City of Molalla Addendum to the Clackamas County Multi-Jurisdictional Hazard Mitigation Plan

Photo Credit: City of Molalla

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Volume II: Molalla Addendum

Prepared for:

City of Molalla

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Purpose

This is an update of the Molalla addendum to the Clackamas County Multi-Jurisdictional Natural Hazard Mitigation Plan (NHMP). This addendum supplements information contained in Volume I (Basic Plan) which serves as the NHMP foundation and Volume III (Appendices) which provide additional information. This addendum meets the following requirements:

- Multi-Jurisdictional **Plan Adoption** §201.6(c)(5),
- Multi-Jurisdictional **Participation** §201.6(a)(3),
- Multi-Jurisdictional **Mitigation Strategy** §201.6(c)(3)(iv) and
- Multi-Jurisdictional **Risk Assessment** §201.6(c)(2)(iii).

Updates to Molalla's addendum are further discussed throughout the NHMP and within Volume III, Appendix B, which provides an overview of alterations to the document that took place during the update process.

Molalla adopted their addendum to the Clackamas County Multi-jurisdictional NHMP on **[Month] [Day]. 2019.** FEMA Region X approved the Clackamas County NHMP on April 12, 2019 and the City's addendum on **[Month] [Day], 2019.** With approval of this NHMP the City is now eligible to apply for the Robert T. Stafford Disaster Relief and Emergency Assistance Act's hazard mitigation project grants through **April 11, 2024.**

Mitigation Plan Mission

The NHMP mission states the purpose and defines the primary functions of the NHMP. It is intended to be adaptable to any future changes made to the NHMP and need not change unless the community's environment or priorities change.

The City concurs with the mission statement developed during the Clackamas County planning process (Volume I, Section 3):

> ***Promote sound public policy designed to protect citizens, critical facilities, infrastructure, private property, and the environment from natural hazards.***

This can be achieved by increasing public awareness, documenting the resources for risk reduction and loss-prevention, and identifying activities to guide the county towards building a safer, more sustainable community.

Mitigation Plan Goals

Mitigation plan goals are more specific statements of direction that Clackamas County citizens and public and private partners can take while working to reduce the City's risk from natural hazards. These statements of direction form a bridge between the broad mission statement and action items. The goals listed here serve as checkpoints as agencies and organizations begin implementing mitigation action items.

The City concurs with the goals developed during the Clackamas County planning process (Volume I, Section 3). All NHMP goals are important and are listed below in no order of priority. Establishing community priorities within action items neither negates nor eliminates any goals, but it establishes which action items to consider implementing first, should funding become available.

Below is a list of the NHMP goals:

GOAL #1: PROTECT LIFE AND PROPERTY

- Implement activities that assist in protecting lives by making homes, businesses, infrastructure, critical facilities, and other property more resistant to natural hazards.
- Reduce losses and repetitive damages for chronic hazard events while promoting insurance coverage for catastrophic hazards.
- Improve hazard assessment information to make recommendations for discouraging new development and encouraging preventative measures for existing development in areas vulnerable to natural hazards.

GOAL #2: ENHANCE NATURAL SYSTEMS

- Balance watershed planning, natural resource management, and land use planning with natural hazards mitigation to protect life, property, and the environment.
- Preserve, rehabilitate, and enhance natural systems to serve natural hazard mitigation functions.

GOAL #3: AUGMENT EMERGENCY SERVICES

- Establish policy to ensure mitigation projects for critical facilities, services, and infrastructure.
- Strengthen emergency operations by increasing collaboration and coordination among public agencies, non-profit organizations, and business, and industry.
- Coordinate and integrate natural hazards mitigation activities, where appropriate, with emergency operations plans and procedures.

GOAL #4: ENCOURAGE PARTNERSHIPS FOR IMPLEMENTATION

- Strengthen communication and coordinate participation among and within public agencies, citizens, non-profit organizations, business, and industry to gain a vested interest in implementation.
- Encourage leadership within public and private sector organizations to prioritize and implement local, county, and regional hazard mitigation activities.

GOAL #5: PROMOTE PUBLIC AWARENESS

- Develop and implement education and outreach programs to increase public awareness of the risks associated with natural hazards.
- Provide information on tools, partnership opportunities, and funding resources to assist in implementing mitigation activities.

NHMP Process, Participation and Adoption

This section of the NHMP addendum addresses 44 CFR 201.6(c)(5), *Plan Adoption*, and 44 CFR 201.6(a)(3), *Participation.*

Molalla first developed an addendum to Clackamas County's Natural Hazards Mitigation Plan in 2009. This plan was updated in 2013 and in 2018. The last update of the Molalla addendum to the Clackamas County NHMP was approved by FEMA on April 8, 2013.

In addition to establishing a comprehensive community-level mitigation strategy, the Disaster Mitigation Act of 2000 (DMA2K), and the regulations contained in 44 CFR 201, require that jurisdictions maintain an approved NHMP to receive federal funds for mitigation projects. Local adoption, and federal approval of this NHMP ensures that the city will remain eligible for pre-, and post-disaster mitigation project grants.

The Oregon Partnership for Disaster Resilience (OPDR) at the University of Oregon's Institute for Policy Research, and Engagement (IPRE) collaborated with the Oregon Office of Emergency Management (OEM), Clackamas County, and Molalla to update their NHMP. This project is funded through the Federal Emergency Management Agency's (FEMA) Fiscal-Year 2016 (FY16) Pre-Disaster Mitigation (PDM) Competitive Grant Program EMS-2017-PC-0005 (PDMC-PL-10-OR-2016-001). Members of the Molalla NHMP Hazard Mitigation Advisory Committee (HMAC) also participated in the County NHMP update process (Volume III, Appendix B).

The Clackamas County NHMP, and Molalla addendum, are the result of a collaborative effort between citizens, public agencies, non-profit organizations, the private sector, and regional organizations. The Molalla HMAC guided the process of developing the NHMP.

Convener

The Molalla City Manager serves as the NHMP addendum convener. The convener of the NHMP will take the lead in implementing, maintaining and updating the addendum to the Clackamas County NHMP in collaboration with the designated convener of the Clackamas County NHMP (Clackamas County Resilience Coordinator).

Representatives from the City of Molalla HMAC met formally and informally, to discuss updates to their addendum (Volume III, Appendix B). The HMAC reviewed and revised the City's addendum, with focus on the NHMP's risk assessment and mitigation strategy (action items).

This addendum reflects decisions made at the designated meetings and during subsequent work and communication with Clackamas County Resilience Coordinator, and the OPDR. The changes are highlighted with more detail throughout this document and within Volume III, Appendix B. Other documented changes include a revision of the City's risk assessment and hazard identification sections, NHMP mission and goals, action items, and community profile.

The Molalla HMAC was comprised of the following representatives:

- Convener, Dan Huff, City Manager
- Dan Zinder, GIS Analyst

Public participation was achieved with the establishment of the HMAC, which was comprised of City officials representing different departments and sectors and members of the public. The HMAC served as the local review body for the NHMP's development. Community members were provided an opportunity for comment via the NHMP review process, and through a survey administered by Clackamas County (Volume III, Appendix G).

NHMP Implementation and Maintenance

The City Council will be responsible for adopting the Molalla addendum to the Clackamas County NHMP. This addendum designates a HMAC and a convener to oversee the development and implementation of action items. Because the City addendum is part of the County's multi-jurisdictional NHMP, the City will look for opportunities to partner with the County. The City's HMAC will convene after re-adoption of the Molalla NHMP addendum on an annual schedule. The County is meeting on a semi-annual basis and will provide opportunities for the cities to report on NHMP implementation and maintenance during their meetings. The City Manager will serve as the convener and will be responsible for assembling the HMAC. The HMAC will be responsible for:

- Reviewing existing action items to determine suitability of funding;
- Reviewing existing and new risk assessment data to identify issues that may not have been identified at NHMP creation;
- Educating and training new HMAC members on the NHMP and mitigation actions in general;
- Assisting in the development of funding proposals for priority action items;
- Discussing methods for continued public involvement; and
- Documenting successes and lessons learned during the year.

The convener will also remain active in the County's implementation and maintenance process (Volume I, Section 4).

The City will utilize the same action item prioritization process as the County (Volume I, Section 4).

Implementation through Existing Programs

This NHMP is strategic and non-regulatory in nature, meaning that it does not necessarily set forth any new policy. It does, however, provide: (1) a foundation for coordination and collaboration among agencies and the public in the city; (2) identification and prioritization of future mitigation activities; and (3) aid in meeting federal planning requirements and qualifying for assistance programs. The mitigation plan works in conjunction with other city plans and programs including the Comprehensive Land Use Plan, Capital Improvements Plan, and Building Codes, as well as the Clackamas County NHMP, and the State of Oregon NHMP.

The mitigation actions described herein (and in Attachment A) are intended to be implemented through existing plans and programs within the city. Plans and policies already in existence have support from residents, businesses and policy makers. Where possible, Molalla will implement the NHMP's recommended actions through existing plans and policies. Many land-use, comprehensive and strategic plans get updated regularly, allowing them to adapt to changing conditions and needs. Implementing the NHMP's action items

through such plans and policies increases their likelihood of being supported and implemented. Implementation opportunities are further defined in action items when applicable.

Future development without proper planning may result in worsening problems associated with natural hazards. Molalla's acknowledged comprehensive plan is the City of Molalla Comprehensive Plan (1980, updated September 2014). The Oregon Land Conservation and Development Commission first acknowledged the plan in 1980. The City implements the plan through the Development Code.

Molalla currently has the following plans, regulations, and projects that relate to natural hazard mitigation. For a complete list visit the City's website:

- Comprehensive Plan
- Wastewater Flow Mapping
- Municipal Code
    - Section 13.04.276 Approved devices and installation thereof – Methods of backflow prevention required
    - Section 13.08.470 Protection of excavations – Restoration of public property
    - Section 17.4.2.040 Application Submission Requirements
    - Section 21.50.010 Dangerous building defined
    - Section 21.90.020 Tree Retention
- Transportation Systems Plan
- Stormwater Treatment
- Wastewater Facility and Collection System Master Plan
- Water System Master Plan
- Stormwater Master Plan
- Parks and Recreation Master Plan
- Smoke Testing Report
- Natural Features Report
- Capital Improvement Program

Other plans:

- Clackamas County Community Wildfire Protection Plan
    - Molalla Rural Fire Protection District #73

Government Structure

The City of Molalla has a council-manager form of government. The City Council consists of six members; a mayor and five councilors. The mayor presides over Council meetings. The mayor and City Council members are elected to four-year terms of office through a general election. The City Council is responsible for identifying problems and needs within the community and then addressing those problems through community goals and objectives.

Community Development is responsible for residential building and planning and monitoring future development. They make recommendations to City Council for changes to the Planning and Land Development Ordinance, Historic District Zones, the Comprehensive Plan and the Zoning Map.

The City of Molalla provides a variety of services to promote the safety and welfare of its residents. Public services that support the demands of a growing community include Community Development, Community Services, GIS, Public Safety, and Public Works. The City contracts with Clackamas County for building including electrical, mechanical, and plumbing.

Economic Development: Helps to develop economic opportunities for the community.

Finance: Manages the city's financial operations, including the general ledger, accounts receivable, accounts payable, payroll, utility billing, banking, and investments.

Parks & Recreation: Provides neighborhood and community parks to serve all residents of Molalla. Develop and maintain a city-wide system of trails to provide recreational opportunities.

Planning Department: The Department manages development projects within the city and produces the strategic vision of the city.

Police: Consists of the Molalla Police, who provide services to enhance the health and safety of Molalla residents.

Public Works: Responsible for maintaining streets, streetlights, water, sewer, and stormwater systems and manages the Water Treatment and Wastewater Treatment Plants. It consists of three divisions: Administration and Engineering, Water Quality, and Maintenance. Public works is also responsible for emergency management and response.

Continued Public Participation

An open public involvement process is essential to the development of an effective NHMP. To develop a comprehensive approach to reducing the effects of natural disasters, the planning process shall include opportunity for the public, neighboring communities, local and regional agencies, as well as, private and non-profit entities to comment on the NHMP during review.[1] Keeping the public informed of the City's efforts to reduce its risk to future natural hazard events is important for successful NHMP implementation and maintenance. The City is committed to involving the public in the NHMP review and updated process (Volume I, Section 4). The City posted the plan update for public comment before FEMA approval, and after approval will maintain the plan on the City's website: https://www.cityofmolalla.com/

NHMP Maintenance

The Clackamas County NHMP and City addendum will be updated every five years in accordance with the update schedule outlined in the Disaster Mitigation Act of 2000. During the County NHMP update process, the City will also review and update its addendum (Volume I, Section 4). The convener will be responsible for convening the HMAC to address the questions outlined below.

- Are there new partners that should be brought to the table?

[1] Code of Federal Regulations, Chapter 44. Section 201.6, subsection (b). 2015

- Are there new local, regional, state or federal policies influencing natural hazards that should be addressed?
- Has the community successfully implemented any mitigation activities since the NHMP was last updated?
- Have new issues or problems related to hazards been identified in the community?
- Are the actions still appropriate given current resources?
- Have there been any changes in development patterns that could influence the effects of hazards?
- Have there been any significant changes in the community's demographics that could influence the effects of hazards?
- Are there new studies or data available that would enhance the risk assessment?
- Has the community been affected by any disasters? Did the NHMP accurately address the impacts of this event?

These questions will help the HMAC determine what components of the mitigation plan need updating. The HMAC will be responsible for updating any deficiencies found in the NHMP.

Mitigation Strategy

This section of the NHMP addendum addresses 44 CFR 201.6(c)(3(iv), *Mitigation Strategy*.

The City's mitigation strategy (action items) were first developed during the 2009 NHMP planning process and revised during subsequent NHMP updates. During these processes, the HMAC assessed the City's risk, identified potential issues, and developed a mitigation strategy (action items).

