

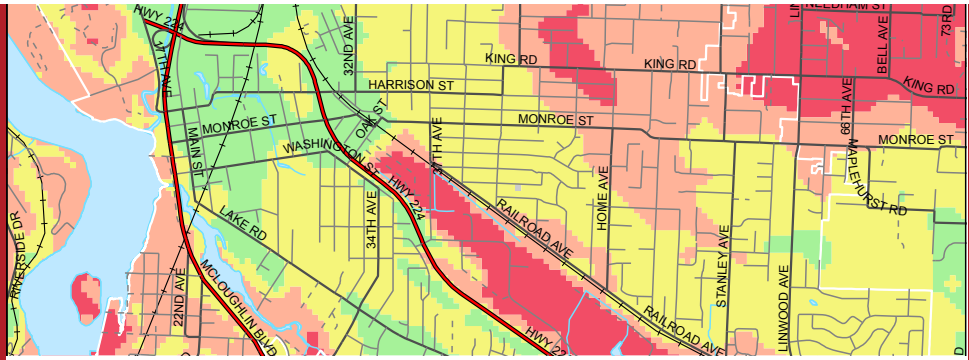


Background Report: Natural Hazards

Milwaukie Comprehensive Plan Update

Block 2 Topic Area

Prepared for the
Comprehensive
Plan Advisory
Committee
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Introduction

While Milwaukie is fortunate to be located in a region with beautiful scenery and natural resources, these same conditions create potential risks for a variety of natural hazards. Natural hazard planning is critical to preventing the loss of life, property, and economic well-being as a result of extreme environmental forces. In Milwaukie, potential natural hazards include flooding, landslides, weak foundation soils, earthquakes, and wildfires, although the risks associated with these hazards vary significantly. Informed by an understanding of these hazards, the City of Milwaukie can reduce the risks to property, environmental quality, and human safety by regulating land uses within areas subject to these natural hazards.

Since the Milwaukie Comprehensive Plan was acknowledged in 1981, there have been significant advances in assessing natural hazards given new technology such as lidar (light detection and ranging) and research regarding the likelihood of a devastating Cascadia subduction zone earthquake. In addition, scientists and planners now recognize the potential impacts of climate change in exacerbating certain natural hazards such as flooding and wildfires.

As the City begins the process to update the Natural Hazards Element of the Comprehensive Plan, it will build upon past planning efforts and the 2017 Community Vision. The updated element will account for emerging trends and information as well as the opportunities and challenges of planning to protect the Milwaukie community from natural hazards.

Planning for Natural Hazards

Oregon has a set of 19 Statewide Planning Goals, which serve as the foundation of the state's land use planning program that is implemented at the local level through the Comprehensive Plan. [Statewide Planning Goal 7](#) is called Areas Subject to Natural Hazards and seeks to "protect people and property from natural hazards." Natural hazards applicable to Milwaukie include floods, landslides, weak foundation soils, earthquakes (and related hazards such as liquefaction), and wildfires. Goal 7 calls for local governments to respond to new hazard inventory information provided by federal and state agencies by adopting or amending plan policies and implementing measures as needed. For riverine flood hazards, local governments must adopt and implement local floodplain regulations that meet the minimum National Flood Insurance Program (NFIP) requirements. In implementing natural hazard plans and policies, the State goal urges local governments to do the following: coordinate



Sandbags Line Johnson Creek during 2015 Flooding

plans with emergency preparedness and recovery programs; consider stormwater management as a means to address flood and landslide hazards; consider nonregulatory approaches to implementing hazard plans; and to require technical reports when reviewing development requests in hazard areas.

The City of Milwaukie complies with Goal 7 by regulating development in hazard-prone areas through the Milwaukie Development Code. Code sections address the following types of natural hazard conditions: seismic hazards (Chapter 16.12), weak foundation soils (Chapter 16.16), and flood hazard areas (Chapter 18.04).

