the hazard risk prioritization process, and to ensure the Plan adequately addressed the public's concerns and priorities. The survey was available in English, Spanish, Tagalog, Traditional Chinese, and Simplified Chinese. A total of 45 respondents that lived in the Town and 17 that worked in the Town participated in the survey. Please refer to **Volume 1 (Planning Area-wide Elements)** for further information and supporting documentation of the public meetings and public survey.

How Public Input was Incorporated into the Plan

Information and feedback gained through the public survey, public meetings, and public comment period provided valuable data to validate and confirm the risk assessment findings and potential mitigation strategies. Specifically, feedback from the public offered during the public meetings offered greater insights into the public's concerns regarding specific hazards and their impacts. The public also offered specific initiatives they felt would create greater resiliency for the Town and its residents.

Survey results helped validate the hazards included in the Plan, the hazard ranking process, and areas where the County and jurisdictions could further improve outreach and education efforts. Open-ended responses, specifically regarding their experience with damages from past hazards, helped to validate hazard-specific impact data in *Chapter 4 (Hazard Identification and Risk Assessment)* of **Volume 1 (Planning Area-wide Elements)**. These, and related findings, helped the County and Town Core Planning Team determine meaningful mitigation projects.



After the public comment period ended, no public feedback was received for the Town of Moraga Annex. However, in order to keep the Plan current after it is approved, the Town will ensure that the public continues to be involved in the Plan and how it is carried out. Refer to Section B.2 of this Annex for further details on continued public engagement.

B.1. Public Comment Period

Once the draft Plan was completed, the public was given an opportunity to review and provide comments on the County Hazard Mitigation Plan, including the Town of Moraga's Annex, prior to submitting the Plan to the State and FEMA. The countywide public comment period began on April 22, 2024, and went on through May 31, 2024. Prior to the public comment period, the Contra Costa County Core Planning Team conducted a strategy meeting with all plan participants (i.e., Town of Moraga) that served as a brainstorming session and helped determine the public outreach goals and proper outreach methods for the public comment period. Subsequently, the Town of Moraga Core Planning Team developed a public outreach strategy that meets the Town's unique needs of the community to engage stakeholders and the public during the public comment period. The Town ensured equitable outreach by targeting Contra Costa County's vulnerable communities, including the younger (under 18 years old) and elderly (over 65 years old) population, individuals with limited English proficiency, and those with access and functional needs.

The Town of Moraga Local Planning Team coordinated with its stakeholders to ensure that the public had an opportunity to learn about the Plan, mitigation actions planned for their community, and ways to get involved in the planning process. Outreach to the Town of Moraga community involved a combination of in person, printed, and digital media starting on April 30, 2024, through the end of the public comment period on May 31, 2024. To ensure equitable outreach a calendar was created to strategize and map all events.

Public Comment Outreach Calendar

April 2024	
Date	Tuesday, April 30th
Event Name	General Plan 2040 Community Meeting
Location	Saint Mary's College 1928 St Marys Road Moraga, CA 94575
Outreach Method	Community Event
Outreach Purpose	Inform, Involve
Targeted Population	Age (Elderly and Younger), Access and Functional Needs
Accommodations Provided	After Hours

2024 Hazard Mitigation Plan
Contra Costa County, California



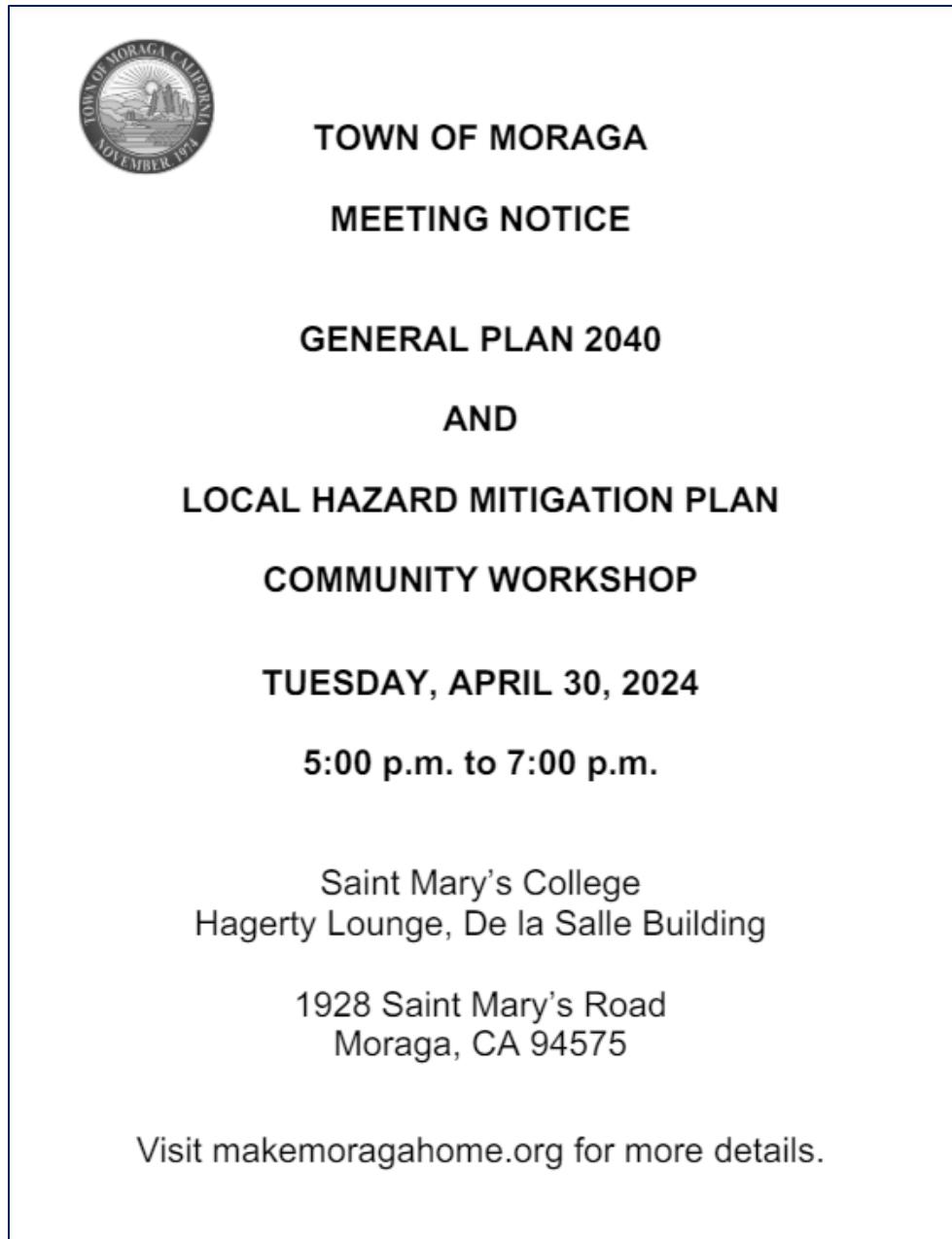
May 2024		
Date	Wednesday, May 15th	Tuesday, May 21st
Event Name	Moraga Orinda Fire District Board of Supervisors Public Meeting	Town of Moraga Planning Commission Meeting
Location	Sarge Littlehale Room 22 Orinda Way Orinda, CA 94563	Council Chambers 335 Rheem Boulevard Moraga, CA, 94556
Outreach Method	Presenting to Governing Body	Presenting to Governing Body, Area-Specific Meetings
Outreach Purpose	Inform, Involve	Inform, Involve
Targeted Population	Townwide, Age (Elderly), Access and Functional Needs	Townwide, Age (Elderly), Access and Functional Needs
Accommodations Provided	After Hours, Virtual Option	After Hours
Date	Tuesday, May 21st	
Event Name	Rotary Club of Moraga Weekly Meeting	
Location	La Finestra Ristorante 1419 Moraga Way Moraga, CA, 94556	
Outreach Method	Community Event	
Outreach Purpose	Inform, Involve	
Targeted Population	Community Organization, Age (Elderly)	
Accommodations Provided	Meeting over lunch hour	

The Town was scheduled to present during the Moraga Youth Involvement Committee (MYIC) Public Hearing on May 9, 2024. However, the event got cancelled. This event was meant to reach the younger (under 18 years old) population.



April 30, 2024 – General Plan 2040 Community Meeting

The General Plan 2040 Community Meeting was open to the public after hours (5:00 PM – 7:00 PM) to allow working families and seniors the opportunity to attend. The meeting was held at Saint Mary's College, which allowed the Town access to the younger population of Moraga. This public outreach opportunity was combined with the pre-established General Plan 2040 Community Meeting because hazard mitigation is a similar topic to newly proposed elements of the General Plan. The Town hosted a table sharing information on the Contra Costa County Hazard Mitigation Plan, including Town of Moraga's Annex, opportunities to provide feedback on the Plan, and the community's local hazards.







May 15, 2024 – Moraga Orinda Fire District Board of Supervisors Public Meeting

The Moraga Orinda Fire District Board of Supervisors Public Meeting was held in person with a virtual option (Zoom), after hours (7:00 PM) on a weekday. Town staff spoke about the Contra Costa County Hazard Mitigation Plan, including the Town's Annex, and opportunities for the public to be part of the planning process by reviewing and providing feedback on the Plan and Annex. This meeting is open to all Town residents, including all vulnerable communities.



Moraga-Orinda Fire District Board of Directors

REGULAR MEETING
May 15, 2024 – 6:00 PM
6:00 p.m. CLOSED SESSION
7:00 p.m. OPEN SESSION

MEETING LOCATION:
Sarge Littlehale Room
22 Orinda Way
Orinda, CA 94563

To access the meeting remotely:
please click the link below to join the webinar by Zoom:
<https://us02web.zoom.us/j/87259323662>
or By Phone: 1-669-900-6833
Webinar ID: 872 5932 3662

NOTICE OF TELECONFERENCE MEETING:
Pursuant to Government Code Section 54953, Subdivision (b), this meeting will include teleconference participation by Board Member Greg Hasler from:
831 Pershing St.,
Craig, CO 81625

Public Participation
This meeting will be conducted in a hybrid format with in-person and remote options for public participation. If you are participating via the Zoom meeting link (i.e. web platform), and experience personal technological difficulties, please re-join the meeting by phone via phone number provided above.

For In-person Attendees: Face coverings are strongly encouraged and attendees are encouraged to be up-to-date on the COVID-19 vaccine. Social distance should be maintained when practical. If you are feeling sick, please do not attend the meeting in person.



Moraga-Orinda Fire District Board of Directors

8. PUBLIC COMMENT: PUBLIC COMMENT is Open for ITEMS NOT ON THE AGENDA

At the beginning of each regular District Board meeting, any member of the public may address the District Board concerning any item not on the Board's agenda but within the subject matter jurisdiction of the Board. Speakers will be limited to three (3) minutes unless otherwise specified by the Presiding Officer. The public will be given an opportunity to speak on each agenda item at the time it is called. The Board may discuss and/or take action regarding any or all of the items listed below. Once the public comment portion of any item on this agenda has been closed by the Board, no further comment from the public will be permitted unless authorized by the Board and if so authorized, said additional public comment shall be limited to the provision of information not previously provided to the Board or as otherwise limited by order of the Presiding Officer or the Board.

How to Participate

- In Person**
 - Submit a Speaker Card to the District Clerk
 - After the Board of Directors has heard from everyone who submitted speaker cards, anyone electing not to submit a speaker card may form a line at the lectern.
- Virtual**
 - Click the raise hand function if participating via the Zoom App. The District Clerk will announce, "the next speaker has been unmuted." A notification will appear for the speaker who has raised their hand, asking them to unmute their microphone.
 - Dial *9 to raise your hand if participating by Phone. Staff will call on participants by the name provided or last 4 digits of phone number for dial-in attendees.