During the 2018 update process the City re-evaluated their mitigation strategy (action items). During this process action items were updated, noting what accomplishments had been made and whether the actions were still relevant; any new action items were identified at this time (see Volume III, Appendix B for more information on changes to action items).

Priority Action Items

Table MO-1 presents a list of mitigation actions. The HMAC decided to modify the prioritization of action items in this update to reflect current conditions (risk assessment), needs, and capacity. High priority actions are shown in **bold** text with grey highlight. The City will focus their attention, and resource availability, upon these achievable, high leverage, activities over the next five-years. Although this methodology provides a guide for the HMAC in terms of implementation, the HMAC has the option to implement any of the action items at any time. This option to consider all action items for implementation allows the committee to consider mitigation strategies as new opportunities arise, such as capitalizing on funding sources that could pertain to an action item that is not currently listed as the highest priority. Refer to Attachment A for detailed information for each action. Full text of the plan goals referenced in Table MO-1 is located on page MO-2.

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Table MO-1 Molalla Action Items

Natural Hazard Action ID	Action Item	Coordinating Organization (Lead)	Internal Partners	Timing	Plan Goals Addressed				
					Goal 1	Goal 2	Goal 3	Goal 4	Goal 5
MH #1	Develop public education programs to inform the public about methods for mitigating the impacts of natural hazards.	Planning Commission	Planning, City Recorder	Ongoing	✓		✓	✓	✓
MH #2	Continue to integrate mitigation strategies into existing regulatory documents and programs, where appropriate.	Planning Commission	Planning	Ongoing	✓	✓	✓	✓	✓
MH #3	Improve vegetation management throughout the city.	Planning	Code Enforcement	Long Term		✓		✓	
MH #4	Identify and map out evacuation routes for all hazards.	Public Works	Planning, Administration	Short Term	✓		✓		✓
EQ #1	**Conduct seismic evaluations on City Hall/Police Building and implement appropriate structural and non-structural mitigation strategies.**	**Public Works**	**Administration**	**Long Term**	✓		✓		
FL #1	**Obtain funding for implementing recommendations outlined in the Stormwater Master Plan.**	**Public Works**	**Planning, Administration**	**Ongoing**	✓	✓	✓	✓	
FL #2	**Minimize overall impervious cover and disconnect impervious areas.**	**Planning**	**Public Works**	**Long Term**	✓	✓			
LS #1	Identify and locate a secondary location for the water intake system and move it away from the hillside.	Public Works	Planning, Administration	Long Term	✓	✓	✓		

Natural Hazard Action ID	Action Item	Coordinating Organization (Lead)	Internal Partners	Timing	Plan Goals Addressed				
					Goal 1	Goal 2	Goal 3	Goal 4	Goal 5
SW #1	Reduce negative effects from severe windstorm and severe winter storm events.	Public Works	Planning, Administration	Ongoing	✓	✓	✓	✓	✓
WF #1	Promote fire-resistant strategies for new and existing developments.	HMAC	Molalla RFD, Administration	Ongoing	✓	✓	✓	✓	✓
WF #2	Coordinate wildfire mitigation action items through the Clackamas County Community Wildfire Protection Plan.	HMAC	Public Works, Planning, Administration	Ongoing	✓	✓	✓	✓	✓

Source: City of Molalla HMAC, 2018
Note: Full text of the plan goals referenced in this table is located on page MO-2.

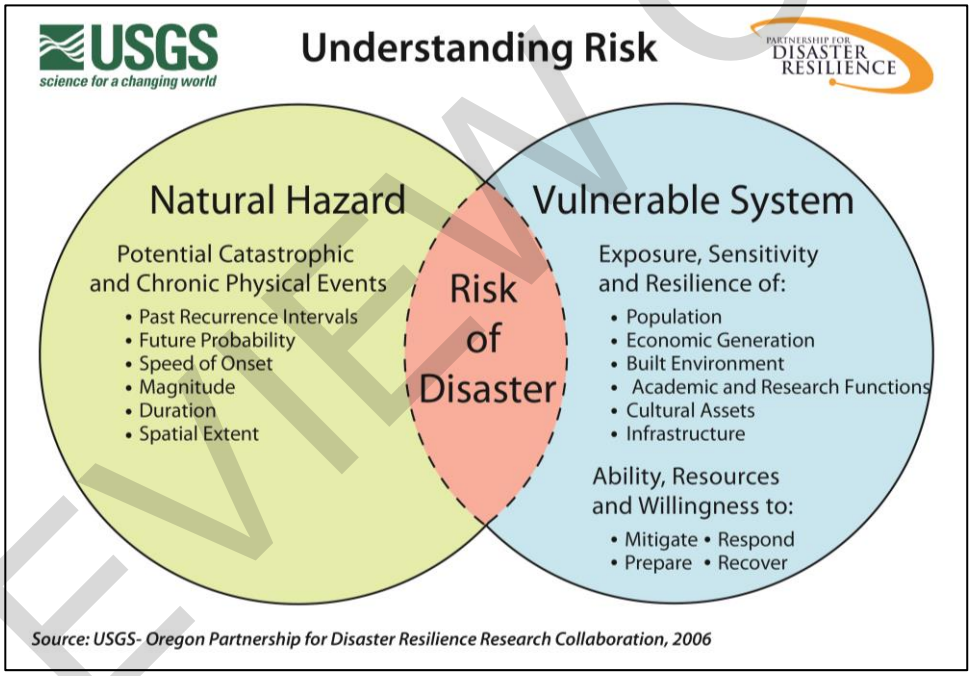
Risk Assessment

This section of the NHMP addendum addresses 44 CFR 201.6(b)(2) - Risk Assessment. In addition, this chapter can serve as the factual basis for addressing Oregon Statewide Planning Goal 7 – Areas Subject to Natural Hazards. Assessing natural hazard risk has three phases:

- **Phase 1:** Identify hazards that can impact the jurisdiction. This includes an evaluation of potential hazard impacts – type, location, extent, etc.
- **Phase 2:** Identify important community assets and system vulnerabilities. Example vulnerabilities include people, businesses, homes, roads, historic places and drinking water sources.
- **Phase 3:** Evaluate the extent to which the identified hazards overlap with or have an impact on, the important assets identified by the community.

The local level rationale for the identified mitigation strategies (action items) is presented herein and within Volume I, Section 2 and Volume III, Appendix C. The risk assessment process is graphically depicted in Figure MO-1. Ultimately, the goal of hazard mitigation is to reduce the area of risk, where hazards overlap vulnerable systems.

Figure MO-1 Understanding Risk



Hazard Analysis

The Molalla HMAC developed their hazard vulnerability assessment (HVA), using their previous HVA and the County's HVA as a reference. Changes from their previous HVA and the County's HVA were made where appropriate to reflect distinctions in vulnerability and risk from natural hazards unique to Molalla, which are discussed throughout this addendum.

Table MO-2 shows the HVA matrix for Molalla listing each hazard in order of rank from high to low. For local governments, conducting the hazard analysis is a useful step in planning for

hazard mitigation, response and recovery. The method provides the jurisdiction with a sense of hazard priorities but does not predict the occurrence of a hazard.

Two catastrophic hazards (Cascadia Subduction Zone earthquake and Crustal earthquake) and two chronic hazards (winter storm and windstorm) rank as the top hazard threats to the City (Top Tier). Drought, wildfire, and extreme heat comprise the next highest ranked hazards (Middle Tier), while flood, volcanic event, and landslide comprise the lowest ranked hazards (Bottom Tier).

Table MO-2 Hazard Analysis Matrix – Molalla

Hazard	History	Vulnerability	Maximum Threat	Probability	Total Threat Score	Hazard Rank	Hazard Tiers
Earthquake - Cascadia	4	45	100	49	198	#1	*Top Tier*
Earthquake - Crustal	6	50	100	21	177	#2	
Winter Storm	10	35	70	56	171	#3	
Windstorm	20	35	50	56	161	#4	
Drought	10	20	50	42	122	#5	*Middle Tier*
Wildfire	6	40	40	49	114	#6	
Extreme Heat Event	2	20	40	49	111	#7	
Flood	6	25	30	35	96	#8	*Bottom Tier*
Volcanic Event	2	15	50	14	81	#9	
Landslide	4	10	20	14	48	#10	

Source: Molalla HMAC, 2018.

Table MO-3 categorizes the probability and vulnerability scores from the hazard analysis for the City and compares the results to the assessment completed by the Clackamas County HMAC. Variations between the City and County are noted in **bold** text within the city ratings.

Table MO-3 Probability and Vulnerability Comparison

Hazard	Molalla		Clackamas County	
	Probability	Vulnerability	Probability	Vulnerability
Drought	**Moderate**	**Moderate**	High	Low
Earthquake - Cascadia	Moderate	High	Moderate	High
Earthquake - Crustal	Low	High	Low	High
Extreme Heat	**Moderate**	**Moderate**	Low	High
Flood	Moderate	Moderate	High	Moderate
Landslide	**Low**	Low	High	Low
Volcanic Event	Low	**Low**	Low	Moderate
Wildfire	**Moderate**	**High**	High	Moderate
Windstorm	**High**	**Moderate**	Moderate	Low
Winter Storm	**High**	Moderate	Moderate	Moderate

Source: Molalla and Clackamas County HMAC, 2018.

Community Characteristics

Table MO-4 and the following section provides information on City specific demographics and assets. Many of these community characteristics can affect how natural hazards impact communities and how communities choose to plan for natural hazard mitigation. Considering the City specific assets during the planning process can assist in identifying appropriate measures for natural hazard mitigation. Between 2010 and 2016 the City grew by 975 people (12%; as of 2018 the population was 9,625) and median household income increased by about 1%.[2] Between 2018 and 2040 the population is forecast to grow by 67% to 16,118.[3] In August 2017, the City annexed 107 acres surrounded by the City. New development has complied with the standards of the Oregon Building Code and the city's development code.

Transportation/Infrastructure

Molalla is roughly 29 miles from Portland and is connected to surrounding communities by two state highways that run through the downtown area. Highway 211 runs east-west and connects Molalla to Interstate 5 and 99E. Highway 213 runs north-south through the City and connects it to both Silverton and Oregon City. Molalla's proximity to Portland and Salem has enabled residents to live in town and work elsewhere.

Motor vehicles represent the dominant mode of travel through and within Molalla. The South Clackamas Transportation District (SCTD) is the bus service that provides public transit to the City. There are no port services available on Molalla River, a tributary of the Willamette River, but there are recreational areas along the river.

Economy

Molalla's proximity to major transportation routes and access to rail has made it a desirable place for commercial and industrial development. Historically Molalla's economy focused on forestry and farming, which is still has a major presence in the workforce. The city's residents work in a variety of industries, with "construction, extraction, and maintenance occupations" (16% of workforce) and "sales and related occupations" (13%) accounting for the top two occupations.[4]

Molalla has an economic advantage due to its location at the north end of the Willamette Valley and its proximity to Portland. A significant portion of the land available for industrial development in Clackamas County is in the Molalla area. There are currently new expansions in existing industries currently underway with available industrial land in its Four Corners Industrial Park or at Avison's Certified Industrial Site.[5]

[2] Portland State University, Population Research Center, "Annual Population Estimates", 2016 & 2018 and Social Explorer, Table T57, U.S. Census Bureau, 2012-2016 and 2006-2010 American Community Survey Estimates.
[3]. Portland State University, Population Research Center, "Population Forecast Tables", 2017.
[4] Social Explorer, Table 50, U.S. Census Bureau, 2012-2016 American Community Survey Estimates
[5] Economic Development (2019). City of Molalla. https://www.cityofmolalla.com/ed

Table MO-4 Community Characteristics

Population Characteristics		
2010 Population	8,110	
2016 Population [2018 Population]	9,085	[9,625]
2040 Forecasted Population	16,118	
Race (non-Hispanic) and Ethnicity (Hispanic)		
White		82%
Black/ African American		< 1%
American Indian and Alaska Native		1%
Asian		1%
Native Hawaiian and Other Pacific Islander		0%
Some Other Race		0%
Two or More Races		1%
Hispanic or Latino		15%
Limited or No English Spoken		6%
Vulnerable Age Groups		
Less than 15 Years	2,340	26%
65 Years and Over	921	10%
Disability Status		
Total Population	1,299	15%
Children	70	3%
Seniors	520	58%

Income Characteristics		
Households by Income Category		
Less than $15,000	253	8%
$15,000-$29,999	406	13%
$30,000-$44,999	574	18%
$45,000-$59,999	537	17%
$60,000-$74,999	382	12%
$75,000-$99,999	426	14%
$100,000-$199,999	540	17%
$200,000 or more	45	1%
Median Household Income	$55,082	
Poverty Rates		
Total Population	1,478	17%
Children	444	17%
Seniors	77	9%
Housing Cost Burden		
Owners with Mortgage	849	42%
Renters	540	48%

Source: U.S. Census Bureau, 2012-2016 American Community Survey; Portland State University, Population Research Center, "Annual Population Estimates", 2016 & 2018; Portland State University, Population Research Center, "Population Forecast Tables", 2017.

Housing Characteristics		
Housing Units		
Single-Family	2,398	73%
Multi-Family	668	20%
Mobile Homes	218	7%
Year Structure Built		
Pre-1970	719	22%
1970-1989	467	14%
1990 or later	2,098	64%
Housing Tenure and Vacancy		
Owner-occupied	2,032	62%
Renter-occupied	1,131	34%
Seasonal	0	0%
Vacant	121	4%

Molalla has grown substantially since its incorporation in 1913 and has an area today of 2.26 square miles. It is in the south-central region of Clackamas County, located approximately 29 miles southeast of the City of Portland. The City is within the Molalla River watershed, with the Molalla River about a mile east of the UGB.[6]

The city has three drainage basins: Molalla River basin, Creamery Creek basin, and Bear Creek basin. Located at 371 feet above sea level, Molalla's climate is consistent with a Mediterranean climate zone, with warm summers and cool, wet winters. Molalla receives most of its rainfall between October and May, and averages 42 inches of rain, and around 6 inches of snow, per year.[7]

According to the Comprehensive Plan, land has been designated for single-family residential, medium-density residential, multi-family residential, central commercial, general commercial, light industrial, heavy industrial, and public/semi-public. The plan incorporates natural hazard considerations, resulting in slopes of 25% or greater being considered unbuildable for future housing needs.