Regarding flood protection, Milwaukie must not only address Statewide Planning Goal 7 requirements but must also comply with the provisions of Title 3 of the Metro Urban Growth Management Functional Plan. Title 3 – Water Quality and Flood Management requires the City to balance any fill in the floodplain with a corresponding cut that excavates an equal amount of material. In addition, Title 3 requires the City to regulate the area of inundation from the 1996 flood in addition to the area with a 1% chance of flooding as identified on National Flood Insurance maps.

Natural Hazards and Milwaukie’s Comprehensive Plan

[Chapter 3 – Environmental and Natural Resources](#) of Milwaukie’s existing Comprehensive Plan is broken into five individual elements, including the Natural Hazards Element. This element includes one Goal Statement, three (3) objectives, and six (6) policies which are focused on addressing natural hazards. The objectives and underlying policies are largely still relevant today, but they do not account for all potential natural hazards of which Milwaukie is at risk. Natural Hazards Element objectives are summarized below:

- *Objective 1 – Floodplain*
Provides guidance for regulation of development within and along the boundaries of the 100-year floodplain, in order to protect their natural function as waterways and to protect lives and property. Policies focus on preserving floodplain capacity, limiting development in the floodplain, and on retaining floodplains as open space whenever possible.
- *Objective 2 – Seismic Condition*
Calls for regulating the structural integrity of all developments consistent with the provisions of the Uniform Building Code, Earthquake Regulations.
- *Objective 3 – Weak Foundation Soils*
Calls for adequate measures to mitigate the structural limitations of soils, and for special reports prepared by qualified professional to accompany development applications in areas with weak foundation soils.

Natural Hazards and Milwaukie's Community Vision

In 2016-2017, the City of Milwaukie underwent an extensive public process to craft a vision and action plan. The process resulted in a new vision statement, with action items to achieve stated goals over the next 20 years. The vision, goals, and actions received input from a variety of people and groups. The City received input from the Vision Advisory Committee (VAC), staff, a technical advisory group, town halls, surveys, City Council, Planning Commission, and many more.

The following priority actions from the [Milwaukie 2040 Vision and Action Plan](#) capture the community's priorities that are associated directly or indirectly with Natural Hazard planning.

Planet 3.2: Develop a Climate Action and Energy Plan that aims to reduce the impacts of the Milwaukie community on climate change and by 2040 make Milwaukie a Net-Zero energy community that produces more electricity than it consumes

Planet 3.5: Ensure that the City's infrastructure and facilities can reasonably withstand natural or man-made disasters and that the City can continue to provide services during an emergency event

Assets & Trends Related to Natural Hazards Planning

There are a number of assets and trends to consider when planning for areas subject to natural hazards. Assets include Milwaukie's geographic/geologic attributes and access to a variety of data, and trends include new federal regulations and local planning efforts. A few of the most relevant assets and trends are discussed below.