To join the Meeting: In Person: Sarge Littlehale Room
22 Orinda Way, Orinda

By Zoom App: <https://us02web.zoom.us/j/87259323662> By Phone: 1-669-900-6833

Webinar ID: 872 5932 3662



2024 Hazard Mitigation Plan Contra Costa County, California



May 21, 2024 – Town of Moraga Planning Commission Meeting

The Planning Commission is responsible for reviewing, evaluating, and deciding land use applications in accordance with the Town's land use policies and zoning regulations. The Commission meets in person on the first and third Tuesday of every month, after hours (6:30 PM). During the meeting, the Planning Director gave a presentation on the Contra Costa County Hazard Mitigation Plan, including the Town's Annex, and opportunities the public has to be part of the planning process by reviewing and providing feedback on the Plan and Annex. The Hazard Mitigation Plan was item 7B on the agenda. This meeting is open to all Town residents, including all vulnerable communities.

<p> TOWN OF MORAGA REGULAR MEETING AGENDA PLANNING COMMISSION TUESDAY, MAY 21, 2024 6:30 p.m. Council Chambers 335 Rheem Boulevard, Moraga, California 94556 1. CALL TO ORDER AND ROLL CALL: A. Chairperson Polsky, Vice Chairperson Mapel, Lentell, Bode, Thiel, Helber, Luster B. Conflict of Interest (if any) C. Contact with Applicants 2. PLEDGE OF ALLEGIANCE 3. PUBLIC COMMENTS – Time reserved for those in the audience who wish to address the Planning Commission on items which are not on the agenda. The audience should be aware that the Commission cannot discuss details or vote on non-agenda items. Your concerns may be referred to staff or placed on a future agenda. 4. ADOPTION OF CONSENT AGENDA: A. Conduct a Public Hearing and Consider Adoption of Planning Commission Resolution – 2024 Approving Design Review Board Permit (DRB-11-23) for a 257 Square Foot Addition to an Existing 2,074 Square Foot Residence within 500 Feet of and Visible from a Town Designated Scenic Corridor at 3744 Campolindo Drive, Moraga, CA (APN: 256-183-003) CEQA Determination: The Residential Addition is Categorically Exempt from California Environmental Quality Act (CEQA) pursuant to Article 19 Categorical Exemptions, Section 15301. Existing Facilities as the addition will not increase the floor area of the residence by 50% or 2,500 square feet, whichever is less. 5. ADOPTION OF MEETING AGENDA 6. PUBLIC HEARINGS 7. ROUTINE AND OTHER MATTERS A. Project Introduction and Informational Session for a 66 Unit Residential Apartment Building Located at 1600, 1640 and 1660 School Street (APN 257-190-050, 051 and 052)</p>	<p>CEQA Determination: This informational session is not a project as defined in Section 15378 of the Public Resources Code; therefore, no California Environmental Quality Act (CEQA) review is required at this time. The project site is a part of the Comprehensive Advanced Planning Initiative Programmatic Environmental Impact Report (State Clearhouse No. 2022-00106). A CEQA consistency analysis of a proposed project and the Comprehensive Advanced Planning Initiative Programmatic Environmental Impact Report will be prepared and provided for consideration at the project's first public hearing.</p> <p>Public Comment received after Agenda was posted.</p> <p>B. Town of Moraga's Local Hazards Mitigation Plan Update Presentation to provide information on the Local Hazards Mitigation Plan Public Comment Period.</p> <p>CEQA Determination: This informational session is not a project as defined in Section 15378 of the Public Resources Code; therefore, no California Environmental Quality Act (CEQA) review is required at this time.</p> <p>8. REPORTS A. Planning Commission B. Staff</p> <p>9. ADJOURNMENT</p> <p>Notices of Planning Commission Meetings are posted at 2100 Donald Drive, The Moraga Commons, 329 Rheem Blvd and the Moraga Library. Copies of the Agenda packets can be viewed prior to the meeting at the Town Office, 329 Rheem Boulevard. NOTICE: If you challenge a Town's zoning plan or a permit decision, you may file a writ of mandate in the Superior Court of California, County of Contra Costa, at the time of the hearing. This action, or an written correspondence to the Town Manager, must be taken in the public hearing. Judgment review or a writ of administrative decision may be filed only if a petition is filed with the court not later than the 9th day following the date upon which the decision becomes final. Judicial review of environmental determination may be subject to a shorter time period for litigation, in certain cases 30 days following the date of final decision. The Town of Moraga will provide special assistance for disabled citizens upon at least 72 hours advance notice to the Town Manager's office (925-388-7023). If you need sign assistance or written material printed in a larger font or typed, advance notice is necessary. All meeting rooms are accessible to the disabled.</p>
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May 21, 2024 – Rotary Club of Moraga Weekly Meeting

The Town of Moraga Planning Staff conducted an in person presentation during the Rotary Club of Moraga Weekly Meeting. The Rotary Club predominantly comprises of senior citizen membership. Due to the membership outlook, the Rotary Club was a primary community-based organization of interest to advertise the Hazard Mitigation Plan, due to the access to the elderly population, the Town of Moraga's most vulnerable community.





Printed Materials

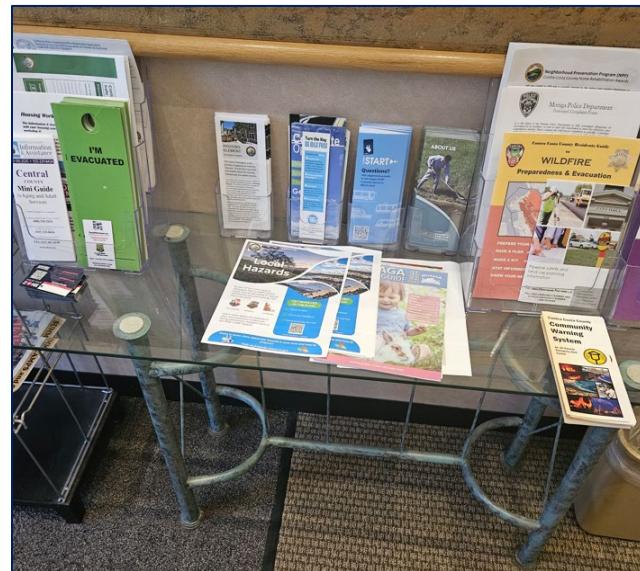
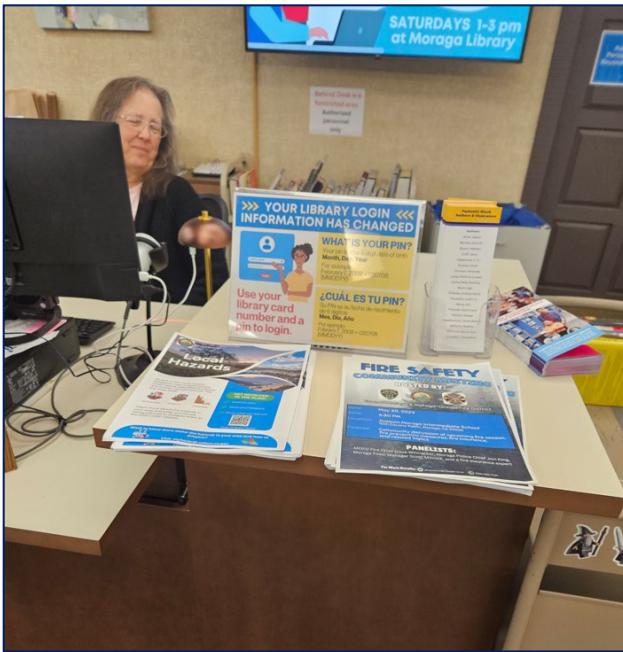
A full page flyer (**Figure B-1**) was created specifically for the public comment period which the Town rebranded with the Town's logo, as seen through pictures within this Appendix. The flyer was created with information on the planning process, ways to get involved, and ways to prepare. Printed materials were distributed at public meetings and outreach events. Additionally, the flyer was posted throughout multiple locations in the Town – Moraga Library, Moraga's government offices, Moraga Planning Department, and Moraga School Board Office.

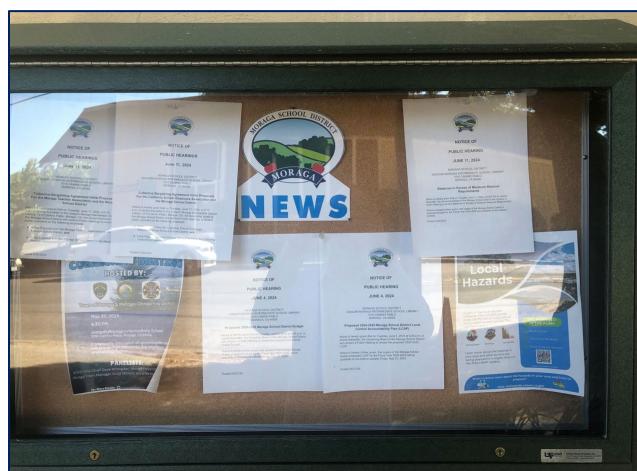
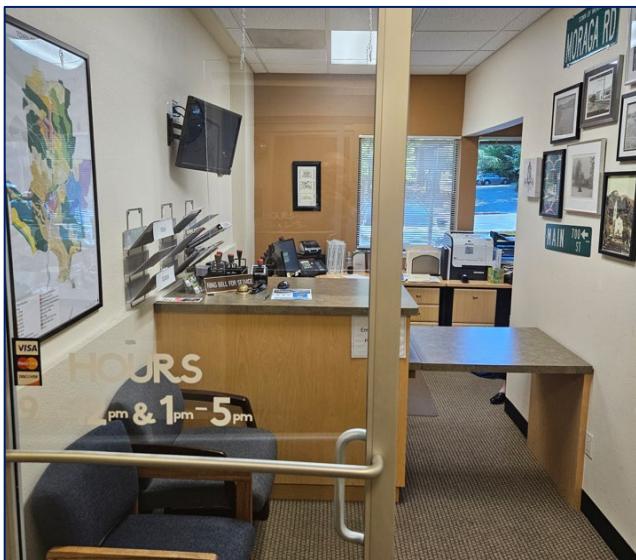
Figure B-1 Public Flyer



2024 Hazard Mitigation Plan

Contra Costa County, California





Lamorinda Weekly Newspaper and Around Town Newsletter

Lamorinda Weekly is an award-winning newspaper written in full color which provides timely, comprehensive, and uniquely relevant information to its readers. The free newspaper is delivered bi-weekly to every home and many businesses in Lafayette, Moraga, and Orinda, which equals to approximately 26,600 copies. The newspaper is also available online and readers can subscribe to receive the newsletter via e-mail. The May 22, 2024 edition included information on the Hazard Mitigation Plan and seeks Plan feedback from residents and business owners throughout the Town. The issue can be accessed via the following link: <https://www.lamorindaweekly.com/archive/issue1807/Local-Hazards-Mitigation-Plan-seeks-public-input.html>.

The Town Clerk issues the About Town Newsletter (e-newsletter) weekly to share the latest community news. The About Town is sent to the community members that subscribe. The May 23, 2024 edition included information on the Contra Costa County Hazard Mitigation Plan and Town Annex and advocated for residents to review the Plan and provide feedback. The announcement included a QR code and link that guided the reader to view the Plan and the feedback form. The edition can be accessed via the following link: <https://www.moraga.ca.us/ArchiveCenter/ViewFile/Item/269>.



Additionally, information was included in the May 20, 2024 e-newsletter edition of the Moraga Citizens Network, a non-profit grassroot organization.