[6] Annual Water Quality Report (2017). City of Molalla. Retrieved March 10, 2019.
[7] "Monthly Average for Molalla, OR" The Weather Channel Interactive, Inc. Retrieved March 10, 2018.

Community Assets

This section outlines the resources, facilities, and infrastructure that, if damaged, could significantly impact the public safety, economic conditions, and environmental integrity of Molalla. It is important to note that the facilities identified as "critical" and "essential" are characterized differently than the structural code that identifies buildings as "essential" and "non-essential." The structural code uses different language and criteria and therefore have completely different meanings than the buildings identified in this addendum.

Critical Facilities

Facilities that are critical to government response, and recovery activities (i.e. life, safety, property, and environmental protection). These facilities include: 911 Centers, Emergency Operations Centers, Police, and Fire Stations, Public Works facilities, sewer, and water facilities, hospitals, bridges, roads, shelters, and more.

Table MO-5 Critical Facilities in Molalla

Facility	Drought	Earthquake	Extreme Heat	Flood	Landslide	Volcanic Event	Wildfire	Windstorm	Winter Storm
Critical Facilities									
City Hall and Police Department									
Fleet Services									
Public Works									
Sewage Treatment Plant									
Fire Stations									
Molalla RFPD #73 - Main Station 82									
Hospitals									
Molalla Medical – Urgent Care									
Providence Medical									
Potential Shelter Sites									
Molalla Adult Community									

Hazardous Materials:

Facilities that, if damaged, could cause serious secondary impacts may also be considered "critical." A hazardous material facility is one example of this type of critical facility. Those sites that store, manufacture, or use potentially hazardous materials include: Gas Stations, IXL Propane, IDMS, Molalla Aquatic Center, Molalla Wastewater Treatment Plant, Molalla Water Treatment Plant, and Pacer Propane.

Essential Facilities

Facilities that are essential to the continued delivery of key government services, and/or that may significantly impact the public's ability to recover from the emergency. These facilities may include: City buildings such as the Public Services Building, the City Hall, and other public facilities such as schools.

Table MO-6 Essential Facilities in Molalla

Facility	Drought	Earthquake	Extreme Heat	Flood	Landslide	Volcanic Event	Wildfire	Windstorm	Winter Storm
Essential Facilities									
Schools									
Molalla Elementary School		X							
Molalla High School									
Molalla River Middle School		X							
Granges									
Foothills									
Molalla Grange									
South Molalla									
Churches									
Church of Christ of Latter Day Saints									
Church of the Nazarene									
Country Church									
Evangelical Church of North America									
Grace Lutheran Church									
Molalla Assembly of God									
Molalla Christian Church									
Molalla Four Square Church									
Saint James Catholic Church									
Seventh-Day Adventist									
South Clackamas Community Church									
United Methodist Church									
Food Providers									
Safeway									
Other Essential Facilities									
High School Football Field									
Masonic Lodge									
Molalla Aquatic Center									
Molalla Communications Company									
Molalla Public Library									
Moose Lodge									
Safeway									
Skydive Oregon Airport									

Critical Infrastructure:

Infrastructure that provides necessary services for emergency response include:

Table MO-7 Critical Infrastructure in Molalla

Facility	Drought	Earthquake	Extreme Heat	Flood	Landslide	Volcanic Event	Wildfire	Windstorm	Winter Storm
Critical Infrastructure									
Arterials *designates road maintained by others									
Highways 213*									
Highways 211*									
Bridges									
Bridge over the Molalla River									
Feyer Park Bridge									
Milk Creek Bridge									
Mulino Bridge*									
Pudding River Bridge									
Wagon Wheel Park Bridge									
Other Critical Infrastructure									
Communication Towers									
NW Natural Pipelines									
Power Substations									
Sewage Infrastructure									
Water Distribution/Drainage Infrastructure									

Environmental Assets:

Environmental assets are those parks, green spaces, wetlands, and rivers that provide an aesthetic, and functional ecosystem services for the community include: Bear Creek Byway, Billy Sheets Field, Bohlander Field, Clark Park, High School Sports Complex, Ivor Davies Trail Park, Leonard Long Park, Rosse Posse Acres (Elk Farm), Sally Fox Park, and the Molalla BMX Track.

Economic Assets/Population Centers:

Economic assets include businesses that employ large numbers of people and provide an economic resource to the city of Molalla. If damaged, the loss of these economic assets could significantly affect economic stability, and prosperity. Population Centers usually are aligned with economic centers, and are a concern during evacuation/notification during a hazard event include:

Table MO-8 Economic Assets/Population Centers in Molalla

Facility	Drought	Earthquake	Extreme Heat	Flood	Landslide	Volcanic Event	Wildfire	Windstorm	Winter Storm
Economic Assets / Population Centers									
Economic Centers									
Brentwood Corporation									
Bus Company – First Student									
Cash Ice									
Coors Tech									
Fountain Valley Dental									
International Forest Products Limited									
IXL Propane									
Molalla Buckaroo									
Molalla Dental Clinic									
Molalla Market Center									
Molalla Redi-Mix									
Molalla Square (Bi-Mart)									
Northwest Polymers									
Pacer Propane									
Safeway Shopping Center									
Population Centers									
Bear Creek Subdivision									
Big Meadows Subdivision									
Fir Crest Apartments									
Lexington Estates									
Molalla School District									
Rondel Court									
Schools									
Shel Mar Estates									
Stone Place Apartments									
Sunrise Acres									
Toliver Terrace									
Twin Meadows Subdivision									

Vulnerable Populations:

Vulnerable populations, including seniors, disabled citizens, women, and children, as well those people living in poverty, often experience the impacts of natural hazards and disasters more acutely. Populations that have special needs or require special consideration include:

Table MO-9 Vulnerable Populations in Molalla

Facility	Drought	Earthquake	Extreme Heat	Flood	Landslide	Volcanic Event	Wildfire	Windstorm	Winter Storm
Vulnerable Populations									
Assisted Living Facilities									
Evergreen Court									
Molalla Manor									
Pheasant Pointe									
Twin Firs Mobile Home Park									
Child Care Centers									
24 Hours Child Care/Preschool									
Early Horizons Preschool Childcare, Inc.									
Schools									
Molalla Elementary School									
Molalla High School									
Molalla River Middle School									
Rural Dell Elementary									
Other Vulnerable Populations									
Cole Apartments (Spanish speaking)									
Molalla Adult Community Center									
Molalla Mobile Manor									
Plaza Los Robles (Spanish speaking)									

Hazard Characteristics

Drought

The HMAC determined that the City's probability for drought is **moderate** and that their vulnerability to drought is **moderate**. *The probability rating and the vulnerability ratings did not change, since the previous version of this NHMP addendum.*

Volume I, Section 2 describes the characteristics of drought hazards, history, as well as the location, extent and probability of a potential event. Due to the climate of Clackamas County, past and present weather conditions have shown an increasing potential for drought.

The City of Molalla Public Works Department manages Molalla's water supply. Molalla houses one large water intake facility and water treatment plant, which provides water to both the City of Molalla and the City of Sherwood. The City draws its water supply from the Molalla River and serves approximately 3,100 residents. There is potential contamination sources within Molalla's drinking water protection area from agriculture, managed forest land, and other sources.[8] There is an action item to find a second accessible water source for the City in case of contamination or drought. The results of the current search will be updated this year and next steps will be considered.

Vulnerability Assessment

Due to insufficient data and resources, Molalla is currently unable to perform a quantitative risk assessment, or exposure analysis, for this hazard. For a list of facilities and infrastructure vulnerable to this hazard see the Community Assets section and Tables MO-5 through MO-10.

Mitigation Activities

The existing drought hazard mitigation activities are conducted at the county, regional, state, and federal levels and are described in the Clackamas County NHMP.

Please review Volume I, Section 2 for additional information on this hazard.

Earthquake (Cascadia Subduction Zone)

The HMAC determined that the City's probability for a Cascadia Subduction Zone (CSZ) earthquake is **moderate** and that their vulnerability to a CSZ earthquake is **high**. *The probability rating decreased, and the vulnerability rating did not change, since the previous version of this NHMP addendum. Previously, the earthquake hazard profile was a single risk assessment, which is now divided into two separate earthquake hazards: Cascadia Subduction Zone (CSZ) earthquake and Crustal earthquake.*

Volume I, Section 2 describes the characteristics of earthquake hazards, history, as well as the location, extent and probability of a potential event. Generally, an event that affects the County is likely to affect Molalla as well. The causes and characteristics of an earthquake event are appropriately described within the Volume I, Section 2 as well as the location and extent of potential hazards. Previous occurrences are well documented within Volume I, Section 2 and the community impacts described by the County would generally be the same for Molalla as well.

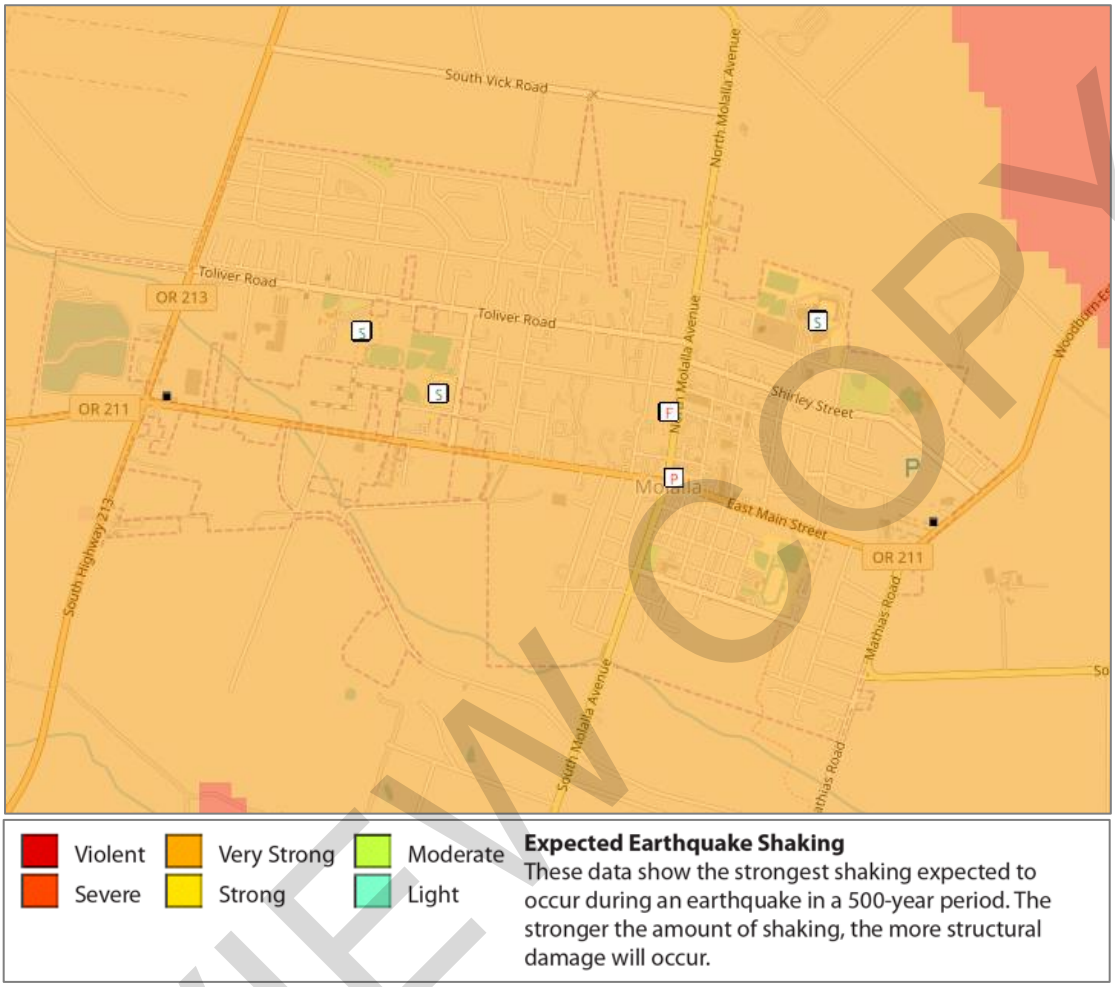
Within the Northern Willamette Valley/Portland Metro Region, three potential faults and/or zones can generate high-magnitude earthquakes. These include the Cascadia Subduction Zone, Gales Creek-Newberg-Mt Angel Structural Zone, Portland Hills Fault Zone, and the Canby-Molalla Fault Zone (discussed in the crustal earthquake section).

Figure MO-2 displays relative shaking hazards from a Cascadia Subduction Zone earthquake event. As shown in the figure, most of the city is expected to experience very strong shaking

[8] *Source Water Assessment Summary Brochure: City of Molalla* (2003). Oregon Health Division and Department of Environmental Quality.

(orange), while areas around the city will experience severe shaking (light red) (shown by the red northeast corner) in a CSZ event.

Figure MO-2 Cascadia Subduction Zone Expected Shaking



Source: Oregon HazVu: Statewide Geohazards Viewer (DOGAMI)
Note: To view detail click the link above to access Oregon HazVu.

