Kent Taylor Civic Hall
200 NE Second Street
McMinnville, OR 97128

Joint City Council & Planning Commission Work Session Meeting
Agenda

Wednesday, June 18, 2028
6:00 p.m. – Joint Work Session Meeting

Welcome! The public is strongly encouraged to participate remotely but there is seating at Civic Hall for those who are not able to participate remotely. However, if you are not feeling well, please stay home and take care of yourself.

JOINT WORK SESSION:

You may join online via Zoom Webinar Meeting:
https://mcminnvilleoregon.zoom.us/j/87251150845?pwd=wBK6xGZvgRbxWP1Aa7ygKOeVaxJs92.1
Or you can call in and listen via Zoom: 1-253- 215- 8782
Webinar ID: 872 5115 0845

6:00 PM – JOINT CITY COUNCIL & PLANNING COMMISSION WORK SESSION – VIA ZOOM AND SEATING AT CIVIC HALL

1. COUNCIL PRESIDENT PERALTA CALLS JOINT MEETING TO ORDER

2. NATURAL RESOURCES/HAZARDS PLANNING UPDATE

3. COUNCIL PRESIDENT PERALTA ADJOURNMENT OF JOINT MEETING

Meeting Accessibility Services and Americans with Disabilities Act (ADA) Notice: Kent Taylor Civic Hall is accessible to persons with disabilities. A request for an interpreter for the hearing impaired or for other accommodations for persons with disabilities should be made a least 48 hours before the meeting to the City Recorder (503) 435-5702 or CityRecorderTeam@mcminnvilleoregon.gov.

City of McMinnville
Community Development
231 NE Fifth Street
McMinnville, OR 97128
(503) 434-7311
www.mcminnvilleoregon.gov

STAFF REPORT

DATE: **June 18, 2025**
TO: **Mayor and City Councilors**
FROM: **Heather Richards, Community Development Director**
SUBJECT: **Work Session: Natural Resources and Natural Hazards Planning**

STRATEGIC PRIORITY & GOAL:

COMMUNITY SAFETY & RESILIENCY
Proactively plan for & responsively maintain a safe & resilient community.

GROWTH & DEVELOPMENT CHARACTER
Guide growth & development strategically, responsively & responsibly to enhance our unique character.

Report in Brief:

This is a work session to update the City Council on the City's Oregon Land Use Goal 5 (Natural Resources) and Oregon Land Use Goal 7 (Natural Hazards) planning that is required as part of the City's recent urban growth boundary amendment. What work has been done thus far. What work still needs to be done. What have been some of the barriers for moving forward.

Background:

In 2020, the City of McMinnville adopted Ordinance No. 50098, approving the McMinnville Growth Management and Urbanization Plan (MGMUP) 2020 UGB Update. This resulted in an expansion of the McMinnville urban growth boundary (UGB) by 662.40 gross buildable acres (862.40 gross acres) of additional land to the UGB to meet identified residential, commercial, industrial, and other public and semi-public land needs for a targeted population forecast of 44,055 people.

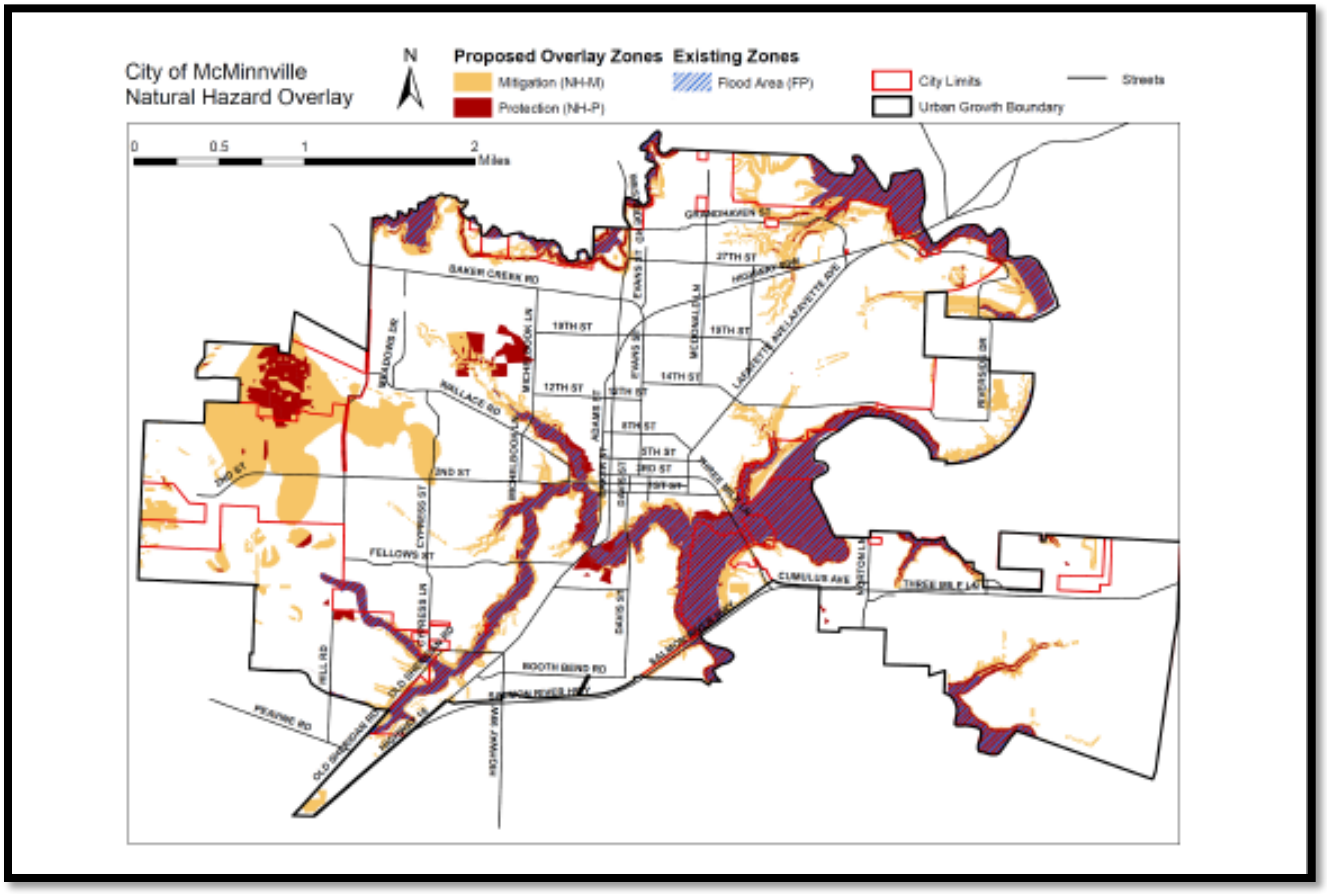
In the course of evaluating land for the UGB expansion, the City discovered natural hazards and natural resources in the expansion areas that needed to be studied and addressed.

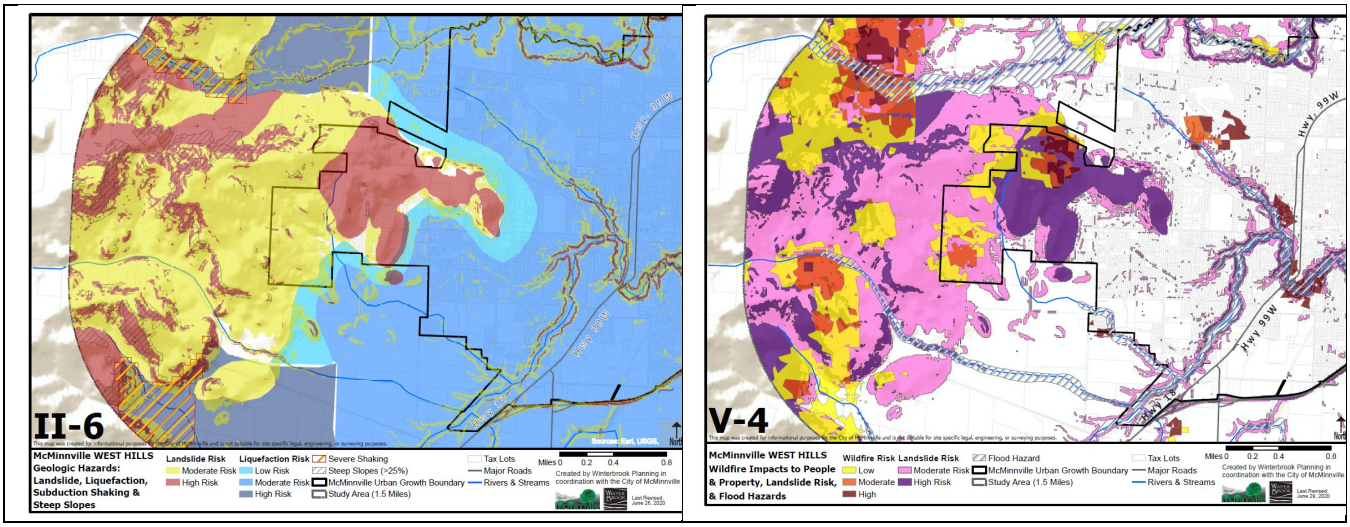
The City hired Winterbrook Planning in 2021 to help with the Natural Hazards and Natural Resources planning work.

Data was collected and evaluated. Inventories and maps were created of the natural hazards and natural resources per the following:

Natural Hazards:

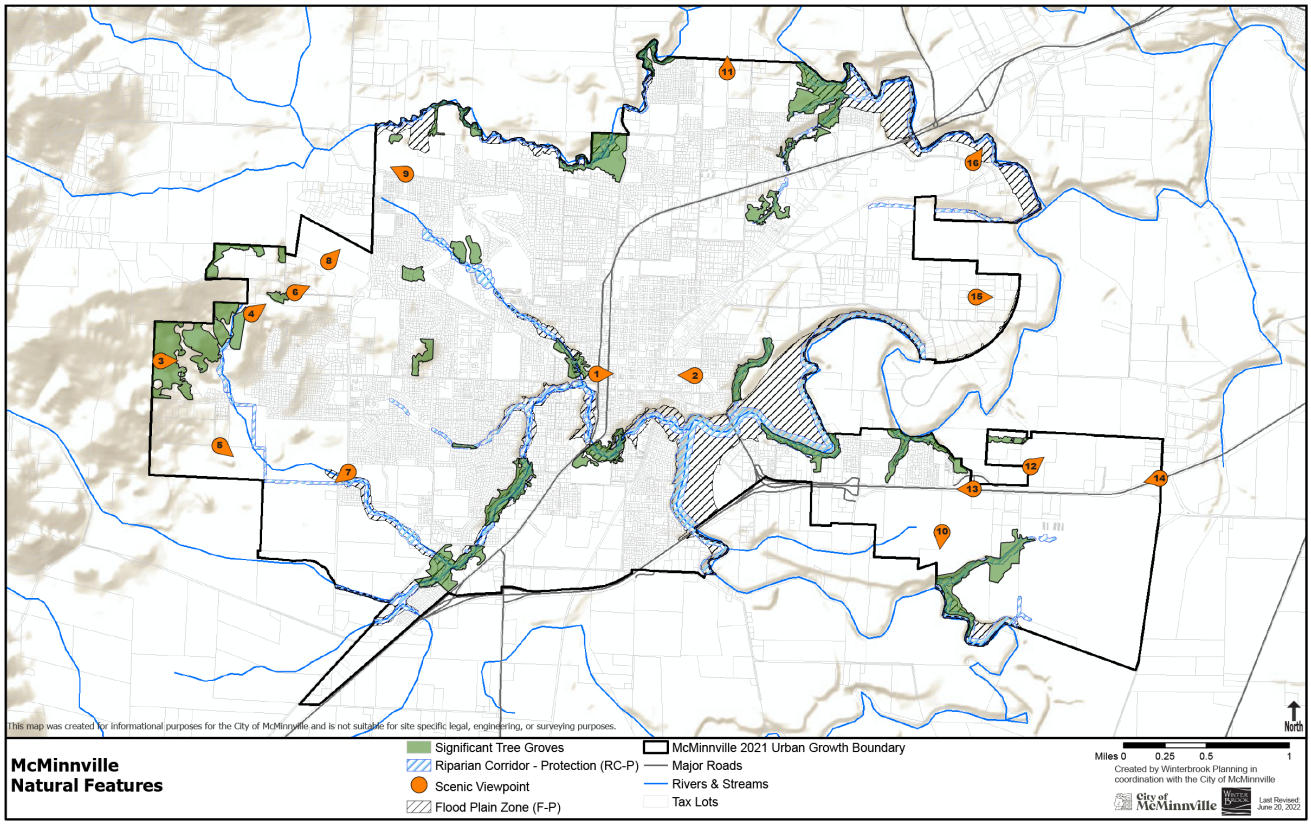
- Floods (Floodplains)
- Landslides (Liquefaction Soils, Steep Slopes)
- Wildfire
- Earthquakes (Subduction Shaking)

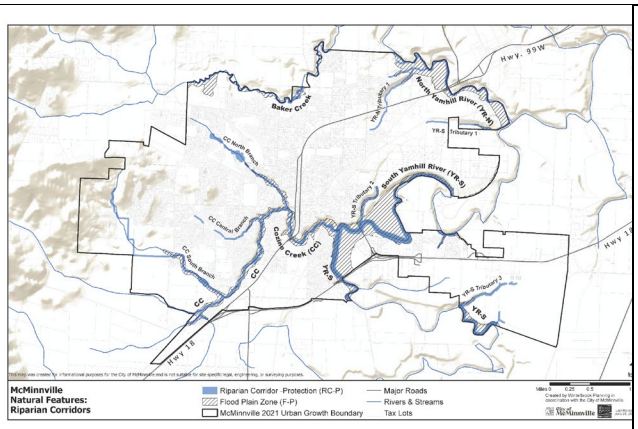


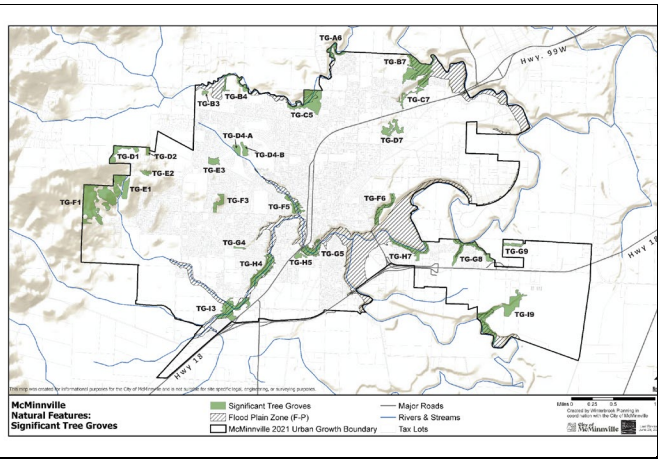


Natural Resources:

- Riparian Corridors
- Tree Groves
- Scenic Views







Then the City needed to identify what it would do with the information – ie what measures the City wanted to take to protect people and property from the Natural Hazards, and what measures the City wanted to take to protect the Natural Resources from people and property.

Draft development code and comprehensive plan policies were developed. Discussion ensued on what those protective measures did to both private development projects and public improvement projects, and the project was put on hold.

Discussion:

The City needs to complete its Natural Hazards and Natural Resources work. Questions remain as to what protective measures the City wants to codify and how those measures impact both private and public development projects within the City, now and into the future.

Attachments:

Natural Resources:

- Natural Resources Summary Memorandum, 2025
- Natural Resources Summary Slides, 2025
- Riparian Corridor Report, 2021
- Tree Grove Assessment Report, 2021
- Scenic Inventory Report, 2021
- Draft Tree Grove Protection Code Amendments

Natural Hazards:

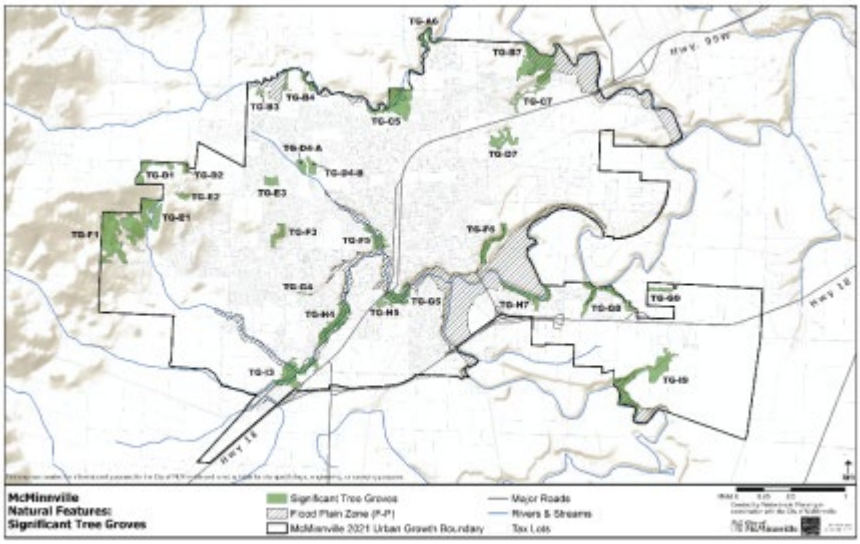
- Natural Hazards Summary, 2025
- Natural Hazards Zone Map, 2025
- Natural Hazards Report, 2021
- Draft Natural Hazards Code Amendments
- Draft Natural Hazards Comprehensive Plan Amendments

Natural Resources Program Summary

Inventory

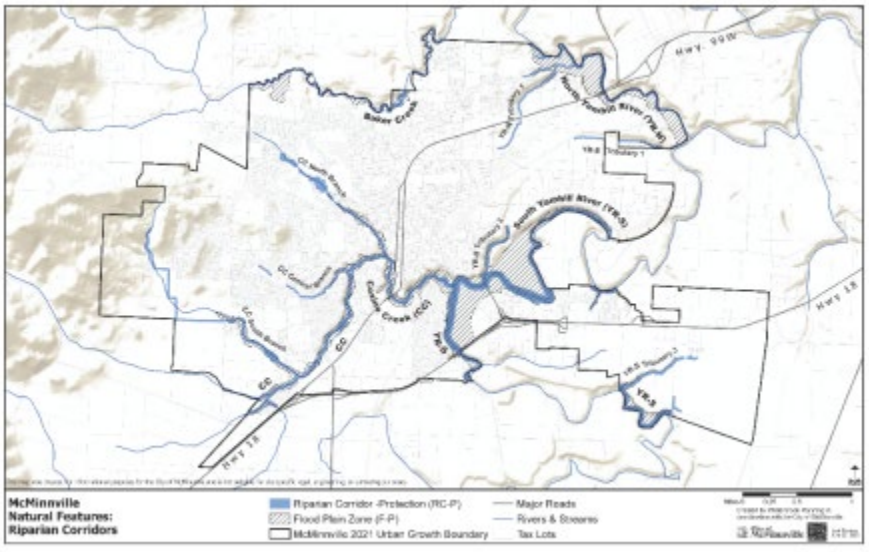
Tree Groves

- Thirty groves identified
  - Predominantly 25’ tall or more
  - One acre of contiguous canopy
- Field assessment – point system based on ten functional criteria
- 27 groves ranked as “significant”



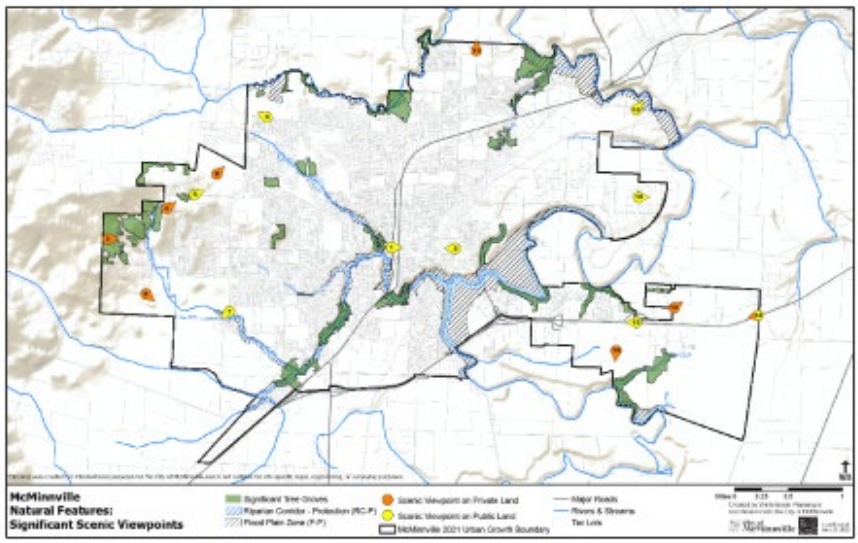
Riparian Corridor

- Eleven Riparian Corridors Inventoried
- Followed “Safe Harbor” under OAR 660-023-0030
- 75’ from bank of South Yamhill River
  50’ from bank of all other fish-bearing streams
- Most riparian corridors within 100-year floodplain



Scenic Viewpoints

- Created using Digital Elevation Modeling (DEM)
- Viewsheds extend beyond UGB
- Significant Viewsheds:
- Mountain Views
- Hill Views
- Ag Land Views
- Riparian Corridor Views
- Gateway Views
- City Views
- Viewpoints inside UGB:
- Public Property/ROW (9 viewpoints)
- Private Property (7 viewpoints)



DRAFT Limited Protection Programs

Draft Riparian Corridor Program Summary

Permitted, Conditional, and Prohibited Uses

- Impervious surface areas and tree removal prohibited – except for public facilities.
- Exemption for emergency repairs to public facilities, stream restoration, and routine maintenance or replacement of public facilities.
- Detailed in Table 17.47.120, with categories for ministerial review, Director approval, conditional use, or prohibited outright.
- Residential structures and parking prohibited.
- Public facilities such as roads and sewer lines allowed if no feasible alternative exists and mitigation provided. Minor utility crossings permitted with BMP's.
- Nature trails and low impact recreational facilities allowed. Replacement structures allowed.

Development Standards:

- Minimize site impacts: Development must minimize excavation, tree removal, and hydrological disruption.
- Construction in riparian setbacks must use materials and methods that minimize environmental harm.
- Mitigation is required on a 1:1 or 1.5:1 basis depending on the impact.

Variances and Adjustments

- Up to 50% adjustment to base zone dimensional standards may be granted to reduce impact on riparian areas.
- Economic hardship variances may be granted if a property would otherwise have no reasonable economic use.

Draft Tree Groves Program Summary

Exemption for City of McMinnville:

- Public emergencies, including emergency repairs to public facilities; and
- Routine maintenance or replacement of existing public facilities projects.

Use Regulations (Table 17.47.220)

- Permitted Uses: Passive recreation, removal of invasives, repair of existing facilities, replacement of existing structures,
- Permitted Uses with Mitigation. Public facilities that appear on the City's Public Facilities Plan when there is no reasonable alternative, streets where there is no reasonable alternative, utility crossings, Park improvements where authorized by a parks master plan.
- Director Approval Required: For local streets, utilities, park improvements, herbicide use under WAMP.
- Conditional Use: Economic hardship variances and master plan-based tree grove reduction.
- Prohibited Uses: New structures, grading, fill, native vegetation removal, herbicides (unless exempted), etc.

Application Requirements:

- Grading plan
- Arborist Report
- Tree grove Mitigation Report (if development is within a tree grove)
- Wildfire Assessment and Management Plan.

Development Standards

- Avoid or minimize impacts on trees and vegetation, structures not allowed unless specifically permitted. Include alternatives considered.
- 1:1 mitigation for temporary disturbance, 5:1 mitigation for permanent veg. removal

- Construction materials and methods must minimize harm to water quality and vegetation.

Adjustments, Variances, Density Transfer

- Up to 50% administrative adjustment to base zone standards allowed to reduce impact.
- Hardship variances are allowed only if no reasonable economic use exists, and adverse effects are minimized.
- Permits transfer of residential density to nearby buildable land under the same ownership, using standards from the next higher zone.

Draft Scenic View Program

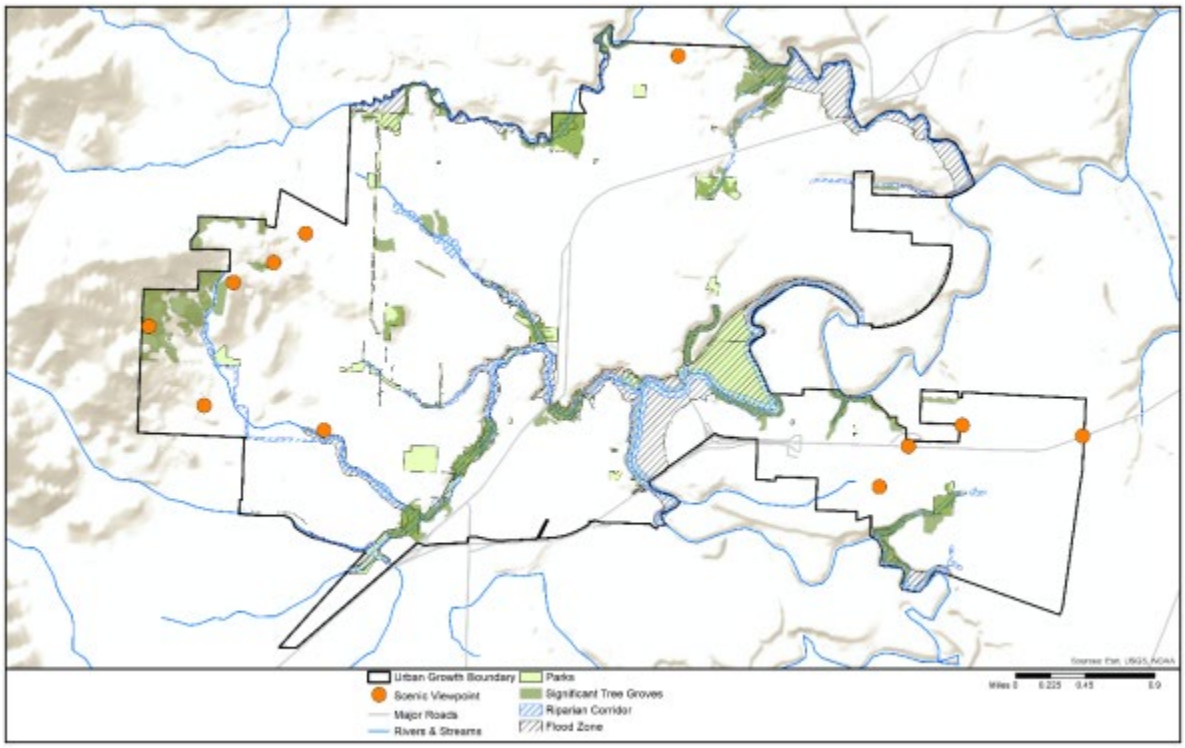
Significant Scenic Views are proposed to be protected through comprehensive plan policies, not as development code amendments. While the inventory is complete (though unadopted), the comprehensive plan policies are at preliminary stages of development.

Private Land

- For private land, an ESEE analysis shall be required for area plans with a scenic viewpoint. The analysis shall consider alternative program options to protect identified scenic viewsheds, including but not limited to the layout and design of private streets and open spaces, pedestrian and bicycle circulation systems, and the spacing and design of proposed buildings, landscaping and above-ground utilities.

Public Land

- For public land, scenic views and viewsheds shall be considered in creation of and amendments to park master plans and public facilities master plans adopted by the City Council. Viewpoints and viewsheds shall be considered in the orientation and design of above-ground (vertical elements) infrastructure projects that could obstruct scenic views from public land or improvements.