Page: 4 LAMORINDA WEEKLY 925-377-0977 www.lamorindaweekly.com Wednesday, May 22, 2024


MORAGA

See public meetings schedule on these pages and check online for agendas, meeting notes and announcements

Town of Moraga:
www.moraga.ca.us
Phone: (925) 888-7022

Chamber of Commerce:
www.moragachamber.org

Moraga Citizens' Network:
www.moragacitizensnetwork.org

Town Council Meetings
Wed., May 22, 6:30 p.m.
Wed., June 12, 6:30 p.m.
Planning Commission:
Tuesday, June 4, 6:30 p.m.
Park and Recreation Commission:
Mon., June 10, 6:30 p.m.

Local Hazards Mitigation Plan seeks public input

By Vera Kochan

Contra Costa County is in the process of updating a 5-year Multi-Jurisdictional Local Hazard Mitigation Plan (LHMP). The Plan will require working with cities, special districts, and county departments involving three main areas: hazard identification, mitigation action planning, and public comment and outreach.

Moraga's residents are invited to provide input for the LHMP. In doing so it will allow the town to meet federal, state, and local requirements for grant funding. Associate Planner Mio Mendez said that by providing comments, "the Town of Moraga will be eligible for resiliency grants to reduce

Moraga's vulnerabilities to local hazards, as they are made available, and for recovery grants once the town experiences and recovers from a local hazard."

According to the Contra Costa County website, "During the hazard identification phase, the planning team analyzed data on natural and human-caused hazards based on the likelihood, impact, and severity. For the county, the three highest-ranked hazards were earthquakes, wildfires, and landslides. Even though every participating city and special district also ranked their hazards based on their area, there are common trends across

the county in the hazard ranking."

In Moraga's case, the LHMP Hazard Risk Ranking's high probability factor included landslides, heavy rainfall, severe thunderstorms, strong/damaging winds, heat wave/extreme heat, and utility interruptions. The town's medium probability factor included earthquakes, wildfire, flood (urban/flash flood and ravine/creek), drought, hazardous materials incidents, climate change, cyber security threats, and active shooter incidents.

"After hazards were identified, at least one mitigation action item was identified for each hazard," continued the

county website. "This ensures that each participating agency has a proposed strategy to mitigate hazard impacts."

"In an effort to make the county more disaster-ready and resilient, the Contra Costa County Office of Emergency Services is seeking public feedback on the 2024 LHMP," stated Moraga Planning Director Afshan Hamid. "The plan serves as a guide for the county to become more resilient to the impacts of natural, human-caused, and technological disasters."

The county also wants to remind residents that "just as mitigation planning helps local governments be-

come more resilient during disasters, personal preparedness can help you and your family recover more quickly after a disaster. Talk to your family about your local hazards, make a preparedness kit for every household member and pet, and practice your emergency plan at least twice a year."

The 2024 LHMP for Moraga is available on the town's website: www.moraga.ca.us/599/Local-Hazards-Mitigation-Plan. Interested residents have until May 31 to view and provide comments on the Plan before it is submitted to FEMA for review.

 **WE NEED YOUR INPUT: LOCAL HAZARD MITIGATION PLAN**

Town residents are invited to get involved in the Local Hazard Mitigation Plan (LHMP) and provide input from **April 22, 2024 to May 31, 2024**. Your input in the LHMP will allow Moraga to meet federal, state, and local requirements for grant funding.



Town residents are in a unique position to identify natural, human-caused, and technological hazards. Once the LHMP identifies hazards and local risks, the plan will outline strategies for County Departments, Cities, Towns, and Special Districts to reduce the impact of these hazards. As part of developing the 5-year LHMP update, all jurisdictions in Contra Costa County are required to make the draft LHMP available to the public and public comment.

The 2024 Hazard Mitigation Plan for the Town of Moraga is available on the Town website and the **public comment period is now open (April 22, 2024, to May 31, 2024)**.

For more information and to comment on the 2024 Hazard Mitigation Plan for the Town of Moraga please see [link](#).



Get Involved in the Planning Process

- Read the plan!
- Comment!
- Share what you learned!

 **SCAN ME**

Check the County Website for more information.







HAZARDS SURVEY - YOUR VOICE IS NEEDED!



human-caused, and technological hazards.

We are all invited to get involved in the **Local Hazard Mitigation Plan (LHMP)** by providing input **this month**. Our input to the LHMP will allow Moraga to obtain federal, state, and local requirements for grant funding. As Town residents, we are in a unique position to identify natural,

The 5-year LHMP update is an effort to make Contra Costa County more resilient to various hazards. Once the LHMP identifies hazards and local risks, the plan will outline strategies for County Departments, Cities, Towns, and Special Districts to reduce the impact of these hazards.

The 2024 Hazard Mitigation Plan for the Town of Moraga is available on the Town website; the public **comment period is now open until May 31, 2024**. As a resident of Moraga, please read the draft and provide public comment on the County website. For more information on the 2024 Hazard Mitigation Plan for the Town, [please see this link](#). About half way down the Comment Form page, you will find a place to put your name, and begin the form to register your comments.



District Website

Information on the Contra Costa County Hazard Mitigation Plan and the Town of Moraga Annex, and announcement providing opportunity to comment was posted to the Town's website. The website served as a central place which allowed all residents, stakeholders, and partners in the Town of Moraga to review and provide feedback on the Plan, and thus promoted more public comment.

The screenshot shows the homepage of the Town of Moraga website. The header features the town's logo with the text "Town of MORAGA California". To the right are social media icons for Facebook, Twitter, LinkedIn, and Instagram, along with a search bar. The main content area displays a scenic view of green hills and mountains. Below this, a sidebar on the left lists links: "Make Moraga Home", "Application Forms", "Housing Resources", "Senate Bill 9 (SB9)", and "Local Hazards Mitigation Plan". The main content area shows the breadcrumb navigation "Home > Departments > Planning > Local Hazards Mitigation Plan" and the title "Local Hazards Mitigation Plan". The text describes the Local Hazard Mitigation Plan (LHMP) as a 5-year plan setting mitigation priorities for the county, involving over 40 partners county-wide, including the Town of Moraga as a partner agency.

Make Moraga Home

Application Forms

Housing Resources

Senate Bill 9 (SB9)

Local Hazards Mitigation Plan

Home > Departments > Planning > Local Hazards Mitigation Plan

Local Hazards Mitigation Plan

The Local Hazard Mitigation Plan (LHMP) is a 5-year plan that sets the mitigation priorities for the County. Over 40 partners county wide are a part of this plan: 16 cities, 20 special districts, and many County Departments. The Town of Moraga is a partner agency and is required to develop Hazard Mitigation Plan Annex document. The Annex is not intended to be a standalone document but supplements the information contained in Volume 1 (Planning Area-wide Elements). Therefore, all sections of Volume 1 including the planning process, hazard identification and risk assessment, mitigation strategy, and plan maintenance apply to and were met by the Town of Moraga. This Annex provides additional information specific to the Town, with a focus on providing additional details on the hazard risk assessment and mitigation strategy (i.e., mitigation actions) for this community.



Stakeholder Engagement

Due to the size of the Plan (the Base Plan and 40 annexes), some stakeholders would receive the same invitation a significant amount of times. For a more productive outreach and to avoid overwhelming stakeholders, Contra Costa County sent a single invitation to all the countywide stakeholders via e-mail. However, each plan participant was required to cross-reference the countywide list and identify the stakeholders that applied specifically to their jurisdiction. Not only did this help ensure that a comprehensive list was compiled as part of the stakeholder engagement, but it assisted each plan participant identify any additional stakeholders that may have not been on the list. **Table 26** outlines the stakeholders the Town of Moraga identified and provided an opportunity to review and provide feedback on the draft Plan and Annex, via the countywide stakeholders e-mail.

Table 26. Town of Moraga Specific Stakeholders List

Local and Regional Agencies	
Bay Area Air Quality Management District	Contra Costa County Mosquito and Vector Control District
Cal OES	Contra Costa County Office of Communication and Media
CalFire	Contra Costa County Office of Education
California Department of Parks and Recreation	Contra Costa County Office of Restorative Equity and Social Justice
California Department of Social Services	Contra Costa County Office of the Sheriff
California Department of Transportation (Caltrans)	Contra Costa County Probation
California Department of Water Resources	Contra Costa County Risk Management
California Highway Patrol	Contra Costa County Transportation Authority
California State Lands Commission	Contra Costa County Treasurer-Tax Collector
Contra Costa County Airport	Contra Costa County Veteran Services Office
Contra Costa County Animal Services Department	Contra Costa County Volunteer Organizations Aiding in Disaster
Contra Costa County Auditor – Controller	Contra Costa Water District
Contra Costa County Clerk-Recorder	Contra Costa Regional Medical Center
Contra Costa County Department of Agriculture	East Bay Municipal Utility District
Contra Costa County Department of Conservation and Development	East Bay Regional Park District
Contra Costa County Department of Information Technology	Metropolitan Transportation Commission
Contra Costa County Department of Public Works	National Oceanic and Atmospheric Association
Contra Costa County District Attorney's Office	National Weather Service
Contra Costa County Employment & Human Services Department	State Water Resources Control Board
Contra Costa County Health Services	
Agencies that have the Authority to Regulate Development	
Contra Costa County Department of Conservation Development	



Neighboring Communities	
City of Lafayette	City of Orinda
Nonprofit Organizations	
American Red Cross	La Familia Counseling
California Autism Foundation	Loaves and Fishes – Contra Costa County
California Resiliency Alliance	Meals on Wheels
Care Parent Network	Monument Crisis Center
CARESTAR Foundation	Regional Center of the East Bay
Carlton Senior Living	Society of St. Vincent de Paul of Contra Costa County
CocoKids	United Way Bay Area
Community Awareness and Emergency Response	VistAbility
Concord Corps. – The Salvation Army	La Familia Counseling
Contra Costa County Crisis Center - 211	Loaves and Fishes – Contra Costa County
Contra Costa County Crisis Center – Hope Solutions	Meals on Wheels
Interfaith Council of Contra Costa County	Monument Crisis Center
Down Syndrome Connection of the Bay Area	Regional Center of the East Bay
Futures Explored	Society of St. Vincent de Paul of Contra Costa County
Independent Living Resources – Solano and Contra Costa Counties	United Way Bay Area
Inter-Tribal Council of California	VistAbility
Businesses, Academia, and Other Private Organizations	
AC Transit	John Muir Behavioral Health
Amtrak	Kaiser Permanente Hospital
AtHoc/Blackberry	Lone Tree Post Acute Skilled Nursing Facility
Bloomfield Cherries	Marathon Petroleum
BMK Engineers	Martinez Refinery Company/PBF Energy
BNSF Railway	Milestone California-Based Investment Company
Brenden Theater	MV Transportation
Canyon Elementary School **	Pacific Gas & Electric
Chevron Refinery	Philips 66 Rodeo Refinery
Contra Costa County Community College District	Shell Oil Company
Contra Costa Event Park – Contra Costa County Fair	Sutter Delta Medical Center
Corteva	Tenet Health



Businesses, Academia, and Other Private Organizations	
County Connection Transportation and Link Paratransit Services	University of San Francisco
EcoServices	Valero Energy Corporation
Food Bank of Contra Costa and Solano	Vituity
Global Medical Response	

Refer to **Volume 1 (Planning Area-wide Elements)** for a full list of the countywide stakeholders.

Additionally, the Town of Moraga identified the Moraga School District as an additional stakeholder (unique to the jurisdiction/not in the countywide stakeholders e-mail) for the Town. An e-mail was sent to the Superintendent who distributed Hazard Mitigation Plan information to the District's distribution list.



Dear Moraga Community,

May is the month of celebration and appreciation! This month, we celebrated **Staff Appreciation Week** and it was wonderful to see our staff appreciated for their hard work. Our PTAs really came through and our staff lounges were filled with goodies most of the week! In Moraga, we know that teachers are the top indicator of student success, and we have some of the very best around. I am so grateful to work in a community with such incredible and dedicated educators.