Cascadia Subduction Zone

The Cascadia Subduction Zone is a 680-mile-long zone of active tectonic convergence where oceanic crust of the Juan de Fuca Plate is subducting beneath the North American continent at a rate of 4 cm per year. Scientists have found evidence that 11 large, tsunami-producing earthquakes have occurred off the Pacific Northwest coast in the past 6,000 years. These earthquakes took place roughly between 300 and 5,400 years ago with an average occurrence interval of about 510 years. The most recent of these large earthquakes took place in approximately 1700 A.D.[9]

The city's proximity to the Cascadia Subduction Zone, potential slope instability and the prevalence of certain soils subject to liquefaction and amplification combine to give the city

[9] The Cascadia Region Earthquake Workgroup, 2005. Cascadia Subduction Zone Earthquakes: A magnitude 9.0 earthquake scenario. http://www.crew.org/PDFs/CREWSubductionZoneSmall.pdf

a high-risk profile. Due to the expected pattern of damage resulting from a CSZ event, the Oregon Resilience Plan divides the State into four distinct zones and places the city predominately within the "Valley Zone" (Valley Zone, from the summit of the Coast Range to the summit of the Cascades). Within the Northwest Oregon region, damage and shaking is expected to be strong and widespread - an event will be disruptive to daily life and commerce and the main priority is expected to be restoring services to business and residents.

The City is not within the severe shaking area, though there is significant area around the City that have severe and very severe shaking if a large earthquake were to occur. These areas include Highway 211 and Highway 213, which could result in Molalla having access issues from emergency vehicles and other response efforts.

Earthquake (Crustal)

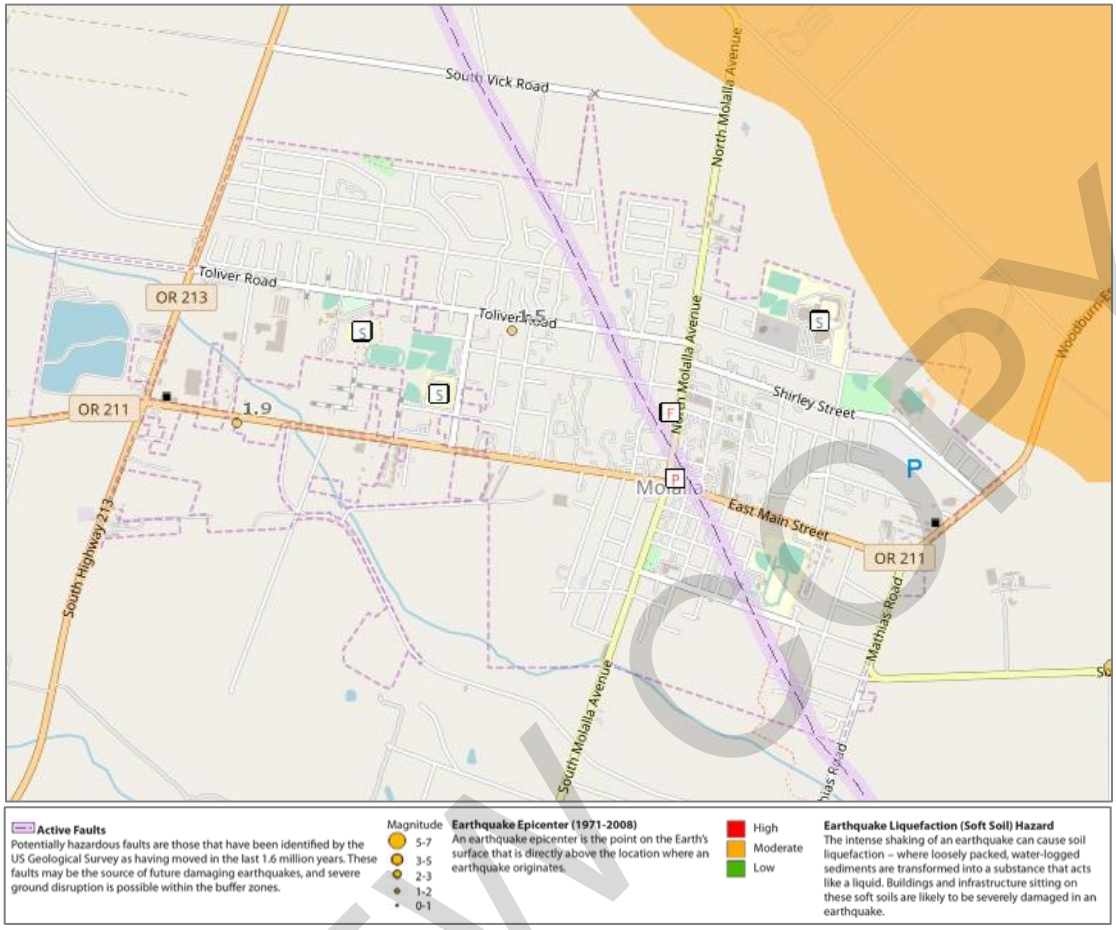
The HMAC determined that the City's probability for a crustal earthquake is **low** and that their vulnerability to crustal earthquake is **high**. *The probability rating decreased, and the vulnerability rating did not change, since the previous version of this NHMP addendum. Previously, the earthquake hazard profile was a single risk assessment, which is now divided into two separate earthquake hazards: Cascadia Subduction Zone (CSZ) earthquake and Crustal earthquake.*

Volume I, Section 2 describes the causes and characteristics of earthquake hazards, history, as well as the location, extent, and probability of a potential event. Generally, an event that affects the County is likely to affect Molalla as well. Figure MO-3 shows a generalized geologic map of the Molalla area that includes the areas for potential regional active faults, earthquake history (1971-2008), and soft soils (liquefaction) hazard. The figure shows the areas of greatest concern within the City limits as red and orange.

Earthquake-induced damages are difficult to predict, and depend on the size, type, and location of the earthquake, as well as site-specific building, and soil characteristics. Presently, it is not possible to accurately forecast the location or size of earthquakes, but it is possible to predict the behavior of soil at any site. In many major earthquakes, damages have primarily been caused by the behavior of the soil.

The Canby-Molalla Fault runs through the center of the City and can generate high-magnitude earthquakes. The City is also 15 miles away from the Portland Hills Fault Zone (discussed in greater detail below). Historical records count over 56 earthquakes in the Portland-metro area. The more severe ones occurred in 1877, 1880, 1953 and 1962. The most recent severe earthquake was the March 25, 1993 Scotts Mills quake. It was a 5.6 magnitude quake with aftershocks continuing at least through April 8. In December 2017 a 4.0 tremor was felt in Molalla along the same epicenter as the 5.6 quake, this time no damage occurred.

Figure MO-3 Active Crustal Faults, Epicenters (1971-2008), and Soft Soils



Source: Oregon HazVu: Statewide Geohazards Viewer (DOGAMI)
Note: To view detail click the link above to access Oregon HazVu

Canby-Molalla Fault Zone

The Canby-Molalla Fault Zone is a series of NE-trending fault that vertically displace the Columbia River Basalt with discontinuous aeromagnetic anomalies that represent significant offset of Eocene basement and volcanic rocks. The fault zone extends for 31 miles from the vicinity of Tigard south through the towns of Canby and Molalla in northern Oregon.

Portland Hills Fault Zone

The Portland Hills Fault Zone is a series of NW-trending faults that vertically displace the Columbia River Basalt by 1,130 feet and appear to control thickness changes in late Pleistocene (approx. 780,000 years ago) sediment. The fault zone extends along the eastern margin of the Portland Hills for 25 miles and lies about 15 miles northeast of Molalla.

Vulnerability Assessment

Due to insufficient data and resources, Molalla is currently unable to perform a quantitative risk assessment for this hazard. However, in 2018 the Department of Geology and Mineral Industries (DOGAMI) completed a regional impact analysis for earthquakes originating from the Cascadia Subduction Zone and Portland Hills faults (O-18-02), findings from that report are provided at the end of the crustal earthquakes hazard section.

Seismic building codes were implemented in Oregon in the 1970s, however, stricter standards did not take effect until 1991 and early 2000s. As noted in the community profile, approximately 36% of residential buildings were built prior to 1990, which increases the City's vulnerability to the earthquake hazard. Information on specific public buildings' (schools and public safety) estimated seismic resistance, determined by DOGAMI in 2007, is shown inTable MO-10; each "X" represents one building within that ranking category. Of the facilities evaluated by DOGAMI using their Rapid Visual Survey (RVS), zero (0) have a very high (100% chance) collapse potential and zero (0) have a high (greater than 10% chance) collapse potential.

For a list of facilities and infrastructure vulnerable to this hazard see the Community Assets section and Tables MO-5 through MO-10.

Table MO-10 Rapid Visual Survey Scores

Facility	Site ID*	Level of Collapse Potential			
		Low (<1%)	Moderate (>1%)	High (>10%)	Very High (100%)
Schools					
Molalla Elementary (910 Toliver Rd)	Clac_sch32	X			
Molalla River Middle (318 Leroy Ave)	Clac_sch33	X			
Molalla High (357 Francis St)	Clac_sch68	X			
Molalla RFPD #73					
Station 82 (EOC) (320 N Molalla Ave)	**Clac_fir18**	**Retrofit per SRGP 2015-2017 Phase II**			
Police					
City Hall/Police Department (117 N Molalla Ave)	Clac_pol10	X			

Source: DOGAMI 2007. Open File Report 0-07-02. Statewide Seismic Needs Assessment Using Rapid Visual Assessment. "*" – Site ID is referenced on the RVS Clackamas County Map
Note: **Bold** indicates facilities that have been seismically retrofitted or rebuilt.

In addition to building damages, utility (electric power, water, wastewater, natural gas) and transportation systems (bridges, pipelines) are also likely to experience significant damage. There is a low probability that a major earthquake will result in failure of upstream dams.

Utility systems will be significantly damaged, including damaged buildings and damage to utility infrastructure, including water treatment plants and equipment at high voltage substations (especially 230 kV or higher which are more vulnerable than lower voltage substations). Buried pipe systems will suffer extensive damage with approximately one break per mile in soft soil areas. There would be a much lower rate of pipe breaks in other areas. Restoration of utility services will require substantial mutual aid from utilities outside of the affected area.

Mitigation Activities

Molalla has taken mitigation steps to reduce the city's vulnerably in earthquake events. City Hall and the water treatment plant are up to the newest building codes, meaning these buildings can be occupied even after large earthquake events. Seismic retrofit grant awards per the Seismic Rehabilitation Grant Program[10] have been funded to retrofit Molalla Fire District Station 82 (Phase Two of 2015-2017 grant award, $1,189,967).

Earthquake Regional Impact Analysis

In 2018 DOGAMI completed a regional impact analysis for earthquakes originating from the Cascadia Subduction Zone and Portland Hills faults (O-18-02). Their study focused on damage to buildings, and the people that occupy them, and to two key infrastructure sectors: electric power transmission and emergency transportation routes. Each earthquake was studied with wet and dry soil conditions and for events that occur during the daytime (2 PM) and night time (2 AM). Impacts to buildings and people were tabulated at the county, jurisdictional (city), and neighborhood unit level. Estimated damaged varied widely across the study area depending on local geology, soil moisture conditions, type of building, and distance from the studied faults. In general, damage from the Cascadia Subduction Zone scenario was greater in the western portion of the study area, however, damage could still be significant in some areas east of the Willamette River. The report found that damage to high-value commercial and industrial buildings was high since many of these facilities are in areas of high to very high liquefaction hazard. Casualties were higher during the daytime scenario (generally double) since more people would be at work and occupying non-wood structures that fare worse in an earthquake. The Portland Hills fault scenario created greater damages than the Cascade Subduction Zone scenario due primarily to its placement relative to population centers and regional assets; however, at distances 15 or more miles from the Portland Hills fault the damages from the Cascadia Subduction Zone scenario generally were higher. In both the Cascadia Subduction Zone and Portland Hills Fault scenarios it is forecasted that emergency transportation routes will be fragmented, affecting the distribution of goods and services, conditions are worse under the Portland Hills Fault scenario. Portions of the electric distribution system are also expected to be impacted under both scenarios, however, the impact is considerably less than it is to the transportation routes. Additional, capacity or redundancy within the electric distribution network may be beneficial in select areas that are likely to have greater impacts.

Table MO-11 shows the permanent resident population that are vulnerable to injury or death (casualty) and the buildings in the City that are susceptible to liquefaction and landslides, it does not predict that damage will occur in specific areas due to either liquefaction or landslide. More population and property are exposed to higher degrees of expected damage or casualty under the Portland Hills Fault "wet" scenario than in any other scenario.

[10] The Seismic Rehabilitation Grant Program (SRGP) is a state of Oregon competitive grant program that provides funding for the seismic rehabilitation of critical public buildings, particularly public schools and emergency services facilities.

Table MO-11 Expected damages and casualties for the CSZ fault and Portland Hills fault: earthquake, soil moisture, and event time scenarios

	Cascadia Subduction Zone (M9.0)		Portland Hills Fault (M6.8)	
	"Dry" Soil	"Wet" Saturated Soil	"Dry" Soil	"Wet" Saturated Soil
Number of Buildings	3,176	3,176	3,176	3,176
Building Value ($ Million)	854	854	854	854
Building Repair Cost ($ Million)	21	21	37	37
Building Loss Ratio	2%	2%	4%	4%
Debris (Thousands of Tons)	11	11	14	16
Long-Term Displaced Population	8	8	17	17
Total Casualties (Daytime)	12	12	17	17
Level 4 (Killed)	0	0	1	1
Total Casualties (NIghttime)	3	3	7	7
Level 4 (Killed)	0	0	0	0

Source: DOGAMI, Earthquake regional impact analysis for Clackamas, Multnomah, and Washington Counties, Oregon (2018, O-18-02), Tables 12-8, 12-9, 12-10, and 12-11.