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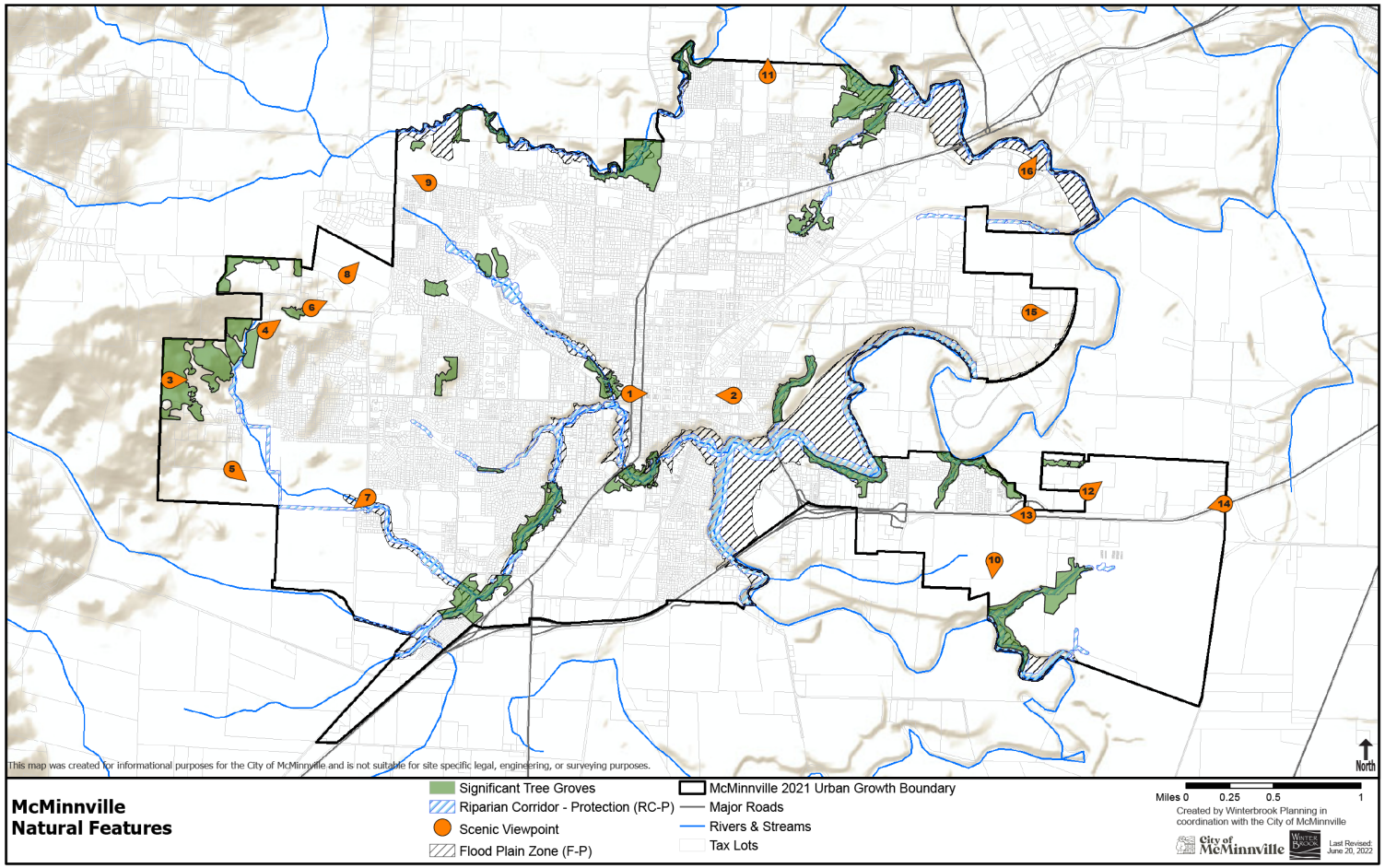
City of McMinnville

NATURAL RESOURCES PROGRAM WORK SESSION

Tice Park (Tree Grove C5) *(source: Winterbrook Planning)*



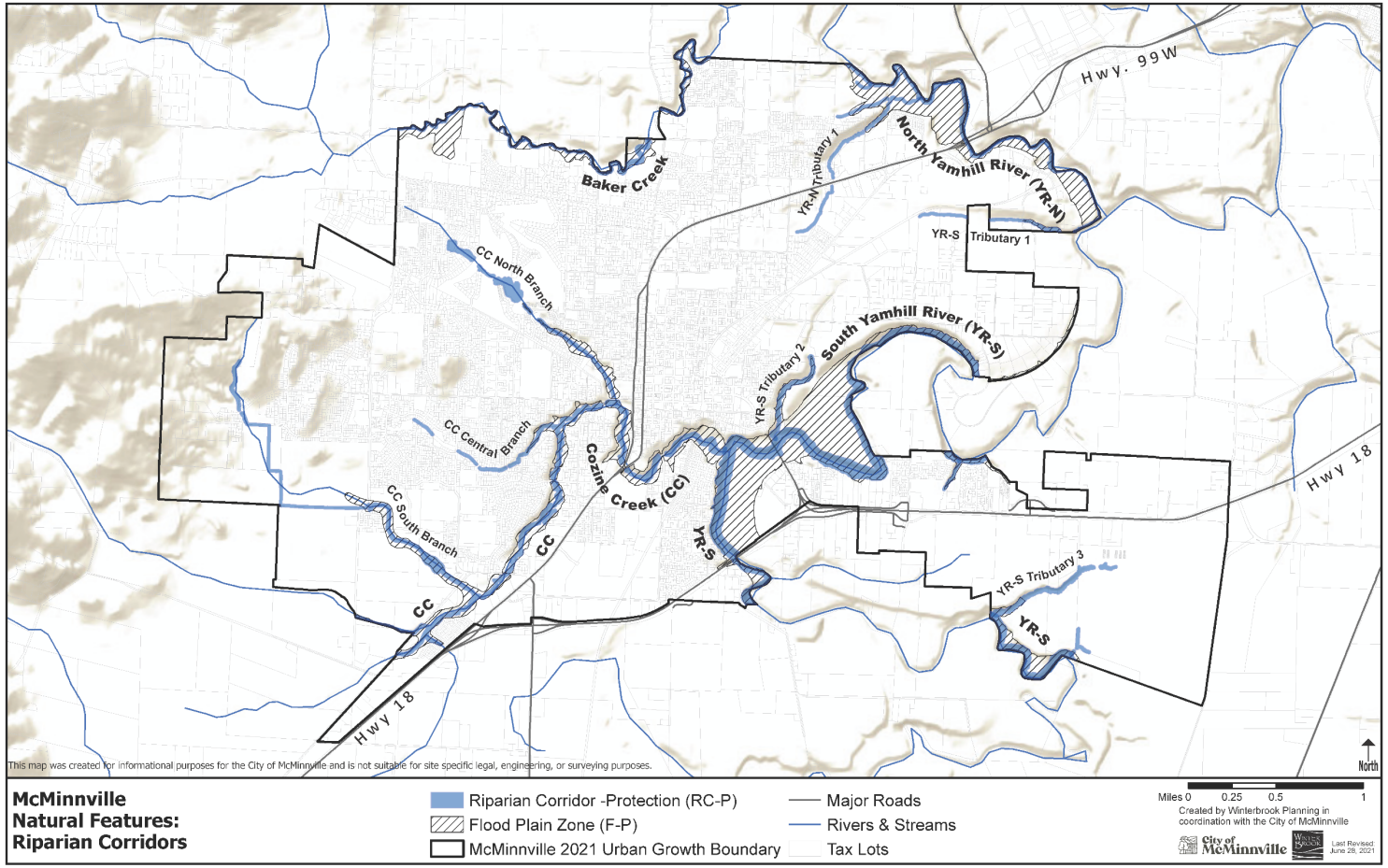
SIGNIFICANT NATURAL RESOURCES

- Inventoried in 2021-22
  - Riparian Corridors
  - Tree Groves
  - Scenic Viewpoints and Viewsheds
- Draft Programs Created
- Next Steps
  - Input from Public Works, Parks
  - Goal 5 ESEE Analysis
  - Public Process with Hearings

Added on 06.13.2025

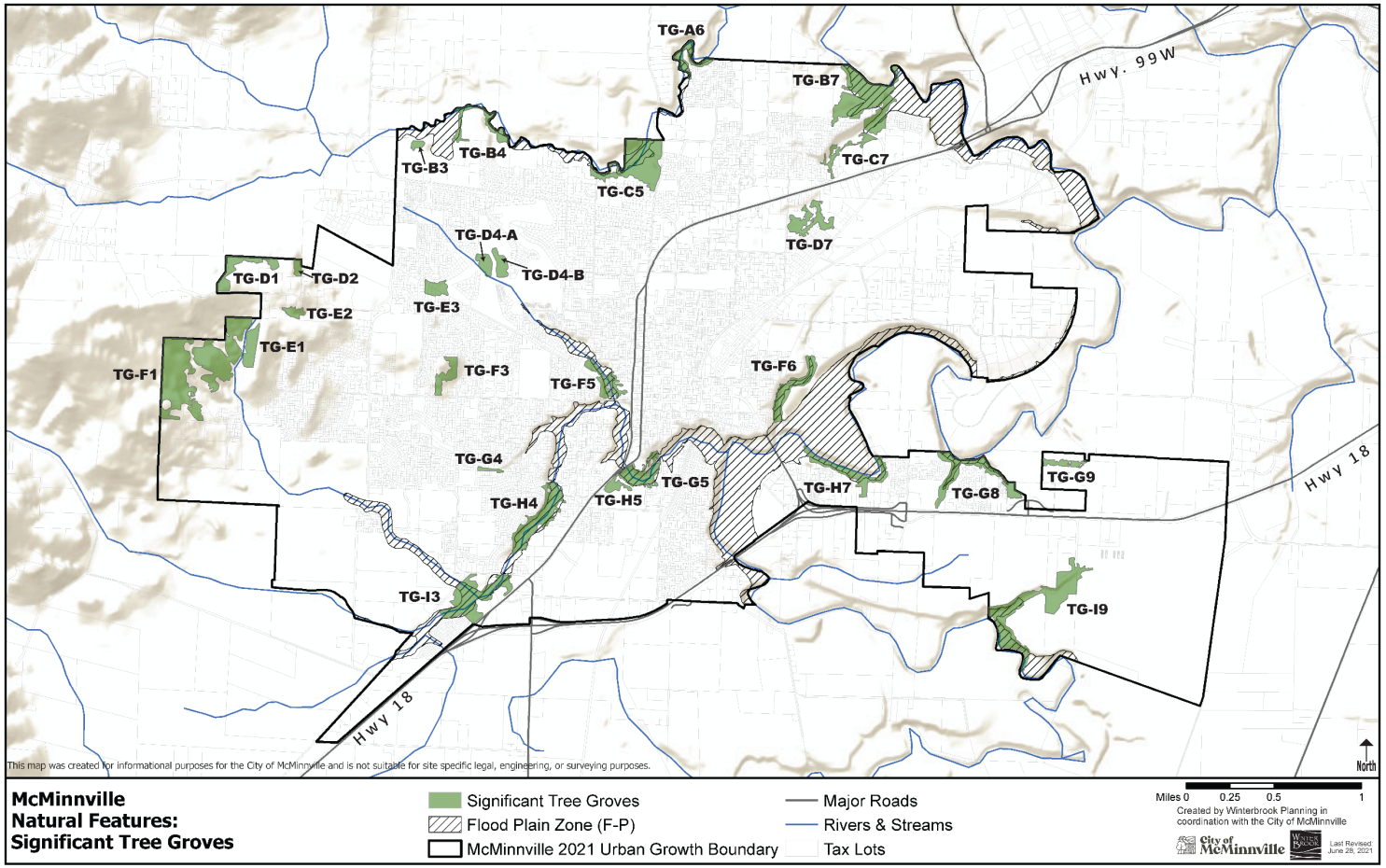
RIPARIAN CORRIDOR INVENTORY

- Eleven Riparian Corridors Inventoried
- Followed "Safe Harbor" under OAR 660-023-0030
- 75' from bank of South Yamhill River
- 50' from bank of all other fish-bearing streams
- No Goal 5 ESEE analysis required because safe harbor
- Most riparian corridors within 100-year floodplain



TREE GROVE INVENTORY

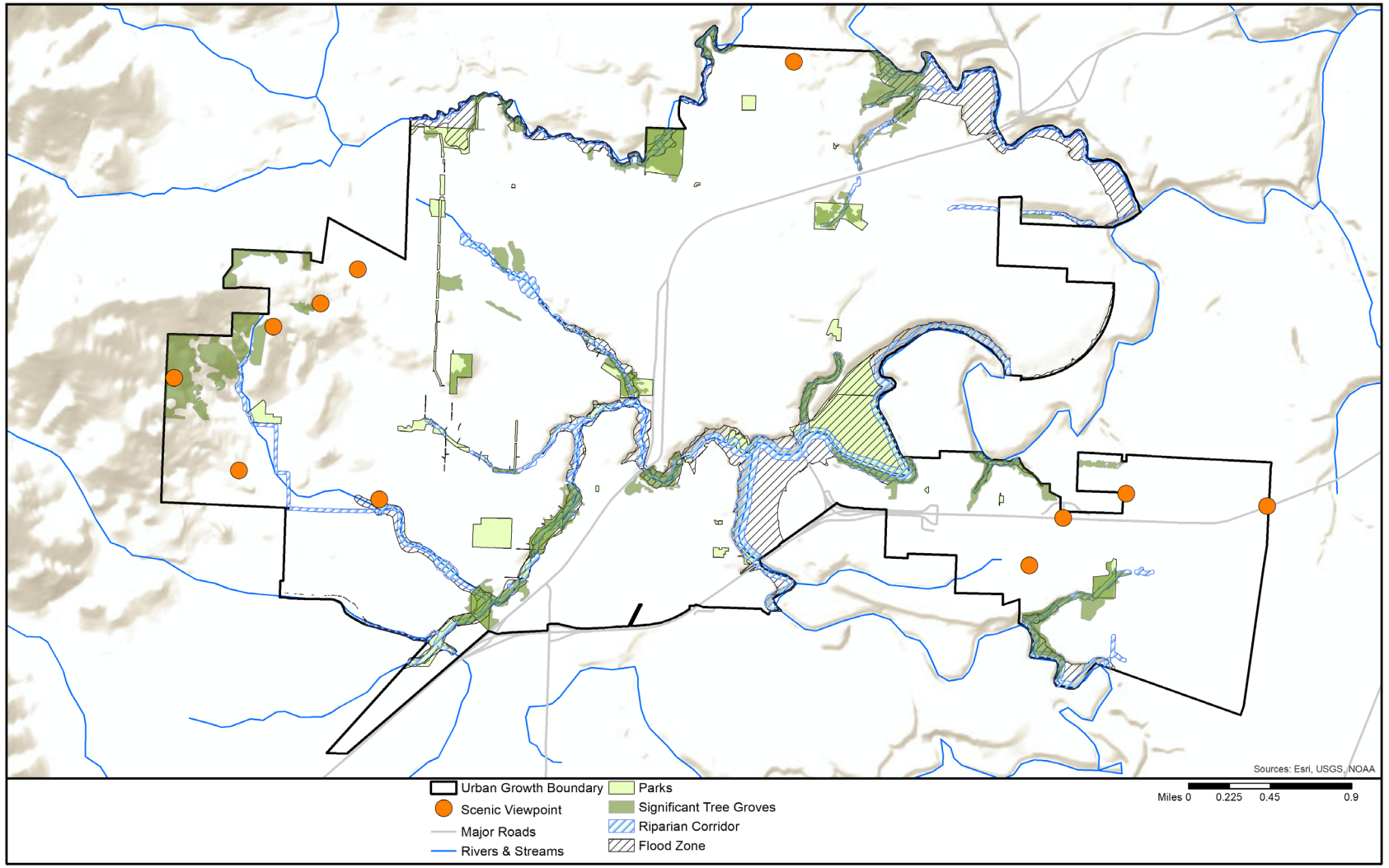
- Thirty groves identified
  - Predominantly 25’ tall or more
  - One acre of contiguous canopy
- Field assessment – point system based on ten functional criteria
- 27 groves ranked as “significant”
- Goal ESEE analysis in process – required prior to developing a protection program (tree grove subdistrict)



TREE GROVES AND PARKS

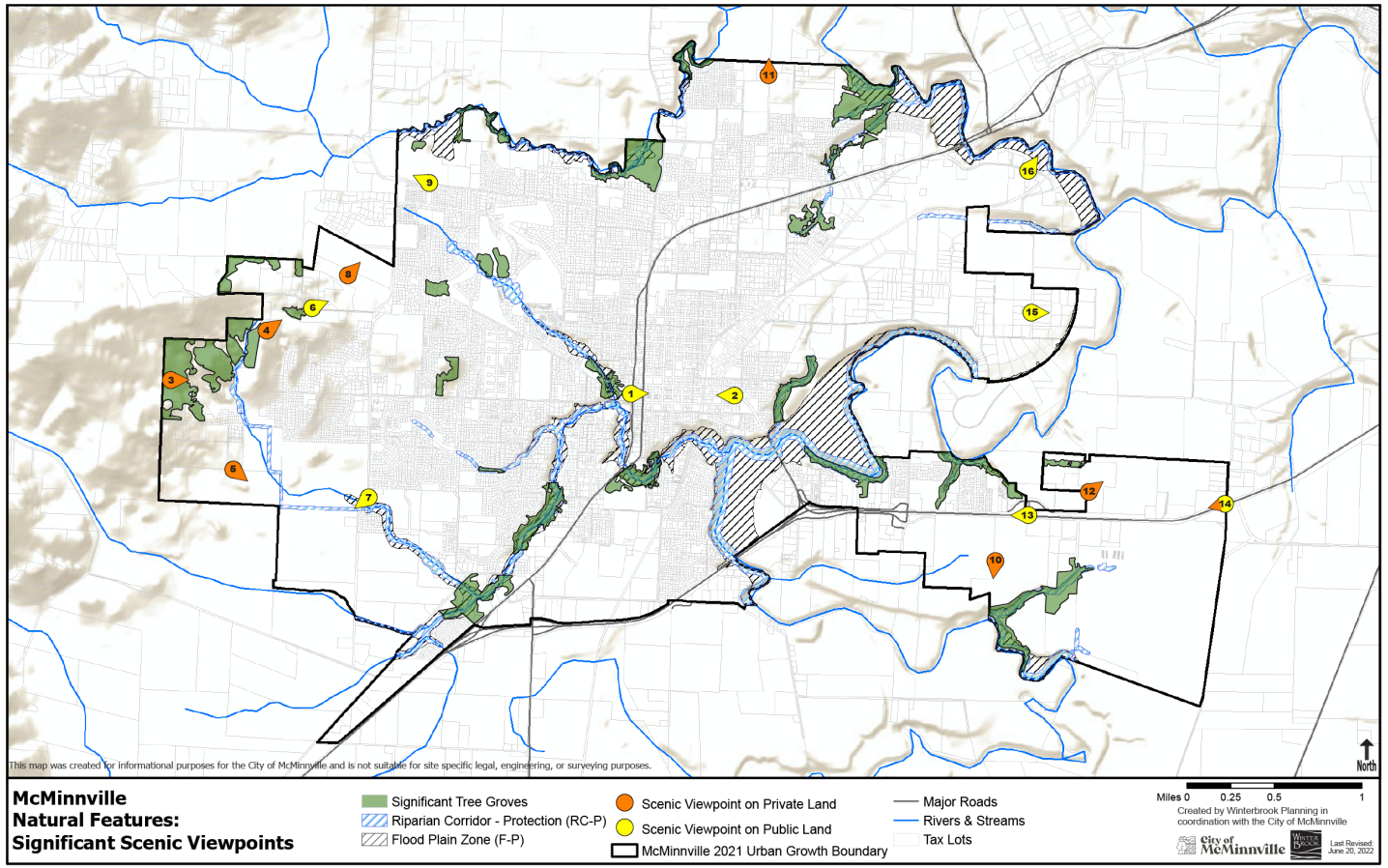
Several parks have large areas of significant tree groves, including:

- Quarry Park
- City Park
- Airport Park
- Rotary Nature Preserve
- Wortman Park



SCENIC VIEWS INVENTORY

- Sixteen viewpoints identified collaboratively with the City
- Significant Viewsheds:
  - Mountain Views
  - Hill Views
  - Agricultural Land Views
  - Riparian Corridor Views
  - Gateway Views
  - City Views
- Created using Digital Elevation Modeling (DEM)
- Viewpoints inside UGB:
  - Public Property/ROW (9 viewpoints)
  - Private Property (7 viewpoints)



RIPARIAN CORRIDORS- DRAFT PROGRAM SUMMARY

Permitted, Conditional, and Prohibited Uses

- Impervious surface areas and tree removal prohibited – except for public facilities.
- Exemption for emergency repairs to public facilities, stream restoration, and routine maintenance or replacement of public facilities.
- Detailed in Table 17.47.120, with categories for ministerial review, Director approval, conditional use, or prohibited outright.
- Residential structures and parking prohibited.
- Public facilities such as roads and sewer lines allowed if no feasible alternative exists and mitigation provided. Minor utility crossings permitted with BMP's.
- Nature trails and low impact recreational facilities allowed. Replacement structures allowed.

Development Standards:

- Minimize site impacts: Development must minimize excavation, tree removal, and hydrological disruption.
- Construction in riparian setbacks must use materials and methods that minimize environmental harm.
- Mitigation is required on a 1:1 or 1.5:1 basis depending on the impact.

Variances and Adjustments

- Up to 50% adjustment to base zone dimensional standards may be granted to reduce impact
- Economic hardship variances may be granted if a property would otherwise have no reasonable economic use.

TREE GROVES-
DRAFT PROGRAM SUMMARY

Exemption for City of McMinnville:

- Public emergencies, including emergency repairs to public facilities; and
- Routine maintenance or replacement of existing public facilities projects.

Use Regulations (Table 17.47.220)

- Permitted Uses: Passive recreation, removal of invasives, repair of existing facilities, replacement of existing structures,
- Permitted Uses with Mitigation. Public facilities that appear on the City's Public Facilities Plan when there is no reasonable alternative, streets where there is no reasonable alternative, utility crossings, Park improvements where authorized by a parks master plan.
- Director Approval Required: For local streets, utilities, park improvements, herbicide use under WAMP.
- Conditional Use: Economic hardship variances and master plan-based tree grove reduction.
- Prohibited Uses: New structures, grading, fill, native vegetation removal, herbicides (unless exempted), etc.

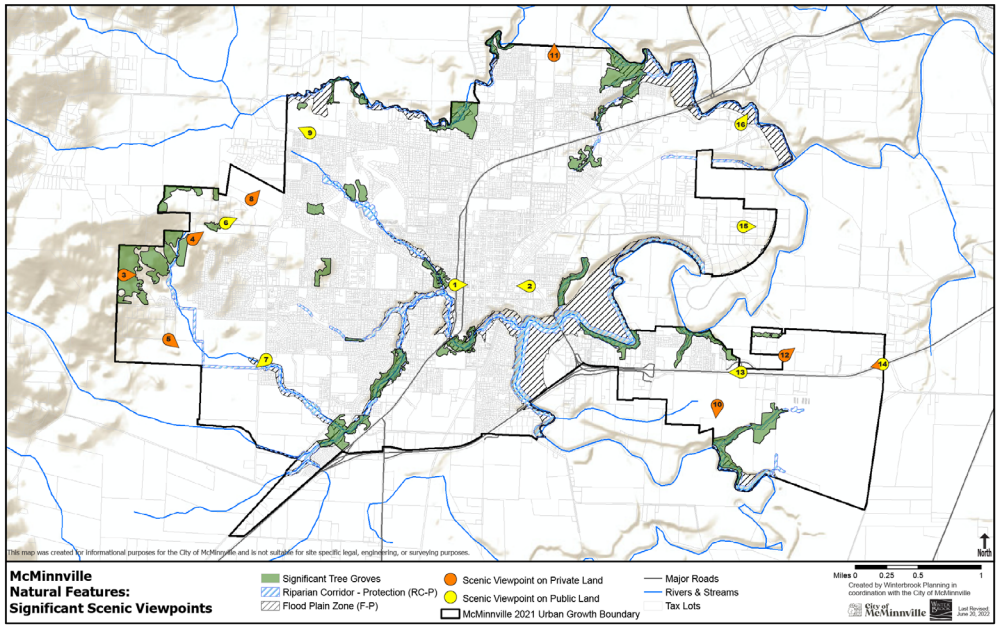
Development Standards

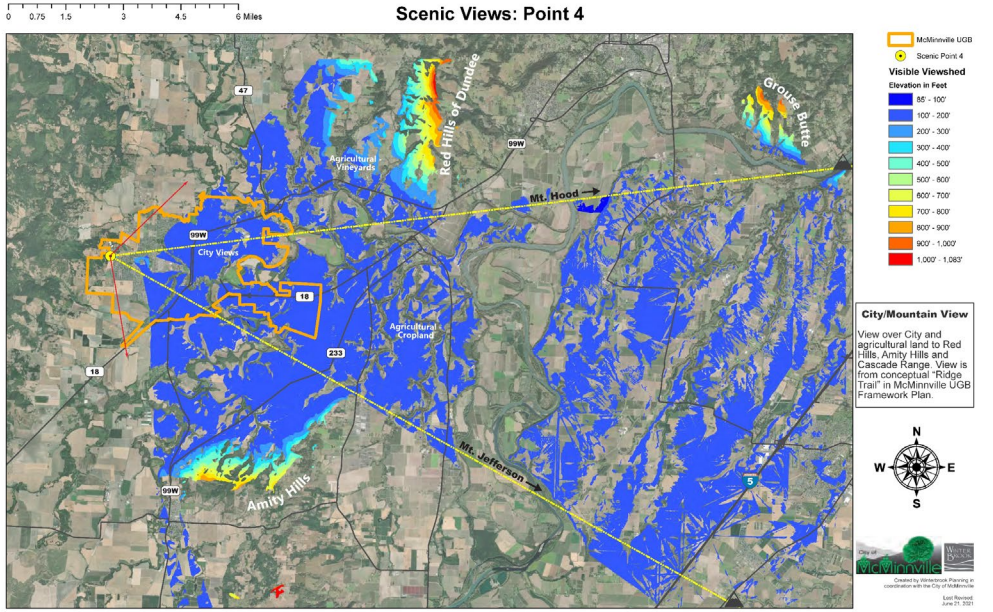
- Avoid or minimize impacts on trees and vegetation, structures not allowed unless specifically permitted. Include alternatives considered.
- 1:1 mitigation for temporary disturbance, 5:1 mitigation for permanent veg. removal
- Construction materials and methods must minimize harm to water quality and vegetation.
- Hardship variances are allowed only if no reasonable economic use exists, and adverse effects are minimized.
- Permits transfer of residential density to nearby

SCENIC VIEWS
DRAFT PROGRAM SUMMARY

Comprehensive Plan Policies (not development code)- in preliminary stages of development.

- Private Land
  - ESEE analysis required for area plans with a scenic viewpoint. The analysis shall consider alternative program options to protect identified scenic viewsheds, including but not limited to the layout and design of streets and open spaces, pedestrian and bicycle circulation systems, and the spacing and design of proposed buildings, landscaping and above-ground utilities.
- Public Land
  - Scenic views and viewsheds shall be considered in creation of and amendments to park master plans and public facilities master plans adopted by the City Council. Viewpoints and viewsheds shall be considered in the orientation and design of above-ground (vertical elements) infrastructure projects that could obstruct scenic views from public land or improvements.





City of McMinnville
Riparian Corridor Inventory Report

Prepared by:

WINTER BROOK
COMMUNITY RESOURCE PLANNING

City of McMinnville
Riparian Corridor Inventory

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Appendices

INTRODUCTION

Riparian areas (including watercourses and wetlands) are identified as significant natural features in the City of McMinnville's Great Neighborhood Policies. Under Policy 187.50.1,

> "*Great Neighborhoods are sensitive to the natural conditions and features of the land. Neighborhoods shall be designed to preserve significant natural features including, but not limited to, watercourses, sensitive lands, steep slopes, wetlands, wooded areas, and landmark trees.*"

To implement Great Neighborhood Policies, the City authorized Winterbrook Planning to prepare an inventory of watercourses and associated riparian corridors within the McMinnville study area. The study area covers the City of McMinnville Urban Growth Boundary (UGB), including the 2020 adopted additions to the UGB. The purpose of the inventory is to identify fish bearing streams and follow the safe harbor provisions for riparian corridor protection outlined in the Statewide Planning Goal 5 (Natural Resources) administrative rule (OAR Chapter 600, Division 0023).

For the purposes of this project, the riparian area is "the area adjacent to a river, lake, or stream, consisting of the area of transition from an aquatic ecosystem to a terrestrial ecosystem." The riparian corridor is "a Goal 5 resource that includes the water areas, fish habitat, adjacent riparian areas, and wetlands within the riparian area corridor." (OAR 660-023-090(1))

This report begins with a summary of key inventory findings. Next, inventory methods are described, followed by a review of inventory results. The report ends with a conclusion and summary of next steps in the Goal 5 process.

- Appendix A provides an overview map of riparian corridors within the study area with safe harbor riparian corridor buffers along streams and rivers.
- Appendix B shows a detailed index of top-of-bank and riparian corridors.
- Appendix C provides a key to plant scientific names.
- Appendix D provides a database of wetland determination files within the study area from the Department of State Lands.

SUMMARY

Eleven (11) riparian corridors were identified within the City of McMinnville study area. Table 1 summarizes the riparian corridors within the McMinnville study area: their location, stream length, field dates, and general characteristics. The corridors are described in more detail in the Inventory Results section.

Table 1. Summary of McMinnville Riparian Corridors

Site	Name / Location	Reach Length	Field date	Riparian Characteristics
BC	Baker Creek	3.09 mi	3.9.21, 3.10.21	Large, free-flowing creek with broad wetland complex at Tice Park
YR-N	North Yamhill River	2.55 mi	3.10.21	Wide forested river corridor through mostly agricultural lands
YR-N1	North Yamhill River Tributary 1 – Grandhaven	1.22 mi	3.9.21, 3.10.21	Multi-stemmed tributary between Wortman Park and large riverine forest
YR-S	South Yamhill River	4.84 mi	3.9.21, 3.10.21	Large, forested river corridor along eastern edge of study area
YR-S1	South Yamhill River Tributary 1 – Riverside	0.72 mi	3.9.21, 3.10.21	Small tributary that flows through fragmented habitat
YR-S2	South Yamhill River Tributary 2 – Brooks	0.60 mi	3.9.21, 3.10.21	Forested site connecting to the broad river corridor in Kiwanis Marine Park
YR-S3	South Yamhill River Tributary 3 – Airport	0.76 mi	3.11.21, 4.7.21	Diverse forested tributary with associated wetlands at Airport Park
CC	Cozine Creek	3.72 mi	3.11.21, 4.7.21	Mixed forest and developed corridor meanders widely within floodplain
CC-N	Cozine Creek North Branch	1.03 mi	3.9.21, 4.7.21	Fragmented corridor travels through City Park before joining Cozine Creek
CC-C	Cozine Creek Central Branch	0.94 mi	4.7.21	Narrow, developed corridor opens out to floodplain forest east of Fleishauer
CC-S	Cozine Creek South Branch	2.41 mi	3.11.21, 4.7.21	Upper farm ditches transition to diverse corridor with wetland mosaic

The City's riparian corridors form an impressive network of open space and natural habitats that connect neighborhoods and provide defining natural landmarks. The Baker Creek riparian corridor provides a natural backdrop along the northern City limits, while North Yamhill River defines the northeast edge of the City. The South Yamhill River corridor is a prominent natural feature on the City's east side, with tributary stream corridors extending into the City's core. The largest of these, Cozine Creek and its branches, reach west into the City providing a broad, green open space network that links City Park, Linfield University, and areas such as Barber and Tall Oaks open spaces. The City's riparian corridor system provides important services and amenities to the McMinnville community. These include scenic, environmental, social and economic amenities.

RIPARIAN CORRIDOR INVENTORY METHODS

Winterbrook conducted a riparian corridor inventory for fish bearing rivers and streams within McMinnville's recently adopted UGB using the "safe harbor" provisions of OAR 660-023-090(5). As set forth in the Goal 5 rule[1], stream reaches with an average annual flow of 1,000 cubic feet per second (cfs) or greater have a riparian corridor of 75' measured from the top-of-bank. Stream reaches with less than 1,000 cfs have a 50' riparian corridor. Two levels of investigation were conducted for the inventory of riparian corridors: a review of existing information and a field inventory.

Review of Existing Information

A review of existing maps and other materials was conducted to gather information on riparian corridors along rivers, ponds, and streams in McMinnville.

Winterbrook consulted multiple sources for this review, including the following:

- Oregon Fish Habitat Distribution Data (ODFW, September 2020)
- Hydrography Statewide Streams (Oregon Department of Forestry, 2007)
- Topography 7.5-minute map for McMinnville, OR (USGS, 2020)
- LiDAR Data 7.5' Quadrangle, (DOGAMI, accessed February 2021)
- 2' Contours, (created using DOGAMI Bare Earth DEM, February 2021)
- National Wetlands Inventory (NWI) maps (USFWS, 2020)
- Statewide Wetlands Inventory (SWI) maps (DSL, 2020)
- Department of State Lands (DSL) Wetland Determination files
- Federal Emergency Management Agency flood maps (FEMA, 2010)
- National Hydrography Dataset (USGS, accessed February 2021)
- Color Aerial Image, 1' Resolution (Oregon Spatial Data Library, 2018)

[1] (5) As a safe harbor in order to address the requirements under OAR 660-023-0030, a local government may determine the boundaries of significant riparian corridors within its jurisdiction using a standard setback distance from all fish-bearing lakes and streams shown on the documents listed in subsections (a) through (f) of section (4) of this rule, as follows:
(a) Along all streams with average annual stream flow greater than 1,000 cubic feet per second (cfs) the riparian corridor boundary shall be 75 feet upland from the top of each bank.
(b) Along all lakes, and fish-bearing streams with average annual stream flow less than 1,000 cfs, the riparian corridor boundary shall be 50 feet from the top of bank.
(c) Where the riparian corridor includes all or portions of a significant wetland as set out in OAR 660-023-0100, the standard distance to the riparian corridor boundary shall be measured from, and include, the upland edge of the wetland.