Low Hazard Risks

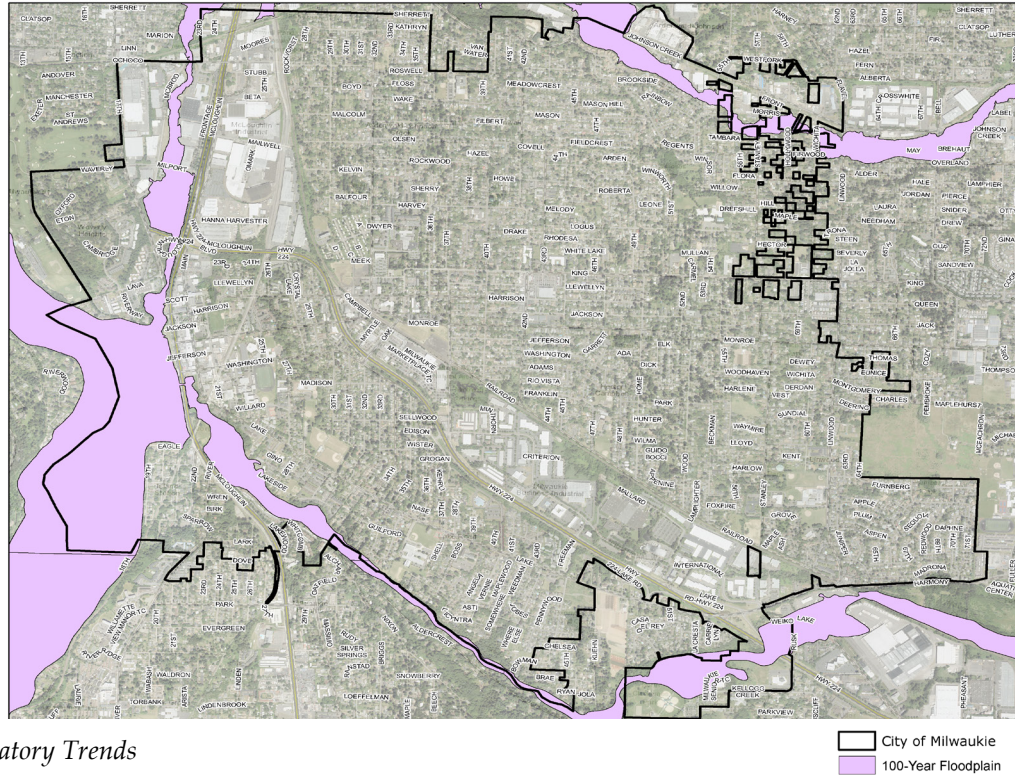
Milwaukie is fortunate to face fewer risks for certain natural hazards than other cities in the region. In particular, there are relatively few steep slopes in Milwaukie compared to jurisdictions like Portland or Lake Oswego. Because the city is largely surrounded by urbanized areas, there are also fewer wildfire risks. This is an obvious benefit to the protection of residents' lives and private property, but it also allows the City to focus more effort on planning for other natural hazards. Although these hazards are less of a risk in Milwaukie, they still merit attention.

Hazards Data and Mapping

Through its Regional Land Information System (RLIS), Metro provides the City with GIS data regarding slopes, hillshade, and floodplain boundaries. The Oregon Department of Forestry's "Advanced Oregon Wildfire Risk Explorer" online tool provides wildfire risk mapping. The Federal Emergency Management Agency (FEMA) provides flood hazard mapping in support of the Risk Mapping, Assessment and Planning (Risk MAP) Program and National Flood Insurance Program. The areas in Milwaukie within the 100-year floodplain are included in Figure 1.

In addition, the Oregon Department of Geology and Mineral Industries (DOGAMI) provides mapping for a range of geologic hazard data, including landslide, earthquake, and liquefaction hazards. DOGAMI has created a set of landslide inventory maps that are more accurate and comprehensive than any in the past (see Figure 2). These maps use a laser-based terrain mapping system called lidar (light detection and ranging) and a new mapping protocol created specifically for lidar-based imagery. These tools more accurately identify locations of historic landslides and help to target areas that may be vulnerable to potential landslide hazards in the future.