Cascadia Subduction Zone Scenario

The City of Molalla is expected to have a 2% building loss ratio with a repair cost of $21 million under the CSZ "dry" scenario, and under the CSZ "wet" scenario.[11] The city is expected to have around 12 daytime or 3 nighttime casualties during the CSZ "dry" scenario and 12 daytime or 3 nighttime casualties during the CSZ "wet" scenario. It is expected that there will be a long-term displaced population of around 8 for the CSZ "dry" scenario and 8 for the CSZ "wet" scenario.[12]

Portland Hills Fault Scenario

The City of Molalla is expected to have a 4% building loss ratio with a repair cost of $37 million under the CSZ "dry" scenario, and under the CSZ "wet" scenario.[13] The long-term displaced population and casualties are greatly increased for all the Portland Hills Fault scenarios. The city is expected to have around 17 daytime or 7 nighttime casualties during the Portland Hills Fault "dry" scenario and 17 daytime or 7 nighttime casualties during the Portland Hills Fault "wet" scenario. It is expected that there will be a long-term displaced population of around 17 for the Portland Hills Fault "dry" scenario and 17 for the Portland Hills Fault "wet" scenario.[14]

Recommendations from the report included topics within Planning, Recovery, Resiliency: Buildings, Resiliency: Infrastructure Improvements, Resiliency: Essential and Critical Facilities, Enhanced Emergency Management Tools, Database Improvements, Public Awareness, and Future Reports. The recommendations of this study are largely incorporated within this NHMPs mitigation strategies (Table MO-1 and Volume I, Section 3). For more detailed information on the report, the damage estimates, and the recommendations see: *Earthquake regional impact analysis for Clackamas, Multnomah, and Washington Counties, Oregon* (2018, O-18-02).

Please review Volume I, Section 2 for additional information on this hazard.

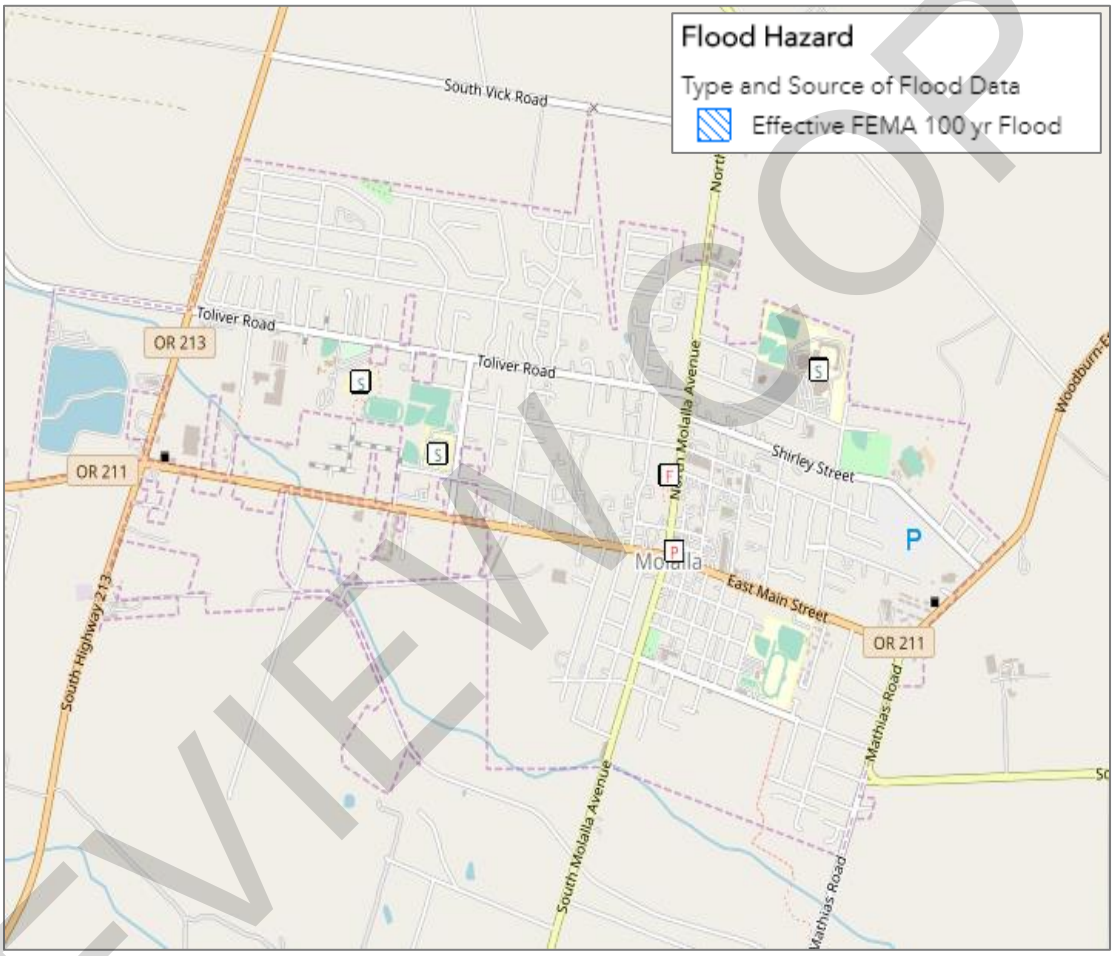
[11] DOGAMI, Earthquake regional impact analysis for Clackamas, Multnomah, and Washington Counties, Oregon (2018, O-18-02), Tables 12-8 and 12-9.
[12] Ibid, Tables 12-8 and 12-9.
[13] Ibid, Tables 12-10 and 12-11
[14] Ibid, Tables 12-10 and 12-11.

Flood

The HMAC determined that the City's probability for flood is **moderate** and that their vulnerability to flood is **moderate**. *The probability rating decreased and the vulnerability rating did not change since the previous version of this NHMP addendum.*

Volume I, Section 2 describes the characteristics of flood hazards, history, as well as the location, extent, and probability of a potential event. Figure MO-4 illustrates the flood hazard area for Molalla.

Figure MO-4 Special Flood Hazard Area



Source: Oregon HazVu: Statewide Geohazards Viewer (DOGAMI)
Note: To view detail click the link above to access Oregon HazVu

The latest flooding incident was in February 2014 when Main Street was flooded. While Molalla does not show any areas within the FEMA mapped special flood hazard areas (100-year flood vulnerability), the city regularly experiences urban flooding. This is primarily due to inadequate storm drain pipes, and culverts that are too small. Molalla also has clay soils, which means that the percolation rate is very slow, and the water table is very high. Additionally, the extent of flooding will vary depending on climatic conditions and precipitation levels. Areas within Molalla that are frequently impacted by urban flooding events include: the intersection of South Cole and Main Street; East 3rd Street; Mathias Road south of 8th Street; areas south of 7th Street; and Highway 213 south of Toliver Road.

Typically, roads are covered with water in urban flooding events, and water will occasionally overflow manholes in some parts of the city. Newer homes are built on higher ground to avoid flooding issues, and many older homes have pumps within their crawlspaces to avoid flood events.

Vulnerability Assessment

Due to insufficient data and resources, Molalla is currently unable to perform a quantitative risk assessment for this hazard. Molalla is a "Non-special Flood Hazard Area" (NSFHA), which means the entire city is in a low-to-moderate risk flood zone. A NSFHA is not in any immediate danger from flooding caused by overflowing rivers or hard rains.

Floods can have a devastating impact on almost every aspect of the community, including private property damage, public infrastructure damage, and economic loss from business interruption. It is important for the City to be aware of flooding impacts and assess its level of risk.

The economic losses due to business closures often total more than the initial property losses that result from flood events. Business owners, and their employees are significantly impacted by flood events. Direct damages from flooding are the most common impacts, but indirect damages, such as diminished clientele, can be just as debilitating to a business.

For mitigation planning purposes, it is important to recognize that flood risk for a community is not limited only to areas of mapped floodplains. Other portions of Molalla outside of the mapped floodplains may also be at relatively high risk from over bank flooding from streams too small to be mapped by FEMA or from local storm water drainage.

The extent of flooding hazards in Molalla primarily depends on climate and precipitation levels. Additionally, withdrawals for irrigation and drinking water, as well as stream and wetland modifications or vegetation removal can influence water flow. In the past flooding has occurred along Main Street and other roadways due to urban flooding. For a list of facilities and infrastructure vulnerable to this hazard see the Community Assets section and Tables MO-5 through MO-10.

Mitigation Activities

Molalla employs several mitigation strategies to reduce the city's risk to flood events. The city development code includes policies and regulations for flood prone areas including the Water Resources Overlay District, and mapping and protecting 'significant vegetation' within the City's community design standards. Development review practices and conditions of development require developers to account for all stormwater management onsite to reduce the risks of urban flooding in the future. Molalla regularly inspects and maintains the stormwater facilities. Enclosed pipe sections and catch basins are routinely cleaned and inspected using the combination truck, and a regular street sweeping program reduces the amount of debris and contaminants entering the stormwater system. The Stormwater Master Plan and Water System Mater Plan both address the potential for urban flooding and actions to avoid it in the future.

National Flood Insurance Program (NFIP)

FEMA's Flood Insurance Study (FIS), and Flood Insurance Rate Maps (FIRMs) are effective as of June 17, 2008. Table MO-12 shows that as of July 2018, Molalla has six (6) National Flood Insurance Program (NFIP) policies in force. Of those, one (1) is for a property that was

constructed before the initial FIRMs. Molalla has not had a Community Assistance Visit (CAV) and does not participate in the Community Rating System (CRS). The table shows that all flood insurance policies are for residential structures, primarily single-family homes. There has been a total of four (4) paid claims for $110,943. The City complies with the NFIP through enforcement of their water resources overlay district and the mapping of their local wetland inventory.

The Community Repetitive Loss record for Molalla identifies no Repetitive Loss Properties[15] or Severe Repetitive Loss Properties[16].

Table MO-12 Flood Insurance Detail

	Clackamas County	Molalla
Effective FIRM and FIS	6/17/2008	6/17/2008
InitialFIRM Date	-	6/17/2008
Total Policies	1,957	6
Pre-FIRM Policies	1,086	1
Policies by Building Type		
Single Family	1,761	5
2 to 4 Family	30	1
Other Residential	58	0
Non-Residential	9	0
Minus Rated A Zone	123	0
Insurance in Force	$541,833,400	$1,927,900
Total Paid Claims	590	4
Pre-FIRM Claims Paid	450	2
Substantial Damage Claims	83	0
Total Paid Amount	$20,830,662	$110,943
Repetitive Loss Structures	51	0
Severe Repetitive Loss Properties	4	0
CRS Class Rating	-	NP
Last Community Assistance Visit	-	-

Source: Information compiled by Department of Land Conservation, and Development, July 2018.
Note: The portion of the cities of Portland and Tualatin that are within Clackamas County are not included in this table.
NP = Not Participating

Please review Volume I, Section 2 for additional information on this hazard.

[15] A Repetitive Loss (RL) property is any insurable building for which two or more claims of more than $1,000 were paid by the National Flood Insurance Program (NFIP) within any rolling ten-year period, since 1978. A RL property may or may not be currently insured by the NFIP.

[16] A Severe Repetitive Loss (SRL) property is a single family property (consisting of 1 to 4 residences) that is covered under flood insurance by the NFIP, and has incurred flood-related damage for which 4 or more separate claims payments have been paid under flood insurance coverage, with the amount of each claim payment exceeding $5,000, and with cumulative amount of such claims payments exceeding $20,000; or for which at least 2 separate claims payments have been made with the cumulative amount of such claims exceeding the reported value of the property.

Landslide

The HMAC determined that the City's probability for landslide is **low** and that their vulnerability to landslide is **low**. *The probability rating did not change, while the vulnerability rating decreased since the previous version of this NHMP addendum.*

Volume I, Section 2 describes the characteristics of landslide hazards, history, as well as the location, extent, and probability of a potential event within the region. Molalla does not have a history of landslides. This is due to the relatively flat topography within the UGB as well as the City's requirements of geological analysis on slopes of 25% or greater, usually located along stream embankments, before extensive tree removal, excavation, or construction occurs.

Although landslides have not occurred in Molalla, in 1996 a landslide upstream of Molalla dammed the Molalla River for about 6 or 7 hours and destroyed the City's intake valves. A damned river is the City's biggest vulnerability to landslide hazards, which could also damage Highway 211 and 213 bridges.

Landslide susceptibility exposure for Molalla is shown in Figure MO-5. Most of Molalla demonstrates a low landslide susceptibility exposure. There are no areas within Molalla that have very high or high landslide susceptibility exposure, while approximately 4% show moderate landslide susceptibility exposure.[17]

Note that even if a jurisdiction has a high percentage of area in a high or very high landslide exposure susceptibility zone, this does not mean there is a high risk, because risk is the intersection of hazard, and assets.

Vulnerability Assessment

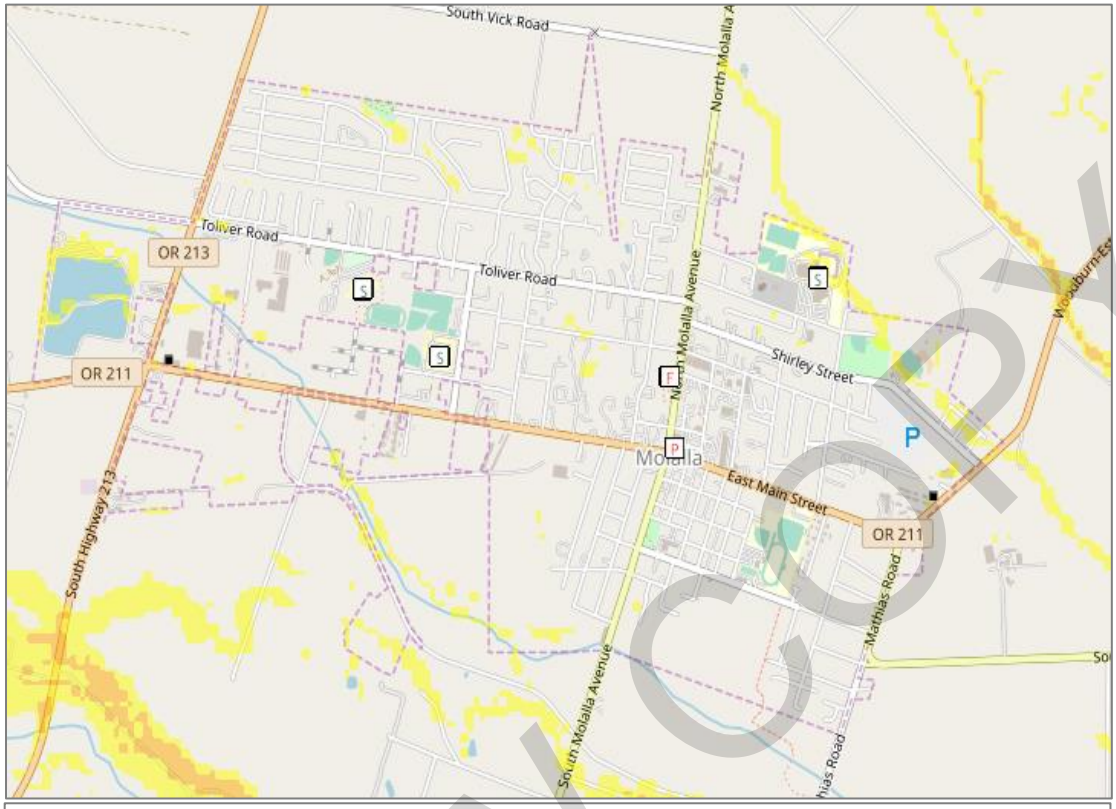
Due to insufficient data and resources, Molalla is currently unable to perform a quantitative risk assessment for this hazard. However, DOGAMI completed a statewide landslide susceptibility assessment in 2016 (O-16-02), general findings from that report are provided above and within Figure MO-5.