- Oregon Urban Growth Boundary 2019 (DLCD, 2020)
- Tax Lots (Yamhill County Assessor, 2019)

The existing information served as the basis for preparing GIS base maps showing fish bearing rivers and streams within the study area. Riparian corridor sites were assigned a code based on stream name (e.g., CC for Cozine Creek) and stream tributaries (e.g., CC-N for North Branch of Cozine Creek). For ease of reference, the base mapping was laid out on a grid covering the McMinnville study area, creating a set of 11"x17" field maps at a scale of 1"=200'.

The information review made use of technologies such as Light Detection and Radar (LiDAR) and Geographic Information System (GIS) mapping and analysis technology. Tops-of-bank were estimated using LiDAR (2-foot contours were derived for the study area using bare earth Digital Elevation Model (DEM)). Winterbrook also reviewed DSL wetland determination files for potential wetlands within or partially within riparian corridors. Riparian corridor GIS maps were geocoded so that they can be overlain with natural hazard, tree grove and scenic views.

Field Inventory

A field inventory of riparian corridors was conducted along stream and river reaches that could be viewed from public land or rights-of-way. Multiple observation points were used for each site where possible. Tops-of-bank were field checked at accessible points along rivers and streams. Grid base maps were reviewed in the field and notations were made on tops of bank and riparian features, as appropriate.

The location, length, and general characteristics of each riparian corridor were identified. Other relevant information such as adjacent land uses, the presence of streamside wetlands and potential riparian enhancement measures were also noted.

INVENTORY RESULTS

The riparian corridor field work was conducted within the McMinnville study area between March and May 2021.

Fish bearing streams include the North and South Yamhill Rivers and their tributaries, as identified on ODFW and Forest Service maps. Eleven (11) riparian corridors were identified within the City of McMinnville study area. Specifically, the fish bearing river, stream and tributaries identified include the following:

- North Yamhill River (YR-N)
  - North Yamhill River Tributary 1 – Grandhaven (YR-N1)
- South Yamhill River (YR-S)
  - South Yamhill River Tributary 1 – Riverside (YR-S1)

    - South Yamhill River Tributary 2 – Brooks (YR-S2)
    - South Yamhill River Tributary 3 – Airport (YR-S3)
- Baker Creek (BC)
- Cozine Creek (CC)
    - Cozine Creek North Branch (CC-N)
    - Cozine Creek Central Branch (CC-C)
    - Cozine Creek South Branch (CC-S)

McMinnville's riparian corridors range from large, free-flowing streams and rivers with densely forested banks to narrow, fragmented corridors through developed residential, farm, and open space lands. The riparian corridor reaches range in length from 0.6 to 4.84 miles.

Determination of Riparian Corridor Width

Thresholds for stream flow were estimated based on the one USGS gage within the study area at South Yamhill River (Three Mile Bridge).

- This gage shows an average annual flow (since 1995) of 1,711 cfs; hence the South Yamhill River site exceeds the 1,000 cubic feet per second (cfs) flow threshold under the riparian corridor safe harbor (Footnote 1).
- The North Yamhill River has no gage, but its drainage basin is 113,441 acres, which is only 25 percent of the drainage area above the South Yamhill gage. For this reason, the average annual flow of the North Yamhill River is estimated to be less than 1,000 cfs.
- All of the tributaries including Baker Creek and Cozine Creek also fall below this threshold.

Thus, the South Yamhill River has a riparian corridor width of 75 feet from top-of-bank and the remaining riparian corridors within the UGB have a width of 50 feet from top-of-bank.

Most of the City's riparian corridors are associated with floodplain areas. Floodplains follow the main river and stream corridors, but generally do not extend more than half-way up tributary streams. Streamside wetlands often occur in clusters within broad floodplain areas. Palustrine forested and emergent wetlands are the most common within the study area. Examples of prominent wetland mosaics are found at Tice Park and Barber open space. There are several smaller mapped wetlands found along the riparian corridors.

DSL Mapped Wetlands

The Goal 5 rule (OAR 660-023-0090(5)(c)) states that the riparian corridor must be expanded to include "significant wetlands."

(c) Where the riparian corridor includes all or portions of a significant wetland as set out in OAR 660-023-0100, the standard distance to the riparian corridor boundary shall be measured from, and include, the upland edge of the wetland.

However, Section 100 of the rule specifies that "locally significant wetlands" can only be determined based on a "local wetlands inventory" that meets demanding Department of State Lands (DSL) rule requirements.[2] Therefore, the riparian corridor must be limited to the 50-foot and 75-foot from top-of-bank standards discussed above.

Winterbrook requested and received a DSL spreadsheet from listing more than 100 wetland files. Winterbrook had planned to show the DSL mapping of these wetlands in relation to riparian corridors. However, DSL wetland determination files have not been digitized or are not available in a systematic or mappable form. DSL confirmed that they plan to digitize and add these files to the Statewide Wetland Inventory but staffing shortages have delayed this work.

Appendix D of this report includes an Excel database with links to the DSL files. Winterbrook believes this database may be useful for future City planning and development review efforts, but the records are not relevant to the riparian corridor safe harbor program since only wetlands deemed "locally significant" can be used to adjust the corridor width. Oregon law requires cities to notify DSL of development applications that may impact wetlands.[3]

The following section reviews each of the 11 riparian corridor reaches (or sites) in greater detail. The review summarizes the length and overall character of each reach and reviews vegetation communities, streamside wetlands, and other physical features of the riparian corridor. It also provides data on field dates, observers, public viewpoints and affected grid maps. Where there are potential threats to the health or function of a site, the review recommends riparian enhancement strategies.

[2] OAR 660-0100 reads in relevant part: (3) For areas inside urban growth boundaries (UGBs) and urban unincorporated communities (UUCs), local governments shall: (a) Conduct a local wetlands inventory (LWI) using the standards and procedures of OAR 141-086-0110 through 141-086-0240 and adopt the LWI as part of the comprehensive plan or as a land use regulation; and (b) Determine which wetlands on the LWI are "significant wetlands" using the criteria adopted by the Division of State Lands (DSL) pursuant to ORS 197.279(3)(b) and adopt the list of significant wetlands as part of the comprehensive plan or as a land use regulation.

[3] ORS 227.350. **Notice of proposed wetlands development; exception; approval by city.** (1) After the Department of State Lands has provided the city with a copy of the applicable portions of the Statewide Wetlands Inventory, the city shall provide notice to the department, the applicant and the owner of record, within five working days of the acceptance of any complete application for the following activities that are wholly or partially within areas identified as wetlands on the Statewide Wetlands Inventory: * * *

Review of Riparian Corridor Sites

Following is an expanded review of the riparian corridor sites (river and stream reaches) listed in Table 1. Appendices A and B show the location and maps referenced below.

Baker Creek (BC)	Field dates: 3/9, 3/10/21	Observers: ACS, TB, PQ
Public viewpoints: Tice Park		Maps: A5-6, B3-5, C4-5

Characterization of stream/corridor:

The Baker Creek reach flows approximately 3.09 miles west to east along the northern boundary of the McMinnville study area. It is bordered in several areas by streamside wetlands. At Tice Park, the stream is bordered by a broad wetland complex dissected by several small channels, which appear stable and are well vegetated. Steep ravine slopes border the broad, flat-bottom lowlands. There is substantial large wood in this reach, including fallen trees and large branches from recent winter storms.

The riparian corridor is dominated by a forest community of Douglas fir and Oregon oak, with some western redcedar and bigleaf maple.[4] The understory is generally sparse, with osoberry, tall Oregon grape, beaked hazelnut, common snowberry, and vine maple as small patches or isolated individuals. English ivy has been cleared in some areas at Tice Park but is common elsewhere; recent shrub replanting was also observed. Himalayan blackberry and shining geranium, which are considered invasive species, are also common in this reach. Blackberry thickets are common along the banks of Baker Creek where tree canopy cover is thin. Most of the riparian corridor has limited public access.

Streamside wetlands:

Forested wetlands support a diverse and healthy plant community dominated by Oregon ash and Hooker willow in the overstory and an array of native and nonnative forbs and grasses underneath.

Potential riparian enhancement measures:

Continue and expand management of invasive species, including ivy, geranium and blackberry. Restore native forest canopy along stream banks and riparian corridors, working toward full canopy closure to improve shade, restrict blackberry growth, and enhance fish and wildlife habitat.

[4] See Appendix C for a key to scientific names of plants referenced in this study.

North Yamhill River (YR-N) Field date: 3/10/21 Observers: TB

Public viewpoints: Hwy. 99W bridge, Riverside Drive Maps: A7-8, B7-9, C8-9

Characterization of stream/corridor:
The North Yamhill River reach meanders 2.55 miles along the northeast edge of the McMinnville study area. Most of the riparian corridor cuts a wide, forested swath through agricultural lands, while a smaller section borders industrial land along Riverside Drive, south of Highway 99W. The river enters the study area near the north end of Grandhaven Drive and flows east until it joins the South Yamhill River and forms the "Yamhill River." The riparian corridor follows the edge of the McMinnville UGB and is therefore partly inside and partly outside of the study area. This site has very limited public access.

The North Yamhill River corridor is composed of mature mixed forest locally dominated by Oregon ash, Oregon oak, and Douglas fir. Secondary species include bird cherry, bigleaf maple, willows, and an understory dominated by blackberry and ivy in areas. Broad floodplains and riverside wetlands are present along the corridor, often situated on one side of the river with steep riverbanks climbing 15-25 feet above the river valley.

Streamside wetlands:
Where the river valley bottom widens, palustrine forested and emergent wetlands are found within the floodplain areas. Oregon ash is often the dominant tree and some emergent communities are dominated by reed canarygrass (an invasive species).

Potential riparian enhancement measures:
Manage invasive species along river. Revegetate exposed sections of riverbanks with native trees and shrubs, working toward a closed canopy condition along river corridor improve shade, restrict blackberry growth, and enhance fish and wildlife habitat.

North Yamhill River - Tributary 1 (YR-N1) Field dates: 3/9, 3/10/21 Observers: ACS, TB, PQ

Public viewpoints: Wortman Park and Grandhaven Drive Maps: B7, C7, D7

Characterization of stream/corridor:
This riparian site is a northeast flowing tributary to the North Yamhill River, originating at Wortman Park. The riparian corridor reach is 1.22 miles in length. Riparian conditions range from mature forest with sparse understory (at Wortman Park), to developed urban edge (Walmart), to a large, diverse forest community north of Grandhaven Drive. Areas between Wortman Park and Grandhaven are more sparsely wooded and shrub/emergent dominated. Riparian tree cover includes Douglas fir, Oregon oak, and Oregon ash with areas of black

cottonwood, western red cedar, and willows. This fish-bearing tributary has potential fish barriers (culverts) at Highway 99E and Grandhaven Drive.

Streamside wetlands:
Several smaller emergent and forested wetlands are found on low-lying areas along the corridor. Some of the emergent wetlands are overrun by blackberry and reed canarygrass.

Potential riparian enhancement measures:
Restore native understory in upstream (southern) reaches. Limit active uses and development along the stream channel (e.g., Wortman Park has several areas of exposed, eroded banks). Manage invasive species along the stream corridor.

South Yamhill River (YR-S) Field dates: 3/9, 3/10/21 Observers: TB

Public viewpoints: Dancer Park/Hwy. 18 Maps: D9, E7-8, F7-8, G6-8, H6, I6

Characterization of stream/corridor:
The South Yamhill River is a large, forested riparian corridor that supports a wide variety of fish and wildlife species. The river meanders in and out of the eastern part of the study area, flowing a total of 4.84 miles from the McMinnville Airport downstream to its junction with the North Yamhill River in the northeast corner of the City.

The river's banks are steep, rising 15-25 feet from the river valley . Riparian vegetation is dominated Oregon ash, black cottonwood, big leaf maple, and Douglas fir. Red alder and bird cherry are secondary species. Oregon oak and Douglas fir are common above the riverbanks. The understory is dominated by red osier dogwood and Himalayan blackberry is common on exposed riverbanks. Snags and large downed wood are found on the banks and river's edge. Recent bank erosion and slumping is visible along several river bends, such as at the north bank at Dancer Park. The riparian corridor is an active wildlife corridor linking to nearby habitats along Cozine Creek and the North Yamhill River. Songbirds and woodpeckers were observed in abundance in early March.

Streamside wetlands:
Broad forested and emergent wetland complexes are found in areas where the river floodplain widens such as at the Cozine Creek junction.

Potential riparian enhancement measures:
Revegetate and restore eroded riverbanks. Manage invasive blackberry and cherry along banks and plant native riparian trees and shrubs to restore canopy cover and shade.

South Yamhill River Tributary 1 (YR-S1) Field dates: 3/9, 3/10/21 Observers: ACS, TB, PQ

Public viewpoints: Riverside Drive Crossing Maps: D8, D9

Characterization of stream/corridor:

This small tributary to the South Yamhill River flows approximately 0.72 miles from the area north of the McMinnville Treatment Plant east to the river. The riparian vegetation transitions from a willow scrub/shrub community bordered by fir plantation to a more mixed willow, oak, and ash forest to the east. Douglas fir is present on the slopes above the stream. Invasive species such as reed canarygrass and blackberry are common and English ivy is expanding into tree canopies. Areas of blowdown from recent storms east of Riverside Drive were noted in early 2021.

Streamside wetlands:

A narrow border of palustrine emergent and scrub/shrub wetlands are found along a portion of the stream, often dominated by reed canarygrass.

Potential riparian enhancement measures:

Restore forest canopy along the corridor to increase canopy cover and shade. Manage invasive species.

South Yamhill River Tributary 2 (YR-S2) Field dates: 3/9, 3/10/21 Observers: ACS, TB, PQ

Public viewpoints: City Public Works, Kiwanis Marine Park Maps: F6, F7, G6

Characterization of stream/corridor:

This S-shaped riparian corridor flows south from McMinnville Water & Light to the South Yamhill River in Kiwanis Marine Park. The stream reach is 0.6 miles long and bordered by forested banks for most of its length. Dancer Park is located to the east of the site and residential and industrial (substation) uses are found to the west.

Oregon ash and Douglas fir are dominant tree species along the corridor; cottonwood and willow are secondary species. Invasive holly, ivy and blackberry are present in some areas, but the native plant community is well established. No fish barriers were noted but stream flow is low along this small tributary. Snags and downed large wood were noted along the stream channel. The site connects to an active wildlife corridor where it joins South Yamhill River in Dancer Park/Kiwanis Marine Park.

Streamside wetlands:

Narrow streamside emergent wetlands and areas of broader forested wetlands were noted at the southern end of the corridor.

Potential riparian enhancement measures:
Selective removal and management of holly, ivy and blackberry.

South Yamhill River Tributary 3 (YR-S3) Field dates: 3/11, 4/7/21 Observers: ACS, TB, PQ

Public viewpoints: Airport Park Maps: I9, J8, J9

Characterization of stream/corridor:
This 4,000-foot long tributary to the South Yamhill River flows through Galen McBee Airport Park in a forested corridor. There is a looped trail system through the park but on the whole, the riparian habitat is relatively good condition with a diverse native plant community. Dominant tree species include Douglas fir, Oregon oak and bigleaf maple; red alder is common at lower elevations along the stream channel. Though a relatively small site with actively managed farm and airport lands adjacent, there is significant species and structural diversity within the forest. The stream corridor broadens in low gradient reaches, bordered by a mix of forested and emergent wetlands. Areas of blowdown from recent storms were noted in early 2021.

Streamside wetlands:
Palustrine emergent and forested wetlands are found along this corridor. Red alder, slough sedge and lady fern are dominant species; invasive reed canarygrass is also common in wetland areas.

Potential riparian enhancement measures:
Selective removal and management of invasive species. Future area planning and development could build on this park asset, expanding the forest corridor and trail network.

Cozine Creek (CC) Field dates: 3/11, 4/7/21 Observers: ACS, TB, PQ

Public viewpoints: Linfield University, 2nd Avenue Maps: G4-6, H4-5, I3-4, J2-3

Characterization of stream/corridor:
The mainstem of Cozine Creek weaves a path from the southwest corner of the study area at Hill Road into downtown (2nd Avenue), south to Linfield University, then east to the Yamhill River. This 3.72-mile riparian corridor reach is predominantly forested but passes through a mix of open fields, emergent marshes, and developed residential lands. The streamside vegetation is typically Oregon ash and willows, with Douglas fir, Oregon oak and bigleaf maple common at slightly higher elevations. Himalayan blackberry and English ivy are well established in the more open and developed parts of the corridor.

Most of the Cozine Creek corridor is contained within a broad floodplain area that extends the entire length of the site. The creek channel is low gradient and meanders throughout this floodplain area. The riparian/floodplain area is an active wildlife corridor with high bird and mammal activity noted in early 2021.

Streamside wetlands:
A mix of palustrine emergent, scrub/shrub and forested wetlands are found within the wide Cozine Creek floodplain. Oregon ash is a dominant component of the forest wetlands, while reed canarygrass is a widespread emergent.

Potential riparian enhancement measures:
Restore native forest along the corridor to increase canopy cover and shade. Manage invasive species including blackberry, ivy and reed canarygrass.

Cozine Creek North Branch (CC-N) Field dates: 3/9, 4/7/21 Observers: ACS, TB, PQ

Public viewpoints: City Park, Michelbook Lane Maps: D3-4, E4, F4-5

Characterization of stream/corridor:
The North Branch of Cozine Creek corridor begins near Cottonwood Drive and the Michelbook Country Club and travels approximately one mile through residential and park land before joining the Cozine Creek mainstem. The upper reach of the corridor is fragmented, passing through managed lawns, patches of forest, excavated ponds, with some segments of creek piped. The corridor takes on a more wooded character east of 11th Street and south through City Park. Douglas fir mixes with Oregon oak, black cottonwood, Oregon ash, bigleaf maple, western redcedar and bird cherry. Where understory is present, it is dominated by Himalayan blackberry, and locally contains clustered rose, beaked hazelnut, common snowberry, sword fern, and English ivy. Invasive species management efforts are ongoing at City Park.

The stream channel shows signs of erosion and lacks vegetative cover in many areas. Both conditions were noted in City Park where sections of stream bank have collapsed into the channel and understory shrub cover is sparse. Similar to the Cozine Creek mainstem, the North Branch flows through a wide floodplain in the lower reach through City Park. Songbird and woodpecker activity was high throughout the corridor during spring field visits.

Streamside wetlands:
A few, narrow palustrine forested wetlands are found along the stream channel. Oregon ash is common in these areas.

Potential riparian enhancement measures:

Augment native tree and understory shrub plantings along the stream channel to stabilize stream banks and provide a buffer from active park uses. Continued management of invasive species.

Cozine Creek Central Branch (CC-C) Field dates: 4/7/21 Observers: TB

Public viewpoints: Cypress Street, Fleishauer Lane Maps: G3, G4

Characterization of stream/corridor:
The Cozine Creek tributary originates in a linear ditch bordered by managed open space fields and planted trees along the West McMinnville Linear Park. The drainageway appears to be piped for a section of park west of Cypress Street; a broad swale is visible but no channel or stream bank. The corridor is highly fragmented along its 0.94-mile course, following open, often channelized paths through the local residential neighborhood downstream of the park. Hardened channel banks covered by dense growth of English ivy are found in the residential areas. Numerous stormwater pipes discharge into the creek in this reach.

East of Fleishauer Lane, the corridor opens into a broader floodplain area with increasing cover of Oregon ash and Douglas fir as the tributary approaches its confluence with the mainstem of Cozine Creek.

Streamside wetlands:
No wetlands were noted from viewpoints or on field maps.

Potential riparian enhancement measures:
The highly disturbed and physically constrained condition of this corridor limit enhancement options. Where feasible, native tree and understory plantings along the stream channel could improve shade and habitat conditions. These plants could replace the monoculture of ivy found in some areas, which threatens the health of the remaining trees along the corridor.

Cozine Creek South Branch (CC-S) Field dates: 3/11, 4/7/21 Observers: TB

Public viewpoints: Old Sheridan Road Map: F1, G1-2, H2-3, I3

Characterization of stream/corridor:
The southern tributary to Cozine Creek originates on the hills above West Hills Neighborhood Park and travels southeast in linear ditches through farmland until it reaches Hill Road. East of Hill Road the riparian area widens and its vegetation diversifies as it winds its way south and east to the mainstem of Cozine Creek. The overall length of the corridor is 2.41 miles, but only the lower mile has any significant vegetative cover.

South of Alexandria Street, the riparian corridor opens into a broad floodplain with farmland to the south. The floodplain contains an Oregon ash forested wetland bordered by emergent wetlands and a seasonal pond west of Old Sheridan Road. East of Sheridan, the uplands are predominantly coniferous, grading to hardwood in floodplain. A diverse wetland complex spreads out at confluence of the south tributary and Cozine Creek. Large Douglas fir are dominant in the uplands, with scattered oaks, bigleaf maple, grand fir and bird cherry. Understory vegetation includes beaked hazelnut, vine maple, osoberry, snowberry, tall Oregon grape, California dewberry, and sword fern. English ivy and English holly are also present.

The riparian/floodplain area is dominated by Oregon ash; secondary species include black cottonwood, Hooker, Pacific and Scouler willow. This site provides diverse wildlife habitat with high songbird and raptor activity noted during spring field visits.

Streamside wetlands:
Forested, scrub-shrub and emergent wetlands are present along the corridor. Oregon ash is a dominant component of forest wetlands, willows are common in shrub communities, and reed canarygrass is a widespread emergent.

Potential riparian enhancement measures:
Build on existing open space protections at this site (e.g., Barber open space). Restore native tree and shrub canopy along the upper reaches of the corridor. Manage invasive species.

CONCLUSION

The Riparian Corridor Inventory report and maps (Appendices A and B) identify the location and characteristics of riparian corridors within the McMinnville UGB (the study area). The City's riparian corridors form an impressive network of open space and natural habitats that connect neighborhoods, form natural landmarks, and provide important habitat and migration corridors for fish and wildlife. A variety of public parks and open space areas are established along these corridors; there may be opportunities to expand trails and public open spaces into a larger greenway system, linking to the City's existing network of parks, trails and greenways.

NEXT STEPS

Winterbrook will prepare draft Comprehensive Plan policies and land use regulations designed to protect land within designated riparian corridors, following a "safe harbor" Goal 5 program. Most riparian corridors are already protected by floodplain regulations. This

program will prohibit most urban development within the designated riparian corridor except for those specifically listed in the administrative rule (including public facilities and water-related uses).

City of McMinnville
Tree Grove Assessment Report

Prepared by:

WINTER BROOK
COMMUNITY RESOURCE PLANNING

City of McMinnville
Tree Grove Assessment

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Appendices

INTRODUCTION

Wooded areas are identified as significant natural features in the City of McMinnville's Great Neighborhood Policies. Under Policy 187.50.1:

> "*Great Neighborhoods are sensitive to the natural conditions and features of the land. Neighborhoods shall be designed to preserve significant natural features including, but not limited to**,** watercourses, sensitive lands, steep slopes, wetlands, **wooded areas,** and landmark trees."*

To implement Great Neighborhood Policies, the City authorized Winterbrook Planning to prepare an inventory and assessment of significant wooded areas (tree groves) within the McMinnville study area. The study area covers the City of McMinnville Urban Growth Boundary (UGB), including the 2020 adopted additions to the UGB. The purpose of the Tree Grove Assessment project is to document the location, quantity, and quality of tree groves in the study area, and to determine which of the groves are "significant."

The project follows the inventory process outlined in the Statewide Planning Goal 5 (Natural Resources) administrative rule (OAR Chapter 660 Division 023). The inventory will inform the development of policy encouraging the preservation of significant groves through an effective but limited tree grove protection program.

This report describes the methodology used to conduct the assessment and provides a summary of results and analysis. Appendix A contains the Tree Grove index and site maps. Appendix B contains the Tree Grove Assessment (TGA) data forms for each tree grove. The TGA forms include the tree grove information and assessment data described in the Tree Grove Inventory Methods section, below.

SUMMARY

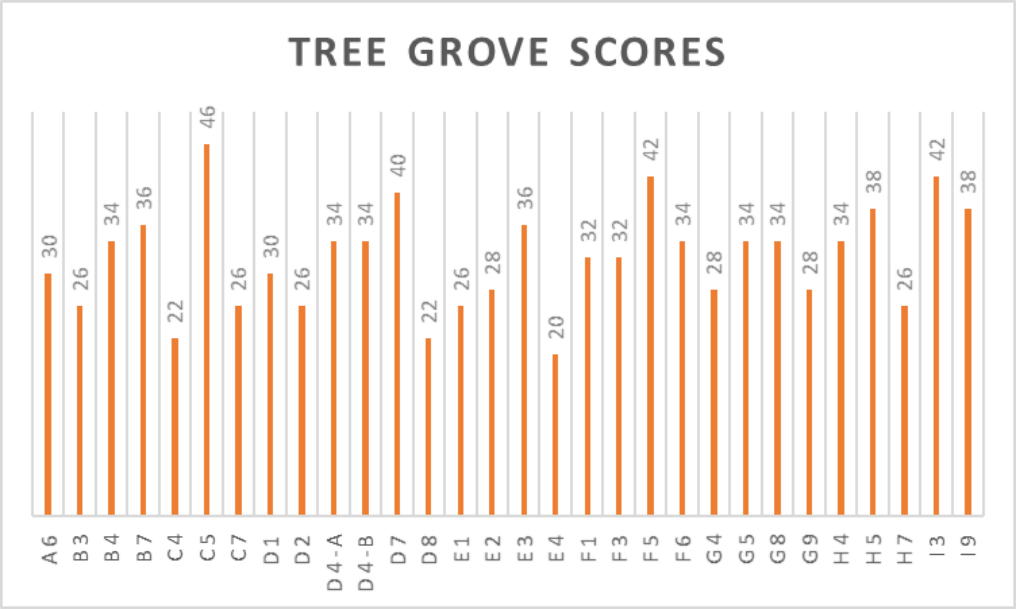
Winterbrook Planning conducted the tree grove assessment field work within the McMinnville urban growth boundary (UGB) between March and May 2021.

For the purposes of this project, a tree grove is defined as a stand of trees that are predominantly 25 feet or more in height with contiguous canopy cover of one acre or more located outside of floodplains. Tree groves generally do not include linear plantings that are one or two trees wide (e.g., street trees, rows of trees along a property line), or fragmented areas, such as treed areas with a high proportion of the canopy broken by houses, roads, and other developed uses.

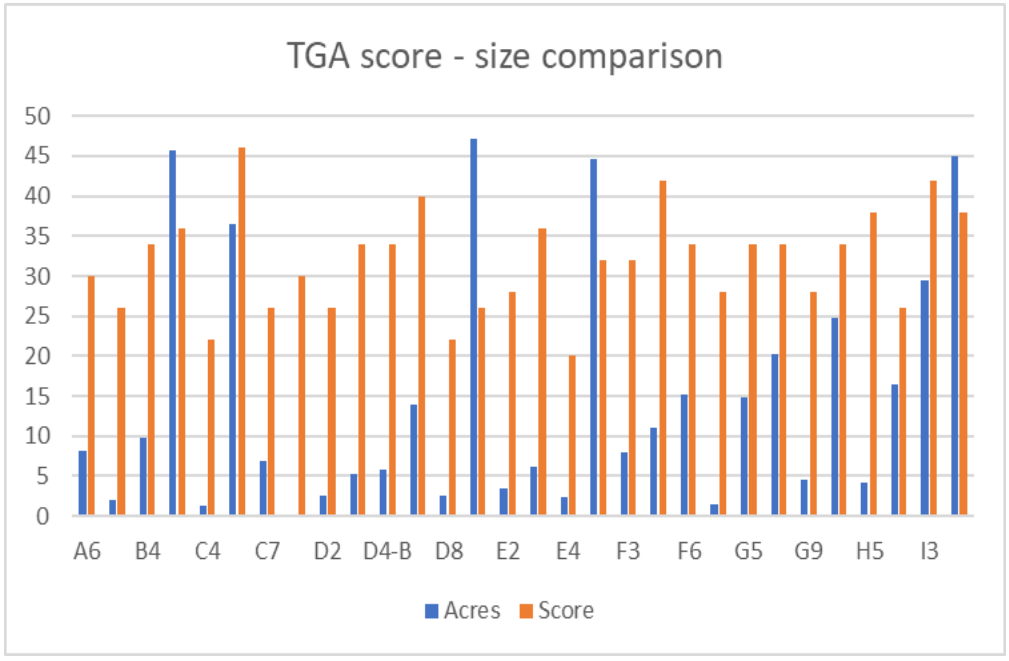
As shown on Graphs 1 and 2, 30 significant tree grove sites were identified within the McMinnville study area. The sites range from 1.2 to 47.1 acres, with a combined area of 450 acres. The average site size is 15 acres; the median size is 9 acres.

Overall TGA scores ranged from a high of 46 (Site C5) to a low of 20 (Site E4). The average score for all groves was 31.93; the median score for all groves was 33. Graph 1 shows a summary of the TGA scores. Graph 2 shows a comparison of grove scores(orange) to grove size (blue). Note that tree grove quality (overall score) bears little relationship to tree grove quantity (acreage).

Graph 1. Tree Grove Assessment Scores



Graph 2. Tree Grove Score – Size (in Acres) Comparison



TREE GROVE INVENTORY METHODS

Consistent with OAR 23-023-0030 Inventory Process, Winterbrook followed a multi-step method to determine the location and the relative quantity and quality of Tree Groves in McMinnville.

Initial Tree Grove Candidate Inventory

City planning staff prepared a preliminary map of potentially significant tree groves of two acres or greater outside the 100-year floodplain based on their review of aerial photography and local knowledge. City staff provided GIS maps showing the results of this work.

Using aerial photo interpretation, Winterbrook refined the tree grove boundaries to include groves (wooded subareas) with contiguous canopy cover of one acre or more located outside of floodplains; groves partially within floodplains were included in the inventory when the total non-floodplain area of the grove exceeded one acre. Linear and fragmented/developed areas were removed from the mapped groves to focus on larger, cohesive tree groves.

Tree Grove Field Inventory Methods

Using the updated base maps and inventory forms for each candidate grove, Winterbrook completed the field inventory. Tree groves were surveyed from public lands (e.g., parks, public trail networks, public streets and rights of way).

Winterbrook completed detailed Tree Grove Assessment (TGA) forms and refined mapped tree grove boundaries during field visits. The data collection and assessment parameters used are described below. Ground level photographs were taken for each grove that was accessible and visible. Once the field data was collected, information was transferred to electronic data sheets and the functional assessment rankings completed.