Figure 1. 100-year Floodplain Map



Regulatory Trends

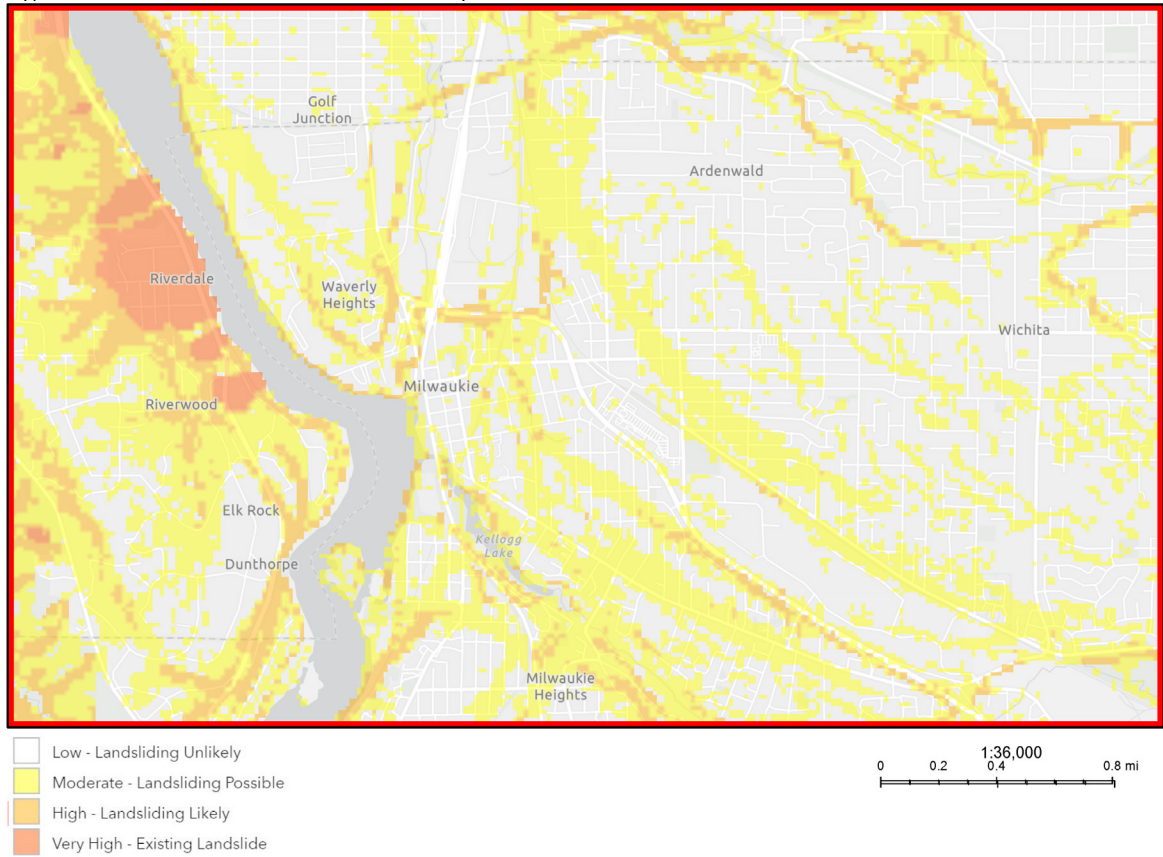
- Floodplain regulations** – FEMA administers the National Flood Insurance Program (NFIP). FEMA has announced changes to the NFIP in Oregon in response to a determination by the National Marine Fisheries Service (NMFS) that the scope of development currently allowed within the federally-regulated 100-year floodplain (known as the Special Flood Hazard Area [SFHA]) jeopardizes the continued existence of threatened or endangered species.

Amendments to the NFIP in Oregon may result in significant changes to development restrictions and permitting requirements within the SFHA, and re-mapping of the SFHA. Full implementation will take several years, but some changes may be implemented sooner. All cities in Oregon affected by these changes, including Milwaukie, will be required to update their local floodplain regulations accordingly.
- Local response regarding changes to the NFIP** – Cities throughout Oregon will be monitoring how changes to the NFIP will affect them locally. Milwaukie will likely respond to new requirements by formulating its own regulatory responses in a manner that is consistent with guidance from the Oregon Department of Land Conservation and Development (DLCD).

Regional Efforts and Coordination

In 2018, Clackamas County updated its Natural Hazards Mitigation Plan (NHMP). The plan is intended to help the county plan for actions that can lessen the impact of disasters. Upon approval by FEMA, the county and cities covered by the plan (including Milwaukie) are eligible to apply for grant funding for hazard mitigation projects.