Potential landslide-related impacts are adequately described within Volume I, Section 2, and include infrastructure damages, economic impacts (due to isolation, and/or arterial road closures), property damages, and obstruction to evacuation routes. Rain-induced landslides, and debris flows can potentially occur during any winter, and thoroughfares beyond City limits are susceptible to obstruction as well. For a list of facilities and infrastructure vulnerable to this hazard see the Community Assets section and Tables MO-5 through MO-10.

The most common type of landslides are slides caused by erosion. Slides move in contact with the underlying surface, are generally slow moving, and can be deep. Rainfall-initiated landslides tend to be smaller; while earthquake induced landslides may be quite large. All soil types can be affected by natural landslide triggering conditions.

[17] DOGAMI. Open-File Report, O-16-02, *Landslide Susceptibility Overview Map of Oregon* (2016)

Figure MO-5 Landslide Susceptibility Exposure



Low	**Landsliding unlikely.** Areas classified as Landslide Density = Low (less than 7%) and areas classified as Slopes Prone to Landsliding = Low.
Moderate	**Landsliding possible.** Areas classified as Landslide Density = Low to Moderate (less than 17%) and areas classified as Slopes Prone to Landsliding = Moderate OR areas classified as Landslide Density = Moderate (7%-17%) and areas classified as Slopes Prone to Landsliding = Low.
High	**Landsliding likely.** Areas classified as Landslide Density = High (greater than 17%) and areas classified as Slopes Prone to Landsliding = Low and Moderate OR areas classified as Landslide Density = Low and Moderate (less than 17%) and areas classified as Slopes Prone to Landsliding = High.
Very High	**Existing landslides** Landslide Density and Slopes Prone to Landsliding data were not considered in this category. Note: the quality of landslide inventory (existing landslides) mapping varies across the state.

Source: Oregon HazVu: Statewide Geohazards Viewer (DOGAMI)
Note: To view detail click the link above to access Oregon HazVu

Mitigation Activities

Molalla works to mitigate future landslide hazards. The city development code includes several policies and regulations to protect slopes as mentioned above. Within the Comprehensive Plan there is language that make slopes of 25% or greater as unbuildable. The Municipal Code has surface and subsurface drainage requirements (21.70.100) to limit the potential of changes to surface drainage on slopes.

Please review Volume I, Section 2 for additional information on this hazard.

Severe Weather

Severe weather can account for a variety of intense, and potentially damaging hazard events. These events include extreme heat, windstorms, and winter storms. The following section describes the unique probability, and vulnerability of each identified weather hazard.

Extreme Heat

The HMAC determined that the City's probability for extreme heat events is **moderate** and that their vulnerability is **moderate**. *The probability rating decreased, and the vulnerability rating did not change, since the previous version of this NHMP addendum.*

Volume I, Section 2 describes the characteristics of extreme heat, history, as well as the location, extent, and probability of a potential event within the region. Generally, an event that affects the County is likely to affect the City as well.

A severe heat episode or "heat wave" occurs about every two to three years, and typically lasting two to three days but can last as many as five days. A severe heat episode can be defined as consecutive days of upper 90s to around 100. Severe heat hazard in the Portland metro region can be described as the average number of days with temperatures greater than or equal to 90-degrees, or 100-degrees, Fahrenheit. On average the region experiences 13.6 days with temperatures above 90-degrees Fahrenheit, and 1.4 days above 100-degrees Fahrenheit, based on new 30-year climate averages (1981-2010) from the National Weather Service – Portland Weather Forecast Office.

The City of Molalla has not experienced any life-threatening consequences from the few historical extreme heat events, although changes in climate indicate that the area should expect to see more extreme heat events.

Please review Volume I, Section 2 for additional information on this hazard.

Windstorm

The HMAC determined that the City's probability for windstorm is **high** and that their vulnerability to windstorm is **moderate**. *The probability and vulnerability ratings did not change, since the previous version of this NHMP addendum.*

Volume I, Section 2 describes the characteristics of windstorm hazards, history, as well as the location, extent, and probability of a potential event within the region. Because windstorms typically occur during winter months, they are sometimes accompanied by flooding and winter storms (ice, freezing rain, and very rarely, snow). Other severe weather events that may accompany windstorms, including thunderstorms, hail, lightning strikes, and tornadoes are generally negligible for Molalla.

Volume I, Section 2 describes the impacts caused by windstorms, including power outages, downed trees, heavy precipitation, building damages, and storm-related debris. Additionally, transportation, and economic disruptions result as well.

Damage from high winds generally has resulted in downed utility lines, and trees usually limited to several localized areas. Electrical power can be out anywhere from a few hours to several days. Outdoor signs have also suffered damage. If the high winds are accompanied

by rain (which they often are), blowing leaves, and debris clog drainage-ways, which in turn may cause localized urban flooding.

Please review Volume I, Section 2 for additional information on this hazard.

Winter Storm (Snow/Ice)

The HMAC determined that the City's probability for winter storm is **high** and that their vulnerability to winter storm is **moderate**. *The probability and vulnerability ratings did not change, since the previous version of this NHMP addendum.*

Volume I, Section 2 describes the characteristics of winter storm hazards, history, as well as the location, extent, and probability of a potential event within the region. Severe winter storms can consist of rain, freezing rain, ice, snow, cold temperatures, and wind. They originate from troughs of low pressure offshore that ride along the jet stream during fall, winter, and early spring months. Severe winter storms affecting the City typically originate in the Gulf of Alaska or in the central Pacific Ocean. These storms are most common from November through March.

The biggest impact of winter storms is congestion on roadways. In January 2007 the City experienced freezing temperatures and high winds caused a tree to fall on the main fire station and blocked some of the roads.

Most winter storms typically do not cause significant damage, they are frequent, and have the potential to impact economic activity. Road, and rail closures due to winter weather are an uncommon occurrence but can interrupt commuter, and commercial traffic as noted above.

Vulnerability Assessment

Due to insufficient data and resources, Molalla is currently unable to perform a quantitative risk assessment, or exposure analysis, for the extreme heat, windstorm, and winter storm hazards. For a list of facilities and infrastructure vulnerable to these hazards see the Community Assets section and Tables MO-5 through MO-10.

Mitigation Activities

Mitigating severe weather can be difficult because storms affect all areas of the city, but Molalla has made progress to reduce the effects of storms. Most utilities are above ground, though all new utilities are required to be undergrounded. All water, phone and sewer lines have been placed underground. Molalla also has snowplows and clears arterials first to help expedite snow removal.

Please review Volume I, Section 2 for additional information on this hazard.

Volcanic Event

The HMAC determined that the City's probability for a volcanic event is **low** and that their vulnerability to a volcanic event is **low**. *The probability rating did not change, while the vulnerability decreased since the previous version of this NHMP addendum.*

Volume I, Section 2 describes the characteristics of volcanic hazards, history, as well as the location, extent, and probability of a potential event within the region. Generally, an event that affects the western portion of the County is likely to affect Molalla as well. Several

volcanoes are located near Molalla, the closest of which are Mount Hood, Mount Adams, Mount Saint Helens, Mount Rainier, and the Three Sisters.

Vulnerability Assessment

Due to insufficient data and resources, Molalla is currently unable to perform a quantitative risk assessment, or exposure analysis, for this hazard. For a list of facilities and infrastructure vulnerable to this hazard see the Community Assets section and Tables MO-5 through MO-10.

Due to Molalla's relative distance from volcanoes, the city is unlikely to experience the immediate effects that eruptions have on surrounding areas (i.e., mud and debris flows, or lahars). Depending on wind patterns and which volcano erupts, however, the city may experience ashfall. The eruption of Mount St. Helens in 1980, for example, coated the Willamette Valley with a fine layer of ash. If Mount Hood erupts, however, the city could experience a heavier coating of ash.

Mitigation Activities

The existing volcano hazard mitigation activities are conducted at the county, regional, state, and federal levels and are described in the Clackamas County NHMP.

Please review Volume I, Section 2 for additional information on this hazard.

Wildfire

The HMAC determined that the City's probability for wildfire is **moderate**, and that their vulnerability to wildfire is **high**. *These ratings did not change since the previous version of this NHMP addendum.*

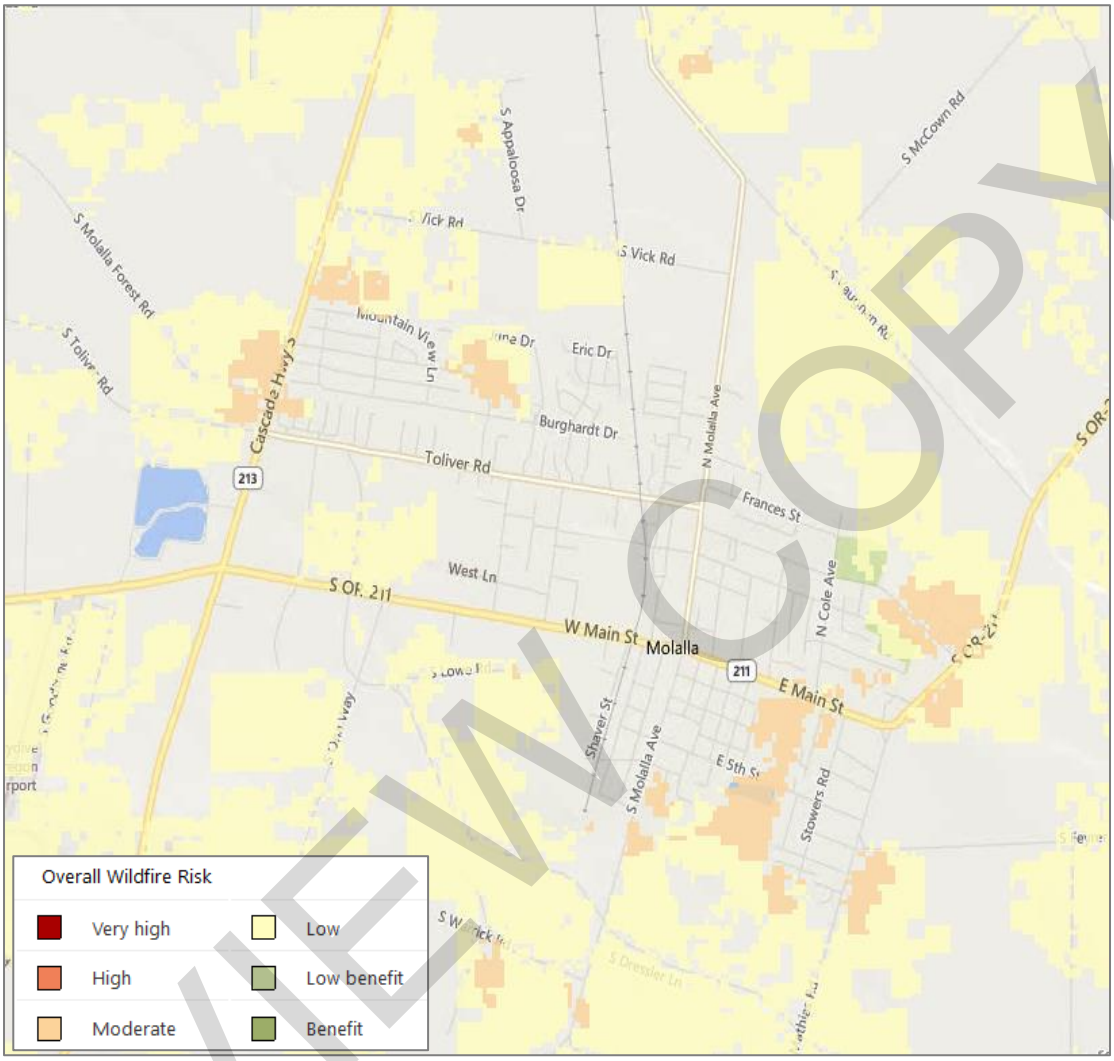
The 2017 Clackamas County Community Wildfire Protection Plan (CWPP) was completed in May 2018. The CWPP is hereby incorporated into this NHMP addendum by reference, and it will serve as the wildfire section for this addendum. The following presents a summary of key information; refer to the full CWPP for a complete description, and evaluation of the wildfire hazard: https://www.clackamas.us/dm/CWPP.html. Information specific to Molalla is found in the following chapter: Chapter 10.9: Molalla Rural Fire Protection District #73.

Volume I, Section 2 describes the characteristics of wildland fire hazards, history, as well as the location, extent, and probability of a potential event within the region. The location, and extent of a wildland fire vary depending on fuel, topography, and weather conditions. Weather, and urbanization conditions are primarily at cause for the hazard level. Molalla has not experienced a wildfire within City limits, but the city has abundant wooded areas that are a concern in the case of a wildfire event. Figure MO-6 shows overall wildfire risk in Molalla.