Survey Data

The TGA survey forms contain information on the general characteristics of the grove such as its size, location, and vegetation composition. The following survey data was recorded for each candidate tree grove in the field (except as noted below).

- *Site #* – The grove site number follows the GIS grid mapping system for the study area, generally a letter and number combination (e.g., B4). For groves spanning multiple maps, the map with the most prominent part of the grove was generally keyed as the site number.

- *Size* – Site acreage, reflecting any site boundary amendments made in the field; this calculation is provided by GIS.

- *Maps* – The map numbers for the subject grove, based on the GIS grid mapping system.

- *Score* – The cumulative total of points for the tree grove functional categories (see discussion below). Scoring was automated using Excel-based TGA forms. The range of potential scores for a given grove is 10 to 50 points. Those sites with the highest scores provide the highest number and quality of functions.

- *Location* – Site identifiers, such as street intersections, parks or creeks, or other characteristics aiding identification of the grove to which the TGA form pertains.

- *Floodplain* – Is any portion of the site part of a floodplain?

- *Observers* – Initials of field observers.

- *Date* – Date(s) of the field survey.

- *Trees* – General classification of forest or woodland community using National Vegetation Classification System (NVCS). Dominant, co-dominant and secondary tree species are typically noted here, as well as general understory characteristics or species.

Field Assessments

The assessment section of the survey focuses on the functional characteristics of the tree grove. Ten functional categories were evaluated, and each grove received a score of low (1), medium (3), or high (5) based on threshold factors established in each category as described below. The range of potential scores for a given grove is 10 to 50 points. Based on cumulative scores for each tree grove, a significance threshold was determined.

Following is a summary of the ten functional categories and their assessment factors.

1. **Grove Maturity/ Tree Size**: Scenic values tend to be a function of tree size or age. Also, mature trees are difficult or take a long time to replace. The primary assessment factor in this category is the percent of large trees (greater than 14" diameter at breast height (dbh)) in the grove. Multi-stem trees are evaluated by the size of the largest individual trunk at chest height.

2. **Grove Size**: The vitality and resilience of a grove generally increase with grove area. Scenic, natural and other values often increase with size as well. Based on local grove conditions, groves of greater than five acres are defined as large (high), groves between two and five acres are defined as medium, and groves of less than two

acres are defined as small (low). Grove size was verified using GIS following any grove map refinements in the field.

3. **Health**: This category assesses the general health and condition of a grove, including signs of dieback, threats, and disturbance. Threats may include infestations of invasive plants such as English ivy that tend to degrade forest habitat functions and values. It may also include natural processes, such as beaver activity, that change the hydrologic regime to alter the existing tree grove composition and health.

4. **Visibility**: Groves that are clearly visible from major streets or public open space have greater value to the community. Assessment factors include visibility from an arterial or local street and/or public or private open space.

5. **Screening/Buffering**: Groves may serve as land use buffers. The value of buffering or screening is a function of the grove size, location and nearby uses. The greatest value to the community is when the tree grove provides a buffer between different types of uses, primarily between industrial/commercial use and residential/open space uses.

6. **Accessibility**: Accessibility is a function of ownership (public or private) and physical features (topography, trail access, etc.). Public access provides more opportunity for public use and enjoyment. Steep terrain and inaccessible features (wetlands, dense brush) may limit or preclude opportunities for public use.

7. **Rarity**: Unusual features, such as large size, rare species, or historic/landmark values, add to community value. This category considers whether such features are present, and whether they are uncommon or unique within the study area.

8. **Educational/Recreational Potential**: Groves with both public access and noteworthy features offer increased educational values. Groves with public or semi-public access and trail networks offer passive recreation values. Important factors include public versus private ownership and whether developed access exists. This category is a function of accessibility and rarity values: if either category ranks low, this function is low; if both rank medium, this function is medium; otherwise, this function is high.

9. **Wildlife Habitat Value and Connectivity**: Tree groves can provide important habitat for terrestrial wildlife species. The size, location and composition of a grove are all factors influencing the quality of habitat. Larger groves located near or connected to other habitat areas generally provide greater habitat value than smaller, isolated groves. Groves with a diverse mix of species and structure (such as mid-canopy trees, shrubs, groundcover, and standing or downed logs) generally provide higher value forage, cover and nesting habitat than groves with few species or with no understory.

Groves with large trees, particularly Oregon oak trees, provide important habitat for sensitive bird species. Proximity to water sources improves habitat value as well.

10. **Level of Existing Development**: Groves located on undeveloped or partially developed sites offer the opportunity to protect groves through site planning. Groves surrounded by development tend to be more at risk.

Comments

The Comments section is used to make additional notes relevant to assessment, such as statements of overall quality, invasive species presence, land use context, unusual characteristics and clarifications on assessment rankings.

Management Recommendations

Where appropriate, grove management recommendations are noted in this section.

Geocoding

The location and score for each tree grove was geocoded for use on GIS overlay maps. These tree grove layers and information can be compared with GIS maps for other inventoried natural resources, and to other natural hazard layers prepared as part of a comprehensive Natural Hazards Inventory and ranking system.

INVENTORY RESULTS

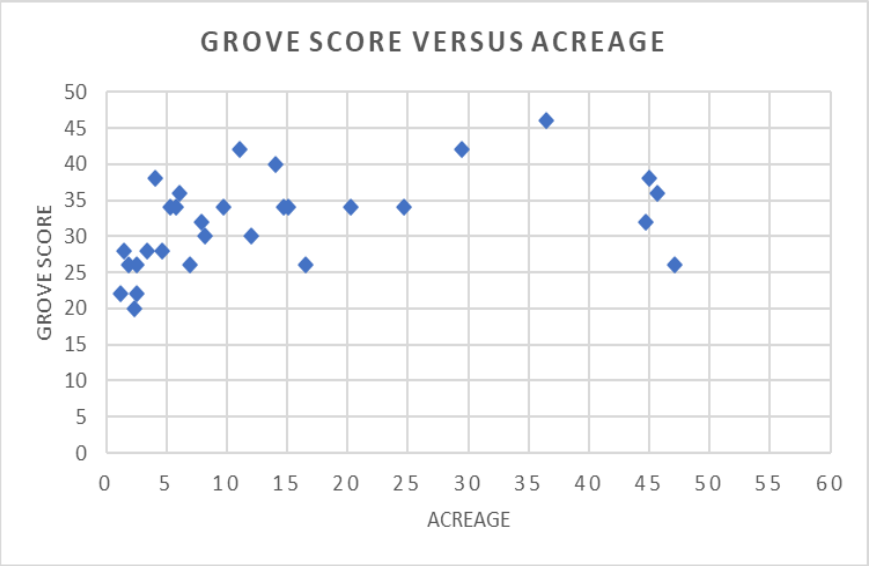
The tree grove assessment field work was conducted within the McMinnville study area between March and May 2021.

Tree Grove Location, Quantity and Quality

Thirty (30) tree groves sites were identified within the McMinnville study area. Many of the groves are associated with riparian corridors, including the North and South Yamhill Rivers and their major tributaries Cozine Creek and Baker Creek. Approximately half of the groves are partially within floodplain areas. The sites range from 1.2 to 47.1 acres, with a combined area of 450 acres. The average site size is 15 acres; the median size is 9.75 acres, indicating that several larger groves skew the average size upward significantly. The largest grove, Grove E1 on Redmond Hill, covers 47.1 acres.

Overall TGA scores ranged from a high of 46 (Site C5 at Tice Park/Rotary Nature Preserve, to a low of 20 (Site E4, Michelbook Country Club - South). The average score for all groves was 31.9; the median score was 33. As illustrated in Graph 3, there was no significant correlation between grove size and grove score. The largest four groves (all over 40 acres) ranged from scores of 26 to 38, while five smaller groves (of as small as four acres) scored 38 or higher.

Graph 3. Relationship of Grove Score to Size



Most tree groves are composed of a mix of tree species, with Douglas fir and Oregon oak or Oregon ash being the most common dominant species[1]. Other species present may include black cottonwood, bigleaf maple, western red cedar, red alder, Scouler willow, and bird cherry (an invasive species). Approximately 40% of the groves are dominated by one species, typically either Oregon oak, Oregon ash, Douglas fir or black cottonwood. Of the groves dominated by fir, some are densely stocked, even-aged plantations with minimal understory vegetation. These monocultures typically receive low TGA scores due to factors such as lower grove maturity, health, and habitat functions.

Some of the City's tree groves are badly infested with invasive plants, particularly in the understory. Tree groves along some river and stream banks have dense thickets of Himalayan blackberry, which can crowd out growth of understory plants. Another problem species includes English ivy, which forms dense mats on the ground and can climb, smother and topple large trees if not managed. Bird cherry and English holly are other noted invasive species. Invasive species management will be important to protecting the long-term health of the City's tree groves.

Thirteen (13), or 43 percent, of the grove sites are located partially within floodplain areas. A larger number – 17 groves (57%) – are located along riparian corridors. These groves generally support greater habitat complexity due to variation in the plant community related to moisture gradients between upland, riparian and wetland habitats. In areas influenced by nearby streams or wetlands, Oregon ash, red alder, Pacific willow, and black cottonwood are dominants, while Douglas fir and bird cherry are often found at slightly higher elevations.

[1] See Appendix C for a key to scientific names of plants referenced in this study.

The City's tree groves provide suitable habitat for three key bird species that are listed by the State as sensitive: olive-sided flycatcher (*Contopus cooperi)*, western bluebird (*Sialia mexicana)*, and white-breasted nuthatch (*Sitta carolinensis aculeata).* Maps created by Oregon Department of Fish and Wildlife (https://www.dfw.state.or.us/maps/compass/) indicate that habitat for one or more of the birds is found within 27 of the City's tree groves.

Table 1 summarizes key characteristics of tree groves within the McMinnville study area: their location, size, TGA score, inventory field dates, key bird habitat, and dominant vegetation.

Table 1. Characteristics of McMinnville Tree Groves

Grove#	Site / Location	Acres	Score	Field Date	Key Birds*	Dominant Species
A6	Lower Baker Creek / Harvest Ct	8.2	30	3.9.21	B, F, N	Douglas fir, Oregon ash
B3	Baker Creek Oaks	1.9	26	3.9.21	B, N	Oregon oak
B4	Upper Baker Creek / Pinot Noir Ct	9.75	34	3.9.21	B, F, N	Douglas fir, Oregon oak
B7	Grandhaven Dr (north)	45.7	36	3.9.21	B, F, N	Douglas fir, Oregon oak, Oregon ash
C4	Baker Crest Ct	1.2	22	3.9.21	B, F, N	Douglas fir, Oregon oak
C5	Tice Park / Rotary Nature Preserve	36.5	46	3.9.21	B, F, N	Douglas fir, Oregon oak, Oregon ash
C7	Grandhaven Dr (south)	6.9	26	3.9.21	B, F, N	Douglas fir, Black cottonwood
D1	Fox Ridge Rd (west)	12	30	3.9.21	B, F, N	Oregon oak, Douglas fir
D2	Fox Ridge Rd (east)	2.5	26	3.9.21	B, F, N	Oregon oak (no view, aerials only)
D4-A	Michelbook Country Club (west)	5.3	34	3.9.21		Douglas fir, Oregon oak
D4-B	Michelbook Country Club (east)	5.8	34	3.9.21	N	Douglas fir, Oregon oak
D7	Wortman Park	14	40	3.9.21		Oregon oak, Douglas fir
D8	Riverside Dr	2.5	22	3.9.21	B, F, N	Douglas fir plantation
E1	Redmond Hill	47.1	26	3.11.21	B, F, N	Douglas fir plantation
E2	Fox Ridge Rd / Masonic Cemetery	3.4	28	3.9.21	B, F, N	Douglas fir, Oregon oak
E3	Meadows Dr	6.1	36	3.9.21	N	Oregon ash – Forested wetland
E4	Michelbook Country Club (South)	2.3	20	3.9.21	B, F, N	Black cottonwood (linear feature)
F1	Redmond Hill (west)	44.7	32	3.11.21	B, F, N	Douglas fir, Oregon oak
F3	Quarry Park	7.9	32	4.7.21		Douglas fir
F5	City Park	11.1	42	3.9.21, 4.7.21	B, F, N	Douglas fir
F6	Public Works/ Oregon St	15.1	34	3.9.21	B, F, N	Douglas fir, Oregon ash
G4	Ash Meadows	1.5	28	3.11.21	N	Oregon ash
G5	Linfield College: Cozine Creek	14.75	34	3.11, 4.7.21	B, F, N	Douglas fir, Oregon ash
G8	Yamhill River branch / Kingwood	20.3	34	3.11.21	B, F, N	Douglas fir
G9	Evergreen Aviation Chapel	4.6	28	3.11.21	B, N	Oregon oak
H4	Tall Oaks/Cozine Creek	24.7	34	3.11.21	B, F, N	Douglas fir, Oregon oak
H5	Linfield College: Queen's Grove	4.1	38	3.11, 4.7.21	B, F, N	Oregon oak
H7	Yamhill River extension	16.5	26	3.11.21	B, F, N	Douglas fir
I3	Barbel/Grange	29.5	42	3.11.21	B, F, N	Douglas fir, Oregon ash
I9	Airport Park	45	38	3.11, 4.7.21	B, F, N	Douglas fir, Oregon oak, bigleaf maple

* Key: Grove provides suitable habitat for B = western bluebird, F = olive-sided flycatcher, N = white-breasted nuthatch (ODFW 2021)

Significance determination

Tree groves that met the threshold definition of a grove and had a Tree Grove Assessment score of at least 25 out of 50 were deemed significant. An analysis of environmental, social, economic and energy consequences of regulatory alternatives (ESEE analysis) must be conducted and serve as the basis for any future City protection program.

Grove E4 (Michelbrook Country Club-South), C4 (Baker Crest Ct), and D8 (Riverside Dr) are below this threshold score and are therefore not significant. These groves will not be evaluated further in the development of a Goal 5 conservation program.

CONCLUSION

This Tree Grove Assessment report, together with the tree grove maps (Appendix A) and TGA assessment forms (Appendix B), document the location, quantity and quality of tree groves in McMinnville, and determine which groves are significant. Twenty-seven tree groves in McMinnville are significant.

The City's tree groves, riparian areas and floodplains form an impressive network of open space and natural habitats that provide a variety of services and amenities to the McMinnville community. These include scenic, environmental, social and economic amenities.

NEXT STEPS

Tree groves that are partially within floodplains have existing local protection. Trees also provide erosion control, water quality and stormwater retention benefits. As part of the Goal 7 Natural Hazards inventory and protection program, Winterbrook will recommend additional protection for tree groves and large trees located on steep slopes and within floodplains and landslide areas.

The focus of new policy will be on the groves, or portions of groves, located outside of floodplain areas. For these areas, the next step in the Goal 5 process will be an analysis of Economic, Social, Environmental and Energy (ESEE) consequences of different conservation strategies, that will serve as the basis for policy recommendations encouraging the preservation and protection of significant groves through a limited tree grove protection program. The goal of the incentive-based program is to create a positive pull toward maintaining these groves and expanding them where desirable and feasible.

City of McMinnville
Scenic Viewpoint and Viewshed Inventory Report

Prepared by:

WINTER BROOK
COMMUNITY RESOURCE PLANNING

City of McMinnville
Scenic Viewpoint and Viewshed Inventory

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INTRODUCTION

The City of McMinnville's Great Neighborhood Principles call for equitable access to community amenities such as scenic views and viewpoints. McMinnville residents have expressed their desire to preserve the City's scenic views for all to enjoy – as stated in Great Neighborhood Principle 2 as implemented by Policy 187.50(2) Scenic Views:

> *Policy 187.50. The McMinnville Great Neighborhood Principles are provided below. Each Great Neighborhood Principle is identified by number below (numbers 1 – 13) and is followed by more specific direction on how to achieve each individual principle.*
>
> 2. ***Scenic Views**. Great Neighborhoods preserve scenic views in areas that everyone can access.*
>   a. *Public and private open spaces and streets shall be located and oriented to capture and preserve scenic views, including, but not limited to, views of significant natural features, landscapes, vistas, skylines, and other important features.*

Interpretation of Policy 187.50(2)

McMinnville Comprehensive Plan Policy 187.50(2) focuses on the future location, orientation and design of viewpoints from existing and planned public parks, streets and trails to corresponding viewsheds (significant scenic features that are observable from viewpoints). While City designated viewpoints are all located within the McMinnville Urban Growth (UGB), scenic views from these viewpoints (viewsheds) include urban and rural landscapes, such as significant natural features and urban streetscapes within the UGB, and rural farm and forest lands, and distant hills and mountains outside the UGB. For purposes of this scenic inventory, Scenic Views Policy 187.50(2):

- Applies primarily to public improvements on public land – to ensure that vertical public improvements (including but not limited to signs, bridge railings, lighting, overhead wires, utility cabinets, and street trees) are considered in the public facilities design process and do not unnecessarily obstruct significant scenic views.
- Applies when determining the location, orientation and design of planned public streets, parks and trails that will serve future urban development – focusing on undeveloped land within the 2020 UGB expansion area – consistent with applicable area plans such as the McMinnville UGB Framework Plan and the Three Mile Lane Corridor Plan. The intent is to provide public access to significant viewsheds by locating, orientating and designing public streets, trails and parks to take maximum scenic view potential.
- Is not intended to limit the location, orientation or design of private development allowed under the McMinnville Zoning Ordinance (including base zones, and natural

resource and natural hazard subdistricts) outside of existing and planned public parks and transportation rights-of-way.
- Is not intended to provide an additional layer of local protection to scenic viewsheds outside the McMinnville UGB. The protection of rural areas, however, is ensured by state and federal ownership and management practices, and Oregon Statewide Planning Program, primarily Goals 3 (Agricultural Lands) and Goal 4 (Forest Lands) that restrict development on farm and forest lands.

To implement Great Neighborhood Principles and its scenic policy, the City authorized Winterbrook Planning to prepare an inventory of scenic viewpoints within the McMinnville UGB – and corresponding scenic viewsheds both within and beyond the UGB.

Characteristics of Significant Viewsheds

Viewsheds have scenic characteristics that, when considered together, are valued by the community. City staff and Winterbrook have identified the scenic characteristics that cumulatively define significant scenic viewsheds.

- **Mountain views** – Cascade Range, including Mt. Jefferson and Mt. Hood and the Coast Range areas.
- **Hill views** - McMinnville's West Hills, Red Hills of Dundee, Amity Hills, and Chehalem Mountains, including forested areas.
- **Agricultural land views** - Cropland, pastures, orchards, and vineyards.
- **Riparian corridor views** - Forests and floodplains along North and South Yamhill Rivers and Baker Creek.
- **Gateway views** - Views entering City along Hwy. 18 and views of Downtown historic buildings and tree-lined streets.
- **City views** – Views of the City from the West Hills, including downtown, forested riparian corridors and park views.

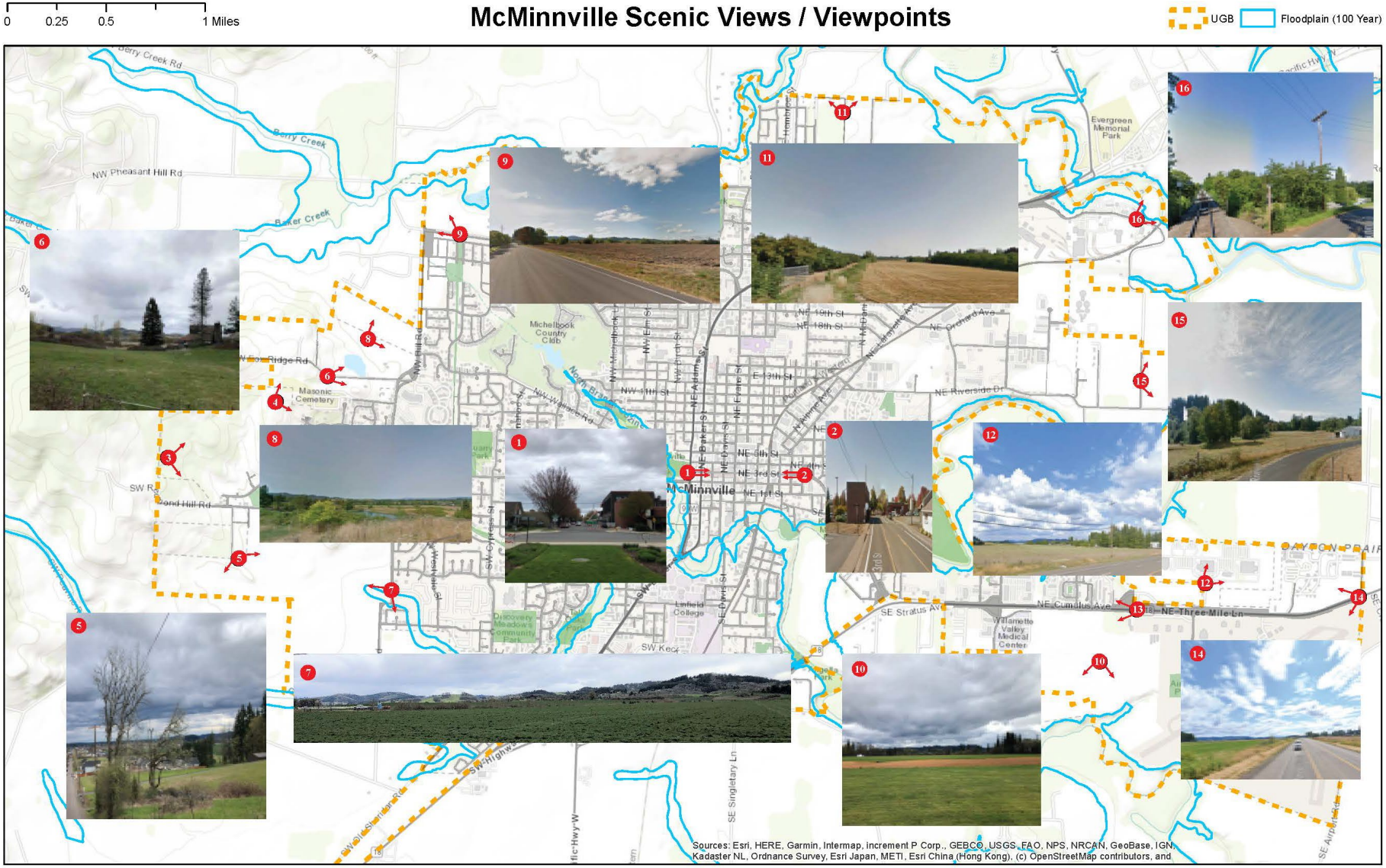
Many of these scenic characteristics overlap. For example, scenic vineyards are frequently found on the southern exposures of hillsides that can be seen from the McMinnville viewpoints; and gateway views overlap with city views.

Scenic Viewpoint Site Selection

Working collaboratively with City planning staff, the project team identified 16 scenic viewpoints within the McMinnville UGB with viewsheds that have one or more of the characteristics described above.

Figure 1

McMinnville Scenic Views / Viewpoints



SCENIC INVENTORY METHODS

Winterbrook Planning conducted the McMinnville Scenic Viewpoint and Viewshed Inventory for viewpoints within the McMinnville UGB between April and June 2021.

1. Based on field observations, Winterbrook initially identified a selection of potential scenic viewpoints on public land within the UGB. Working with City planning staff, 16 significant scenic viewpoints were identified, including potential viewpoints that could be located in planned transportation rights-of-way and parks.
2. Figure 1 shows each of the 16 numbered viewpoints, including the general direction and images of corresponding viewsheds. Figure 1 provided the basis for subsequent scenic viewpoint and viewshed analysis.
3. Winterbrook visited and took additional ground-level photographs from publicly accessible viewpoints, including public rights-of-way, public parks, and other public lands. Each preliminary viewpoint was revised and their respective viewsheds were preliminarily determined. Because viewpoints on undeveloped private lands could not be accessed without written authorization from the property owner, Winterbrook took photos or used publicly available online imagery from nearby roads that were similar to selected views from viewpoints on private land.
4. Using GIS technology combined with geographical research and aerial photography analysis, Winterbrook mapped the characteristics of significant viewsheds that are visible from the corresponding viewpoint.

    a. The GIS viewshed analysis relies on two main data inputs: observation points (viewpoints) and bare earth digital elevation modeling (DEM) available from the Oregon Department of Geology and Mineral Industries.

    b. The spatial analyst "Viewshed" tool was used to determine visible and non-visible surface locations, as viewed from each of the 16 viewpoints. These 360° outputs represent unrefined viewsheds from each viewpoint.

    c. Winterbrook refined viewsheds to reflect the general scenic characteristics originally identified by City Staff. This refinement narrowed each viewshed to a general direction and extent (width).

    d. Each viewshed was color coded by elevation, using classifications of 100 ft. or 200 ft., depending on the viewshed.

    e. Winterbrook analyzed arial photographs to identify agricultural land types (cropland and vineyards) found in mapped viewsheds.

    f. Winterbrook used McMinnville city, OR Nearby Mountains to identify the common names of mountains, hills and peaks in each viewshed.

    g. Both viewpoints and viewsheds were projected in Oregon's 2011 National Spatial Reference System – North (International Feet) to allow for the creation of a series of overlay maps that can be evaluated with inventoried natural hazards in a composite natural features inventory.

SCENIC INVENTORY RESULTS

To implement McMinnville's Great Neighborhood Scenic Policy 187.20(2) the City initiated an inventory of scenic views within the McMinnville study area.

The City identified 16 significant scenic viewpoints and corresponding viewsheds within existing and planned public parks and transportation rights-of-way. Corresponding significant scenic viewsheds include both urban and rural landscapes, city gateways, natural features and scenic vistas of observable mountains and hills. **Figure 1. Scenic Viewpoints and Viewshed Key Map** shows the location of scenic viewpoints and the direction and images of corresponding scenic viewsheds.

Winterbrook analyzed the viewsheds from selected viewpoints using available geographical resources, arial photography, field observations, and GIS digital elevation modeling.

- **Table 1. Summary of McMinnville Scenic Viewpoints and Viewshed Characteristics** on the following page summarizes the results of the inventory for each numbered viewpoint and the scenic characteristics of the corresponding viewshed.
- **Appendix A**: **Scenic Viewpoints and Viewsheds Annotated Inventory Maps** includes 16 annotated GIS scenic viewpoint and viewshed maps showing the direction of scenic views, elevation levels, and scenic characteristics within each viewshed.

Next Steps

The McMinnville Scenic Viewpoints and Viewshed Inventory will inform program recommendations encouraging the preservation and enhancement of identified scenic viewpoints and their corresponding viewsheds to ensure public access to scenic viewpoints from public rights-of-way and parks.

A companion report entitled "McMinnville Natural Resources Program Recommendations" includes draft policies to ensure that public access to significant scenic viewpoints and viewsheds is considered in the location, orientation, and design of planned public facility projects in McMinnville.

Table 1. Summary of McMinnville Scenic Viewpoints and Viewshed Characteristics

VIEW-POINT	LOCATION	DESCRIPTION	PRELIMINARY REMARKS/ RECOMMENDATIONS
1	NE 3rd Street - East	View type: City/Gateway view Orientation: East Object of view: Historic Downtown view from City Park/Giant Sequoia tree. View of historic buildings, street, prominent tree canopy.	Maintain and enhance gateway image by preserving tree canopy, limiting obtrusive vertical structures, and supporting complementary streetscape improvements. Note that as a historic district/ streetscape view, DEM viewshed mapping was not found useful.
2	NE 3rd Street - West	View type: City/Gateway view Orientation: West Object of view: Historic Downtown view from east end of street. View of historic buildings, street and prominent tree canopy.	Maintain and enhance gateway image by preserving tree canopy, limiting obtrusive vertical structures, and supporting complementary streetscape improvements. Note that as a historic district/ streetscape view, DEM viewshed mapping was not found useful.
3	West Hills north of SW Redmond Hill Road	View type: City/Mountain view Orientation: East/Northeast Object of view: View over City and agricultural land to Red Hills, Amity Hills and Cascade Range. View from conceptual "Ridge Trail" in McMinnville UGB Framework Plan.	Maintain and enhance views of the City, local hills and Cascade Range. Guide the location, orientation and design of future trail and park improvements. Note that this viewpoint is located within an identified tree grove.
4	West Hills, west of Masonic Cemetery	View type: City/Mountain view Orientation: East Object of view: View over City and agricultural land to Red Hills, Amity Hills and Cascade Range. View from conceptual "Ridge Trail."	Maintain and enhance views of the City, local hills and Cascade Range. Guide the location, orientation and design of future trail and park improvements.
5	West study area, south of West Hills Nbhd. Park	View type: Agricultural view Orientation: Southeast Object of view: View of agricultural land (primarily cropland) with backdrop of Amity Hills. View from conceptual "Ridge Trail."	Maintain and enhance agricultural land views. Guide the location, orientation and design of future trail and park improvements.
6	Fox Ridge Road - East	View type: Agricultural/City view Orientation: Northeast Object of view: View of City and agricultural land (cropland and vineyard) with backdrop of Red Hills and Chehalem Mountains.	Maintain and enhance agricultural land and City views. Manage street tree selection and location. Guide location and design of above-ground utilities and potential viewpoint improvements.
7	West study area, west of SW Hill Road (at Fellows Street)	View type: Agricultural/Local hills view Orientation: Southwest Object of view: View of agricultural land, Coast Range, West Hills and Amity Hills. View is along conceptual future extension of Fellows Street near activity center identified in Framework Plan.	Maintain and enhance views of locals hills, Coast Range, and agricultural land. Guide the location, orientation and design of future transportation corridors and park improvements to capture views.
8	West of SW Hill Road and north of Fox Ridge Road	View type: Mountain view Orientation: Northeast Object of view: View of Mt. Hood with agricultural land, Red Hills and Chehalem Mountains in foreground. View from conceptual "Ridge Trail" south of future high school in Framework Plan.	Maintain and enhance views of the Mt. Hood, Chehalem Mountains, and Red Hills. Guide the location, orientation and design of future trails, park improvements, and transportation corridors.