May 19th through May 25th is **Classified Employee Appreciation Week**! I want to thank all our classified employees who work tirelessly for our students. They are absolutely instrumental to our district operations and treasured members of our school communities.

We also hosted our **First Annual Multilingual Learner Celebration** at Rheem. Over 90 students and family members attended to join in community. Engaging our multilingual learner community has been a goal this year and we were very happy to see this event be a success. Students were recognized for the very difficult feat of achieving reclassification as English proficient.

And, last but not least, this time of year we have the privilege of celebrating our retirees! This year we celebrate three staff members, **Jill Lichti**, English and Foods teacher at JM, **Mariam Atefi**, intensive instructional assistant at JM, and **Lynne Wilson**, Director of Bobcat Club at Camino Pablo.

ELA Adoption Plan

On Tuesday, our Governing Board heard a presentation from the English Language Arts committee regarding their decision to pilot two ELA programs during the 2024-2025 school year. Eight teachers and classrooms will take part in the pilot. The committee will give a recommendation to the school board in the spring of 2025. You can view Tuesday's presentation [HERE](#).

School-Family Relationships Survey

Annually, we strive to improve through obtaining feedback from our community partners. This year, many of you completed a survey to provide feedback on the Local Control and Accountability Plan. Thank you for the time and effort in doing this; this feedback is being incorporated into our planning for next year. In addition, we would love to hear feedback from families on relationships at schools. Please take a few minutes to complete our annual parent/guardian survey on school relationships.

[SCHOOL-FAMILY RELATIONSHIPS SURVEY LINK](#)

Town of Moraga Announcements

Our school community is encouraged to attend two upcoming sessions from the Town of Moraga and to provide feedback on the future of our wonderful town:

- On May 21st at 6:30 p.m. the Planning Commission will provide a project introduction of the proposed four-story 66-unit residential apartment building on School Street. Proposed residential amenities include a shared workspace, wellness center, landscape improvements to the site, and an elevated outdoor courtyard amenity space on the second floor serving the apartment residents.



- On May 22nd the Town Council will hold a Study Session on the General Plan Community Design Element. This update will focus on the two commercial areas and sustainable development. The revisions support a vision for a vibrant, walkable town center that supports a local economy. The Town proposes 2040 Community Design goals and policies.
- Public Comment is open on the 2024 Hazard Mitigation Plan. Town residents are in a unique position to identify natural, human-caused, and technological hazards. Once the LHMP identifies hazards and local risks, the plan will outline strategies for County Departments, Cities, Towns, and Special Districts to reduce the impact of these hazards. As part of developing the 5-year LHMP update, all jurisdictions in Contra Costa County are required to make the draft LHMP available to the public and public comment.

Sincerely,
Julie Parks, Superintendent

 @moraga_school_district

B.2. Continued Public Engagement

To ensure continued public engagement, Contra Costa County and the Town of Moraga will ensure the Plan is available in the County's Hazard Mitigation Plan webpage after it has been approved to allow the public an opportunity to provide continual feedback and input. As future needs and concerns arise, or if the public would like to provide feedback regarding the latest version of the Plan and the Town's Annex, the public is invited to use the comment form, which is provided on the website, to provide comments.

County Hazard Mitigation Webpage: contracosta.ca.gov/6415/Local-Hazard-Mitigation-Plan

Comment Form: survey.alchemer.com/s3/7792090/CommentFormContraCostaCountyHMP

The Town of Moraga will continue to work with Contra Costa County and stakeholders to ensure that the public has an opportunity to learn about the Plan, mitigation actions planned for their communities, and ways to get involved. Hazard mitigation will be a part of the Town's community outreach strategy to include, but not limited to, public meetings, community events, social media, and public surveys throughout the year. Furthermore, the Town of Moraga will continue to ensure equitable outreach by working with other departments, non-profits, and agencies that work with underserved communities throughout the County.



APPENDIX C. HAZARD RISK ASSESSMENT METHODOLOGY

As part of the Contra Costa County Office of Emergency Services (OES), the risk assessment identifies the natural, human-caused, and technological hazards that have potential impacts on all or portions of the County. Hazard identification, historical occurrences, and risk modeling (where applicable and available for specific hazards) information was collected from multiple sources including, but not limited to:

- Environmental Systems Research Institute (Esri)
- Federal Emergency Management Agency (FEMA)
- National Centers for Environmental Information (NCEI)
- National Weather Services (NWS)
- United States Geological Survey (USGS)
- Local repositories

This information was analyzed to assess the risk and vulnerability of people, property, the environment, and the jurisdiction's essential operations from these hazards. Furthermore, a risk ranking was performed for the hazards of concern described in this Plan. The risk ranking is an important step in developing an action plan, as it allows jurisdictions to compare the risk factors from one hazard to another. That comparison provides critical information to use in selecting hazard mitigation actions and their priorities. This process is not only intended to help focus actions on the hazards with the highest ranking, but also to ensure that jurisdictions are aware of the hazards that ranked low yet still pose significant risk.

In order to provide an informed and comprehensive ranking of the hazards addressed in this Plan, a number of factors were considered: probability, extent, vulnerability, and impact. The sum of all the weighted factors for the extent, vulnerability, and impact categories was combined into a final consequence score. Probability multiplied by consequence resulted in a total risk score for each hazard.

Extent + Vulnerability + Impact = Consequence

Consequence x Probability = Total Risk Score

These results were determined by following a data driven quantitative assessment, reviewing, and ranking local knowledge from local subject matter experts, and developing other risk elements by the Core Planning Team based on the data collected. These elements were then aggregated to inform the analysis.

At the fundamental level, consequence is an assessment of the potential impact(s) if the hazard incident actually occurs. In this assessment, the consequence of an event (or the impact) will be interdependent on the following factors:

- Vulnerabilities (i.e., social, physical, and community conditions)
- Capabilities and capacities
- Mitigation



- Characteristics of the hazard event (i.e., magnitude, scale)

The frequency/probability of the hazard is not included in assessing the consequence because without the event, there is no consequence or impact.

C.1. Probability of Occurrence

The probability of occurrence of a hazard is indicated by a probability factor based on the likelihood of annual occurrence. Numerical probability factors were assigned as follows.

Table 27 outlines the probability of occurrence factors used in the risk assessment calculations for this Plan. A significant hazard event is defined as any hazard occurrence that directly or indirectly damages structures or infrastructure, impedes normal business operations, and/or is likely to cause serious or fatal injuries.

Table 27. Probability of Occurrence

Probability	Description	Probability Factor
High	Significant hazard event is likely to occur annually.	3
Medium	Significant hazard event is likely to occur within 25 years.	2
Low	Significant hazard event is likely to occur within 100 years.	1
Unlikely	There is little to no probability of significant occurrence, or the recurrence interval is greater than every 100 years.	0

The assessment of hazard frequency is generally based on past hazard events in the area and professional judgment of local subject matter experts.

C.2. Extent Factors

Extent was assessed in two (2) categories – extent/intensity potential and catastrophic probability of the hazard. Numerical extent factors were assigned as follows.

C.2.1. Extent/Intensity Factor

Extent is defined as the range of anticipated intensities of the identified hazards. This category is most commonly expressed using various scientific scales (e.g., Saffir-Simpson, Enhanced Fujita, Modified Mercalli). Extent/Intensity Factors are hazard-specific and are detailed in each hazard profile. **Table 28** outlines the extent/intensity factors used in the risk assessment calculations for this Plan.

Table 28. Extent/Intensity Factor

Probability	Description	Extent Factor
High	Historical and/or probabilistic models/studies for this hazard indicate the possibility of a high-intensity incident.	3
Medium	Historical and/or probabilistic models/studies for this hazard indicate the possibility of a medium-intensity incident.	2
Low	Historical and/or probabilistic models/studies for this hazard indicate the possibility of a low-intensity incident.	1
Unlikely	Historical and/or probabilistic models/studies for this hazard indicate the possibility of little to no intensity.	0



C.2.2. Catastrophic Factor

The probability that a hazard could be catastrophic. Catastrophes are defined as significant incidents that cause sudden and great harm or destruction. **Table 29** outlines the catastrophic factors used in the risk assessment calculations for this Plan.

Table 29. Catastrophic Factor

Probability	Description	Extent Factor
High	Catastrophic hazard event is likely to occur at least once in 10 years.	3
Medium	Catastrophic hazard event is likely to occur at least once between 11 and 50 years.	2
Low	Catastrophic hazard event is likely to occur at least once in 51 or more years.	1
Unlikely	Virtually no probability that this hazard could be catastrophic.	0

Each category was assigned a weighting factor to reflect its significance, consistent with this typically used for measuring the benefits of hazard mitigation actions – a weighting factor of three (3) was assigned for *Extent/Intensity* and its potential for *Catastrophe*.

C.3. Vulnerability Factors

Vulnerabilities were assessed in three (3) categories – population exposure, property exposure, and exposure based on changes in development. Numerical vulnerability factors were assigned as follows.

C.3.1. Population Exposure Factor

Population exposure values were assigned based on the percentage of the total population exposed to the hazard event. **Table 30** outlines the population exposure factors used in the risk assessment calculations for this Plan.

Table 30. Population Exposure Factor

Probability	Description	Vulnerability Factor
High	30% or more of the population is exposed to the hazard.	3
Medium	15% to 29% of the population is exposed to the hazard.	2
Low	14% or less of the population is exposed to the hazard.	1
No Vulnerability	None of the population is exposed to the hazard.	0

C.3.2. Property Exposure Factor

Property exposure values were assigned based on the percentage of the total property value exposed to the hazard event. **Table 31** outlines the property exposure factors used in the risk assessment calculations for this Plan.



Table 31. Property Exposure Factor

Probability	Description	Vulnerability Factor
High	25% or more of the total assessed property value is exposed to the hazard.	3
Medium	10% to 24% of the total assessed property value is exposed to a hazard.	2
Low	9% or less of the total assessed property value is exposed to a hazard.	1
No Vulnerability	None of the total assessed property value is exposed to a hazard.	0

C.3.3. Changes in Development

Changes in development in the past five (5) years have increased or decreased the community's vulnerability/exposure to the hazard. **Table 32** outlines the changes in development factors used in the risk assessment calculations for this Plan.

Table 32. Changes in Development Factor

Probability	Description	Vulnerability Factor
High	Changes in development have increased the vulnerability/exposure of the community to the hazard by 10% or more.	3
Medium	Changes in development have increased the vulnerability/exposure of the community to the hazard between 5% and 9%.	2
Low	Changes in development have increased the vulnerability/exposure of the community to the hazard by 4% or less.	1
No Vulnerability	Changes in development had no effect and/or have decreased the vulnerability/exposure of the community to the hazard.	0

Each category was assigned a weighting factor to reflect the significance, consistent with those typically used for measuring the benefits of hazard mitigation actions – a weighting factor of three (3) was assigned for *Population Exposure*, and a weighting factor of one (1) was assigned for *Property Exposed* and *Changes in Development*.

C.4. Impact Factors

Hazard impacts were assessed in eight (8) categories – population and life/safety, underserved/equity, property damages, economic, environmental, essential operations, future development, and climate change. Numerical impact factors were assigned as follows.

C.4.1. Population and Life Safety Factor

Population and life safety values were assigned based on the best available data (historical and probabilistic) for people vulnerable to the hazard event and whether the affected population is likely to experience adverse impacts from the hazard incident. **Table 33** outlines the population and life safety factors used in the risk assessment calculations for this Plan.