Clackamas County has two major physiographic regions: the Willamette River Valley in western Clackamas County and the Cascade Range Mountains in eastern and southern Clackamas County. The Willamette River Valley, which includes Molalla, is the most heavily populated portion of the county and is characterized by flat or gently hilly topography. The Cascade Range has a relatively small population and is characterized by heavily forested slopes. Eastern Clackamas County is at higher risk to wildfire than western portions of the county due to its dense forest land. Human caused fires are responsible for most fires in

Clackamas County. In Molalla most instances the fires have been small enough to contain quickly and easily.

Figure MO-6 Overall Wildfire Risk



Source: Oregon Wildfire Risk Explorer, date accessed November 9, 2018.

Molalla is surrounded mostly by farmlands which creates a buffer from the forested areas. There are some areas of heavy tree coverage in the northeast and southern portions of the City. Identified High and Medium Priority Communities at Risk (CARs) are all located outside of the City limits.[18] Wildfires are not a frequent occurrence within the city, but regional wildfires occasionally introduce pollutants within the city. Molalla sits in the bottom of a valley, and pollution from regional fires settles in the area, causing health concerns for residents.

Most of the city has less severe (moderate or less) wildfire burn probability that includes expected flame lengths less than four-feet under normal weather conditions.[19] However,

[18] Clackamas County Community Wildfire Protection Plan, *Molalla Fire Department* (2018), Table 10.13-1.

[19] Oregon Wildfire Risk Explorer, date accessed November 9, 2018.

conditions vary widely and with local topography, fuels, and local weather (including wind) conditions. Under warm, dry, windy, and drought conditions expect higher likelihood of fire starts, higher intensity, more ember activity, and a more difficult to control wildfire that will include more fire effects and impacts.

Vulnerability Assessment

Due to insufficient data and resources, Molalla is currently unable to perform a quantitative risk assessment, or exposure analysis, for this hazard. For a list of facilities and infrastructure vulnerable to this hazard see the Community Assets section and Tables MO-5 through MO-10.

The potential community impacts, and vulnerabilities described in Volume I, Section 2 are generally accurate for the City as well. Molalla's fire response is addressed within the CWPP which assesses wildfire risk, maps wildland urban interface areas, and includes actions to mitigate wildfire risk. The City will update the City's wildfire risk assessment if the fire plan presents better data during future updates (an action item is included to participate in future updates to the CWPP).

Property can be damaged or destroyed with one fire as structures, vegetation, and other flammables easily merge to become unpredictable, and hard to manage. Other factors that affect ability to effectively respond to a wildfire include access to the location, and to water, response time from the fire station, availability of personnel, and equipment, and weather (e.g., heat, low humidity, high winds, and drought).

Mitigation Activities

Molalla uses several mitigation tools to reduce the city's risk to wildfires. Molalla Rural Fire Protection District #73 adopted a district-wide wildland map that governs new construction, and an active public education program for high risk-wildfire areas (including information on fire prevention and defensible space).

Please review the 2017 Clackamas Community Wildfire Protection Plan (CWPP) and Volume I, Section 2 for additional information on this hazard.

ATTACHMENT A: ACTION ITEM FORMS

** - Priority Action Item*

Note: The HMAC decided to modify the prioritization of action items in this update to reflect current conditions (risk assessment), needs, and capacity.

Summary of Action Changes

Below is a list of changes to the action items since the previous plan.

Previous NHMP Actions Completed:

Flood Action #1 (2012): "Evaluate flooding risk in areas being considered for future growth, as it relates to the comprehensive plan" was removed. During the recent comprehensive plan update process, it was determined that areas of potential growth are outside of flood hazard areas. Existing flood ordinance have been deemed adequate for current and potential growth.

Flood Action #4 (2012): "Ensure continued compliance in the National Flood Insurance Program (NFIP) through enforcement of local floodplain management ordinances" is considered complete. It was determined by the steering committee that this action is a function of NFIP participation, as such the action is not needed in the NHMP since participation in the NFIP requires compliance. Additionally, the City does not have areas of mapped special flood hazard areas.

See 2018 status identified in each action for activities that have been completed since the previous plan.

New NHMP Actions added to this version (2019):

No new actions were added during this update.

Previous NHMP Actions Removed from this version:

Multi-Hazard Action #3 (2012): "Identify and pursue funding opportunities to develop and implement hazard mitigation activities" was removed from the list since it was determined by the steering committee that this is a function of their Implementation and Maintenance Plan and did not need to be included as an action.

Multi-Hazard Action #4 (2012): "Continue to update and improve hazard assessments in the Natural Hazards Mitigation Plan as new information becomes available" was removed from the list since it was determined by the steering committee that this is a function of their Implementation and Maintenance Plan and considered during the five-year plan updates and did not need to be included as an action.

Multi-Hazard Action #6 (2012): "Identify and encourage churches and other facilities to become certified Red Cross shelter sites and maintain a list of disaster shelters located throughout Molalla" was removed from the list since this is a function of the Red Cross and not the City's job to complete.

Note: 2012 Actions MH#5 and MH#7 were renumbered to 2019 Actions MH#3 and MH#4. 2012 Actions FL#2, FL #3, and FL#5 were renumbered to 2019 Actions FL #1, FL #2, and FL #3

Action Item Forms

Each action item has a corresponding action item worksheet describing the activity, identifying the rationale for the project, identifying potential ideas for implementation, and assigning coordinating and partner organizations. The action item worksheets can assist the community in pre-packaging potential projects for grant funding. The worksheet components are described below.

ALIGNMENT WITH EXISTING PLANS/POLICIES

The Clackamas County multi-jurisdictional Natural Hazard Mitigation Plan includes a range of action items that, when implemented, will reduce loss from hazard events in the County. Within the plan, FEMA requires the identification of existing programs that might be used to implement these action items. Clackamas County currently addresses statewide planning goals and legislative requirements through its comprehensive land use plan, capital improvements plan, mandated standards and building codes. To the extent possible, Clackamas County will work to incorporate the recommended mitigation action items into existing programs and procedures. Each action item identifies related existing plans and policies.

STATUS/RATIONALE FOR PROPOSED ACTION ITEM

Action items should be fact-based and tied directly to issues or needs identified throughout the planning process. Action items can be developed at any time during the planning process and can come from a number of sources, including participants in the planning process, noted deficiencies in local capability, or issues identified through the risk assessment. The rationale for proposed action items is based on the information documented in Section 2. The worksheet provides information on the activities that have occurred since the previous plan for each action item.

IDEAS FOR IMPLEMENTATION

The ideas for implementation offer a transition from theory to practice and serve as a starting point for this plan. This component of the action item is dynamic, since some ideas may prove to not be feasible, and new ideas may be added during the plan maintenance process. Ideas for implementation include such things as collaboration with relevant organizations, grant programs, tax incentives, human resources, education and outreach, research, and physical manipulation of buildings and infrastructure.

COORDINATING (LEAD) ORGANIZATION:

The coordinating organization is the public agency with the regulatory responsibility to address natural hazards, or that is willing and able to organize resources, find appropriate funding, or oversee activity implementation, monitoring and evaluation.

INTERNAL AND EXTERNAL PARTNERS:

The internal and external partner organizations listed in the Action Item Worksheets are potential partners recommended by the project HMAC but not necessarily contacted during the development of the plan. The coordinating organization should contact the identified partner organizations to see if they are capable of and interested in participation. This initial

contact is also to gain a commitment of time and/or resources toward completion of the action items.

Internal partner organizations are departments within the County or other participating jurisdiction that may be able to assist in the implementation of action items by providing relevant resources to the coordinating organization.

External partner organizations can assist the coordinating organization in implementing the action items in various functions and may include local, regional, state, or federal agencies, as well as local and regional public and private sector organizations.

PLAN GOALS ADDRESSED:

The plan goals addressed by each action item are identified as a means for monitoring and evaluating how well the mitigation plan is achieving its goals, following implementation.

TIMELINE:

All broad scale action items have been determined to be ongoing, as opposed to short-term (0 to 2 years) or long-term (3 or more years). This is because the action items are broad ideas, and although actions may be implemented to address the broad ideas, the efforts should be ongoing. For example, although Severe Weather Action Item #1: "*Reduce negative effects from severe windstorm and severe winter storm events*" has been addressed by requiring new developments to put utilities underground and there are snowplow routes determined, the HMAC will continue this effort of mitigating severe weather loss.

POTENTIAL FUNDING SOURCE

Where possible potential funding sources have been identified. Example funding sources may include: Federal Hazard Mitigation Assistance programs, state funding sources such as the Oregon Seismic Rehabilitation Grant Program, or local funding sources such as capital improvement or general funds. An action item may include several potential funding sources.

ESTIMATED COST

A rough estimate of the cost for implementing each action item is included. Costs are shown in general categories showing low, medium, or high cost. The estimated cost for each category is outlined below:

Low - Less than $50,000
Medium - $50,000 – $100,000
High - More than $100,000

Multi-Hazard #1

Proposed Action Item	Alignment with Plan Goals:
Develop public education programs to inform the public about methods for mitigating the impacts of natural hazards.	Protect Life and Property; Augment Emergency Services; Encourage Partnerships for Implementation; Promote Public Awareness

Alignment with Existing Plans/Policies:

2018 Status/Rationale for Proposed Action Item:

- Conducting public outreach campaigns raises awareness about natural hazards and helps illustrate what residents and businesses can do to reduce the impact of a natural disaster on their properties, thereby significantly reducing the impact of natural hazards on the City of Molalla.
- The Disaster Mitigation Act of 2000 requires that communities continue to involve the public beyond the original planning process [201.6(c)(4)(ii)]. Developing public education programs for hazard risk mitigation would be a way to keep the public informed of, and involved in, the county's actions to mitigate hazards.
- The City currently does hazard planning activities and is continuing to work on public outreach.

Ideas for Implementation:

- Conduct public education as hazard seasons approach. These include: earthquake awareness month in April, wildfire prevention in summer, flood, severe storm and landslide outreach in fall/winter;
- Identify property owners in flood and wildfire hazard zones and conduct a target mailing to disseminate hazard information;
- Partner with Clackamas County and other jurisdictions to develop public education flyers for all hazards;
- Include hazard information on the city website;
- Encourage individual homeowners to implement mitigation practices;
- Educate the public about the resources available for hazard mitigation, response, and preparedness;
- Include insurance information in public outreach and education materials.

Coordinating Organization:	Planning Commission

Internal Partners:	External Partners:
Planning, City Recorder	Neighborhood Associations, Molalla Chamber of Commerce, Clackamas County Emergency Management, Oregon Office of Emergency Management, FEMA

Potential Funding Sources:	Estimated cost:	Timeline:
General Fund	Low	☐ Short Term (0-2 years) ☐ Long Term (2-4+ years) X Ongoing

Form Submitted by:	Added during the 2009 plan development process
Priority:	Medium

Multi-Hazard #2

Proposed Action Item:	Alignment with Plan Goals:
Continue to integrate mitigation strategies into existing regulatory documents and programs, where appropriate.	Protect Life and Property; Enhance Natural Systems; Augment Emergency Services; Encourage Partnerships for Implementation; Promote Public Awareness

Alignment with Existing Plans/Policies:
Comprehensive Plan, Zoning Ordinance

2018 Status/Rationale for Proposed Action Item:
• The Disaster Mitigation Act of 2000 requires communities to identify actions and projects that reduce the effects of hazards on the community [201.6(c)(3)(ii)]. Incorporating natural hazards plans into comprehensive plans, local ordinances, and land-use regulations will ensure that communities implement the proper mitigation measures for their community. • The City updated their Design Standards within their development code.

Ideas for Implementation:
• Use the mitigation plan to help the City's Comprehensive Land Use Plan meet State Land Use Planning Goal 7, designed to protect life and property from natural disasters and hazards through planning strategies that restrict development in areas of known hazards; • Integrate mitigation strategies within current capital improvement plans. When applicable, utilize mitigation funding to assist with capital improvement projects. • Incorporate the Natural Hazards Mitigation Plan into deed restrictions and conditions of approval where appropriate.

Coordinating Organization:	Planning Commission

Internal Partners:	External Partners:
Planning	Department of Land Conservation and Development, Department of Geology and Mineral Industries, Oregon Department of Transportation, Department of Environmental Quality

Potential Funding Sources:	Estimated cost:	Timeline:
General Fund, DLCD Technical Assistance Grant	Low	☐ Short Term (0-2 years) ☐ Long Term (2-4+ years) X Ongoing

Form Submitted by:	Added during the 2009 plan development process
Priority:	Medium

Multi-Hazard #3

Proposed Action Item:	Alignment with Plan Goals:
Continue vegetation management throughout the city.	Enhance Natural Systems; Encourage Partnerships for Implementation

Alignment with Existing Plans/Policies:

2018 Status/Rationale for Proposed Action Item:
• Landscaping and vegetation make a difference in mitigating the impacts of natural hazards. Trees break the force of the wind and stabilize the soil. Wetlands absorb much of the overflow from stream channels. Fire-resistant vegetation can retard the spread of wildfires toward vulnerable buildings. Limiting or regulating the amount of vegetation cleared off a hillside lot reduces the risk of increasing the number of landslide-prone areas in a community. Planting vegetation or maintaining slope terraces can also reduce slope- runoff. Planners can use landscaping requirements to preserve or enhance he protection such natural features afford. These requirements may be part of site plan reviews or a separate set of zoning regulations and environmental performance standards. • The City has updated their code enforcement and stormwater management practices around vegetation.

Ideas for Implementation:
• Partner with Clackamas County, Oregon Department of Transportation (ODOT), railroad companies, Oregon Department of Forestry (ODF), US Forestry Service (USFS), and citizens to control vegetation along transportation corridors; • Identify appropriate practices for eliminating invasive species such as blackberry • and English Ivy; • Maintain a healthy tree population to develop a canopy within the urban area; • Maintain vegetation coverage for slope stability; • Provide education to the public about justifications for, and benefits of vegetation mitigation practices.