VIEW-POINT	LOCATION	DESCRIPTION	PRELIMINARY REMARKS/ RECOMMENDATIONS
9	Baker Creek Road - West	View type: Local hills view Orientation: West Object of view: View of West Hills, looking west from Baker Creek Road in northwest corner of study area.	Maintain and enhance views of West Hills. Guide the location and design of above-ground utilities and viewshed improvements. Manage street tree selection and location.
10	Southeast study area, south of Hwy. 18	View type: Mountain/Local hills view Orientation: South/Southeast Object of view: View of Mt. Jefferson and Amity Hills across agricultural land (cropland).	Maintain and enhance views of Mt Jefferson and Amity Hills. Guide the location, orientation and design of future trails, park improvements, and transportation corridors.
11	North of Grandhaven Elementary School	View type: River Corridor view Orientation: North Object of view: View of North Yamhill River and Baker Creek corridors, with agricultural land in foreground, local hills as backdrop. View from conservation easement/school district land looking north.	Maintain and enhance views of river corridors and local hills. Guide the location, orientation and design of public parks, trails, bridges, and viewpoint improvements.
12	North of Hwy. 18 at Evergreen Aviation	View type: Mountain/Local hills view Orientation: Northeast Object of view: Views from Three Mile Lane corridor northeast to Mt. Hood and Red Hills with agricultural land in foreground.	Maintain and enhance views of mountains and hills to northeast. Guide the location, orientation and design of public parks, trails, and roads to capture views.
13	Southeast study area, view from Hwy. 18	View type: Mountain/Gateway view Orientation: Southeast Object of view: View of Amity Hills and Mt. Jefferson looking across agricultural land (cropland). View southeast from Hwy. 18.	Maintain and enhance mountain and gateway views. Guide the location, orientation and design of public parks, trails, and roads to capture views. Inform the design of public improvements such as signage, art, landscaping, and seating.
14	View from Hwy. 18 entering City from east	View type: Gateway view Orientation: West Object of view: View of agricultural land (cropland), West Hills and coastal foothills. View entering City on Hwy. 18.	Maintain and enhance gateway view by limiting obtrusive vertical structures and supporting complementary streetscape improvements. Manage the selection and placement of trees on public property.
15	Riverside Drive - South	View type: River Corridor view Orientation: East Object of view: View looking east from Riverside Drive of South Yamhill River corridor and agricultural land (cropland).	Maintain and enhance river corridor views by limiting obtrusive vertical structures and supporting complementary streetscape improvements. Manage the selection and placement of trees on public property.
16	Riverside Drive - North	View type: River Corridor view Orientation: Northeast Object of view: View looking northeast from Riverside Drive of North and South Yamhill River corridors/floodplains and agricultural land (cropland) with backdrop of Red Hills.	Maintain and enhance river corridor views by limiting obtrusive vertical structures and supporting complementary streetscape improvements. Manage the selection and placement of trees on public property.

NATURAL RESOURCES

PROPOSED AMENDMENTS TO THE MCMINNVILLE MUNICIPAL CITY CODE – TITLE 17, ZONING ORDINANCE

New proposed language is represented by **bold underline font**, deleted language is represented by ~~strikethrough font.~~

ZONING*

Chapters:

* Prior ordinance history: Ord. 3380 as amended by Ords. 3392, 3441, 3497, 3557, 3565, 3603, 3614, 3633, 3677, 3694, 3707, 3742, 3764, 3803, 3817, 3888, 3898, 3925, 3933, 3966, 3967, 3968, 3983, 3995, 4001, 4011, 4017, 4025, 4043, 4046, and 4066.

This whole chapter is new to the McMinnville Municipal Code

Chapter 17.47

NATURAL RESOURCES OVERLAY SUBDISTRICTS

17.47.000 Natural Resource Subdistricts Generally

Natural Resource Subdistricts (NR Subdistricts) apply to significant natural resource areas that have some level of local protection pursuant to Statewide Planning Goal 5 – Natural and Cultural Resources.

- **A. NR Subdistricts are based on adopted natural resource inventories – which include maps showing significant resource sites and supporting reports documenting the criteria and methods used to determine local resource site significance.**
- **B. NR Subdistricts implement McMinnville Comprehensive Plan Chapter XI Natural Features policies related to Natural Resources.**
- **C. NR Subdistrict boundaries appear on the official City Zoning Map.**

D. NR Subdistrict standards apply in addition to standards of the underlying base zone. In cases of conflict, the more restrictive NR Subdistrict standards control.

E. NR Subdistricts may overlap with Natural Hazard Protection and Mitigation Subdistricts. Generally, the review authority shall seek to harmonize subdistrict standards that appear to conflict. However, where standards cannot be read together to achieve a consistent outcome:

1. The more restrictive standards apply, except that
2. NH-P and NH-M Subdistrict fuel reduction standards shall prevail in cases of unavoidable conflict with the significant tree and vegetation standards of this chapter.

17.47.010 Definitions

The following definitions apply within the NR Subdistricts listed below.

A. Riparian Corridor – Protection (RC-P) Subdistrict Definitions

1. Riparian Corridor. The riparian corridor includes significant (fish-bearing) rivers and streams and their respective riparian setback areas as documented in the Riparian Corridors Inventory Report (Winterbrook Planning, 2021) and as shown on the RC-P Subdistrict map.
2. Riparian Corridor Mitigation Plan. A detailed plan to compensate for identified adverse impacts on water resources and riparian setback areas from alteration, development, excavation or vegetation removal within the RC-P Subdistrict. A mitigation plan must be prepared by recognized experts in fish and wildlife biology, native trees and plants, and hydrological engineering, and typically require removal of invasive plants and re-planting with native plant species.
3. Landmark and Significant Trees. Please see definitions in Chapter 17.58 Trees.
4. Native Plants. Native plant species are those listed on the Portland Plant List, which is incorporated by reference into this chapter.
5. Top of Bank. Top-of-bank usually means a clearly recognizable sharp break in the stream bank. It has the same meaning as "bank-full stage" as defined in OAR 141-085-0510(6). It is the stage or elevation at which water overflows the natural banks of streams and begins to inundate the upland. The methods used to determine tops-of-bank are found in the McMinnville Riparian Corridor Inventory Report.

B. Tree Grove – Protection (TG-P) Subdistrict Definitions

In addition to the definitions found in Subsection A, the following definitions apply to the review of development on properties with significant tree groves.

1. Certified Arborist. An arborist certified through the International Society of Arboriculture (ISA).
2. Critical Root Zone (CRZ). The area directly beneath the tree dripline than should not be disturbed by development (i.e., the outer circumference of the tree branches). When the tree canopy gets wet, any excess is shed to the ground along this dripline, much like an umbrella.

3. **McMinnville Significant Tree Grove Map. A map that identifies significant tree groves within the McMinnville Urban Growth Boundary. This generalized map is based on the City of McMinnville Tree Grove Assessment (Winterbrook Planning, 2021).**
4. **Tree Grove Mitigation Plan (TGMP). A detailed plan to compensate for identified adverse impacts on tree groves and native vegetation within tree grove boundaries from alteration, development, excavation or vegetation removal within the TG-P Subdistrict. The TGMP must be prepared by a certified arborist, and typically requires mitigation for tree removal by re-planting with fire-resistant native plants and trees. The TGMP must be consistent with the recommendations of the required WAMP.**
5. **Wildfire Assessment and Mitigation Plan (WAMP). A plan prepared by certified arborist or professional forester in coordination with the McMinnville Fire District designed to assess and mitigate wildfire risks to people and property.**

RIPARIAN CORRIDOR PROTECTION (RC-P) SUBDISTRICT
[SEE SECTION 17.47.100-190]

PROPOSED TREE GROVE PROTECTION SUBDISTRICT (TG-P) SUBDISTRICT

17.47.200 Purpose and Intent of the TG-P Subdistrict

The TG-P Subdistrict implements the Tree Grove protection policies of the McMinnville Comprehensive Plan. The TG-P Subdistrict operates in conjunction with Chapter 17.56 Tree Code, Chapter 17.48 Floodplain Zone, Chapter 17.49 Natural Hazards Subdistrict, and Section 17.47.100 Riparian Corridors, to resolve conflicts between development and protection of significant tree groves identified in the City of McMinnville Tree Grove Inventory (2021). The TG-P Subdistrict protects mapped significant tree groves pursuant to Statewide Planning Goal 5 (Natural and Cultural Resources) as implemented by OAR 660-023. Specifically, this chapter allows reasonable economic use of property while establishing clear and objective standards to:

A. Protect significant tree groves and restrict development within their boundaries;
B. Provide shade and minimize runoff and erosion, thereby maintaining and enhancing water quality;
C. Preserve landmark and significant trees and native plant cover within tree groves, thereby maintaining and enhancing fish and wildlife habitats;
D. Conserve scenic, recreational and educational values of significant tree groves; and
E. Minimize wildfire risk to people and property by reducing fuel near structures.

17.47.210 Applicability and General Provisions

The TG-P Subdistrict applies to all significant tree groves, as shown on the McMinnville Significant Tree Groves Map and the McMinnville Zoning Map.

A. Development Standards. The standards and procedures of this chapter:
   1. Apply to all development proposed on property located within, or partially within, the TG-P Subdistrict;
   2. Are in addition to the standards of the underlying zone; and
   3. Supersede the standards of the underlying zone in cases of conflict.
B. Critical Root Zone (CRZ). The CRZ for an individual tree is measured from the dripline(s) of a tree or trees. The CRZ for a tree grove is measured from the outer edge of the perimeter tree grove canopy (i.e., the perimeter tree grove dripline(s)).
   1. The dripline (CRZ) measurement must be performed by a certified tree arborist as part of the arborist report required by Section 17.47.230.
   2. The applicant shall be responsible for surveying and mapping the precise location of the CRZ and any additional measurements required by this code at the time of application submittal.
C. Exemption for Developed Subdivision Lots. This subsection does not apply to existing developed lots of 9,000 square feet or less in approved residential subdivisions, if the relevant side or rear yards were cleared

of riparian vegetation and either developed with structures or planted in lawns or shrubs prior to the effective date of this ordinance.

D. City of McMinnville Exemption. When performed under the direction of the City the following shall be exempt from the provisions of this chapter:
   1. Public emergencies, including emergency repairs to public facilities; and
   2. Routine maintenance or replacement of existing public facilities projects.

E. Exception. The protected tree canopy area of Tree Groves E-1 Redmond Hills and F-1 West Redmond Hill may be reduced based on a supplemental ESEE Analysis adopted as part of an approved master plan per Section 17.47.290.

17.47.220 Permitted, Conditional and Prohibited Uses

Generally, land uses permitted by the underlying (base) zoning district are not allowed within the TG-P Subdistrict, except as set forth in in Table 17.47.220 below.

A. Permitted and Conditional Uses. Table 17.47.220 below summarizes permitted, conditional and prohibited uses within the TG-P Subdistrict. A "Yes" indicates that the use is permitted ministerially, is allowed under prescribed conditions subject to approval by the Director or may be approved subject to discretionary criteria for conditional use permit review. A "No" indicates that the use is not permitted. A use that is not permitted may not be approved through the variance provisions of this chapter.

Table 17.47.220 Tree Grove – Protection Subdistrict Use List

Regulated Activity & Procedure Type		
1. Permitted Uses with Mitigation – Ministerial	Significant Tree Groves	Mitigation Plan Required?
a) Determination of Tree Grove CRZ boundaries	Yes	No
b) Exemption from tree grove development standards for developed residential lots	Yes	No
c) Low impact, passive, or water related recreation facilities and trails including, but not limited to, viewing shelters, picnic tables, nature trails and interpretive signs	Yes	No
d) Replacement of existing structures with new structures that do not disturb any additional tree grove surface area	Yes	No
e) Except for landmark or significant trees: removal of non-native vegetation and replacement with native plant species	Yes	Yes

f) Removal of diseased or hazardous trees authorized in writing by a certified arborist and deemed necessary for hazard prevention	Yes	No
g) Perimeter mowing of existing cultivated lawns	Yes	No
h) Tree Grove or wildlife habitat restoration projects authorized by Watershed Council (which may include herbicide use)	Yes	Yes
i) Adjustments to numeric standards of the underlying zone necessary to reduce impacts on tree groves	Yes	Yes
j) Repair and maintenance of existing facilities	Yes	No
2. Permitted Uses with Mitigation – Planning Director Approval with notice	Significant Tree Groves	Mitigation Plan Required?
a) Uses permitted in the TG-P Subdistrict where applicable	Yes	Yes
b) Tree trimming and removal (including use of herbicides) approved as part of a WAMP	Yes	Yes
c) Public facilities that appear on the City's Public Facilities Plan when there is no reasonable alternative (which may include herbicide use)	Yes	Yes
d) Local streets and driveways serving residences and public facilities when there is no reasonable alternative	Yes	Yes
e) Underground public drainage facilities	Yes	Yes
f) Utility crossings and below-ground utilities	Yes	Yes
g) Adjustments to numeric standards of the underlying zone necessary to eliminate or reduce impacts on tree groves	Yes	No
h) Park improvements within significant tree groves where authorized by a parks master plan approved by the City Council	Yes	Yes
3. Conditional Use or Variance Review subject to Planning Commission Approval at a Public Hearing	Significant Tree Groves	Mitigation Plan Required?
a) Economic Hardship Variances, subject to variance provisions of Chapter 17.47.280	Yes	Yes
b) Approval of significant tree grove area reduction by up to 50 percent through the master planning process (applicable only to TG-E1 and TG-E1)	Yes	Yes

4. Prohibited Uses - unless specifically authorized above	Significant Tree Groves	Mitigation Plan Required?
a) Removal of native plant species	No	Not applicable
b) Placement of structures or impervious surfaces	No	Not applicable
c) Grading and placement of fill	No	Not applicable
d) Application of herbicides	No	Not applicable
e) Dumping of garbage or lawn debris or other unauthorized materials	No	Not applicable
f) Creation of a parcel that would be wholly within the TR-P district or resulting in an unbuildable parcel, as determined by the Director.	No	Not applicable
g) Removal of significant or landmark trees as defined in Chapter 17.58 Trees	No	Not applicable

17.47.230 Application Requirements

All development applications on lots within, or partially within, the TG-P Subdistrict shall submit the following information, in addition to other information required by this code.

A. Ministerial Uses. The applicant shall prepare a plan that demonstrates that the use will be constructed and located to avoid removal of any significant trees within a tree grove The Director may require additional information where necessary to determine TG-P boundaries or to mitigate identified impacts from a proposed development, including but not limited to:

1. **A site survey as prescribed in Section 17.47.230.B; and**
2. **One or more of the reports described in Section 17.47.230.D.**

B. Director and Planning Commission Review Uses – Site Specific Survey Required. If any use or activity is proposed within a significant tree grove, the applicant shall be responsible for preparing a survey of the entire site that shows the following:

1. **The name, location and dimensions of the significant tree grove, as shown on the McMinnville Tree Grove Assessment.**
2. **The area enclosed by the tree grove canopy per Section 17.47.210.B.**
3. **The 100-year floodplain if applicable.**
4. **Land subject to the Natural Hazard – Mitigation (NH-P), Natural Hazard Protection (NH-P), and/or Riparian Corridor – Protection (RC-P) Subdistricts.**
5. **Steeply sloped areas where the slope of the land is 15% or greater.**
6. **Existing public rights-of-way, structures, roads and utilities.**
7. **Vegetation types (native and non-native).**
8. **The driplines of significant trees or tree clusters of trees 6-inches or greater dbh that would be impacted by tree removal, major pruning or ground disturbance.**
9. **Existing and proposed contours at 2-foot intervals.**

C. Required Studies and Mitigation Reports. Where required by Table 17.47.200, the applicant shall prepare the following studies in addition to the submission of information required for specific types of development. All required studies shall be prepared by professionals in their respective fields. The Planning Director may exempt permit applications from one or more of these studies, based on specific findings as to why the study is unnecessary to determine compliance with this chapter. This determination must be made, in writing, at or immediately following the required pre-application conference and prior to application submittal.

1. **Grading Plan. The grading plan shall be specific to a proposed physical structure or use and shall include information on terrain, drainage, direction of drainage flow, location of proposed structures and existing structures which may be affected by the proposed grading operations, water quality facilities, existing and finished contours (at two-foot intervals) including all cut and fill slopes and proposed drainage channels. Project designs including but not limited to locations of surface and subsurface devices, walls, dams, sediment basins, storage**

reservoirs, and other protective devices shall form part of the submission. The grading plan shall also include a construction phased erosion control plan consistent with the provisions of this code and a schedule of operations and shall be prepared by a professional engineer registered in Oregon.

2. Arborist Report. This report shall identify the significant tree grove boundaries affecting the development site based on the driplines of perimeter trees. The arborist report also shall assess the health and driplines of any trees considered in the required alternatives analysis per Section 17.47.240.
3. Tree Grove Mitigation Report (TGMR). If development is proposed within a within the tree grove, then the arborist report shall be supplemented by a survey of existing trees and vegetative cover, whether it is native or introduced, and how it will be altered by the proposed development. The TGMR shall include recommendations to assure compliance with each applicable provision of this code and shall be prepared by an arborist or landscape architect with specific knowledge of native plant species, planting, susceptibility to wildfire, maintenance methods, and survival rates.
4. Wildfire Assessment and Management Plan (WAMP). The WAMP is required whenever a development project occurs on a site with a significant tree grove. The WAMP must meet the wildfire assessment and mitigation standards set forth in Section 17.49.130.

17.47.240 Development Standards

The following shall apply to all development, including vegetation removal and excavation, allowed within the TG-P Subdistrict. No application for a use identified in Section 17.47.220 shall be deemed complete until the applicant has addressed each of these standards in writing.

A. Alternatives Considered. Development applications for allowed uses that require public notice must carefully examine alternatives for the proposed use and explain the reasons why the proposed development cannot reasonably occur outside of the significant tree grove boundary, why any significant trees must be removed to meet project objectives, and why native vegetation cannot reasonably be avoided.
B. Minimize Siting Impacts. The proposed use shall be designed, located and constructed to minimize excavation and erosion within significant tree groves (especially within CRZs), loss of native vegetation and significant trees, and adverse hydrological impacts on adjacent streams, rivers and wetlands.
    1. For development applications that require public notice, the certified arborist must certify that any adverse impacts on the health of remaining trees will be minimized consistent with best management practices.

2. For all uses, the development shall avoid significant and landmark trees if possible, recognizing the operational needs of the proposed development.

C. Construction Materials and Methods. Where development within the significant tree grove is unavoidable, construction materials or methods used within the tree grove area shall minimize damage to water quality, native vegetation and significant trees.

D. Above-Ground Structures. Above-ground structures shall not be permitted within the TG-P Subdistrict except where specifically authorized by Table 17.47.220 Tree Grove – Protection Subdistrict Use List or exempted under Section 17.42.210.

E. Meet NR- and NH- Subdistrict Standards. All development must meet applicable natural resource and natural hazard subdistrict standards in addition to the provisions of this chapter. In cases of conflict, the more restrictive standard shall apply.

F. Avoid Steep Slopes. Removal of significant trees and native vegetation removal shall be avoided on slopes of 25 percent or greater and in areas with high erosion potential (as shown on National Resource Conservation Service (NRCS) maps), except where necessary to construct public facilities, to ensure slope stability, or to comply with the recommendations of an approved WAMP.

G. Minimize Impacts on Existing Vegetation. The following standards shall apply when construction activity is proposed in areas where native vegetation and significant trees are to be preserved.

1. Temporary measures used for initial erosion control shall not be left in place permanently.
2. Work areas on the immediate site shall be carefully identified and marked to reduce potential damage to trees and vegetation.
3. Significant trees shall not be used as anchors for stabilizing working equipment and the root zones shall be protected.
4. During clearing operations, significant trees and vegetation shall not be permitted to fall or be placed outside the work area.
5. In areas designated for selective cutting or clearing, care in falling and removing trees and brush shall be taken to avoid injuring trees and shrubs to be left in place.
6. Stockpiling of soil, or soil mixed with vegetation, shall not be permitted on a permanent basis.

H. Tree Grove Mitigation Plan. If a TGMP is required:

1. The applicant shall be responsible for re-vegetating areas temporarily disturbed by excavation on a 1:1 basis.
2. Where approval is granted within a significant tree grove, the applicant shall be responsible for mitigating for significant tree and native vegetation removal by replacing significant trees and native vegetation within the remaining, protected tree grove on a 1.5:1 basis.

(a) That is, for each significant tree removed, at least 1.5 new trees shall be planted. Each new tree shall be at least two inches in caliper.

(b) For each 100 square feet of disturbed native vegetation removed, at least 150 square feet of cleared or non-native vegetation shall be re-planted with native, fire-resistant plant species.

3. The re-vegetation plan shall provide for the replanting and maintenance of native plant species designed to achieve pre-disturbance conditions. The applicant shall be responsible for replacing any native plant species that do not survive the first two years after planting, and for ensuring the survival of any replacement plants for an additional two years after their replacement.
4. Significant and landmark trees shall be replaced as required by Chapter 17.58 Trees.
5. Wildfire Assessment and Mitigation Plan (WAMP) recommendations regarding the fire-resistant trees and native vegetation shall be followed where necessary to reduce wildfire risk.

I. Water and Sewer Infiltration and Discharge. Water and sanitary sewer facilities shall be designed, located and constructed to avoid infiltration of floodwaters into the system, and to avoid discharges from such facilities to streams and wetlands.

J. On-Site Systems. On-site septic systems and private wells shall be prohibited within the TG-P Subdistrict.

K. Erosion Control Plan. If a use that requires public notice is proposed within a riparian setback area, the City of McMinnville Storm Drainage Design and Construction Standards shall apply. A schedule of planned erosion control and re-vegetation measures shall be provided, which sets forth the progress of construction activities, and mitigating erosion control measures.

L. Conditional Uses. In addition to the procedural and substantive provisions of Chapter 17.74.030, Conditional Uses, the applicant for conditional use approval shall prepare a TGMP demonstrating no net loss of tree grove, native vegetation or associated wildlife habitat values will result from the proposed conditional use.

17.47.250 Decision Options and Conditions of Approval

A. Decision Options. The Approval Authority may approve, approve with conditions, or deny an application based on the provisions of this chapter. The Approval Authority may require conditions necessary to comply with the intent and provisions of this chapter.

B. Conditions. The required reports shall include design standards and recommendations necessary for the engineer and biologist, certified wetland scientist or other qualified individual to provide reasonable assurance that the standards of this section can be met with appropriate mitigation measures. These measures, along with staff

recommendations, shall be incorporated as conditions into the final decision approving the proposed development.

C. Assurances and Penalties. Assurances and penalties for failure to comply with mitigation, engineering, erosion and water quality plans required under this section shall be as stated in Chapter 17.03 General Provisions.

17.47.260 Administrative Adjustment to Underlying Zone Dimensional Standards

The purpose of this section is to allow adjustments to dimensional standards of the underlying zoning district to reduce or move the development footprint to minimize adverse impacts on natural resource values within the TG-P Subdistrict. The Planning Director may approve adjustment applications with public notice.

A. Adjustment Option. The Planning Director may approve up to a 50 percent adjustment to any dimensional standard (*e.g.*, setback, height or lot area) of the underlying zoning district outside the boundaries of the significant tree grove to allow development consistent with the purposes of the TG-P Subdistrict.

B. Adjustment Criteria. A TG-P adjustment may be requested when development is proposed on a site within or partially within a TG-P Subdistrict. For the director to approve a dimensional adjustment to standards outside the tree grove boundary in the underlying zoning district, the applicant shall demonstrate that the following criteria are fully satisfied:

1. The adjustment is the minimum necessary to allow a permitted use, while at the same time minimizing disturbance within significant tree grove area.
2. Explicit consideration has been given to maximizing tree retention and vegetative cover, protecting significant and landmark trees, and minimizing excavation and impervious surface area.
3. Design options have been considered to reduce the impacts of development, including but not limited to multi-story construction, siting of the structure or residence close to the street to reduce driveway distance, maximizing the use of native landscaping materials, and minimizing parking area and garage space.
4. Assurances are in place to guarantee that future development will not encroach further on land under the same ownership within the TG-P Subdistrict.
5. The Planning Director may impose any reasonable condition necessary to mitigate identified impacts resulting from development on otherwise unbuildable land.

17.47.270 Density Transfer

Residential density transfer from land within the TG-P Subdistrict (the sending area) to contiguous property under the same ownership that is outside any

applicable natural resource or hazard protection subdistricts (the receiving area), shall be permitted.

A. Maximum Density. To encourage density transfer, the transfer area shall be subject to the development standards of the next higher residential zoning district.

B. Example. For example, density transfer from the TG-P Subdistrict to land with an underlying R1 zone to the sending area on the same site but outside the Natural Hazards or Protection and the Natural Resource Protection Subdistricts shall be capped at the density allowed in the R2 zone.

17.47.280 Economic Hardship Variances

Variances to the provisions of the TG-P Subdistrict shall be discouraged and may be considered only as a last resort when application of the TG-P Subdistrict would result in a property (one or more contiguous lots under common ownership) having no reasonable economic use.

A. Variance Option. The planning commission shall hear and decide variances from dimensional provisions of this chapter, in accordance with the criteria in Chapter 17.53.163 Exceptions and Variances.

B. Additional Criteria. In addition to the general variance criteria described in Chapter 17.53.63, the following additional criteria must be met to grant a variance to any dimensional provision of this chapter:

1. The variance is necessary to allow reasonable economic use of the subject parcel or parcels of land owned by the applicant that were not created after the effective date of this chapter.
2. Strict application of the provisions of this chapter would otherwise result in the loss of a buildable site for a use that is permitted outright in the underlying zoning district, and for which the applicant has submitted a formal application.
3. The applicant has exhausted all options available under this chapter to relieve the hardship.
4. Based on review of all required studies described in Section 17.47.240, the variance is the minimum necessary to afford relief, considering the potential for increased flood and erosion hazard, and potential adverse impacts on significant trees, native vegetation, fish and wildlife habitat, and water quality.
5. Based on review of all required studies described in Section 17.47.240, any adverse impacts on tree canopy, water quality, erosion or slope stability that will result from approval of this hardship variance have been mitigated to the greatest extent possible.
6. Loss of significant tree and vegetative cover shall be minimized. Any lost vegetative cover shall be replaced on-site, on a 1-to-1 basis, by native trees and vegetation. Landmark tree removal shall be prohibited.

17.47.290 Exception for Large Tree Groves Subject to an Area Master Plan

A. **Purpose. The two largest significant tree groves in the West Hills (TG-E1 and TG-E2) cover approximately 92 acres, are of relatively low quality, and are subject to geological and wildfire hazards. Policy 187.40 of the McMinnville Comprehensive Plan requires that an Area Master Plan be prepared for the general area where these two tree groves are located. The 2022 Tree Grove ESEE Analysis determined that full protection of these two tree groves (outside the NH-P Subdistrict) would reduce the city's buildable lands supply by approximately 90 acres. Based on the recommendations of the 2022 Tree Grove ESEE Analysis, these two tree groves shall be subject to special tree grove protection standards as indicated below.**

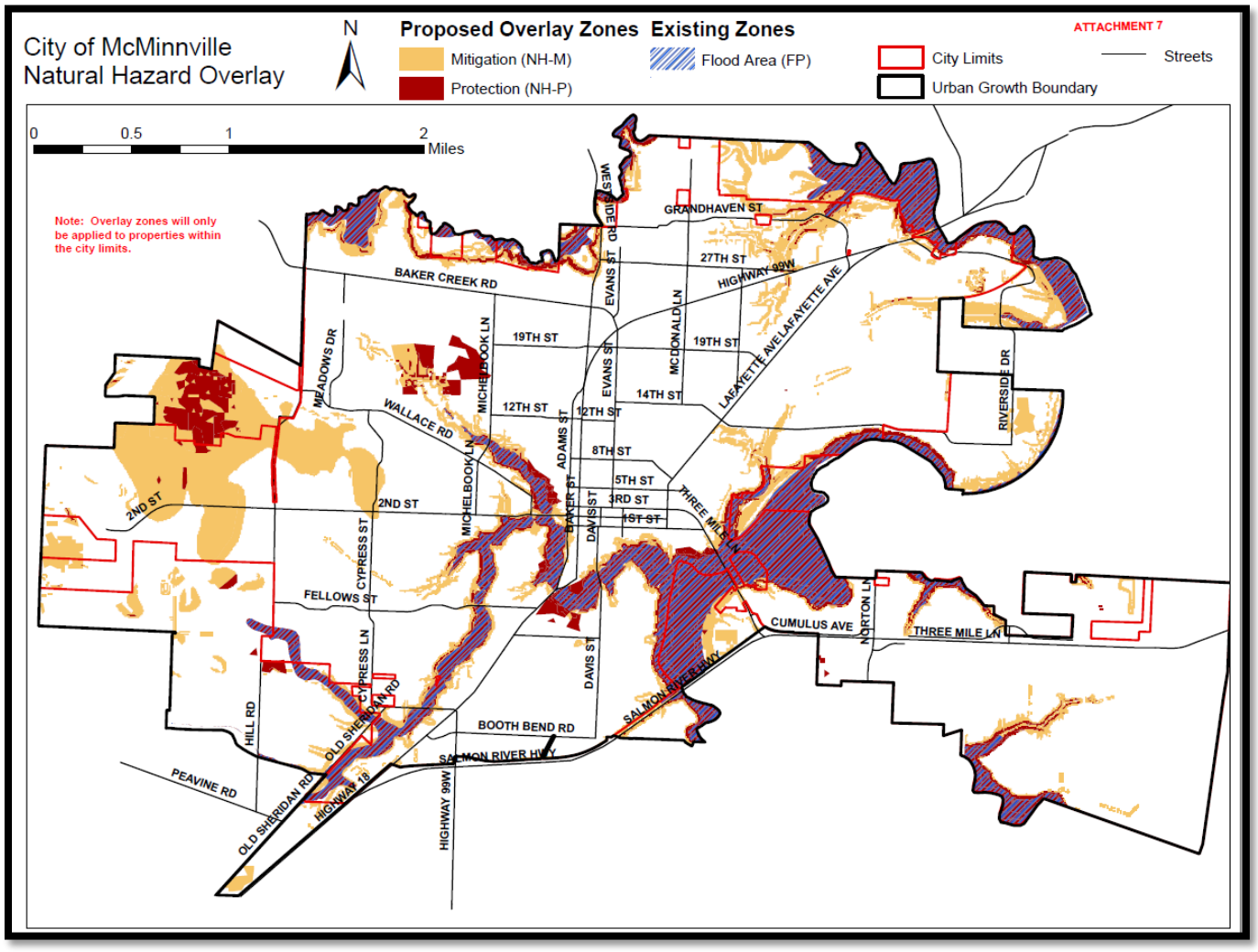
B. **Tree Groves within NH-P Subdistrict. The portions of TG-E1 and TG-F1 within the NH-P Subdistrict shall remain subject to both the NH-P and TG-P Subdistricts.**

C. **Limited Protection Program. Up to a 50 percent (approximately 45 acres) of the significant tree grove area (outside of the NH-P Subdistrict) may be excluded from the TG-P Subdistrict to allow development authorized by the approved master plan.**

D. **Significant Tree Grove Area Reduction Criteria. The remaining 50 percent of the TG-E1 and TG-F1 canopy (outside the NH-P Subdistrict) shall be retained in the TG-P Subdistrict and shall be protected through the master planning process. The location of the TG-P protected area shall be determined on the following priorities:**

   1. **Landmark tree canopy shall be the highest priority for protection;**
   2. **Tree canopy within the NH-M Subdistrict shall be given second priority for protection – where contiguous to protected landmark tree canopy or protected tree canopy within the NH-P Subdistrict;**
   3. **The remaining protected tree canopy shall be determined based on the recommendations of a certified arborist.**
   4. **Protected tree canopy within the TG-P Subdistrict shall be managed consistent with the recommendations of the required TGMP and WAMP.**

NATURAL HAZARDS SUMMARY:



Background:

Natural hazard planning is not new to McMinnville. The original comprehensive plan in 1981 conducted natural hazard planning and from this effort, the Flood Area zone was realized. When new hazard inventory data becomes available from the state local governments should update their natural hazard planning programs to evaluate the new data and develop a mitigation plan if appropriate.