Table 33. Population and Life Safety Factor

Probability	Description	Impact Factor
High	Populations exposed to this hazard are likely to experience significant adverse impacts, such as fatalities and severe injuries.	3
Medium	Populations exposed to this hazard are likely to experience some adverse impacts, such as injuries requiring acute medical care.	2
Low	Populations exposed to this hazard are likely to experience minimal adverse impacts, such as ambulatory injuries.	1
No Impact	Populations exposed to this hazard are not likely to experience significant adverse impacts.	0

C.4.2. Underserved/Equity Factor

Underserved/equity values were assigned based on the best available data for underserved populations vulnerable to the hazard event and whether the affected population is likely to experience adverse/disproportionate impacts from the hazard incident resulting in greater disparity in equity. **Table 34** outlines the underserved/equity factors used in the risk assessment calculations for this Plan.

Table 34. Underserved/Equity Factor

Probability	Description	Impact Factor
High	Underserved populations exposed to the hazard are likely to experience significant adverse/disproportionate impacts, such as fatalities and severe injuries.	3
Medium	Underserved populations exposed to the hazard are likely to experience some adverse/disproportionate impacts, such as injuries requiring acute medical care.	2
Low	Underserved populations exposed to the hazard are likely to experience minimal adverse/disproportionate impacts, such as ambulatory injuries.	1
No Impact	Underserved populations exposed to the hazard are not likely to experience significant adverse/disproportionate impacts.	0

C.4.3. Property Damage Factor

Property damage values were assigned based on the expected total property damage incurred from a hazard incident. It is important to note that values represent estimates of the loss from a major incident based on historical data or probabilistic models/studies. **Table 35** outlines the property damage factors used in the risk assessment calculations for this Plan.

Table 35. Property Damage Factor

Probability	Description	Impact Factor
High	More than \$5 Million in property damages is expected from a single major hazard event, or damages are expected to occur to 15% or more of the property value within the jurisdiction.	3
Medium	More than \$500,000 but less than \$5 Million in property damages is expected from a single major hazard event, or damages are expected to occur to more than 5% but less than 15% of the property value within the jurisdiction.	2



Probability	Description	Impact Factor
Low	Less than \$500,000 in property damages is expected from a single major hazard event or less than 5% of the property value within the jurisdiction.	1
No Impact	Little to no property damage is expected from a single major hazard event.	0

C.4.4. Economic Factor

An estimation of the impact, expressed in terms of dollars, on the local economy is based on a loss of business revenue, crops, worker wages, and local tax revenues or on the impact on the local gross domestic product (GDP). **Table 36** outlines the economic factors used in the risk assessment calculations for this Plan.

Table 36. Economic Factor

Probability	Description	Impact Factor
High	Where the total economic impact is likely to be greater than \$10 Million.	3
Medium	Total economic impact is likely to be greater than \$500,000, but less than or equal to \$10 Million.	2
Low	Total economic impact is not likely to be greater than \$100,000.	1
No Impact	Virtually no significant economic impact.	0

C.4.5. Environmental Factor

An estimate of the environmental impact from a major hazard event requiring outside resources and support; and/or repair, clean-up, restoration, and/or preservation work. **Table 37** outlines the environmental factors used in the risk assessment calculations for this Plan.

Table 37. Environmental Factor

Probability	Description	Impact Factor
High	Environmental impact from a single major hazard event is likely to be significant, requiring extensive outside resources and support; and/or repair, clean-up, restoration, and/or preservation work.	3
Medium	Environmental impact from a single major hazard event is likely to be localized, requiring some outside resources and support; and/or repair, clean-up, restoration, or preservation work.	2
Low	Environmental impact from a single major hazard event is likely to be minimal, requiring little to no outside resources and support, and/or minimal repair, clean-up, restoration, or preservation work.	1
No Impact	No environmental impacts from a single major hazard event are likely.	0

C.4.6. Essential Operations Factors

The essential operations factor is the impact on the ability of the jurisdiction to meet the essential day-to-day operational demands and needs of the community after a single major hazard event. **Table 38** outlines the essential operations factors used in the risk assessment calculations for this Plan.



Table 38. Essential Operations Factor

Probability	Description	Impact Factor
High	Impact greater than 72 hours on the ability of the jurisdiction to meet the essential day-to-day operational demands and needs of the community from a single major hazard event.	3
Medium	Impact between 24 and 72 hours on the ability of the jurisdiction to meet the essential day-to-day operational demands and needs of the community from a single major hazard event.	2
Low	Impact less than 24 hours on the ability of the jurisdiction to meet the essential day-to-day operational demands and needs of the community from a single major hazard event.	1
No Impact	No impact on the ability of the jurisdiction to meet the essential day-to-day operational demands and needs of the community from a single major hazard event.	0

C.4.7. Future Development Factor

The future development factor is the potential that future development will have on increasing or decreasing the impact/consequence of the hazard. **Table 39** outlines the future development factors used in the risk assessment calculations for this Plan.

Table 39. Future Development Factor

Probability	Description	Impact Factor
High	Future development trends will significantly increase the impact/consequence of this hazard.	3
Medium	Future development trends will increase the impact/consequence of this hazard, but not significantly.	2
Low	Future development trends will minimally increase impact/consequence of this hazard.	1
No Impact	Future development trends will not increase the impact/consequence of the hazard, and/or may even decrease the impact/consequence of this hazard.	0

C.4.8. Climate Change Factor

The potential that climate change will increase the risk of the hazard (i.e., type, location, and range of anticipated intensities of the hazard and impacts). **Table 40** outlines the climate change factors used in the risk assessment calculations for this Plan.

Table 40. Climate Change Factor

Probability	Description	Impact Factor
High	Climate Change trends will significantly increase the risk of this hazard and its impacts.	3
Medium	Climate Change trends will increase the risk of this hazard and its impacts, but not significantly.	2
Low	Climate Change trends will minimally increase the risk of this hazard and its impacts.	1
No Impact	Climate change trends will not increase the risk of the hazard and its impacts.	0



Each category was assigned a weighting factor to reflect its significance, consistent with those typically used for measuring the benefits of hazard mitigation actions – a weighting factor of three (3) was assigned for *Population and Life Safety*, and *Underserved/Equity*, and a weighting factor of two (2) was assigned for *Property Damage*. A weighting factor of one (1) was assigned for *Economic, Environmental, Essential Operations, Future Development*, and *Climate Change*.



APPENDIX D. HAZARD RISK RANKING DETAILS

D.1. Probability of Occurrence

Hazard Event	Probability of Occurrence		Probability Factor	Weighted Factor
Climate Change	Medium	Significant hazard event is likely to occur within 25 years.	2	N/A
Dam and Levee Failure	Low	Significant hazard event is likely to occur within 100 years.	1	N/A
Drought	Medium	Significant hazard event is likely to occur within 25 years.	2	N/A
Earthquake	Medium	Significant hazard event is likely to occur within 25 years.	2	N/A
Flood (Riverine/Creek)	Medium	Significant hazard event is likely to occur within 25 years.	2	N/A
Flood (Urban/Flash Flood)	Medium	Significant hazard event is likely to occur within 25 years.	2	N/A
Heat Wave/Extreme Heat (Severe Weather)	High	Significant hazard event is likely to occur annually.	3	N/A
Heavy Rainfall (Severe Weather)	High	Significant hazard event is likely to occur annually.	3	N/A
Landslide	High	Significant hazard event is likely to occur annually.	3	N/A
Sea Level Rise	Unlikely	There is little to no probability of significant occurrence, or the recurrence interval is greater than every 100 years.	0	N/A
Severe Thunderstorm (Severe Weather)	High	Significant hazard event is likely to occur annually.	3	N/A
Strong Winds/ Damaging Winds (Severe Weather)	High	Significant hazard event is likely to occur annually.	3	N/A
Tornado (Severe Weather)	Low	Significant hazard event is likely to occur within 100 years.	1	N/A
Tsunami	Unlikely	There is little to no probability of significant occurrence, or the recurrence interval is greater than every 100 years.	0	N/A
Wildfire	Medium	Significant hazard event is likely to occur within 25 years.	2	N/A
Active Shooter Incidents	Medium	Significant hazard event is likely to occur within 25 years.	2	N/A
Cybersecurity Threats	Medium	Significant hazard event is likely to occur within 25 years.	2	N/A
Hazardous Materials Incidents	Medium	Significant hazard event is likely to occur within 25 years.	2	N/A



Hazard Event	Probability of Occurrence			Probability Factor	Weighted Factor
Terrorism (Weapons of Mass Destruction)	Low	Significant hazard event is likely to occur within 100 years.		1	N/A
Utility Interruptions	High	Significant hazard event is likely to occur annually.		3	N/A

D.2. Extent Factors

Hazard Event	Extent Factor	Extent		Extent Factor	Weighted Factor
Climate Change	<i>Extent/Intensity</i>	Medium	Historical and/or probabilistic models/studies for this hazard indicate the possibility of a medium-intensity incident.	2	6
	<i>Catastrophic</i>	Low	Catastrophic hazard event is likely to occur at least once in 51 or more years.	1	3
Dam and Levee Failure	<i>Extent/Intensity</i>	High	Historical and/or probabilistic models/studies for this hazard indicate the possibility of a high-intensity incident.	3	9
	<i>Catastrophic</i>	Medium	Catastrophic hazard event is likely to occur at least once between 11 and 50 years.	2	6
Drought	<i>Extent/Intensity</i>	High	Historical and/or probabilistic models/studies for this hazard indicate the possibility of a high-intensity incident.	3	9
	<i>Catastrophic</i>	High	Catastrophic hazard event is likely to occur at least once in 10 years.	3	9
Earthquake	<i>Extent/Intensity</i>	High	Historical and/or probabilistic models/studies for this hazard indicate the possibility of a high-intensity incident.	3	9
	<i>Catastrophic</i>	High	Catastrophic hazard event is likely to occur at least once in 10 years.	3	9
Flood (Riverine/Creek)	<i>Extent/Intensity</i>	Medium	Historical and/or probabilistic models/studies for this hazard indicate the possibility of a medium-intensity incident.	2	6
	<i>Catastrophic</i>	Medium	Catastrophic hazard event is likely to occur at least once between 11 and 50 years.	2	6
Flood (Urban/Flash Flood)	<i>Extent/Intensity</i>	High	Historical and/or probabilistic models/studies for this hazard indicate the possibility of a high-intensity incident.	3	9
	<i>Catastrophic</i>	Medium	Catastrophic hazard event is likely to occur at least once between 11 and 50 years.	2	6



Hazard Event	Extent Factor	Extent		Extent Factor	Weighted Factor
Heat Wave/Extreme Heat (Severe Weather)	Extent/Intensity	Medium	Historical and/or probabilistic models/studies for this hazard indicate the possibility of a medium-intensity incident.	2	6
	Catastrophic	Low	Catastrophic hazard event is likely to occur at least once in 51 or more years.	1	3
Heavy Rainfall (Severe Weather)	Extent/Intensity	Medium	Historical and/or probabilistic models/studies for this hazard indicate the possibility of a medium-intensity incident.	2	6
	Catastrophic	Low	Catastrophic hazard event is likely to occur at least once in 51 or more years.	1	3
Landslide	Extent/Intensity	Medium	Historical and/or probabilistic models/studies for this hazard indicate the possibility of a medium-intensity incident.	2	6
	Catastrophic	Medium	Catastrophic hazard event is likely to occur at least once between 11 and 50 years.	2	6
Sea Level Rise	Extent/Intensity	Unlikely	Historical and/or probabilistic models/studies for this hazard indicate the possibility of little to no intensity.	0	0
	Catastrophic	Unlikely	Virtually no probability that this hazard could be catastrophic.	0	0
Severe Thunderstorm (Severe Weather)	Extent/Intensity	Low	Historical and/or probabilistic models/studies for this hazard indicate the possibility of a low-intensity incident.	1	3
	Catastrophic	Low	Catastrophic hazard event is likely to occur at least once in 51 or more years.	1	3
Strong Winds/ Damaging Winds (Severe Weather)	Extent/Intensity	Medium	Historical and/or probabilistic models/studies for this hazard indicate the possibility of a medium-intensity incident.	2	6
	Catastrophic	Low	Catastrophic hazard event is likely to occur at least once in 51 or more years.	1	3
Tornado (Severe Weather)	Extent/Intensity	Low	Historical and/or probabilistic models/studies for this hazard indicate the possibility of a low-intensity incident.	1	3
	Catastrophic	Low	Catastrophic hazard event is likely to occur at least once in 51 or more years.	1	3
Tsunami	Extent/Intensity	Unlikely	Historical and/or probabilistic models/studies for this hazard indicate the possibility of little to no intensity.	0	0
	Catastrophic	Unlikely	Virtually no probability that this hazard could be catastrophic.	0	0