Figure 2. DOGAMI Landslide Hazard Map



Opportunities & Challenges Influencing Natural Hazards Planning

In consideration of the assets and trends identified above, there are opportunities to enhance Milwaukie’s approach to natural hazard planning while recognizing the challenges that the City currently faces. A few of these key opportunities and challenges are discussed below.

Hazard Planning Saves Money

Recovery from natural hazards can be incredibly expensive. Mitigation is the effort to reduce loss of life and property by avoiding or lessening the impact of disasters. Though mitigation often requires some up-front expenditure, it can reduce human and financial consequences after a disaster. Hazard mitigation planning is recognized as a highly effective strategy for saving money—both for public agencies and private property owners.

Green Infrastructure

Statewide Planning Goal 7 urges local governments to consider programs to manage stormwater as a means to help address flood and landslide hazards. There is growing recognition of green infrastructure’s utility in managing flood risk. Green infrastructure (sometimes known as “low impact development” or LID) uses vegetation, soils, and other elements to restore some of the natural processes required to manage stormwater. Green infrastructure facilities such as rain gardens, bioswales, and permeable pavements absorb rainfall, preventing water from overwhelming pipe networks, pooling in streets or basements, and weakening soils. In combination with open space preservation and floodplain management, green infrastructure can help reduce the volume of stormwater that flows into streams and rivers, protect the natural function of floodplains, and reduce the damage to infrastructure and property. Further, the Community Vision identifies natural stormwater management as a priority action ; although the action deals primarily with water quality (Statewide Planning Goal 6), it also touches upon flood hazard management . This presents an opportunity for Milwaukie’s Comprehensive Plan to encourage green infrastructure as a flood and landslide hazard prevention strategy.

Climate Change

Climate change will exacerbate several natural hazards. Increased intensity of storms will exacerbate flood and landslide hazard risks, while hotter weather and droughts are likely to increase wildfire risk in places susceptible to those risks. Wildfires not only pose risks to natural resources and property, the smoke from wildfires also poses risks to human health.

Climate change is resulting in significant increases in global temperatures which have the effect of melting polar ice and increasing sea levels. This has an impact on the inland community of Milwaukie since the Willamette River is influenced by ocean tides. The rising seas will be a threat. Models predict that if global emissions continue at the current rate, there could be a 4°C temperature increase by the year 2100 and resultant tidal flooding that could inundate the wastewater treatment plant, portions of the North Milwaukie Innovation Area along Johnson Creek, the Hwy 217/McLoughlin interchange. Milwaukie’s 2018 Climate Action Plan takes proactive steps intended to “put Milwaukie on a path to achieve goals related to climate preparedness and reducing carbon emissions.”

Earthquakes

City code requires compliance with seismic standards of the Oregon building codes. The City Building Official enforces these requirements. Mapping available from DOGAMI provides information on different levels of risk depending on soil types and propensity for liquefaction. Consideration should be given to developing standards that regulate the siting of new buildings providing emergency services in these higher risk areas.

Since 2005, scientists have been warning of the potential for a major earthquake along the Cascadia subduction zone – a 620-mile long fault line off the Pacific coast. The last known earthquake along this fault was in 1700. Scientists predict an earthquake could be as powerful as 9.0 on the Richter scale (the most powerful earthquake ever recorded in North America was the 1964 Alaska earthquake at 9.2 on the Richter scale). An earthquake of this magnitude is likely to have a devastating impact on communities throughout the state and Portland region. Cities and counties all over Oregon are grappling with the challenge of preparing for this potentially devastating earthquake.

Resiliency

Local governments throughout Oregon have recognized the importance of resilience planning. The Comprehensive Plan provides the opportunity to integrate the community’s goals around resilience and climate change mitigation and adaptation with the Plan’s natural hazard planning goals.