What is Natural Hazard Mitigation? Disasters occur when natural hazard events impact people, property and the environment. Natural hazard mitigation is the identification and implementation of actions that will reduce loss when the next disaster strikes. Implementing mitigation actions can also reduce the length of time that essential services are unavailable after a disaster, protect critical facilities, reduce economic hardship, speed recovery, and reduce construction costs. Natural hazard mitigation is any sustained action

taken to reduce or remove the long-term risk to life, property, and the environment from natural hazards. It is most effective when implemented under a comprehensive, long-term natural hazards mitigation plan, and integrated into other partner plans.

What is a Natural Hazards Mitigation Plan? A natural hazards mitigation plan identifies hazards, vulnerabilities, and risks facing a local, state or tribal government, and prioritizes actions to reduce the risk.

Oregon Land Use Goal #7 requires local governments to evaluate the risk to people and property when new hazard inventory information is available and assess the frequency, severity and location of the hazard; the effects of the hazard on existing and future development; the potential for development in the hazard area to increase the frequency and severity of the hazard; and the types and intensities of land uses to be allowed in the hazard area. In this effort, governments should allow an opportunity for citizen review and comment on the new inventory information and the results of the evaluation, and adopt or amend, as necessary, based on the evaluation of risk, plan policies and implementing measures consistent with the following principles:

- Avoiding development in hazard areas where the risk to people and property cannot be mitigated; and

- Prohibiting the siting of essential facilities, major structures, hazardous facilities and special occupancy structures, as defined in the state building code.

Oregon Land Use Goal #7 further states that state agencies shall coordinate their natural hazard plans and programs with local governments and provide local governments with hazard inventory information.

In 2018, the Oregon Department of Geology and Mineral Industries updated their geohazards data. At the same time, the US Forest Service updated their Pacific Northwest Quantitative Wildfire Risk Assessment Data.

In 2019, Yamhill County with the aid of a grant from the Federal Emergency Management Agency's (FEMA) Hazard Mitigation Program, updated the Yamhill County Multi-Jurisdictional Hazard Mitigation Plan, which was acknowledged by FEMA in December 22, 2020.

As a partner in that process, the City of McMinnville prepared an addendum to that plan that was adopted by the McMinnville City Council on December 8, 2020 by Resolution No. 2020-67. The McMinnville addendum identified a number of action items for the City of McMinnville including mapping and inventorying hazard areas and evaluating comprehensive plan policies and development regulations to ensure that the city is protecting people and property from natural hazard areas.

At the same time, the State of Oregon updated the Oregon Natural Hazards Mitigation Plan, which was approved by FEMA September 24, 2020.

The hazards normally identified in Oregon are floods, earthquakes, landslides, wildfires, tsunamis and coastal erosion.

The existing comprehensive plan addresses flood hazards only – consistent with Federal Emergency Management Agency (FEMA) regulations related to the National Flood Insurance Program (NFIP). The current comprehensive plan does not have a separate natural hazards element. The McMinnville Zoning Ordinance has a separate F-P Flood Hazard Zone that applies to land within the 100-year floodplain. However, the City currently lacks development standards for geological and wildfire hazards. The McMinnville Buildable Lands Inventory indicates slopes of 25% or greater and floodplains as unbuildable consistent with applicable state law.

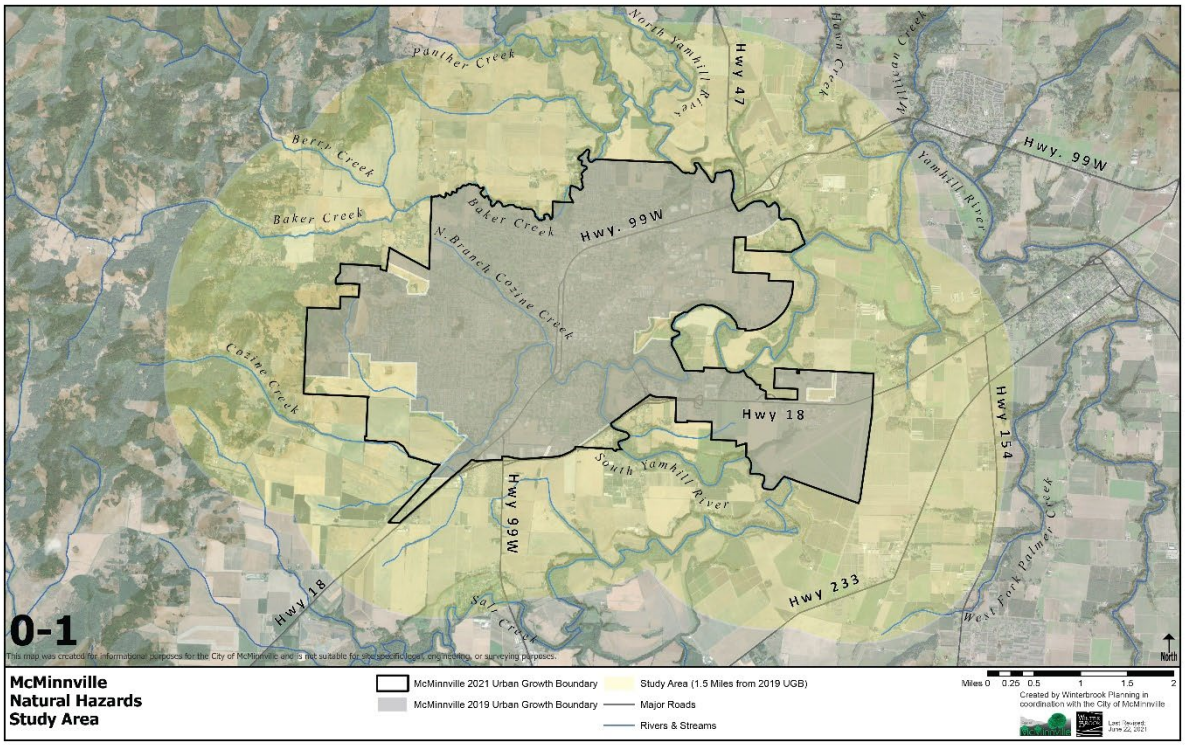
In 2020, the City hired Winterbrook Community Resource Planning to prepare the initial draft of the McMinnville Natural Hazards Inventory, Management Program Options and Recommendations study. The study area at that time included (a) the McMinnville Urban Growth Boundary (UGB) as it existed in June 2020 and (b) the UGB expansion study area within 1.5 miles of the existing UGB.

When the City initiated a UGB amendment process in 2020 simultaneously with the Natural Hazards Inventory and Review, the City considered the natural hazard inventory information provided in the initial draft report as part of the UGB analysis.

In December 2020, the City Council amended its UGB to include approximately 1,280 acres of land (of which 921 acres were considered “buildable”). The County subsequently adopted, and the Land Conservation and Development acknowledged, the UGB amendment in April 2021.

Figure 1 shows the 2021 UGB expansion area in relation to the previously existing 2019 and the Natural Hazards Study Area.

Figure 1 McMinnville 2019 UGB, 2021 UGB, and Natural Hazards Study Area



In April 2021, the City contracted with Winterbrook Planning to revise the 2020 natural hazards study to (a) focus on the expanded 2021 UGB, (b) include social vulnerabilities described in the *Oregon Natural Hazards Mitigation Plan* (Oregon NHMP) in the natural hazards composite ranking system, (c) amend the proposed Natural Hazard Mitigation and Protection maps accordingly, and (d) prepare draft amendments to the McMinnville Zoning Ordinance to include natural hazard mitigation and protection subdistrict maps and text.

The revised study includes an inventory of natural hazards based on available mapping sources, considers alternative management options, and suggests policy and mapping amendments to the McMinnville Comprehensive Plan to systematically address McMinnville's mappable natural hazards within the 2021 UGB.[1]

The revised natural hazards inventory includes a series of GIS (geographic information system) overlay maps showing moderate, high and severe hazard areas within the 2021 UGB and study area. The inventory also includes a description of the following natural hazards and how they may adversely affect life and property:

- **Geological Hazards** (areas subject to landslide, steep slope and earthquake liquefaction and shaking impacts)

[1] Winterbrook addresses relationships among natural hazards and natural resources (such as riparian and upland wildlife habitat and scenic views and viewpoints) in a separate white paper.

- **Flood Hazards** (areas within the 100-year floodplain including the floodway)
- **Wildfire Hazards** (areas that are particularly susceptible to wildfires due to topography, fuel and settlement patterns)
- **Composite Hazards** (areas with one or more overlapping natural hazard categories)

This work resulted in proposed amendments to the McMinnville Comprehensive Plan both in terms of new inventory and recommended programs and new policies for natural hazards. It also resulted in proposed amendments to the McMinnville Municipal Code and McMinnville Zone Map, introducing two new overlay districts, the Natural Hazard – Mitigation Zone (NH-M) and the Natural Hazard Protection Zone (NH-P). Regulations for the administration of both overlay zones is proposed as a new chapter 17.49, "Natural Hazards Overlay Subdistricts".

Throughout the two years of evaluation and draft program implementation, city staff and the Winterbrook team conducted several work sessions with the McMinnville City Council and Planning Commission informing them of the research and evaluation and seeking policy direction on how to move forward with mitigating the risk. In August 2020, the McMinnville City Council asked city staff and the consultants to develop mitigation measures that would help to assess risk for people and property on land that had multiple hazards, and for those lands with moderate overlapping hazards to require additional assessments as part of the development review and with those lands that were identified as high hazard areas to limit development to low density and intensity development to protect people and property.

Impact to Properties:
Existing Uses are considered conforming within both the Natural Hazard Mitigation Zone and the Natural Hazard Protection Zone, and can be expanded by 50% of the habitable area without implicating the provisions of the natural hazards overlay.

The Natural Hazard – Mitigation Zone allows all permitted and conditional uses in the underlying zones to continue to be developed. However, based on the types of hazards on the property, the Community Development Director will determine if an additional study is needed to help inform the development to protect the people and property from a potential natural disaster. That study might be a geo-site assessment for those properties that have landslide, liquefaction or shaking soil hazards, or a wildfire mitigation plan for those properties within a wildfire risk area. Development on slopes greater than 15% might be required by the City Engineer to provide an erosion control plan as part of their development review.

The Natural Hazard – Protection Zone allows all permitted and conditional uses in the underlying zones but limits the intensity and density of the uses by prohibiting large format commercial development, limiting land division and residential development to one unit per lot unless a planned development process is used to locate the more intensive development on land that is less hazardous. The Natural Hazard – Protection Zone also allows for a transfer of residential density rights to other properties within the city limits.

On February 16, 2023, city staff brought the final draft recommendations to the Planning Commission for review and discussion. At that work session, the Planning Commission directed city staff to identify the impact of hazard planning on property owners from the perspective of insurance provisions, and to develop an appeal process for property owners as well as the ability for property owners in the Natural Hazards – Protection overlay where development is limited to transfer their density rights to other properties within the city.

Insurance Risk:

City staff reached out to insurance agencies to inquire about the rise of this planning effort to home insurance policies. Most homeowners and some renters have insurance to protect their home and belongings. Homeowner and renter insurance typically covers certain natural hazards, such as water damage from heavy rain or snow. As long as it can be demonstrated that a domicile has been maintained in good working order, the majority of costs for repair and replacement can be recovered.

However, homeowner and renter insurance policies almost never cover floods, hurricanes, earthquakes, and other natural hazards. Coverage of these hazards events require separate policies that the homeowner initiates on their own. Due to the earthquake subduction zone in McMinnville, the city is already tagged as a hazard area for home insurance and insurers asked did not feel that this new information would impact anything.

Appeal Process:

City staff researched appeal processes in other communities for property owners to prove that their property should not be included in a hazard overlay. Based on that research, Section 17.49.95 was added to the draft code amendments per the following:

17.49.95 Appeal / Verification of Natural Hazards boundaries. The Natural Hazards boundaries may be appealed and must be verified occasionally to determine the true location of a hazard area and its functional values on a site. This may be through a site-specific survey or a simple site visit in those cases where existing information demonstrates that the Natural Hazard significance rating does not apply to a site-specific area. Applications for development on a site located in a Natural Hazard area may request a determination that the subject site is not subject to the standards of Chapter 17.49. Verifications / appeals shall be processed as either a Type I or Type II process as outlined below.

A. Type I Appeal / Verification.

1. *Applicants for a determination under this section shall submit a site plan meeting the requirements of Chapter 17.72, as applicable.*
2. *An applicant may request a Type I Verification determination by the community development director. Such requests may be approved provided that there is evidence substantiating that all the requirements of this chapter relative to the proposed use are satisfied and demonstrates that the property also satisfies the following criteria, as applicable:*
   a. *No natural features have been disturbed.*
   b. *No natural features have been changed.*
   c. *The property does not contain a natural hazard area as identified by the city's local natural hazards area maps.*
   d. *Evidence of prior land use approvals that conform to the natural hazards overlay districts, or which conformed to the natural hazard area overlay district that was in effect prior to the Natural Hazards code adoption date _____.*

B. *Type II Appeal / Verification. Verifications of the Natural Hazards areas which cannot be determined pursuant to the standards of Chapter 17.49 may be processed under the Type II permit procedure.*
   1. *Applicants for a determination under this section shall submit a site plan meeting the requirements of (site plan requirements) as applicable.*
   2. *Such requests may be approved provided that there is evidence that demonstrates in a report prepared by one or more qualified professionals with experience and credentials in natural resource areas, including wildlife biology, ecology, hydrology and forestry, that a resource function(s) and/or land feature(s) does not exist on a site-specific area.*
   3. *Verification to remove a recently developed area from the Natural Hazards shall show that all of the following have been met:*
      a. *All approved development in the Natural Hazards area has been completed*
      b. *All mitigation required for the approved development has been successful.*
      c. *The previously identified Natural Hazards area on the developed site no longer exist or have been subject to a significant impact.*

Transfer of Residential Density Rights:

City staff researched transfer of density rights programs associated with natural hazard overlays in several other Oregon cities. Based on that research, Section 17.49.170 was amended to the draft code amendments per the following:

17.49.170 Residential Density Transfer. A transfer of development density from undeveloped buildable land within the Natural Hazard Protection zone to other property within the city limits is encouraged. Density transfer may occur through the planned development process, as indicated below.

A. *Development Density to Transfer from National Hazard Protection Zone (NH-P). The land area from which density can be transferred excludes developed and unbuildable areas, such as riparian corridors, slopes 15% or greater, and easements. 50% of the development density of identified qualifying land within the land area may be transferred to any other residential zone.*
B. *Development Density in Receiving Area. Up to a maximum 20% reduction in average minimum lot size or lot area per unit requirements is allowed in order to accommodate the density transfer. Developments utilizing a transfer of density will need to apply for a Planned Development pursuant to Chapter 17.51.*
C. *If Density Transfer is Not Feasible. In situations where density transfer is not feasible, a maximum of one dwelling unit per 2.5 acres may be allowed on land zoned for residential use within the NH-P Subdistrict, consistent with the recommendations of a geotechnical engineering study and any conditions required by the review authority.*
D. *Recording of Density Transfer. In all cases where this bonus is used, covenants or other legally binding agreements that run with the land shall preclude the development of the land from which the density is transferred. The covenants or other legally binding agreements shall be recorded before the transferred density may be used.*

Public Engagement:

The City sent out notices to all impacted property owners both within the city limits and outside of the city limits but within the UGB (although the zoning overlays will not apply until such time that the property is annexed into the city limits), informing them of the proposed amendments and inviting them to one of two public information sessions hosted on March 20 and March 27. City staff also set up a project website with an interactive map to help property owners understand the hazards that were identified on their properties and have been meeting with impacted property owners to answer their questions and concerns.

At the public hearing on April 6, 2023, the Planning Commission heard testimony from some property owners who questioned the veracity of the data and the resulting requirements of the overlays as a result of that data.

Planning Commission then had a discussion, electing to continue the public hearing and directing city staff to do some more research on the following:

Transfer of Development Rights Program: Planning Commissioners asked if the development rights could be sold; if the property owner needed to own both the giving property and the receiving property; and asked city staff to research a program with 100% transfer of development rights rather than the 50% recommended.

Veracity of the Data: Planning Commissioners asked city staff to meet with DOGAMI and DLCD staff about the veracity of the data and ask if DOGAMI and DLCD staff could join the Planning Commission at a future meeting.

City staff organized a meeting with DOGAMI (Bill Burns, Engineering Geologist) and DLCD (Katherine Daniel, Natural Hazards Planner) to discuss the City's efforts, the reliance on DOGAMI data and whether the City's current proposed program was meeting the intent and mandate of Goal 7. Both staff representatives said that the City was doing what it needed to do with the best data available to the City and were supportive of the City's efforts. Both state agency staff representatives testified at a public hearing with the Planning Commission on June 15, 2023.

They have been invited to the June 15 Planning Commission meeting.

Types of Reports Required: Some of the property owners that testified expressed their concerns with the added costs of the reports required if their property was in one of these overlays. Planning Commissioners asked city staff to research whether there were other distinctive levels of data analysis that were less expensive than a Geological Site Assessment or a Geotechnical Report that could be required prior to the property owner incurring the expense for those reports.

City staff reached out to a couple of different Geo-Tech firms and are still researching whether there is a preliminary assessment that could be done prior to the Geo Site Assessment outlined in the code.

Below is a link to a document that DOGAMI and DLCD staff prepared. In this document there is considerable discussion on how cities should mitigate hazards with site assessments and geo-tech reports.

Preparing for Landslide Hazards: A Land Use Guide for Oregon Communities

How to decide if a site-specific report is needed.
The general term geologic report refers to the engineering geologic report and the geotechnical engineering report. The difference is as follows:

- *Engineering geologic reports focus on how the earth (e.g., landforms, water table, soil, and bedrock) and earth processes (e.g., landslides and earthquakes) impact structures or potential structures and describe the degree of risk.*
- *Geotechnical engineering reports focus on the design of building products (e.g., structures, retaining walls, pavements) that can withstand or mitigate for subsurface and geologic conditions.*
- *There are two kinds of reports. The local jurisdiction develops its own criteria for triggering its geologic report (engineering geologic report or geotechnical engineering report) requirement on a site by site basis. For example, some communities adopt landslide hazard maps produced by DOGAMI and use these maps to determine if a site is in a hazard zone. If a site is in a hazard zone, generally a report is required. Communities may also use criteria such as percent slope or soil type to trigger a report requirement.*
- *Licensed professionals are generally required to stamp and sign their work products to identify for the public responsibility for the work. OSBGE and OSBEELS have requirements for stamp design and use. For geology work products, stamping requirements are as follows:*
    - *When one geologist prepares all the geology work products in a report, that geologist must stamp and sign the final report.*
    - *When multiple licensed professionals contribute work products to a report (for example, an RG or PE/GE contributing work products to a final report signed and stamped by a CEG), each professional must individually sign and stamp their own work products.*

ATTACHMENT 3

City of McMinnville
Natural Hazard Overlay

N

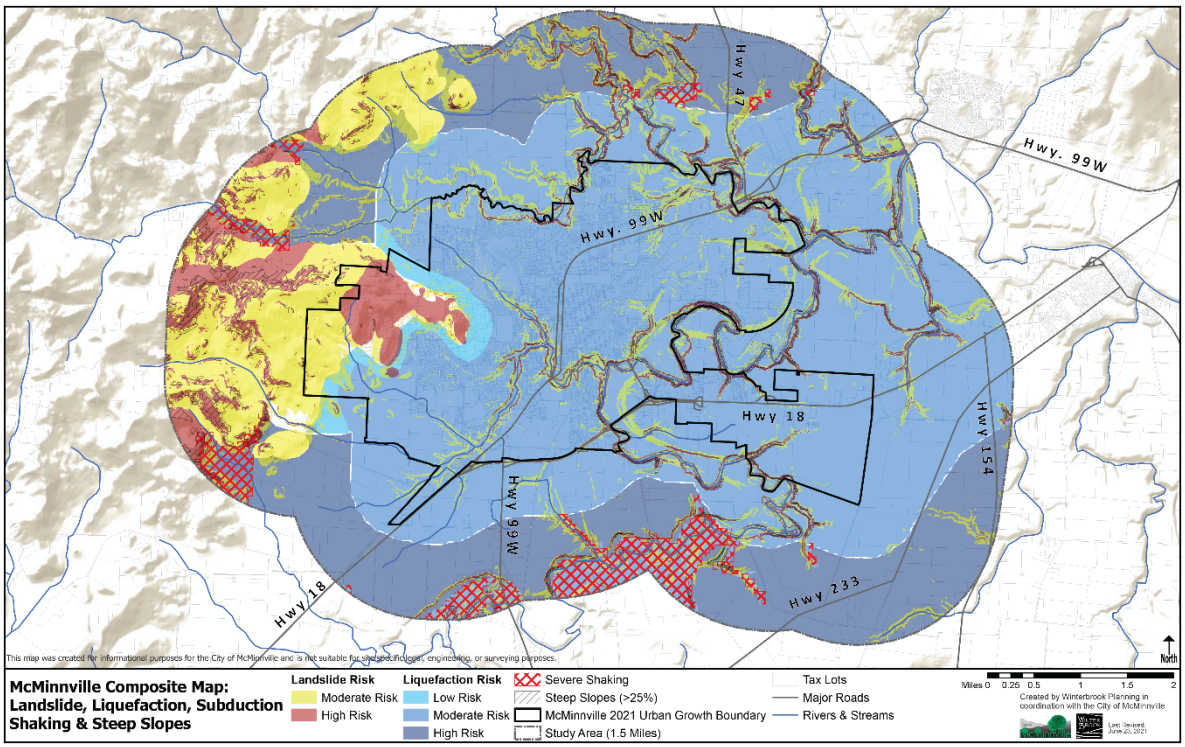
Proposed Overlay Zones
- Mitigation (NH-M)
- Protection (NH-P)

Existing Zones
- Flood Area (FP)
- City Limits
- Urban Growth Boundary
- Streets

0 0.5 1 2 Miles

Note: Overlay zones will only be applied to properties within the city limits.

BAKER CREEK RD
WEST SIDE RD
GRANDHAVEN ST
27TH ST
HIGHWAY 99W
EVANS ST
MCDONALD LN
LAFAYETTE AVE
19TH ST
MEADOWS DR
MICHELBOOK LN
WALLACE RD
12TH ST
14TH ST
ADAMS ST
8TH ST
5TH ST
3RD ST
1ST ST
BAKER ST
DAVIS ST
THREE MILE LN
RIVERSIDE DR
2ND ST
CYPRESS ST
FELLOWS ST
CYPRESS LN
OLD SHERIDAN RD
HILL RD
BOOTH BEND RD
SALMON RIVER HWY
CUMULUS AVE
NORTON LN
PEAVINE RD
HIGHWAY 18
HIGHWAY 99W



Natural Hazards Inventory & Management Program Options and Recommendations

Prepared by:

WINTER BROOK
COMMUNITY RESOURCE PLANNING

Winterbrook Planning | June 24, 2021 | *Draft*

Contents

Appendices

The following appendices support this report.

Appendix 1: Best Natural Hazards Mitigation Programs in Comparator Cities

Appendix 2: Natural Hazard Overlay Methodology

Appendix 3: REVISED Natural Hazard Inventory and Natural Hazard Overly Maps

Figures

Acronyms and Abbreviations

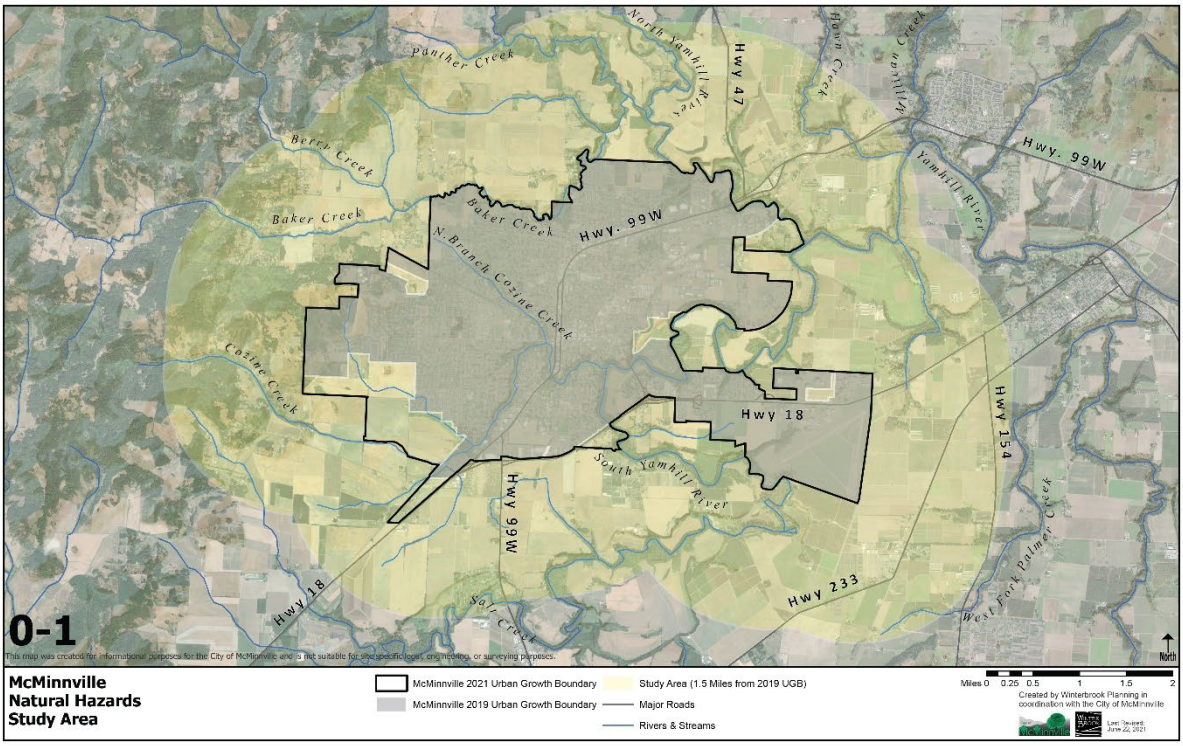
The following acronyms and abbreviations are used in this report.

- **BFE** – Base Flood Elevations
- **Cascadia** or **CSZ —** Cascadia Subduction Zone earthquake
- **CWPP** – *Yamhill County Community Wildfire Protection Plan*
- **DEM** – Digital Elevation Model
- **DOGAMI** – Oregon Department of Geology and Mineral Industries
- **FEMA** – Federal Emergency Management Agency
- **FIRM** – Flood Insurance Rate Map
- **Floodplain** – the 100-year floodplain including the floodway
- **GIS** – Geographic Information System
- **LIDAR** – Light Detection and Ranging
- **McMinnville NHMP** – *McMinnville Addendum to the Yamhill County Natural Hazards Mitigation Plan*
- **NFIP** – National Flood Insurance Program
- **NHO** – Natural Hazards Overlay (Comprehensive Plan Map Overlay)
    - **NH-M Subdistrict** – Natural Hazard Mitigation Subdistrict (Zoning Map Overlay)
    - **NH-P Subdistrict** – Natural Hazard Protection Subdistrict (Zoning Map Overlay)
- **OWRE** – *Oregon Wildfire Risk Explorer*
- **Oregon NHMP –** *Oregon Natural Hazards Mitigation Plan (2020)*
- **RFPD** – Rural Fire Protection Districts
- **SFHA** – Special Flood Hazard Area
- **Study Area** – the Natural Hazard Study Area (including land 1.5 miles from the 2019 UGB)
- **UGB** – McMinnville Urban Growth Boundary
- **UGMA** – Urban Growth Management Agreement
- **WUI Zone** – Wildland Urban Interface Zone

Introduction and Project Summary

In 2020, Winterbrook prepared the initial draft of the McMinnville Natural Hazards Inventory, Management Program Options and Recommendations study. The study area included (a) the McMinnville Urban Growth Boundary (UGB) as it existed in June 2020[1] and (b) the UGB expansion study area within 1.5 miles of the existing UGB[2]. The City considered inventory information provided in the initial draft report during the UGB amendment process. In December 2020, the City Council amended its UGB to include approximately 1,280 acres of land (of which 921 acres were considered "buildable"). The County subsequently adopted, and the Land Conservation and Development acknowledged, the UGB amendment. Figure 0-1 shows the 2021 UGB expansion area in relation to the previously existing 2019 and the Natural Hazards Study Area.

Figure 0-1 McMinnville 2019 UGB, 2021 UGB, and Natural Hazards Study Area



In March 2021, the City contracted with Winterbrook Planning to revise the 2020 Natural Hazards Study to:

a) Focus on the expanded 2021 UGB
b) Include social vulnerabilities described in the *Oregon Natural Hazards Mitigation Plan,* (Oregon NHMP) in the Natural Hazards Composite Ranking System,
c) Amend the proposed Natural Hazard Mitigation and Protection maps accordingly, and
d) Prepare draft amendments to the McMinnville Zoning Ordinance to include natural hazard mitigation and protection subdistrict maps and text.

[1] Referenced throughout this document as the 2019 UGB. (1 and 2 ? where are these referenced?_)
[2] Referenced throughout this document as the 2021 UGB.

This report represents the revised study including an inventory of natural hazards based on available mapping sources, considers alternative management options, and suggests policy and mapping amendments to the McMinnville Comprehensive Plan to systematically address McMinnville's mappable natural hazards within the 2021 UGB.[3]

The revised Natural Hazards Inventory includes a series of GIS (geographic information system) overlay maps showing moderate, high and severe hazard areas within the 2021 UGB and study area. The inventory also includes a description of the following natural hazards and how they may adversely affect life and property:

- **Geological Hazards** (areas subject to landslide, steep slope and earthquake liquefaction and shaking impacts)
- **Flood Hazards** (areas within the 100-year floodplain including the floodway)
- **Wildfire Hazards** (areas that are particularly susceptible to wildfires due to topography, fuel and settlement patterns)
- **Composite Hazards** (areas with one or more overlapping natural hazard categories)

McMinnville Comprehensive Plan

This revised study helps to implement recent amendments to the *McMinnville Comprehensive Plan* (Comprehensive Plan) to incorporate Great Neighborhood Principles and implementing policies.