Hazard Event	Extent Factor	Extent		Extent Factor	Weighted Factor
Wildfire	Extent/Intensity	High	Historical and/or probabilistic models/studies for this hazard indicate the possibility of a high-intensity incident.	3	9
	Catastrophic	Medium	Catastrophic hazard event is likely to occur at least once between 11 and 50 years.	2	6
Active Shooter Incidents	Extent/Intensity	Medium	Historical and/or probabilistic models/studies for this hazard indicate the possibility of a medium-intensity incident.	2	6
	Catastrophic	Low	Catastrophic hazard event is likely to occur at least once in 51 or more years.	1	3
Cybersecurity Threats	Extent/Intensity	Medium	Historical and/or probabilistic models/studies for this hazard indicate the possibility of a medium-intensity incident.	2	6
	Catastrophic	Medium	Catastrophic hazard event is likely to occur at least once between 11 and 50 years.	2	6
Hazardous Materials Incidents	Extent/Intensity	High	Historical and/or probabilistic models/studies for this hazard indicate the possibility of a high-intensity incident.	3	9
	Catastrophic	Medium	Catastrophic hazard event is likely to occur at least once between 11 and 50 years.	2	6
Terrorism (Weapons of Mass Destruction)	Extent/Intensity	High	Historical and/or probabilistic models/studies for this hazard indicate the possibility of a high-intensity incident.	3	9
	Catastrophic	High	Catastrophic hazard event is likely to occur at least once in 10 years.	3	9
Utility Interruptions	Extent/Intensity	Medium	Historical and/or probabilistic models/studies for this hazard indicate the possibility of a medium-intensity incident.	2	6
	Catastrophic	Low	Catastrophic hazard event is likely to occur at least once in 51 or more years.	1	3

D.3. Vulnerability Factors

Hazard Event	Vulnerability Factor	Vulnerability		Vulnerability Factor	Weighted Factor
Climate Change	Population Exposure	High	30% or more of the population (including underserved population) is exposed to the hazard.	3	9
	Property Exposure	Low	9% or less of the total assessed property value is exposed to the hazard.	1	2



Hazard Event	Vulnerability Factor	Vulnerability		Vulnerability Factor	Weighted Factor
	<i>Changes in Development</i>	Low	Changes in development have minimally increased the vulnerability of the community to the hazard by 4% or less.	1	1
Dam and Levee Failure	<i>Population Exposure</i>	Medium	15% to 29% of the population (including underserved population) is exposed to the hazard.	2	6
	<i>Property Exposure</i>	Medium	10% to 24% of the total assessed property value is exposed to the hazard.	2	4
	<i>Changes in Development</i>	Low	Changes in development have minimally increased the vulnerability of the community to the hazard by 4% or less.	1	1
Drought	<i>Population Exposure</i>	High	30% or more of the population (including underserved population) is exposed to the hazard.	3	9
	<i>Property Exposure</i>	Low	9% or less of the total assessed property value is exposed to the hazard.	1	2
	<i>Changes in Development</i>	Low	Changes in development have minimally increased the vulnerability of the community to the hazard by 4% or less.	1	1
Earthquake	<i>Population Exposure</i>	High	30% or more of the population (including underserved population) is exposed to the hazard.	3	9
	<i>Property Exposure</i>	High	25% of the total assessed property is exposed to the hazard.	3	6
	<i>Changes in Development</i>	Medium	The changes in development have increased the vulnerability of the community to the hazard between 5% and 9%.	2	2
Flood (Riverine/Creek)	<i>Population Exposure</i>	Low	14% or less of the population (including underserved population) is exposed to the hazard.	1	3
	<i>Property Exposure</i>	Low	9% or less of the total assessed property value is exposed to the hazard.	1	2
	<i>Changes in Development</i>	Medium	The changes in development have increased the vulnerability of the community to the hazard between 5% and 9%.	2	2
Flood (Urban/Flash Flood)	<i>Population Exposure</i>	Medium	15% to 29% of the population (including underserved population) is exposed to the hazard.	2	6
	<i>Property Exposure</i>	Medium	10% to 24% of the total assessed property value is exposed to the hazard.	2	4
	<i>Changes in Development</i>	Medium	The changes in development have increased the vulnerability of the community to the hazard between 5% and 9%.	2	2
Heat Wave/Extreme Heat (Severe Weather)	<i>Population Exposure</i>	High	30% or more of the population (including underserved population) is exposed to the hazard.	3	9



Hazard Event	Vulnerability Factor	Vulnerability		Vulnerability Factor	Weighted Factor
	Property Exposure	No Vulnerability	None of the total assessed property value is exposed to the hazard.	0	0
	Changes in Development	Low	Changes in development have minimally increased the vulnerability of the community to the hazard by 4% or less.	1	1
Heavy Rainfall (Severe Weather)	Population Exposure	High	30% or more of the population (including underserved population) is exposed to the hazard.	3	9
	Property Exposure	Medium	10 to 14% of the total assessed property is exposed to the hazard.	2	4
	Changes in Development	Low	Changes in development have minimally increased the vulnerability of the community to the hazard by 4% or less.	1	1
Landslide	Population Exposure	Medium	15% to 29% of the population (including underserved population) is exposed to the hazard.	2	6
	Property Exposure	Medium	10% to 24% of the total assessed property value is exposed to the hazard.	2	4
	Changes in Development	Low	Changes in development have minimally increased the vulnerability of the community to the hazard by 4% or less.	1	1
Sea Level Rise	Population Exposure	No Vulnerability	None of the population is exposed to the hazard.	0	0
	Property Exposure	No Vulnerability	None of the total assessed property value is exposed to a hazard.	0	0
	Changes in Development	No Vulnerability	Changes in development had no effect and/or have decreased the vulnerability/exposure of the community to the hazard.	0	0
Severe Thunderstorm (Severe Weather)	Population Exposure	High	30% or more of the population (including underserved population) is exposed to the hazard.	3	9
	Property Exposure	High	25% of the total assessed property is exposed to the hazard.	3	6
	Changes in Development	Low	Changes in development have minimally increased the vulnerability of the community to the hazard by 4% or less.	1	1
Strong Winds/ Damaging Winds (Severe Weather)	Population Exposure	Medium	15% to 29% of the population (including underserved population) is exposed to the hazard.	2	6
	Property Exposure	Medium	10% to 24% of the total assessed property value is exposed to the hazard.	2	4
	Changes in Development	Low	Changes in development have minimally increased the vulnerability of the community to the hazard by 4% or less.	1	1



Hazard Event	Vulnerability Factor	Vulnerability		Vulnerability Factor	Weighted Factor
Tornado (Severe Weather)	Population Exposure	Low	15% to 29% of the population (including underserved population) is exposed to the hazard.	1	3
	Property Exposure	Low	10% to 24% of the total assessed property value is exposed to the hazard.	1	2
	Changes in Development	Low	Changes in development have minimally increased the vulnerability of the community to the hazard by 4% or less.	1	1
Tsunami	Population Exposure	No Vulnerability	None of the population is exposed to the hazard.	0	0
	Property Exposure	No Vulnerability	None of the total assessed property value is exposed to a hazard.	0	0
	Changes in Development	No Vulnerability	Changes in development had no effect and/or have decreased the vulnerability/exposure of the community to the hazard.	0	0
Wildfire	Population Exposure	High	30% or more of the population (including underserved population) is exposed to the hazard.	3	9
	Property Exposure	High	25% of the total assessed property is exposed to the hazard.	3	6
	Changes in Development	Medium	The changes in development have increased the vulnerability of the community to the hazard between 5% and 9%.	2	2
Active Shooter Incidents	Population Exposure	Low	14% or less of the population (including underserved population) is exposed to the hazard.	1	3
	Property Exposure	Low	9% or less of the total assessed property value is exposed to the hazard.	1	2
	Changes in Development	No Vulnerability	Changes in development had no effect and/or decreased the vulnerability of the community to the hazard.	0	0
Cybersecurity Threats	Population Exposure	Medium	15% to 29% of the population (including underserved population) is exposed to the hazard.	2	6
	Property Exposure	No Vulnerability	None of the total assessed property value is exposed to the hazard.	0	0
	Changes in Development	Low	Changes in development have minimally increased the vulnerability of the community to the hazard by 4% or less.	1	1
Hazardous Materials Incidents	Population Exposure	Medium	15% to 29% of the population (including underserved population) is exposed to the hazard.	2	6
	Property Exposure	Low	9% or less of the total assessed property value is exposed to the hazard.	1	2



Hazard Event	Vulnerability Factor	Vulnerability		Vulnerability Factor	Weighted Factor
	<i>Changes in Development</i>	Low	Changes in development have minimally increased the vulnerability of the community to the hazard by 4% or less.	1	1
Terrorism (Weapons of Mass Destruction)	<i>Population Exposure</i>	Medium	15% to 29% of the population (including underserved population) is exposed to the hazard.	2	6
	<i>Property Exposure</i>	Medium	10% to 24% of the total assessed property value is exposed to the hazard.	2	4
	<i>Changes in Development</i>	Low	Changes in development have minimally increased the vulnerability of the community to the hazard by 4% or less.	1	1
Utility Interruptions	<i>Population Exposure</i>	Medium	15% to 29% of the population (including underserved population) is exposed to the hazard.	2	6
	<i>Property Exposure</i>	No Vulnerability	None of the total assessed property value is exposed to the hazard.	0	0
	<i>Changes in Development</i>	Low	Changes in development have minimally increased the vulnerability of the community to the hazard by 4% or less.	1	1

D.4. Impact Factors

Hazard Event	Impact Factor	Impact		Impact Factor	Weighted Factor
Climate Change	<i>Population and Life Safety</i>	Low	Populations exposed to this hazard are likely to experience minimal adverse impacts, such as ambulatory injuries.	1	3
	<i>Underserved/Equity</i>	Low	Underserved populations exposed to the hazard are likely to experience minimal adverse/disproportionate impacts, such as ambulatory injuries.	1	3
	<i>Property Damage</i>	Low	Less than \$500,000 in property damages is expected from a single major hazard event or less than 5% of the property value within the jurisdiction.	1	2
	<i>Economic</i>	Low	Total economic impact is not likely to be greater than \$100,000.	1	1
	<i>Environmental</i>	Low	Environmental impact from a single major hazard event is likely to be minimal, requiring little to no outside resources and support, and/or minimal repair, clean-up, restoration, or preservation work.	1	1