Coordinating Organization:	Planning

Internal Partners:	External Partners:
Code Enforcement	Clackamas County, railroad companies, ODOT, ODF, PGE, USFS

Potential Funding Sources:	Estimated cost:	Timeline:
General Fund	Low	☐ Short Term (0-2 years) X Long Term (2-4+ years) ☐ Ongoing

Form Submitted by:	Added during the 2009 plan development process
Priority:	Medium

Multi-Hazard #4

Proposed Action Item:	Alignment with Plan Goals:
Identify and map out evacuation routes for all hazards.	Protect Life and Property; Augment Emergency Services; Promote Public Awareness

Alignment with Existing Plans/Policies:

2018 Status/Rationale for Proposed Action Item:
• Mapping out evacuation routes for all hazards before those hazards occur help first responders and residents know the routes to take when a situation arises.

Ideas for Implementation:
• Partner with nearby cities to ensure they are on board with the proposed evacuation routes. • Ensure that MOU's with local Law Enforcement are up-to-date as copies of them will be needed in the event of a disaster; • Hold a table-top exercise for City Staff and Special Districts to ensure they are aware of the proposed routes; • Work with neighborhood associations and schools to distribute information regarding evacuation route.

Coordinating Organization:	Public Works

Internal Partners:	External Partners:
Planning, Administration	Red Cross

Potential Funding Sources:	Estimated cost:	Timeline:
General Fund	Low	X Short Term (0-2 years) ☐ Long Term (2-4+ years) ☐ Ongoing

Form Submitted by:	Added during the 2012 plan update process
Priority:	Medium

Earthquake #1*

Proposed Action Item:	Alignment with Plan Goals:
Conduct seismic evaluations on City Hall/Police Building and implement appropriate structural and non-structural mitigation strategies.	Protect Life and Property; Augment Emergency Services

Alignment with Existing Plans/Policies:

2018 Status/Rationale for Proposed Action Item:

- Pre-disaster mitigation strategies will reduce post-disaster response needs by lessening life loss, injury, damage, and disruption.
- The main fire station has been partially seismically retrofitted. The City Hall/Police building is next on the list of vulnerable public buildings. A new police department building is proposed to be built. Seismic upgrades are not scheduled at this time for City Hall.

Ideas for Implementation:

- Research non-structural seismic mitigation strategies;
- Obtain funding to perform evaluations;
- Prioritize seismic upgrades based on criticality of need and population served;
- Partner with appropriate organizations to implement seismic upgrades;
- Seismically retrofit facilities to guarantee continuous operation during and after a natural disaster.

Coordinating Organization:	Public Works

Internal Partners:	External Partners:
Administration	Clackamas County Emergency Management, Oregon Office of Emergency Management, Infrastructure Finance Authority, DOGAMI, FEMA

Potential Funding Sources:	Estimated cost:	Timeline:
General Fund, Seismic Rehabilitation Grant Program, Hazard Mitigation Assistance Grants	Moderate to High	☐ Short Term (0-2 years) X Long Term (2-4+ years) ☐ Ongoing

Form Submitted by:	Added during the 2009 plan development process
Priority:	Medium

** - High Priority Action Item*

Flood #I*

Proposed Action Item:	Alignment with Plan Goals:
Obtain funding for implementing recommendations outlined in the Stormwater Master Plan.	Protect Life and Property; Enhance Natural Systems; Augment Emergency Services; Encourage Partnerships for Implementation

Alignment with Existing Plans/Policies:
Stormwater Master Plan; Wetland Inventory Overlay
2018 Status/Rationale for Proposed Action Item:
• The Disaster Mitigation Act of 2000 requires communities to identify mitigation actions that address new and existing buildings and infrastructure [201.6(c)(3)(ii)]. The Stormwater Master Plan addresses the issues around urban flooding that Molalla is currently vulnerable to. • The Stormwater Master Plan is scheduled to be updated 2021/2022 and obtaining funding is ongoing. Priority is to update SDC's and rates.
Ideas for Implementation:
• Review all recommendations and determine priority for implementation; • Identify funding sources to implement recommendations; • Increase capacity of storm drain pipes and culverts throughout the city. Identify undersized culverts and pipes; prioritize construction projects; include culvert and pipe enhancement in the Capital Improvements Plan; and coordinate with the Oregon Department of Transportation for access to culverts along roadways (if applicable).

Coordinating Organization:	Public Works

Internal Partners:	External Partners:
Planning, Administration	ODOT; Department of Land Conservation and Development; Clackamas County Water Environmental Services

Potential Funding Sources:	Estimated cost:	Timeline:
General Fund	Low	☐ Short Term (0-2 years) ☐ Long Term (2-4+ years) X Ongoing

Form Submitted by:	Added during the 2009 plan development process
Priority:	High

** - High Priority Action Item*

Flood #2*

Proposed Action Item:	Alignment with Plan Goals:
Minimize overall impervious cover and disconnect impervious areas.	Protect Life and Property; Enhance Natural Systems

Alignment with Existing Plans/Policies:
Stormwater Master Plan; Natural Features Report
2018 Status/Rationale for Proposed Action Item:
• Minimizing overall impervious cover is a management recommendation within the city's Natural Features Report. • Paved roadways, sidewalks, driveways and parking areas are the primary sources of impervious surface area. Impervious areas alter runoff and recharge values and site hydrology. On the other hand, maintain pervious surfaces encourages surface water infiltration and groundwater recharge. Molalla deals mostly with urban flooding, which can be caused or exacerbate this type of flooding. • The 2017 edition of Molalla's Public Works Standards addresses the issues around impervious cover and discusses the different types of projects to be accomplished in the near future.
Ideas for Implementation:
• Substitute pervious surfaces for impervious wherever possible; • Utilize the minimum required width for streets and roads; • Where appropriate, avoid the use of curb and gutter. Utilize vegetated open swales, preferably "engineered swales" with a permeable soil base; • Minimize excess parking space construction; utilize pervious pavers in low-use areas; • Minimize cul-de-sac diameters, use doughnut cul-de-sacs, or use alternative turnarounds; • Minimize compaction of the landscape. In areas where soils will become compacted due to construction equipment, specify that the soils will be "disked" prior to seeding, and amended with loam or sand to increase absorption capacity; • Require developers to design and construct drainage systems that cannot release more water from the new development than was released before the construction; • Preserve natural vegetative cover; • Disconnect streets and parking areas from closed culverts; • Increase the time travel of water off of the site; • Revegetate all cleared and graded areas; • Provide sheet flow into natural open space; • Protect wetlands and stream corridors.

Coordinating Organization:	Public Works

Internal Partners:	External Partners:
Planning	Clackamas County Water Environmental Services

Potential Funding Sources:	Estimated cost:	Timeline:
General Fund	Medium to High	☐ Short Term (0-2 years) ☐ Long Term (2-4+ years) X Ongoing

Form Submitted by:	Added during the 2009 plan development process
Priority:	High

** - High Priority Action Item*

Landslide #I

Proposed Action Item:	Alignment with Plan Goals:
Identify and locate a secondary location for the water intake system and move it away from the hillside.	Protect Life and Property; Enhance Natural Systems; Augment Emergency Services

Alignment with Existing Plans/Policies:
Comprehensive Plan, Development Code

2018 Status/Rationale for Proposed Action Item:
• The Disaster Mitigation Act of 2000 requires communities to identify and analyze a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with emphasis on new and existing buildings and infrastructure [201.6(c)(3)(ii)]. Developing a secondary location for the water intake system provides redundancy in the system and reduces the overall threat due to landslide to the water system. • As of 2019, this remains a concern, however, it is also considered not feasible due to regulatory burden to relocate intake.

Ideas for Implementation: CWPP Identified Focus Areas and Priority Actions
• Locate a safer location for the water system, away from the hillside. • Research the feasibility of having a secondary water intake system, instead of moving the current one. • Work with county's Planning and GIS departments to determine the feasibility of moving the water intake system. • Identify possible funding opportunities to support the project.

Coordinating Organization:	Public Works

Internal Partners:	External Partners:
Planning, Administration	Clackamas County Water Environment Services, Clackamas County Department of Transportation and Development – Planning, Clackamas County GIS

Potential Funding Sources:	Estimated cost:	Timeline:
General fund	Medium to High	☐ Short Term (0-2 years) X Long Term (2-4+ years) ☐ Ongoing

Form Submitted by:	Added during the 2012 plan development process
Priority:	Low

Severe Weather #1

Proposed Action Item:	Alignment with Plan Goals:
Reduce negative effects from severe windstorm and severe winter storm events.	Protect Life and Property; Enhance Natural Systems; Augment Emergency Services; Encourage Partnerships & Implementation; Promote Public Awareness

Alignment with Existing Plans/Policies:
Stormwater Master Plan

2018 Status/Rationale for Proposed Action Item:
• The Disaster Mitigation Act of 2000 requires communities to identify and analyze a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with emphasis on new and existing buildings and infrastructure [201.6(c)(3)(ii)]. Developing and implementing programs to reduce the potential for wind and winter storms to cause power outages can assist a community in mitigating its overall risk to wind and winter storms.

Ideas for Implementation:
• Reduce power outages by partnering with PGE to obtain funding to bury power lines subject to frequent failures; • Encourage auxiliary power sources for hospitals, grocery stores, etc.; • Develop partnerships to implement programs to keep trees from threatening lives, property, and public infrastructure; • Continue to require new developments to underground power lines; • Partner with PGE to continue hazardous tree inventory and mitigation programs.

Coordinating Organization:	Public Works

Internal Partners:	External Partners:
Administration, Planning	PGE; ODOT; private landowners

Potential Funding Sources:	Estimated cost:	Timeline:
Capital Funds	Low to High	☐ Short Term (0-2 years) ☐ Long Term (2-4+ years) X Ongoing

Form Submitted by:	Added during the 2009 plan development process
Priority:	Medium

Wildfire #1

Proposed Action Item:	Alignment with Plan Goals:
Promote fire-resistant strategies for new and existing developments.	Protect Life and Property; Enhance Natural Systems; Augment Emergency Services; Encourage Partnerships & Implementation; Promote Public Awareness

Alignment with Existing Plans/Policies:
Clackamas County Community Wildfire Protection Plan (2018)
2018 Status/Rationale for Proposed Action Item:
• The Disaster Mitigation Act of 2000 requires communities to identify and analyze a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with emphasis on new and existing buildings and infrastructure [201.6(c)(3)(ii)]. Developing and implementing programs to reduce the potential for wildfires to cause physical damage to homes can assist a community in mitigating its overall risk to wildfires.
Ideas for Implementation:
• Describe the procedures for ongoing maintenance of fuel breaks, and place information on the city website for public view; • Require street design that facilitates the movement of firefighting equipment; • Review roofing standards and develop recommendations for promoting noncombustible roofing; • Maintain awareness of potential city growth into the wild land urban interface.

Coordinating Organization:	HMAC

Internal Partners:	External Partners:
Molalla RFD, Administration	Clackamas Fire Defense Board, Oregon Department of Forestry, U.S. Forest Service, U.S. Bureau of Land Management, public land management agencies

Potential Funding Sources:	Estimated cost:	Timeline:
General fund, operating budgets	Low to High	☐ Short Term (0-2 years) ☐ Long Term (2-4+ years) X Ongoing

Form Submitted by:	Added during the 2009 plan development process
Priority:	Medium

Wildfire #2

Proposed Action Item:	Alignment with Plan Goals:
Coordinate wildfire mitigation action items through the Clackamas County Community Wildfire Protection Plan.	Protect Life and Property; Enhance Natural Systems; Augment Emergency Services; Encourage Partnerships & Implementation; Promote Public Awareness

Alignment with Existing Plans/Policies:
Clackamas County Community Wildfire Protection Plan (2018)
2018 Status/Rationale for Proposed Action Item:
The wildfire mitigation action items provide direction on specific activities that organizations and residents in Molalla can take to reduce wildfire hazards.
Ideas for Implementation: CWPP Identified Focus Areas and Priority Actions

Wildfire Risk Assessment (Ch. 4):

1. Maintain and update the Fuels Reduction (FR) and Communities at Risk (CAR) maps and databases.
2. Continue to track structure vulnerability data throughout the County through structural triage assessments.
3. Update the Overall Wildfire Risk Assessment as new data becomes available.

Hazardous Fuels Reduction and Biomass Utilization (Ch. 5):

1. Develop and maintain an inventory of potential and successful FR projects by meeting with parks and natural lands managers quarterly.
2. Continue securing funding to implement projects/hire seasonal ODF staff.

Emergency Operations (Ch. 6):

1. Develop and FDB Communications Works Group.
2. Conduct a Conflagration Exercise.

Education and Community Outreach (Ch. 7):

1. Develop Firewise toolkit for CAR's.
2. Create incentives for fuels reduction.
3. Update and distribute the Burn Permitting and Fire Restrictions Brochure.
4. Continue to improve address signage throughout the County.

Structural Ignitability Policies and Programs (Ch. 8):

1. Identify a DTD representative for the WFEPC.
2. Improve coordination with Rural Fire Agencies.
3. Integrate WU into Plan Map and include a public outreach strategy.

Coordinating Organization:	Molalla Rural Fire Protection District #73

Internal Partners:	External Partners:
Public Works, Parks and Recreation, Natural Resources	Clackamas Fire Defense Board, Oregon Department of Forestry, U.S. Forest Service, U.S. Bureau of Land Management, public land management agencies

Potential Funding Sources:	Estimated cost:	Timeline:
ODF, operating budgets	Low to High	☐ Short Term (0-2 years) ☐ Long Term (2-4+ years) X Ongoing

Form Submitted by:	New Action Item
Priority:	High (*CWPP identified priority actions listed above*)

ATTACHMENT B:
PUBLIC INVOLVEMENT SUMMARY

Members of the HMAC provided edits and updates to the NHMP prior to the public review period as reflected in the final document.

To provide the public information regarding the draft NHMP addendum, and provide an opportunity for comment, an announcement (see text below) was provided on the city's website and social media pages including a method for the public to provide comment.

During the public review period there were no comments provided.

Press Release

To be provided