> **Policy 187.40** **The Great Neighborhood Principles shall guide long range planning efforts including, but not limited to, master plans, small area plans, and annexation requests. The Great Neighborhood Principles shall also guide applicable current land use and development applications.**
>
> **Policy 187.50.1** directly addresses natural features (including Natural Hazard Management):
>
> 1. **Natural Feature Preservation**. Great Neighborhoods are sensitive to the natural conditions and features of the land. a. Neighborhoods shall be designed to preserve significant natural features including, but not limited to, watercourses, sensitive lands, steep slopes, wetlands, wooded areas, and landmark trees.

The existing comprehensive plan addresses flood hazards only – consistent with Federal Emergency Management Agency (FEMA) regulations related to the National Flood Insurance Program (NFIP). The current comprehensive plan does not have a separate natural hazards element. The McMinnville Zoning Ordinance has a separate F-P Flood Hazard Zone that applies to land within the 100-year floodplain. However, the City currently lacks development standards for geological and wildfire hazards. The McMinnville Buildable Lands Inventory (ECONorthwest, 2003) identifies slopes of 25% or greater and floodplains as unbuildable consistent with applicable state law.

[3] Winterbrook addresses relationships among natural hazards and natural resources (such as riparian and upland wildlife habitat and scenic views and viewpoints) in a separate white paper.

McMinnville Natural Hazards Mitigation Plan

Recognizing that McMinnville is subject to several other natural hazards, the City has participated in the preparation of the *McMinnville Addendum to the Yamhill County Natural Hazards Mitigation Plan* (McMinnville NHMP).[4]

The mission of the McMinnville NHMP is:

> ***To promote public policy and mitigation activities which will enhance the safety to life and property from natural hazards.***

The McMinnville NHMP includes the following natural hazard goals related to the management of natural hazards:

> ***GOAL 4: PREVENTIVE:*** *Develop and implement activities to protect human life, commerce, and property from natural hazards. Reduce losses and repetitive damage for chronic hazard events while promoting insurance coverage for catastrophic hazards.*
>
> ***GOAL 6: IMPLEMENTATION:*** *Implement strategies to mitigate the effects of natural hazards and increase the quality of life and resilience of economies in Yamhill County.*
>
> ***GOAL 7: DEVELOPMENT:*** *Communities appropriately apply development standards that consider the potential impacts of natural hazards.*

The McMinnville NHMP includes a series of GIS hazard maps and recommends specific "measures" to implement these goals. These recommended natural hazard mitigation measures, along with the natural hazard management practices of six comparable Oregon cities, provide the foundation for developing a geographically based natural hazards management program.

Oregon Natural Hazards Mitigation Plan

The Oregon NHMP was amended in 2020 and incorporates social equity factors when ranking natural hazard risks. Broadly, the State risk assessment is based on 3 variables, (1) the probability of the event happening, (2) the physical vulnerability of the event happening, and (3) the social vulnerability of the event happening. The Oregon NHMP groups these factors by county. Winterbrook included the State's ranking for physical and social vulnerabilities with the localized probability of the natural hazard event occurring. This inclusion provides the revised ranking system presented in Chapters V and VI of this report.

Statewide Planning Goal 7 (Natural Hazards)

As recognized by Goal 7 (Natural Hazards), natural hazards pose risks to life and property that can be mitigated by effective planning. Goal 7 requires each local government to identify and develop programs to mitigate impacts for natural hazards.

> *A. NATURAL HAZARD PLANNING:*
>
> *1. Local governments shall adopt comprehensive plans inventories, policies and implementing measures) to reduce risk to people and property from natural hazards.*

[4] The McMinnville NHMP also considers information found in the *Yamhill County Community Wildfire Protection Plan* (Yamhill County CWPP).

2. Natural hazards for purposes of this goal are: floods (coastal and riverine), landslides, earthquakes and related hazards, tsunamis, coastal erosion, and wildfires. Local governments may identify and plan for other natural hazards.

This report meets Goal 7 requirements by (a) inventorying natural hazards and assessing the risks they pose to people and property and (b) recommending a program to mitigate the effects of mapped natural hazards within the McMinnville UGB and study area.

Overlapping Natural Hazards

In this report, Winterbrook also looks at relationships that exist among natural hazards based on a series of geographic information system (GIS) overlay maps.

- For example, McMinnville's West Hills and associated downslope areas are especially threatened by a combination of geological, wildfire and flood hazards.
- In low-lying areas, the Yamhill River and its tributaries are subject to overlapping flooding, slide hazards (bank failures) and wildfires fueled by riparian vegetation in dry conditions.
- Most of the McMinnville study area outside the West Hills is subject to strong or very strong earthquake liquefaction and shaking hazards due to underlying soil conditions.

Recognizing these inter-relationships and the threats posed by natural hazards to people, public infrastructure and private property, Winterbrook proposes a natural hazards mitigation program that addresses the combined impacts of geological, flood and wildfire hazards. The proposed program includes amendments to the McMinnville Comprehensive Plan and Plan Map that would include:

- A new Chapter XI: Natural Features that includes policies addressing multi-hazard, geological, flooding and wildfire impacts and mitigation within the McMinnville Natural Hazards Study Area.
- A new Natural Hazards Overlay Map that would be implemented by two zoning subdistricts – with graduated development standards depending on the combination of and severity of hazards found in specific geographic subareas in the community.

Report Organization

In addition to the Introduction, this report is organized into seven sections:

- **Section I Revised Inventory Methods** and information sources. The study area includes land within the McMinnville 2021 UGB and land within 1.5 miles of the 2019 UGB. The Inventory considers mappable geological, flooding and wildfire hazard areas.

- **Section II Revised Geological Hazards Inventory** is based on the McMinnville NHMP (which in turn is largely based on Oregon Department of Geology and Mineral Industries (DOGAMI) data). The Geological Hazards Inventory focuses on land within the McMinnville study area and includes areas susceptible to landslides, earthquake liquefaction and earthquake shaking. Inventory maps show moderate, high and severe hazard areas and include descriptions of and threats from each type of geological hazard.

- **Section III Revised Flood Hazard Inventory** is based on existing FEMA maps of the 100-year floodplain. This inventory will likely change based on planned updates and improved data sources.

- **Section IV Revised Wildfire Hazard Inventory** is based on the McMinnville NHMP, the Yamhill County CWPP, and application of the *Oregon Wildfire Risk Explorer* to the McMinnville study area.

- **Section V Natural Hazards – Cumulative Impacts Analysis** is based on Winterbrook's analysis of overlapping natural hazards maps to better understand the spatial relationships that exist among McMinnville's geological, flooding and wildfire hazard areas. The revised Section V incorporates social factors from the Oregon NHMP.

- **Section VI Natural Hazards Management Options** is based on the recommendations of the McMinnville NHMP, the management programs of six comparator communities, the McMinnville-specific natural hazards inventory found in Sections II-V, and recognition of the cumulative impacts of overlapping natural hazards in McMinnville's West Hills and lower elevation drainage systems.

- **Section VII Natural Hazards Program Recommendations** is based on information found in Sections I – VI, comments from the McMinnville planning staff, evaluation of natural hazards programs in other communities, and Winterbrook's experience in preparing natural features management plans. Section VII provides the basis for Zoning Ordinance amendments that include text and maps for Natural Hazard Mitigation and Protection Subdistricts.

I. Natural Hazards Inventory Methods

Information Sources

Winterbrook conducted the McMinnville Natural Hazards Inventory in May and June of 2020 using publicly available sources of hazard information from:

- The Oregon Department of Geology and Mineral Industries (DOGAMI). DOGAMI GIS data is publicly accessible via the Oregon HazVu: Statewide Geohazards Viewer;[5]
- The *McMinnville Addendum to the Yamhill County Natural Hazards Mitigation Plan* (McMinnville MHMP); and
- The *Yamhill County Community Wildfire Protection Plan* (CWPP). Wildfire risk information is available for Oregon regions by using the Oregon Wildfire Risk Explorer.[6]
- Winterbrook amended the natural hazards ranking system to incorporate social indicators found in the 2020 Oregon NHMP in April-May 2021.

The McMinnville Natural Hazards Study Area

Working with Senior Planner Tom Schauer in 2020, Winterbrook reviewed GIS data sources for the Natural Hazards Study Area, which included two subareas shown in Figure I-1: (a) land within the McMinnville 2019 UGB and (b) land within UGB expansion study areas – generally 1.5 miles from the 2019 UGB.[7]

Mappable Hazards

In this study, Winterbrook focused on natural hazards within the 2021 McMinnville UGB that are (a) mappable using GIS technology (i.e., flood plains, steep slopes, soils subject to earthquake liquefaction and shaking, landslide areas, and areas susceptible to wildfires) and (b) classified in the McMinnville NHMP (which in turn is based on DOGAMI and CWPP information) as having moderate and high risk. Such areas are potentially subject to natural hazards overlay zones that include development standards to mitigate impacts.

The draft McMinnville NHMP describes and ranks McMinnville's vulnerability to the following mappable natural hazards[8] and suggests hazard-specific mitigation measures for moderate and high-risk hazards:

- Earthquake hazards (crustal and Cascadia Subduction Zone);
- Landslide and erosion hazards (including steep slopes);
- Flood hazards; and
- Wildfire hazards.

Working with City staff, Winterbrook prepared GIS base maps for moderate and high-risk natural hazard areas. As noted above, this analysis relies primarily on statewide mapping information provided by DOGAMI for flood

[5] https://www.oregongeology.org/hazvu/
[6] https://tools.oregonexplorer.info/OE_HtmlViewer/index.html?viewer=wildfireplanning
[7] The 1.5 mile study area represents an area of mutual interest between the city and county and area that was under consideration by the City of McMinnville for potential UGB expansion in 2020.
[8] Since only mappable hazards are subject to overlay zoning overlay regulations, Winterbrook did not consider drought, severe weather and volcanic events in this inventory.

and geological hazards. To map wildfire hazards we used the Oregon Wildfire Risk Explorer to generate several wildfire risks maps.

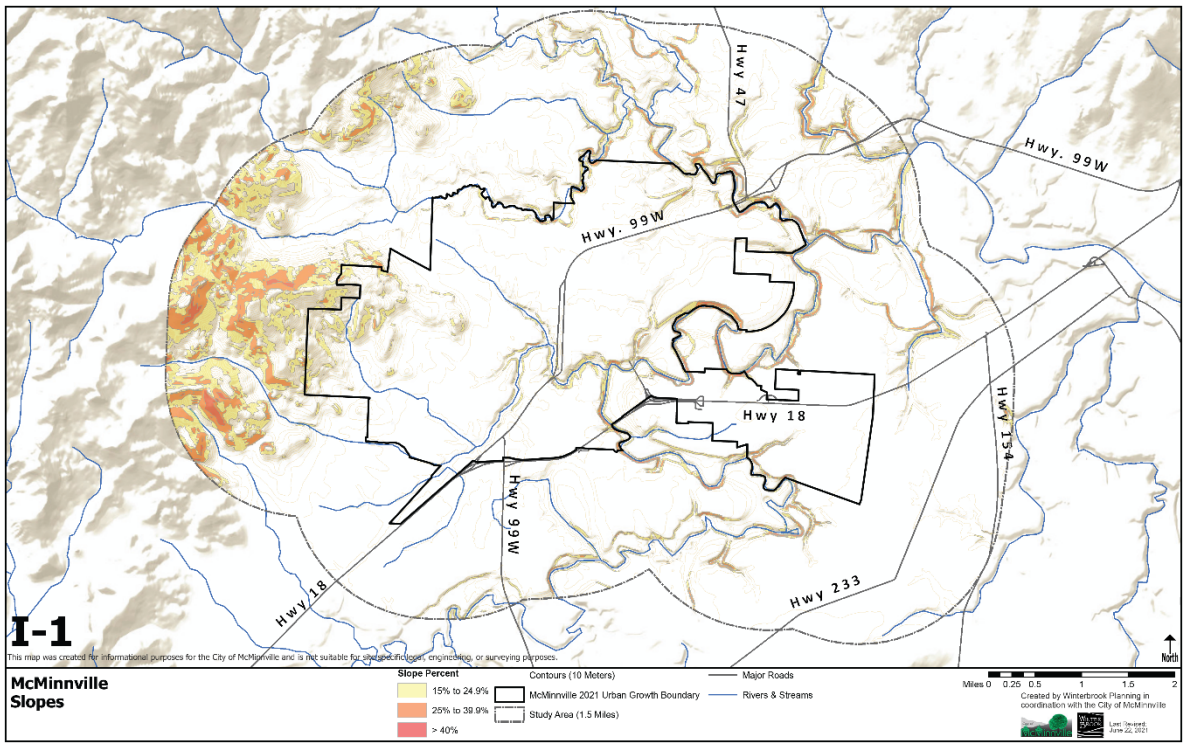
As discussed in Section V of this report, Winterbrook also prepared several composite hazard maps that show spatial relationships among geological, flooding and wildfire hazards. In 2021, Winterbrook worked with Associate Planner Jamie Fleckenstein to incorporate social indicators from the Oregon NHMP into this revised 2021 inventory.

Figure I-1 shows three slope categories within the McMinnville study area that are related to the location and severity of geological, flood (stream bank erosion) and wildfire hazards.

McMinnville Slope Hazards

Steep slopes are associated with wildfire hazards and geological hazards. Slope percentage is used by many jurisdictions to determine whether geological studies should be required prior to development. Slopes of 25% or greater are considered "unbuildable" when preparing buildable lands inventories under state housing rules. (OAR 660-008-005 Definitions) The City of McMinnville also requires sprinkler systems to reduce fire hazards on slopes of 15% or greater. For these reasons, slope percentage is considered in several of the composite maps found in the natural hazards inventory. Steep slopes are found mostly in McMinnville's West Hills and define the banks of the study area streams and rivers.

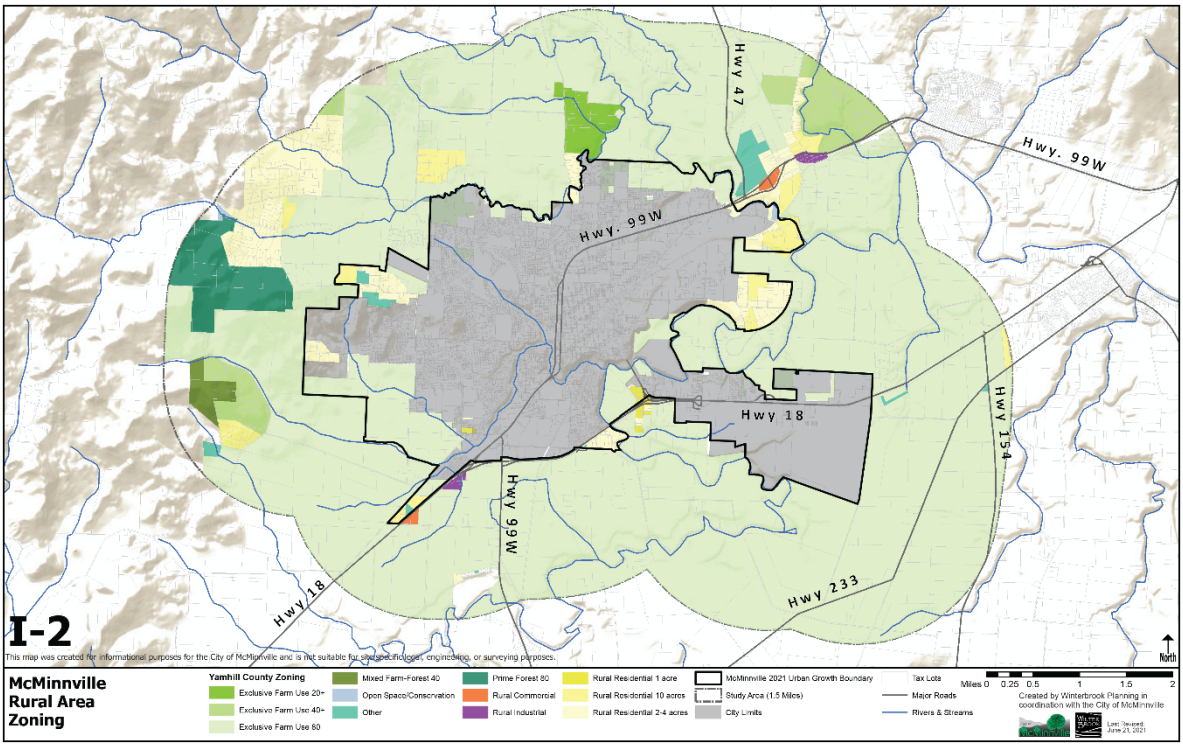
Figure I-1 McMinnville 2021 UGB and Study Areas Slopes



Yamhill County Zoning

Figure I-2 shows Yamhill County zoning outside the McMinnville City Limits. County zoning partially determines land use and density outside the 2021 McMinnville UGB – which in turn is related to hazard vulnerability to life and property. A larger scale and more readable zoning map is available in 11" X 17" format. In Yamhill County land that is zoned for forest use (the Agricultural Forest and Forestry Districts) in the forested West Hills is subject to specific wildfire protection (fuel reduction zones, fire suppression and access) standards for new structures.

Figure I-2 County Zoning within Study Area



II. Geological Hazards Inventory

Section II considers landslide, earthquake and steep slope hazards both individually and in combination.

Data Sources

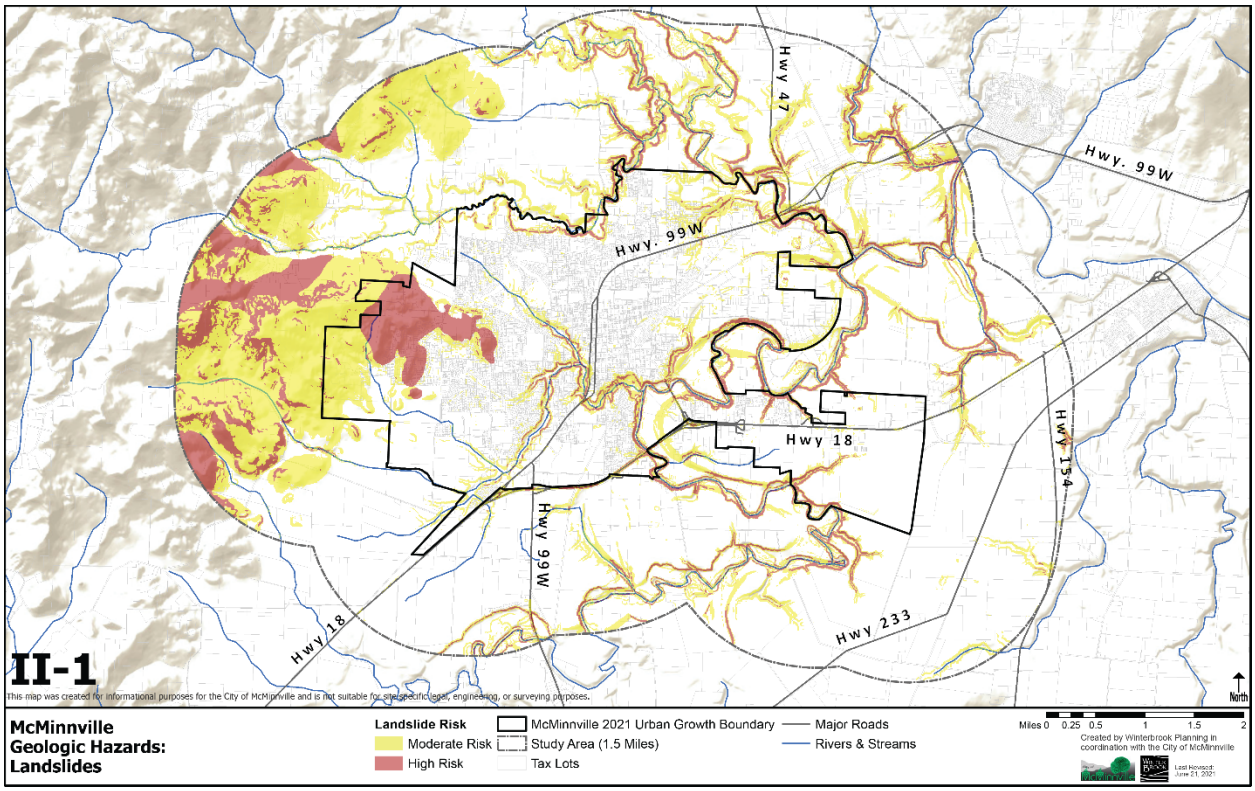
Winterbrook relied on landslide and slope hazard maps available on DOGAMI's Statewide Geohazards Viewer to identify potential landslide and slope hazards:

- DOGAMI: Landslide susceptibility
- DOGAMI: Landslide inventory - Statewide Landslide Information Database for Oregon (SLIDO)
- DOGAMI LIDAR: Hillshade and slope
- DOGAMI: Earthquake shaking and liquefaction risks

Landslide Hazard

The McMinnville NHMP describes and maps areas with moderate and high landslide hazard susceptibility based on the HazVu: Statewide Geohazards Viewer (DOGAMI). Figure II-1 shows moderate and high-risk landslide areas within the study area.

Figure II-1 Geological Hazards: Moderate and High Landslide Risk



Areas that are moderately and highly prone to landslides are found predominately in McMinnville's West Hills and secondarily along Baker Creek, Berry Creek, Cozine Creek and South Yamhill River embankments. Two high-risk landslide areas are located in McMinnville's West Hills: at lower elevation in the western extension of the UGB and at higher elevation in the western extension of the study area. Note that a large band of moderate landslide risk separates these two high-risk areas.

Earthquake Hazards

The McMinnville NHMP and this inventory consider and map the effects of two types of earthquakes:

1. Crustal earthquakes that could emanate from nearby faults and/or zones; and
2. The Cascade Subduction Zone Earthquake.

Potential earthquake hazards include two related and mappable effects: shaking from ground motion and liquefaction due to porous or "soft" soils can result from both types of earthquakes. Earthquakes can also trigger landslides in areas shown on Figure II-1.

Crustal and Cascadia Subduction Zone Earthquakes

The Yamhill County Multi-Jurisdictional NHMP describes the two types of earthquakes and explains their hazardous effects as follows (pp. 4-10 and 4-11):

> *"An earthquake is a sudden motion or trembling of the earth produced by the rupture of rocks due to stresses beyond the rocks' elastic limits. The effects of an earthquake can be felt far beyond the site of its occurrence. Earthquakes usually occur without warning and, after just a few seconds, can cause massive damage and extensive casualties. The most common effect of earthquakes is ground motion, or the vibration or shaking of the ground during an earthquake.*
>
> *The severity of ground motion generally increases with the amount of energy released and decreases with distance from the fault or epicenter of the earthquake. Ground motion causes waves in the earth's interior, also known as seismic waves, and along the earth's surface, known as surface waves. …*
>
> *In addition to ground motion, several secondary hazards can occur from earthquakes, such as surface faulting. Surface faulting is the differential movement of two sides of a fault at the earth's surface. Displacement along faults, both in terms of length and width, varies but can be significant (up to 20 feet), as can the length of the surface rupture (up to 200 miles). Surface faulting can cause severe damage to linear structures, such as railways, highways, pipelines and tunnels.*
>
> *Earthquake-related ground failure due to liquefaction is another secondary hazard. Liquefaction occurs when seismic waves pass through saturated granular soil, distorting its structure, and causing some of the empty spaces between granules to collapse. Porewater pressure may also increase sufficiently to cause the soil to briefly become fluid.*
>
> *Liquefaction causes lateral spreads (horizontal movements of commonly 10 to 15 feet, but up to 100 feet), flow failures (massive flows of soil, typically hundreds of feet, but up to 12 miles) and loss of bearing strength (soil deformations causing structures to settle or tip). Liquefaction can cause severe damage to property.*
>
> *The most common earthquakes that occur in Oregon are crustal, intraplate or great subduction earthquakes. Yamhill County is most susceptible to deep intraplate and subduction zone earthquakes. These are described as follows:*
>
> ***Crustal earthquakes**: These generally occur along shallow faults near the earth's surface. Crustal earthquakes make up the majority of earthquakes in the Cascadia area (western Washington, Oregon and northwestern California) and are a result of fault movement in the Earth's surface. These shallow earthquakes are usually less than 7.5 magnitude and strong shaking generally lasts 20 to 60 seconds. Aftershocks, as well as tsunamis and landslides, are anticipated after a crustal event. The Mount Angel Fault is located approximately 15 miles from Yamhill County, and is responsible for the 5.7 magnitude Spring Break Quake in 1993.*

> ***Great subduction earthquakes****: occur offshore of the Oregon and Washington Coasts along the Cascadia Subduction Zone. This zone is the result of the Juan de Fuca plate being pushed under the North American plate. Earthquakes centered along this zone can be as great as 9.0 magnitude. Geologic evidence demonstrates approximately 500 years between events with the last significant event on January 26, 1700. Aftershocks up to 7.0 magnitude are anticipated to cause additional damage. Liquefaction, tsunamis and landslides are expected as a result of a great subduction earthquake.*

Quoting from the DOGAMI website https://www.oregongeology.org/earthquakes/earthquakehome.htm

> *Earthquake hazards have been recognized as one of the major natural hazards in Oregon since the late 1980s, a result of the geologic research to identify and characterize the Cascadia subduction zone and crustal faults. The March 1993 Scotts Mills earthquake (M5.6) and the September 1993 Klamath Falls earthquakes (M5.9 and M6.0) demonstrated the potential hazards of crustal earthquakes in Oregon.*

According to the McMinnville NHMP (p. MA-37)

> *Within the Northern Willamette Valley that includes Yamhill County, two potential faults and/or zones can generate high-magnitude earthquakes. These include the Cascadia Subduction Zone and the Gales Creek-Newberg-Mt. Angel Structural Zone (including the Newberg Fault).*

Crustal earthquakes can cause serious local damage, as recognized in the Yamhill County Natural Hazard Mitigation Plan (2014):

> *Crustal earthquakes also occur in the Willamette valley although with smaller expected magnitudes (M 5.0-M 7.0). Although these earthquakes are expected to be much smaller than a Cascadia Subduction Zone earthquake, they are more likely to occur close to population centers and are capable of causing severe shaking and damage in localized areas.*

Although crustal earthquakes are more common than great subduction earthquakes (see https://pnsn.org/earthquakes/recent), the Cascadia Subduction Zone (CSZ or Cascadia) earthquake is certain to occur sometime in the future and could occur at any time.

Again, according to the McMinnville NHMP:

> ***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.*

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 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 McMinnville 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.

Quoting from the Cascadia Playbook (Oregon Office of Emergency Management, 2018):

> *A Cascadia event is based on the threat of a catastrophic magnitude 9.0 Subduction Zone earthquake and resultant tsunami. Coastal counties will experience a devastating tsunami on top of severe ground shaking (up to five minutes). Shaking intensity will be less in the I-5 Corridor and Southern, Central, and Eastern Oregon, but older buildings may incur extended damage. Expected Impacts*
>
> - *Ground shaking for 4-6 minutes causing massive critical infrastructure damage*
> - *Liquefaction and landslides causing disruption of transportation routes*
> - *Tsunami inundation to coastal areas with as little as 15 minutes warning*
> - *Up to 25,000 fatalities resulting from combined effects of earthquakes and tsunami*
> - *Tens of thousands of buildings and structures destroyed or damaged*
> - *Tens of thousands of people in need of shelter because of destroyed or damaged households*
> - *$30+ billion in economic loss*

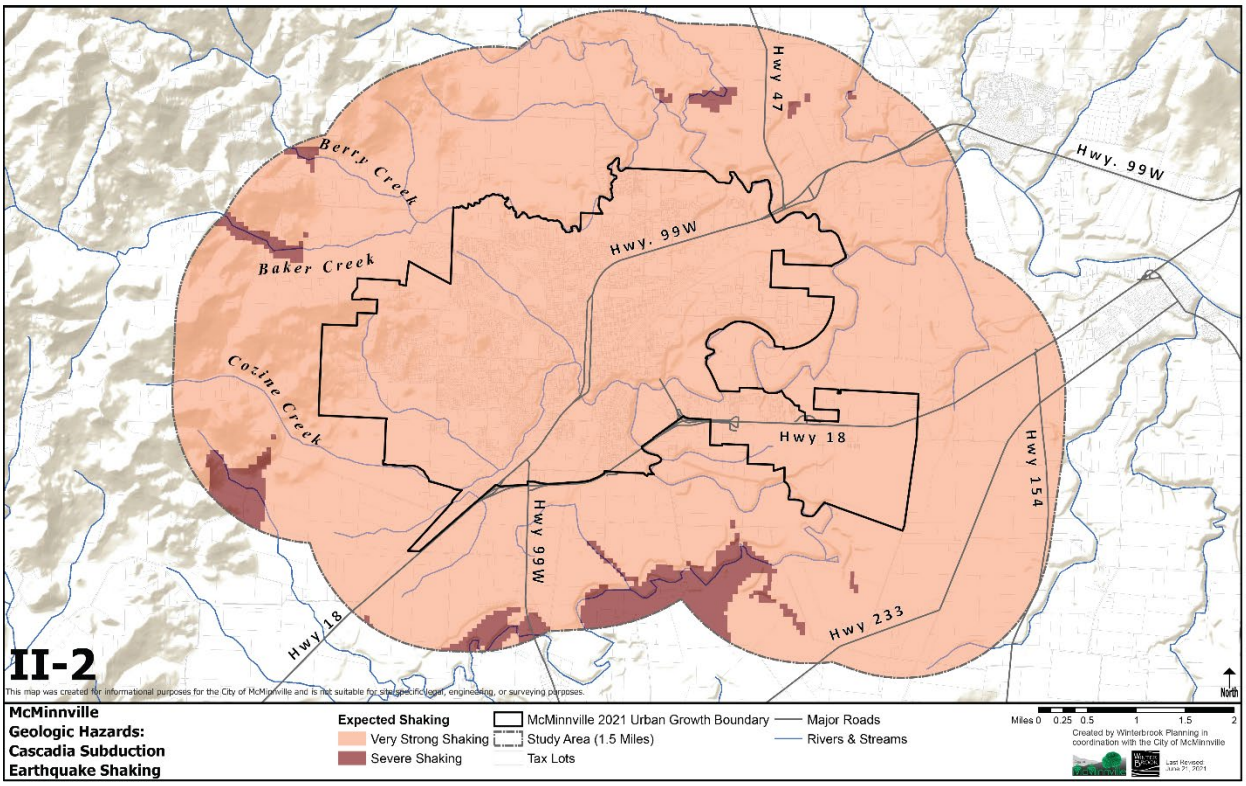
Although coastal communities will experience greater impacts than Willamette Valley communities, McMinnville's location at the base of the Coast Range makes it highly susceptible to Cascadia Subduction Zone earthquake damage. **Because the impacts from the Cascadia Subduction Zone earthquake would be so severe, Winterbrook's analysis and recommendations focus on impacts from the Cascadia event.**

Earthquake Shaking Hazard Areas

DOGAMI provides data and maps for both crustal and subduction earthquakes. Since great subduction earthquakes are more severe and has a high probability of occurring occur over the next 50 years, Winterbrook used DOGAMI subduction earthquake mapping for this analysis.