Hazard Event	Impact Factor	Impact		Impact Factor	Weighted Factor
	<i>Essential Operations</i>	Low	Impact less than 24 hours on the ability of the jurisdiction to meet the essential day-to-day operational demands and needs of the community from a single major hazard event.	1	1
	<i>Future Development</i>	Low	Future development trends will minimally increase impact/consequence of this hazard.	1	1
	<i>Climate Change</i>	High	Climate Change trends will significantly increase the risk of this hazard and its impacts.	3	3
Dam and Levee Failure	<i>Population and Life Safety</i>	High	Populations exposed to this hazard are likely to experience significant adverse impacts, such as fatalities and severe injuries.	3	9
	<i>Underserved/Equity</i>	Medium	Underserved populations exposed to the hazard are likely to experience some adverse/disproportionate impacts, such as injuries requiring acute medical care.	2	6
	<i>Property Damage</i>	High	More than \$5 Million in property damages is expected from a single major hazard event, or damages are expected to occur to 15% or more of the property value within the jurisdiction.	3	6
	<i>Economic</i>	Medium	Total economic impact is likely to be greater than \$500,000, but less than or equal to \$10 Million.	2	2
	<i>Environmental</i>	Medium	Environmental impact from a single major hazard event is likely to be localized, requiring some outside resources and support; and/or repair, clean-up, restoration, or preservation work.	2	2
	<i>Essential Operations</i>	High	Impact greater than 72 hours on the ability of the jurisdiction to meet the essential day-to-day operational demands and needs of the community from a single major hazard event.	3	3
	<i>Future Development</i>	Medium	Future development trends will increase the impact/consequence of this hazard, but not significantly.	2	2
	<i>Climate Change</i>	Medium	Climate Change trends will increase the risk of this hazard and its impacts, but not significantly.	2	2
Drought	<i>Population and Life Safety</i>	Low	Populations exposed to this hazard are likely to experience minimal adverse impacts, such as ambulatory injuries.	1	3
	<i>Underserved/Equity</i>	Medium	Underserved populations exposed to the hazard are likely to experience some adverse/disproportionate impacts, such as injuries requiring acute medical care.	2	6



Hazard Event	Impact Factor	Impact		Impact Factor	Weighted Factor
	<i>Property Damage</i>	Low	Less than \$500,000 in property damages is expected from a single major hazard event or less than 5% of the property value within the jurisdiction.	1	2
	<i>Economic</i>	Medium	Total economic impact is likely to be greater than \$500,000, but less than or equal to \$10 Million.	2	2
	<i>Environmental</i>	Low	Environmental impact from a single major hazard event is likely to be minimal, requiring little to no outside resources and support, and/or minimal repair, clean-up, restoration, or preservation work.	1	1
	<i>Essential Operations</i>	Low	Impact less than 24 hours on the ability of the jurisdiction to meet the essential day-to-day operational demands and needs of the community from a single major hazard event.	1	1
	<i>Future Development</i>	Medium	Future development trends will increase the impact/consequence of this hazard, but not significantly.	2	2
	<i>Climate Change</i>	High	Climate Change trends will significantly increase the risk of this hazard and its impacts.	3	3
Earthquake	<i>Population and Life Safety</i>	High	Populations exposed to this hazard are likely to experience significant adverse impacts, such as fatalities and severe injuries.	3	9
	<i>Underserved/Equity</i>	High	Underserved populations exposed to the hazard are likely to experience significant adverse/disproportionate impacts, such as fatalities and severe injuries.	3	9
	<i>Property Damage</i>	High	More than \$5 Million in property damages is expected from a single major hazard event, or damages are expected to occur to 15% or more of the property value within the jurisdiction.	3	6
	<i>Economic</i>	High	Where the total economic impact is likely to be greater than \$10 Million.	3	3
	<i>Environmental</i>	High	Environmental impact from a single major hazard event is likely to be significant, requiring extensive outside resources and support; and/or repair, clean-up, restoration, and/or preservation work.	3	3
	<i>Essential Operations</i>	High	Impact greater than 72 hours on the ability of the jurisdiction to meet the essential day-to-day operational demands and needs of the community from a single major hazard event.	3	3
	<i>Future Development</i>	High	Future development trends will significantly increase the impact/consequence of this hazard.	3	3



Hazard Event	Impact Factor	Impact		Impact Factor	Weighted Factor
	<i>Climate Change</i>	No Impact	Climate change trends will not increase the risk of the hazard and its impacts.	0	0
Flood (Riverine/Creek)	<i>Population and Life Safety</i>	Medium	Populations exposed to this hazard are likely to experience some adverse impacts, such as injuries requiring acute medical care.	2	6
	<i>Underserved/Equity</i>	Medium	Underserved populations exposed to the hazard are likely to experience some adverse/disproportionate impacts, such as injuries requiring acute medical care.	2	6
	<i>Property Damage</i>	Medium	More than \$500,000 but less than \$5 Million in property damages is expected from a single major hazard event, or damages are expected to occur to more than 5% but less than 15% of the property value within the jurisdiction.	2	4
	<i>Economic</i>	Medium	Total economic impact is likely to be greater than \$500,000, but less than or equal to \$10 Million.	2	2
	<i>Environmental</i>	Medium	Environmental impact from a single major hazard event is likely to be localized, requiring some outside resources and support; and/or repair, clean-up, restoration, or preservation work.	2	2
	<i>Essential Operations</i>	Medium	Impact between 24 and 72 hours on the ability of the jurisdiction to meet the essential day-to-day operational demands and needs of the community from a single major hazard event.	2	2
	<i>Future Development</i>	Medium	Future development trends will increase the impact/consequence of this hazard, but not significantly.	2	2
	<i>Climate Change</i>	High	Climate Change trends will significantly increase the risk of this hazard and its impacts.	3	3
Flood (Urban/Flash Flood)	<i>Population and Life Safety</i>	Medium	Populations exposed to this hazard are likely to experience some adverse impacts, such as injuries requiring acute medical care.	2	6
	<i>Underserved/Equity</i>	Medium	Underserved populations exposed to the hazard are likely to experience some adverse/disproportionate impacts, such as injuries requiring acute medical care.	2	6
	<i>Property Damage</i>	High	More than \$5 Million in property damages is expected from a single major hazard event, or damages are expected to occur to 15% or more of the property value within the jurisdiction.	3	6
	<i>Economic</i>	Medium	Total economic impact is likely to be greater than \$500,000, but less than or equal to \$10 Million.	2	2



Hazard Event	Impact Factor	Impact		Impact Factor	Weighted Factor
Heat Wave/Extreme Heat (Severe Weather)	<i>Environmental</i>	Medium	Environmental impact from a single major hazard event is likely to be localized, requiring some outside resources and support; and/or repair, clean-up, restoration, or preservation work.	2	2
	<i>Essential Operations</i>	Medium	Impact between 24 and 72 hours on the ability of the jurisdiction to meet the essential day-to-day operational demands and needs of the community from a single major hazard event.	2	2
	<i>Future Development</i>	Medium	Future development trends will increase the impact/consequence of this hazard, but not significantly.	2	2
	<i>Climate Change</i>	High	Climate Change trends will significantly increase the risk of this hazard and its impacts.	3	3
Heavy Rainfall (Severe Weather)	<i>Population and Life Safety</i>	Low	Populations exposed to this hazard are likely to experience minimal adverse impacts, such as ambulatory injuries.	1	3
	<i>Underserved/Equity</i>	Medium	Underserved populations exposed to the hazard are likely to experience some adverse/disproportionate impacts, such as injuries requiring acute medical care.	2	6
	<i>Property Damage</i>	No Impact	Little to no property damage is expected from a single major hazard event.	0	0
	<i>Economic</i>	Low	Total economic impact is not likely to be greater than \$100,000.	1	1
	<i>Environmental</i>	No Impact	No environmental impacts from a single major hazard event are likely.	0	0
	<i>Essential Operations</i>	Low	Impact less than 24 hours on the ability of the jurisdiction to meet the essential day-to-day operational demands and needs of the community from a single major hazard event.	1	1
	<i>Future Development</i>	Low	Future development trends will minimally increase impact/consequence of this hazard.	1	1
	<i>Climate Change</i>	High	Climate Change trends will significantly increase the risk of this hazard and its impacts.	3	3



Hazard Event	Impact Factor	Impact		Impact Factor	Weighted Factor
	<i>Property Damage</i>	Low	Less than \$500,000 in property damages is expected from a single major hazard event or less than 5% of the property value within the jurisdiction.	1	2
	<i>Economic</i>	Low	Total economic impact is not likely to be greater than \$100,000.	1	1
	<i>Environmental</i>	Low	Environmental impact from a single major hazard event is likely to be minimal, requiring little to no outside resources and support, and/or minimal repair, clean-up, restoration, or preservation work.	1	1
	<i>Essential Operations</i>	Low	Impact less than 24 hours on the ability of the jurisdiction to meet the essential day-to-day operational demands and needs of the community from a single major hazard event.	1	1
	<i>Future Development</i>	Low	Future development trends will minimally increase impact/consequence of this hazard.	1	1
	<i>Climate Change</i>	High	Climate Change trends will significantly increase the risk of this hazard and its impacts.	3	3
Landslide	<i>Population and Life Safety</i>	Low	Populations exposed to this hazard are likely to experience minimal adverse impacts, such as ambulatory injuries.	1	3
	<i>Underserved/Equity</i>	Low	Underserved populations exposed to the hazard are likely to experience minimal adverse/disproportionate impacts, such as ambulatory injuries.	1	3
	<i>Property Damage</i>	Medium	More than \$500,000 but less than \$5 Million in property damages is expected from a single major hazard event, or damages are expected to occur to more than 5% but less than 15% of the property value within the jurisdiction.	2	4
	<i>Economic</i>	Low	Total economic impact is not likely to be greater than \$100,000.	1	1
	<i>Environmental</i>	Low	Environmental impact from a single major hazard event is likely to be minimal, requiring little to no outside resources and support, and/or minimal repair, clean-up, restoration, or preservation work.	1	1
	<i>Essential Operations</i>	Medium	Impact between 24 and 72 hours on the ability of the jurisdiction to meet the essential day-to-day operational demands and needs of the community from a single major hazard event.	2	2
	<i>Future Development</i>	Low	Future development trends will minimally increase impact/consequence of this hazard.	1	1



Hazard Event	Impact Factor	Impact		Impact Factor	Weighted Factor
	<i>Climate Change</i>	Medium	Climate Change trends will increase the risk of this hazard and its impacts, but not significantly.	2	2
Sea Level Rise	<i>Population and Life Safety</i>	No Impact	Populations exposed to this hazard are not likely to experience significant adverse impacts.	0	0
	<i>Underserved/Equity</i>	No Impact	Underserved populations exposed to the hazard are not likely to experience significant adverse/disproportionate impacts.	0	0
	<i>Property Damage</i>	No Impact	Little to no property damage is expected from a single major hazard event.	0	0
	<i>Economic</i>	No Impact	Virtually no significant economic impact.	0	0
	<i>Environmental</i>	No Impact	No environmental impacts from a single major hazard event are likely.	0	0
	<i>Essential Operations</i>	No Impact	No impact on the ability of the jurisdiction to meet the essential day-to-day operational demands and needs of the community from a single major hazard event.	0	0
	<i>Future Development</i>	No Impact	Future development trends will not increase the impact/consequence of the hazard, and/or may even decrease the impact/consequence of this hazard.	0	0
	<i>Climate Change</i>	High	Climate Change trends will significantly increase the risk of this hazard and its impacts.	3	3
Severe Thunderstorm (Severe Weather)	<i>Population and Life Safety</i>	Low	Populations exposed to this hazard are likely to experience minimal adverse impacts, such as ambulatory injuries.	1	3
	<i>Underserved/Equity</i>	Low	Underserved populations exposed to the hazard are likely to experience minimal adverse/disproportionate impacts, such as ambulatory injuries.	1	3
	<i>Property Damage</i>	Low	Less than \$500,000 in property damages is expected from a single major hazard event or less than 5% of the property value within the jurisdiction.	1	2
	<i>Economic</i>	Low	Total economic impact is not likely to be greater than \$100,000.	1	1
	<i>Environmental</i>	Low	Environmental impact from a single major hazard event is likely to be minimal, requiring little to no outside resources and support, and/or minimal repair, clean-up, restoration, or preservation work.	1	1
	<i>Essential Operations</i>	Low	Impact less than 24 hours on the ability of the jurisdiction to meet the essential day-to-day operational demands and needs of the community from a single major hazard event.	1	1