Incentives as Complement to Regulation

Statewide Planning Goal 7 urges local governments to consider nonregulatory approaches to natural hazard prevention, including financial incentives and disincentives. Beyond regulating development in hazard-prone areas, there may be incentives that encourage property owners to engage in mitigation, such as financial incentives for property owners who seismically retrofit their structures.

Hazards and vulnerable populations

A major challenge with respect to hazard planning is that vulnerable populations are often more affected by natural hazards and are less able to recover. The Clackamas County Natural Hazard Mitigation Plan identifies the following populations as being most vulnerable in a hazard event:

- **Low-income** populations may not have the savings to withstand economic setbacks, and may not be able to afford preventive measures, such as insurance or home modifications. They may also be more reliant upon public transportation and other public programs that could be affected during a natural disaster.
- **Youth and elderly** populations are more reliant on assistance from others, and may be more susceptible to heat, cold, and other health threats.
- **Non-English speaking** populations can be harder to reach with preparedness, mitigation, and emergency information.

- **Disabled and differently abled** populations often face mobility issues that make response efforts more challenging.

Hazard planning efforts should focus special attention on addressing challenges faced by vulnerable populations in response to natural hazards. This may include focusing hazard mitigation on schools or senior housing, translating preparedness and mitigation information into other languages, and devoting additional resources to assist recovery efforts among vulnerable groups.

Financial Impacts to Properties

Regulation for hazard areas has the potential to severely limit the development potential of a property, thereby reducing property values. As such, it is important to consider whether regulations may trigger a requirement to pay the landowner compensation. A land use action that precludes all economically viable use of property would be considered a regulatory taking. It is a constitutional violation to take private property without just compensation. The Oregon Department of Land Conservation and Development's (DLCD) [Legal Issues Guide](#) for natural hazard planning provides guidance to local governments in recognizing regulatory takings and in determining available options when this happens.

Policy Questions, Observations, and Implications

In determining how the Comprehensive Plan Update can support Milwaukie's Community Vision goals and action items, assets, trends, and challenges; we can consider the following questions and observations:

- The Comprehensive Plan should integrate requirements from Title 3 of the Metro Urban Growth Management Functional Plan. Title 3 requires local jurisdictions to limit or mitigate the impact of development activities on Water Quality and Flood Management Areas , which includes the FEMA 100-year floodplain with the 1996 flood inundation areas. Milwaukie's Comprehensive Plan language and development code may need to be adjusted to reflect Title 3 in conjunction with addressing forthcoming FEMA requirements discussed below. Note that City code already incorporates Title 3 requirements.
- Milwaukie should closely monitor FEMA's forthcoming amendments to the National Flood Insurance Program (NFIP) and re-mapping of the Special Flood Hazard Area (SFHA), as local floodplain regulations will need to be updated accordingly. Oregon DLCDC will be a key resource in helping to formulate regulatory responses.
- Milwaukie's Comprehensive Plan and development code do not address landslide hazards, despite DOGAMI's maps showing a number of areas in the city with moderate to high landslide risk. The City should consider adding a landslides objective to the Natural Hazards Element and ultimately address these hazards in their development code. The weak soils map should be updated to reflect information from current DOGAMI maps.
- The Comprehensive Plan also does not address wildfires. Although Milwaukie has a relatively low risk of wildfires, Oregon Department of Forestry maps indicate low to moderate wildfire risks in some of Milwaukie's parks and natural areas. Should wildfire hazards be added to the Natural Hazards Element?
- How can goals and policies related to resilience, including those developed with Milwaukie's Climate Action Plan, be integrated with the Comprehensive Plan? Similarly, should policies or regulations limit or preclude locating certain types of facilities (e.g., schools, medical facilities, etc.) within areas with high potential seismic risks?
- Should the Natural Hazards Element include provisions for incentives as an alternative or supplement to hazard regulation?
- Should the Comprehensive Plan encourage green infrastructure as a flood and landslide hazard prevention strategy?
- How can Milwaukie effectively address the greater needs of vulnerable populations in natural hazard planning?