Hazard Event	Impact Factor	Impact		Impact Factor	Weighted Factor
	<i>Future Development</i>	Low	Future development trends will minimally increase impact/consequence of this hazard.	1	1
	<i>Climate Change</i>	Medium	Climate Change trends will increase the risk of this hazard and its impacts, but not significantly.	2	2
Strong Winds/ Damaging Winds (Severe Weather)	<i>Population and Life Safety</i>	Low	Populations exposed to this hazard are likely to experience minimal adverse impacts, such as ambulatory injuries.	1	3
	<i>Underserved/Equity</i>	Low	Underserved populations exposed to the hazard are likely to experience minimal adverse/disproportionate impacts, such as ambulatory injuries.	1	3
	<i>Property Damage</i>	Medium	More than \$500,000 but less than \$5 Million in property damages is expected from a single major hazard event, or damages are expected to occur to more than 5% but less than 15% of the property value within the jurisdiction.	2	4
	<i>Economic</i>	Low	Total economic impact is not likely to be greater than \$100,000.	1	1
	<i>Environmental</i>	Low	Environmental impact from a single major hazard event is likely to be minimal, requiring little to no outside resources and support, and/or minimal repair, clean-up, restoration, or preservation work.	1	1
	<i>Essential Operations</i>	Low	Impact less than 24 hours on the ability of the jurisdiction to meet the essential day-to-day operational demands and needs of the community from a single major hazard event.	1	1
	<i>Future Development</i>	Low	Future development trends will minimally increase impact/consequence of this hazard.	1	1
	<i>Climate Change</i>	Medium	Climate Change trends will increase the risk of this hazard and its impacts, but not significantly.	2	2
Tornado (Severe Weather)	<i>Population and Life Safety</i>	Low	Populations exposed to this hazard are likely to experience minimal adverse impacts, such as ambulatory injuries.	1	3
	<i>Underserved/Equity</i>	Low	Underserved populations exposed to the hazard are likely to experience minimal adverse/disproportionate impacts, such as ambulatory injuries.	1	3
	<i>Property Damage</i>	Low	Less than \$500,000 in property damages is expected from a single major hazard event or less than 5% of the property value within the jurisdiction.	1	2
	<i>Economic</i>	Low	Total economic impact is not likely to be greater than \$100,000.	1	1



Hazard Event	Impact Factor	Impact		Impact Factor	Weighted Factor
	<i>Environmental</i>	Low	Environmental impact from a single major hazard event is likely to be minimal, requiring little to no outside resources and support, and/or minimal repair, clean-up, restoration, or preservation work.	1	1
	<i>Essential Operations</i>	Low	Impact less than 24 hours on the ability of the jurisdiction to meet the essential day-to-day operational demands and needs of the community from a single major hazard event.	1	1
	<i>Future Development</i>	Low	Future development trends will minimally increase impact/consequence of this hazard.	1	1
	<i>Climate Change</i>	Medium	Climate Change trends will increase the risk of this hazard and its impacts, but not significantly.	2	2
Tsunami	<i>Population and Life Safety</i>	No Impact	Populations exposed to this hazard are not likely to experience significant adverse impacts.	0	0
	<i>Underserved/Equity</i>	No Impact	Underserved populations exposed to the hazard are not likely to experience significant adverse/disproportionate impacts.	0	0
	<i>Property Damage</i>	No Impact	Little to no property damage is expected from a single major hazard event.	0	0
	<i>Economic</i>	No Impact	Virtually no significant economic impact.	0	0
	<i>Environmental</i>	No Impact	No environmental impacts from a single major hazard event are likely.	0	0
	<i>Essential Operations</i>	No Impact	No impact on the ability of the jurisdiction to meet the essential day-to-day operational demands and needs of the community from a single major hazard event.	0	0
	<i>Future Development</i>	No Impact	Future development trends will not increase the impact/consequence of the hazard, and/or may even decrease the impact/consequence of this hazard.	0	0
	<i>Climate Change</i>	Low	Climate Change trends will minimally increase the risk of this hazard and its impacts.	1	1
Wildfire	<i>Population and Life Safety</i>	Medium	Populations exposed to this hazard are likely to experience some adverse impacts, such as injuries requiring acute medical care.	2	6
	<i>Underserved/Equity</i>	Medium	Underserved populations exposed to the hazard are likely to experience some adverse/disproportionate impacts, such as injuries requiring acute medical care.	2	6



Hazard Event	Impact Factor	Impact		Impact Factor	Weighted Factor
	<i>Property Damage</i>	Medium	More than \$500,000 but less than \$5 Million in property damages is expected from a single major hazard event, or damages are expected to occur to more than 5% but less than 15% of the property value within the jurisdiction.	2	4
	<i>Economic</i>	Medium	Total economic impact is likely to be greater than \$500,000, but less than or equal to \$10 Million.	2	2
	<i>Environmental</i>	Medium	Environmental impact from a single major hazard event is likely to be localized, requiring some outside resources and support; and/or repair, clean-up, restoration, or preservation work.	2	2
	<i>Essential Operations</i>	Medium	Impact between 24 and 72 hours on the ability of the jurisdiction to meet the essential day-to-day operational demands and needs of the community from a single major hazard event.	2	2
	<i>Future Development</i>	Medium	Future development trends will increase the impact/consequence of this hazard, but not significantly.	2	2
	<i>Climate Change</i>	High	Climate Change trends will significantly increase the risk of this hazard and its impacts.	3	3
Active Shooter Incidents	<i>Population and Life Safety</i>	Medium	Populations exposed to this hazard are likely to experience some adverse impacts, such as injuries requiring acute medical care.	2	6
	<i>Underserved/Equity</i>	Low	Underserved populations exposed to the hazard are likely to experience minimal adverse/disproportionate impacts, such as ambulatory injuries.	1	3
	<i>Property Damage</i>	Low	Less than \$500,000 in property damages is expected from a single major hazard event or less than 5% of the property value within the jurisdiction.	1	2
	<i>Economic</i>	Low	Total economic impact is not likely to be greater than \$100,000.	1	1
	<i>Environmental</i>	No Impact	No environmental impacts from a single major hazard event are likely.	0	0
	<i>Essential Operations</i>	Medium	Impact between 24 and 72 hours on the ability of the jurisdiction to meet the essential day-to-day operational demands and needs of the community from a single major hazard event.	2	2
	<i>Future Development</i>	Low	Future development trends will minimally increase impact/consequence of this hazard.	1	1
	<i>Climate Change</i>	No Impact	Climate change trends will not increase the risk of the hazard and its impacts.	0	0



Hazard Event	Impact Factor	Impact		Impact Factor	Weighted Factor
Cybersecurity Threats	<i>Population and Life Safety</i>	Low	Populations exposed to this hazard are likely to experience minimal adverse impacts, such as ambulatory injuries.	1	3
	<i>Underserved/Equity</i>	Low	Underserved populations exposed to the hazard are likely to experience minimal adverse/disproportionate impacts, such as ambulatory injuries.	1	3
	<i>Property Damage</i>	Low	Less than \$500,000 in property damages is expected from a single major hazard event or less than 5% of the property value within the jurisdiction.	1	2
	<i>Economic</i>	Medium	Total economic impact is likely to be greater than \$500,000, but less than or equal to \$10 Million.	2	2
	<i>Environmental</i>	No Impact	No environmental impacts from a single major hazard event are likely.	0	0
	<i>Essential Operations</i>	Medium	Impact between 24 and 72 hours on the ability of the jurisdiction to meet the essential day-to-day operational demands and needs of the community from a single major hazard event.	2	2
	<i>Future Development</i>	Low	Future development trends will minimally increase impact/consequence of this hazard.	1	1
	<i>Climate Change</i>	No Impact	Climate change trends will not increase the risk of the hazard and its impacts.	0	0
Hazardous Materials Incidents	<i>Population and Life Safety</i>	Low	Populations exposed to this hazard are likely to experience minimal adverse impacts, such as ambulatory injuries.	1	3
	<i>Underserved/Equity</i>	Low	Underserved populations exposed to the hazard are likely to experience minimal adverse/disproportionate impacts, such as ambulatory injuries.	1	3
	<i>Property Damage</i>	Low	Less than \$500,000 in property damages is expected from a single major hazard event or less than 5% of the property value within the jurisdiction.	1	2
	<i>Economic</i>	Medium	Total economic impact is likely to be greater than \$500,000, but less than or equal to \$10 Million.	2	2
	<i>Environmental</i>	High	Environmental impact from a single major hazard event is likely to be significant, requiring extensive outside resources and support; and/or repair, clean-up, restoration, and/or preservation work.	3	3
	<i>Essential Operations</i>	Medium	Impact between 24 and 72 hours on the ability of the jurisdiction to meet the essential day-to-day operational demands and needs of the community from a single major hazard event.	2	2



Hazard Event	Impact Factor	Impact		Impact Factor	Weighted Factor
	<i>Future Development</i>	Low	Future development trends will minimally increase impact/consequence of this hazard.	1	1
	<i>Climate Change</i>	No Impact	Climate change trends will not increase the risk of the hazard and its impacts.	0	0
Terrorism (Weapons of Mass Destruction)	<i>Population and Life Safety</i>	High	Populations exposed to this hazard are likely to experience significant adverse impacts, such as fatalities and severe injuries.	3	9
	<i>Underserved/Equity</i>	Low	Underserved populations exposed to the hazard are likely to experience minimal adverse/disproportionate impacts, such as ambulatory injuries.	1	3
	<i>Property Damage</i>	High	More than \$5 Million in property damages is expected from a single major hazard event, or damages are expected to occur to 15% or more of the property value within the jurisdiction.	3	6
	<i>Economic</i>	High	Where the total economic impact is likely to be greater than \$10 Million.	3	3
	<i>Environmental</i>	Medium	Environmental impact from a single major hazard event is likely to be localized, requiring some outside resources and support; and/or repair, clean-up, restoration, or preservation work.	2	2
	<i>Essential Operations</i>	High	Impact greater than 72 hours on the ability of the jurisdiction to meet the essential day-to-day operational demands and needs of the community from a single major hazard event.	3	3
	<i>Future Development</i>	Low	Future development trends will minimally increase impact/consequence of this hazard.	1	1
	<i>Climate Change</i>	No Impact	Climate change trends will not increase the risk of the hazard and its impacts.	0	0
Utility Interruptions	<i>Population and Life Safety</i>	Medium	Populations exposed to this hazard are likely to experience some adverse impacts, such as injuries requiring acute medical care.	2	6
	<i>Underserved/Equity</i>	Medium	Underserved populations exposed to the hazard are likely to experience some adverse/disproportionate impacts, such as injuries requiring acute medical care.	2	6
	<i>Property Damage</i>	No Impact	Little to no property damage is expected from a single major hazard event.	0	0
	<i>Economic</i>	Medium	Total economic impact is likely to be greater than \$500,000, but less than or equal to \$10 Million.	2	2
	<i>Environmental</i>	No Impact	No environmental impacts from a single major hazard event are likely.	0	0



Hazard Event	Impact Factor	Impact		Impact Factor	Weighted Factor
	<i>Essential Operations</i>	Medium	Impact between 24 and 72 hours on the ability of the jurisdiction to meet the essential day-to-day operational demands and needs of the community from a single major hazard event.	2	2
	<i>Future Development</i>	No Impact	Future development trends will not increase the impact/consequence of the hazard, and/or may even decrease the impact/consequence of this hazard.	0	0
	<i>Climate Change</i>	Medium	Climate Change trends will increase the risk of this hazard and its impacts, but not significantly.	2	2



APPENDIX E. PLAN ADOPTION

[Placeholder for adoption documentation after State and FEMA Approval]