Figure II-2 shows areas susceptible to "very strong" and "severe" shaking that could result from the Cascadia Subduction Zone Earthquake. As with a crustal earthquake, most of the study area will experience strong shaking in the subduction earthquake. Severe shaking areas include the upper Baker Creek valley and south of Cozine Creek as well as a large area southwest of the airport. The amended UGB did not include severe shaking areas.

Figure II-2 Geological Hazards: Cascadia Subduction Earthquake Shaking Risk

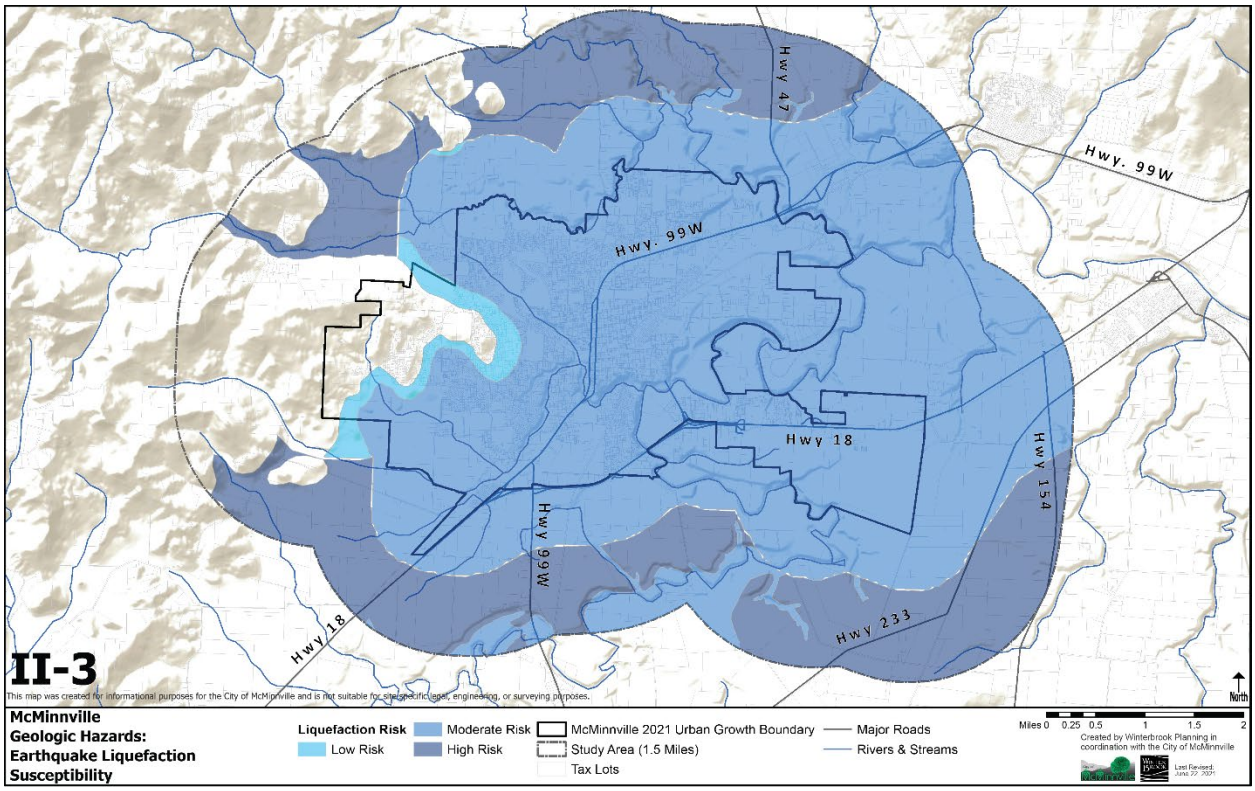


Earthquake Liquefaction Hazard Areas

Liquefaction occurs from both types of earthquakes and results from soft soils. All land within the existing UGB is subject to moderate liquefaction. Areas of moderate liquefaction extend about 0.5 miles north and south of the UGB, and much further beyond the study area boundary east of the UGB.

- Areas of high liquefaction susceptibility extend from 0.5 to 0.75 miles from the UGB to the north and south. The amended UGB did not include high liquefaction areas.
- The West Hills are characterized by high bedrock and less alluvial soil are not subject to liquefaction – except along stream corridors.
- Note the large moderate liquefaction area that extends into the high liquefaction areas southwest of the airport – at the bottom center of Figure II-4. This nodal extension is mapped as a severe shaking area on Figure II-3 which shows the relationship between moderate and high liquefaction and shaking areas.

Figure II-3 Geological Hazards: Earthquake Liquefaction Susceptibility

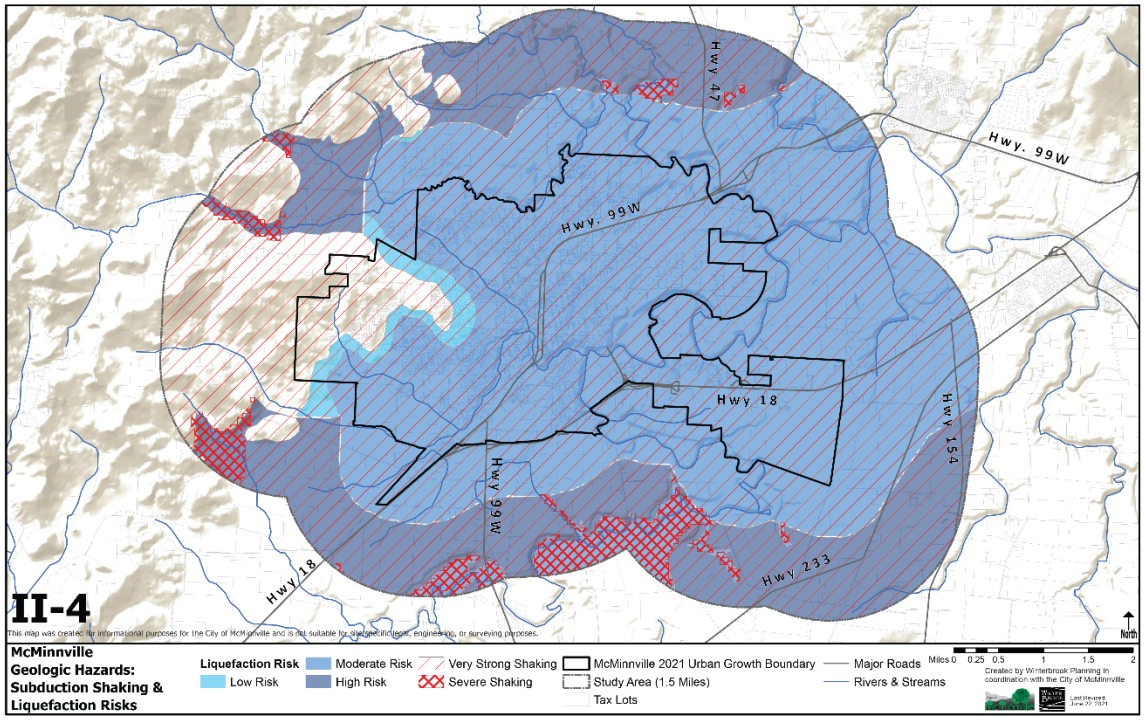


Combined Earthquake Liquefaction and Shaking Hazard Areas

Figure II-4 shows the relationship that exists among high and moderate liquefaction areas and "very strong" and "severe" earthquake shaking areas.

- Note that land within and extending outside the amended McMinnville UGB has moderate liquefaction risk and "very strong" shaking risk.
- However, a large band of high liquefaction risk and "severe" shaking risk is appears the northern and southern areas at a more or less uninform distance from the edge of the study area.
- Finally, note the severe shaking area southwest of the Airport (largely in the South Yamhill River floodplain) shown on Figure II-4 that corresponds roughly with the moderate liquefaction area shown on Figure II-3 above.
- The amended UGB did not include areas with severe shaking risk or high liquefaction risk.

Figure II-4 Geological Hazard: Cascadia Subduction Earthquake Liquefaction and Shaking Risk



Composite Geological Risk Maps

Figure II-5 is a composite map showing slopes of 15% or greater, landslide hazard and earthquake liquefaction hazard areas. We offer the following observations:

- Note the inverse relationship that exists between (a) steep slopes and the moderate to high-risk earthquake risks in the West Hills and (b) moderate to high risk earthquake liquefaction areas to the north, south and east of the UGB.
- Moderate risk geological hazard areas (relatively flat areas with moderate liquefaction hazards and low landslide hazards) are found to the north and south of the UGB. High risk earthquake liquefaction areas are located further to the northwest and south.
- In weighing geological hazard risks, it may be more advisable to direct future urban growth to areas that have areas with moderate geological hazard risk rather than higher risk areas.
- As shown more clearly on 11" by 17" maps accompanying this report, there is rough correlation between 15% and greater slopes and landslide hazard areas, indicating that slope percentage should not be the only threshold for requiring erosion control geotechnical studies.

Figure II-5 Geological Hazards Map: Landslide, Liquefaction, Subduction Shaking and Slopes

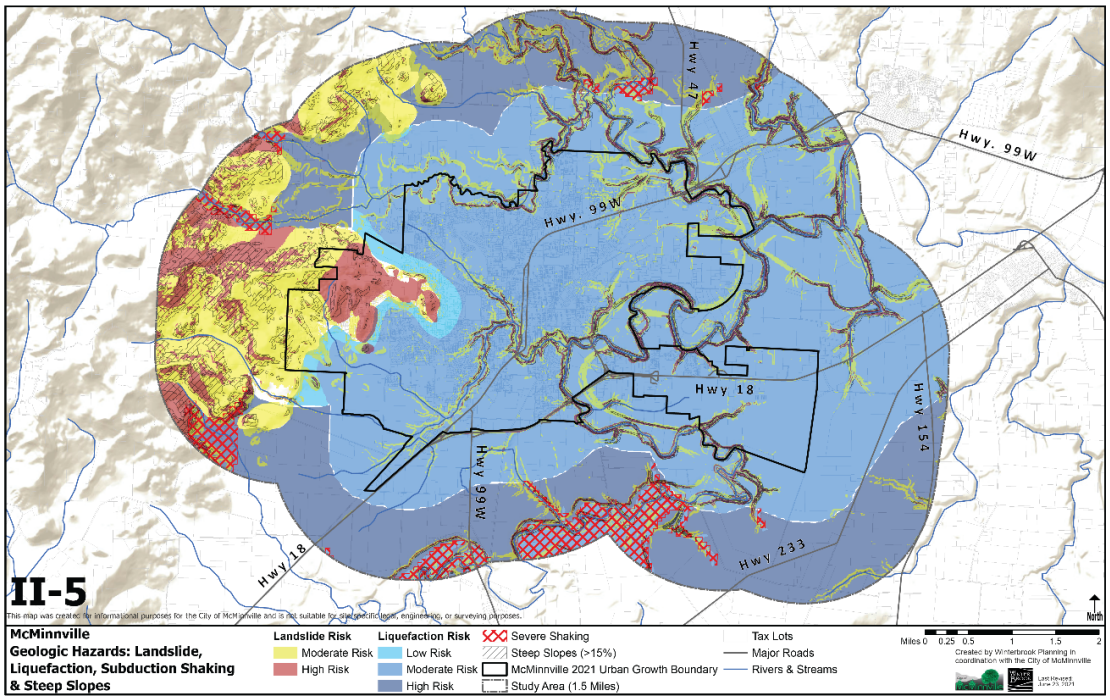
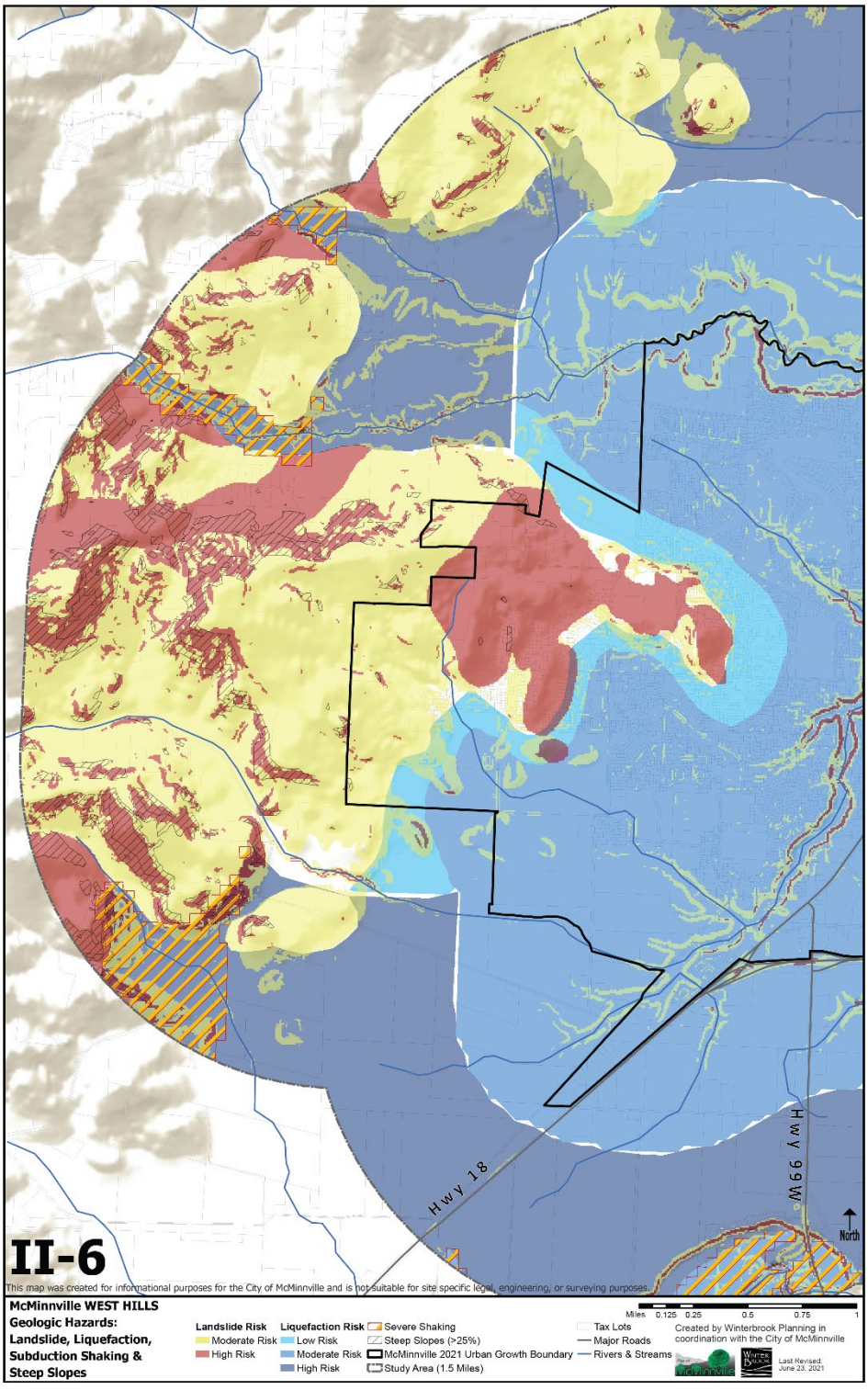


Figure II-6 zooms in on the West Hills to look more closely at the relationships among slopes of 25% and greater, moderate and high-risk landslide liquefactions areas, severe risk landslide shaking areas, and moderate to high risk landslide areas.

Please note the following:

- The high correlation between slopes of 25% or greater and high risk landslide areas.
- The inverse relationship between (a) moderate to high risk landslide areas and (b) high risk liquefaction areas and severe earthquake shaking areas north and south of the West Hills.

Figure II-6 West Hills Geological Map: Steep Slope, Severe Shaking, Landslide and Liquefaction Risk

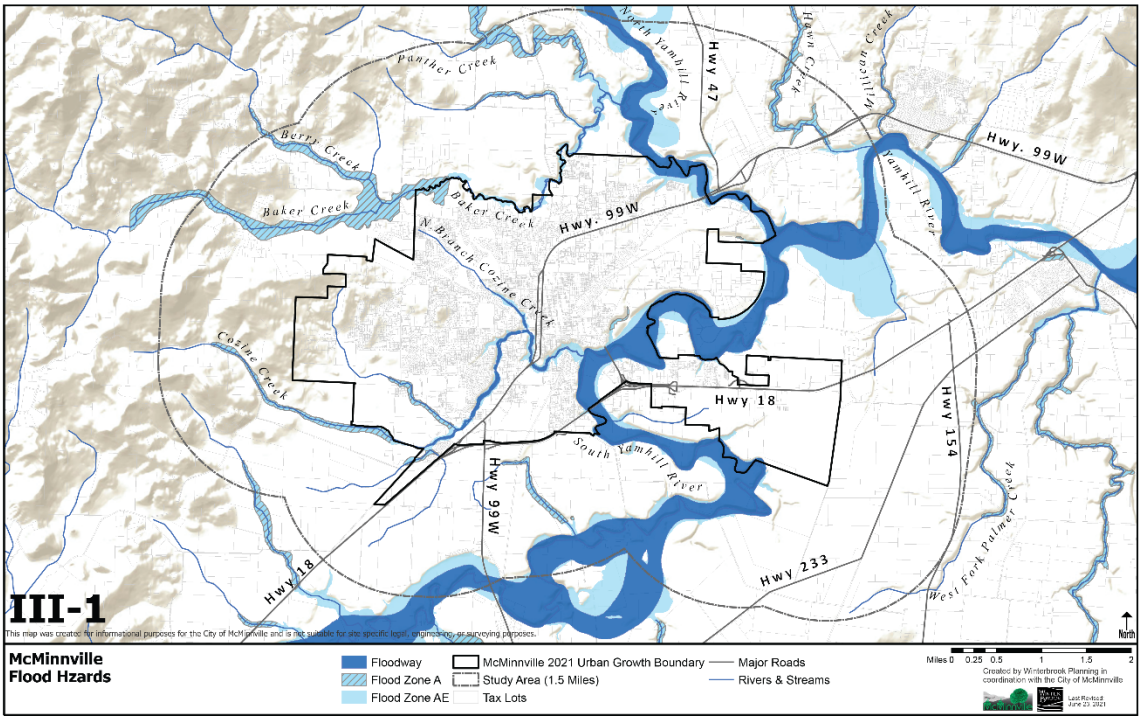


III. Flood Hazard Inventory

Flood Hazard GIS Data Sources and Analysis

Winterbrook relied on flood hazard maps available on DOGAMI's Statewide Geohazards Viewer found in the McMinnville NHMP. Flood hazards include: Zone A, Zone AE, and the Floodway.[9] As shown on Figure III-1, flood hazards within the study area are associated with Cozine Creek, Berry Creek, Baker Creek and the Yamhill River.

Figure III-1 Flood Hazard Map



[9] Winterbrook's understanding is FIRM maps were used as the basis for DOGAMI's statewide inventory.

FEMA Floodway Definition/Description:

A "Regulatory Floodway" means the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height. Communities must regulate development in these floodways to ensure that there are no increases in upstream flood elevations. For streams and other watercourses where FEMA has provided Base Flood Elevations (BFEs), but no floodway has been designated, the community must review floodplain development on a case-by-case basis to ensure that increases in water surface elevations do not occur or identify the need to adopt a floodway if adequate information is available.

About Flood Zones: Flood hazard areas identified on the Flood Insurance Rate Map are identified as a Special Flood Hazard Area (SFHA). SFHA are defined as the area that will be inundated by the flood event having a 1-percent chance of being equaled or exceeded in any given year. The 1-percent annual chance flood is also referred to as the base flood or 100-year flood. SFHAs on Figure III-1 are labeled Floodway, Zone A and Zone AE. Zone A indicates areas where base flood elevations (BFE) have not been fully determined. Additional work is required to define the BFEs in in the upper reaches of the Baker, Cozine and Berry Creek floodplains.

IV. Wildfire Hazard Inventory

Wildfire GIS Data Sources

The **Yamhill County Community Wildfire Protection Plan** (CWPP, Revised 2015) identifies two Wildland Urban Interface Zones (WUI Zones). Zone I is comprised mostly of commercial forest land in West Yamhill County. Zone II includes agricultural land, urban areas and forested uplands in East Yamhill County. The McMinnville study area is mostly within Zone II which includes agricultural, forest and rural residential land within the McMinnville study area.

According to the CCWP, Zone II has a "high" county-wide wildfire hazard ranking. However, some Zone II areas are more at risk than others. For example, rural residential forested slopes near the Newberg and McMinnville urban areas are more at risk than unpopulated agricultural land.

The McMinnville NHMP (pp. MA 50-52) summarizes key findings in the Yamhill County CWPP:

> *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. McMinnville has not experienced a wildfire within City limits. The city is surrounded by developed land, rivers, and/or irrigated agricultural land. However, some wooded areas are a concern in the case of a wildfire event, particularly in the western part of the city.*

Oregon Wildfire Risk Explorer

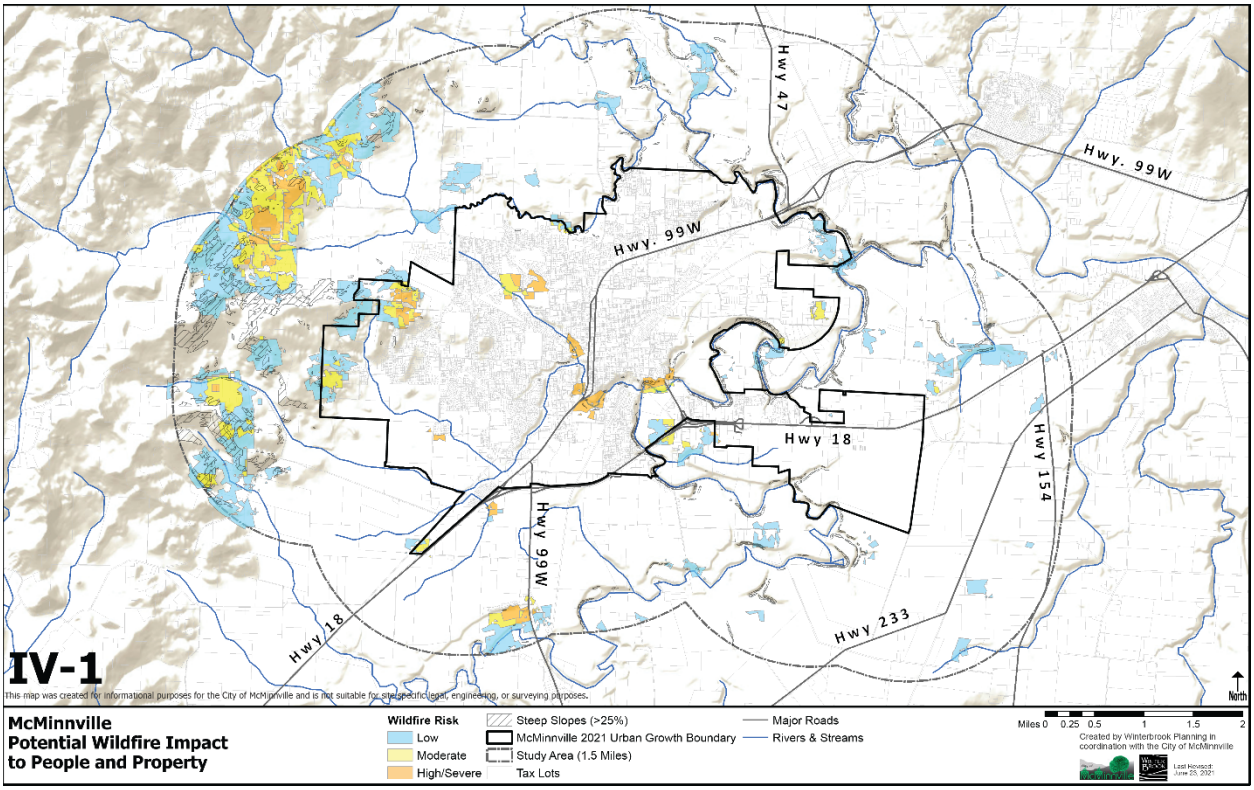
The OWRE Advanced Report provides wildfire risk information for a customized area of interest to support Community Wildfire Protection Plans (CWPPs), Natural Hazard Mitigation Plans (NHMPs), and fuels reduction and restoration treatments in wildfire-prone areas in Oregon. The OWRE Advanced Report provides landscape context of the current fire environment and fire history.

Using the *Oregon Wildfire Risk Explorer*, Winterbrook prepared an *Advanced Report* showing wildfire hazards to potential structures and the people who live and work in them. Figure IV-1 shows Wildfire Hazard to Potential Structures and the general location of McMinnville RFPD Risk Reduction Projects. According to the Risk Explorer:

> ***Hazard to Potential Structures:*** *Hazard to potential structures depicts the hazard to hypothetical structures in any area if a wildfire were to occur. This differs from Potential Impacts, as those estimates consider only where people and property currently exist. In contrast, this layer maps hazard to hypothetical structures across all directly exposed (burnable), and indirectly exposed (within 150 meters of burnable fuel) areas in Oregon. As with the Potential Impacts layers, the data layer does not take into account wildfire probability, it only shows exposure and susceptibility.*

As indicated in the description above, moderate and high risk areas shown on Figure IV-1 correlate highly with rural residential areas shown on Figure I-2. Moderate risk wildfire areas continue into the western extension of the McMinnville UGB. Please note that "Potential Impacts to People and Property" focuses on areas with structures. Thus, areas without structures (mainly in steeply sloped areas) have a lower risk to people and property. Finally, as discussed in Section V, hillsides denuded by recent wildfires are more susceptible to erosion and slide hazards due to loss of stabilizing vegetation.

Figure IV-1 Wildfire – Potential Impacts to People and Property with Steep Slopes



As a reminder, Figure I-2 in Section I of this report shows Yamhill County Zoning in the Natural Hazards Study Area. Yamhill County has effective fire prevention standards for structures in County Prime Forest and Mixed Forest zones.

V. Natural Hazards – Multi-Hazard Cumulative Impacts

Composite Geological Hazard Mapping Approach

The draft McMinnville NHMP mapped and evaluated a series of natural hazards more or less in isolation. The location and severity of each was mapped and assessed and potential community impacts and mitigation measures were identified.

As noted in Section I of this report, Winterbrook used GIS maps and information found in the McMinnville NHMP but focused on mappable natural hazards that exist within the McMinnville study area.

Section II went a step further than the McMinnville NHMP by evaluating relationships that exist among overlapping geological hazards. Figures II-3 through II-5 show overlapping geological hazard maps and a brief analysis of what these overlaps mean in terms of natural hazards planning.

The following composite natural hazards map (Figures V-1 through V-3) show relationships among hazards identified in Section II (Geological), Section III (Flooding) and Section IV (Wildfire).

Figure V-1 on the following page shows that land within the McMinnville UGB – with two notable exceptions – is relatively free of high risk areas. The two exceptions within the UGB include:

1. Flood hazards generally; and
2. High landslide risk hazard areas in the lower slopes of the West Hills and adjacent floodplains.

Most of the land within the amended UGB has moderate (as opposed to high) earthquake liquefaction susceptibility. Hazard conditions outside the UGB tell a different story. The moderate risk liquefaction area extends beyond the amended UGB to the north, northwest, southwest and south for about 0.5 to 0.75 miles before reaching high liquefaction risk areas.

Figure V-1 Composite Map: Landslide, Liquefaction and Flood Hazards

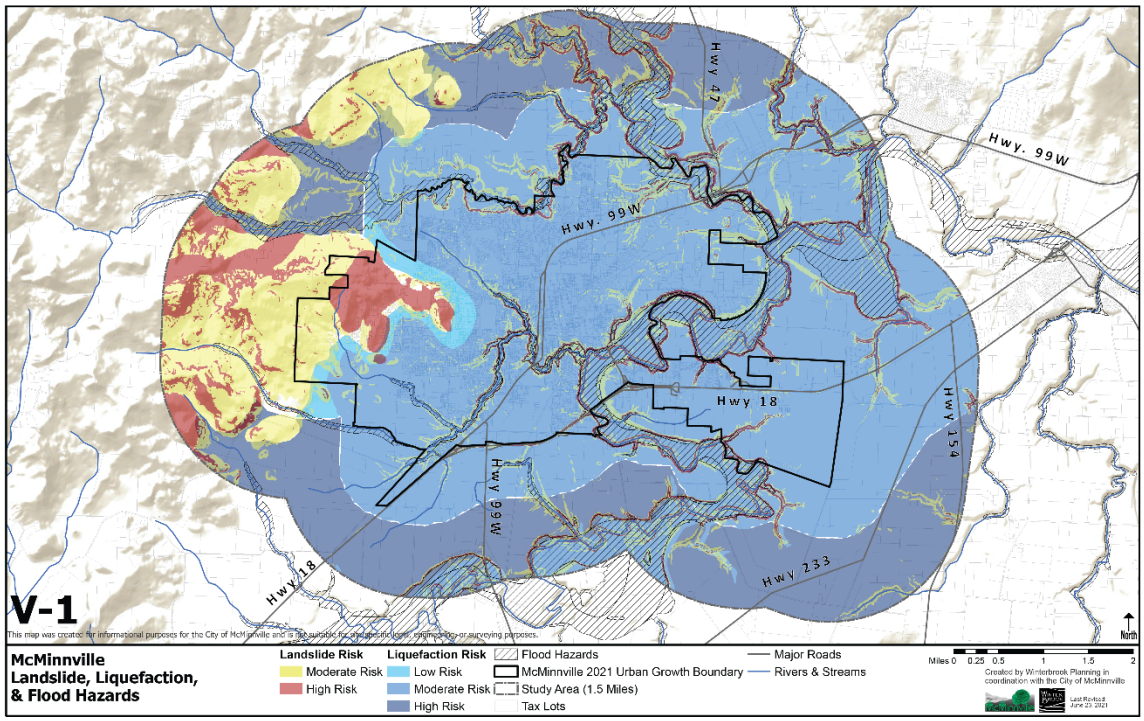


Figure V-1 shows the highest risk areas in the Natural Hazards Study Areas by mapping slopes of 25% and greater; high risk landslide, earthquake liquefaction; and the 100-year floodplain.

- This composite map makes it clear that land within the amended McMinnville UGB is relatively free of high-to-severe hazard risks.
- With the exception of the area served by Highway 18, the UGB has been largely defined by Baker and Cozine Creeks and the North and South Yamhill Rivers. Floodplains in these areas are protected from most types of development by City floodplain regulations.
- The primary high-to-severe hazards within the UGB include high risk landslide hazards in the West Hills and adjacent to protected floodplains.
- As discussed in Section II of this report (and shown on Figure II-4), high risk earthquake liquefaction and severe shaking areas are clearly defined to the west and south of the amended UGB.

To the west of the UGB, there is a moderate risk landslide area that extends to the West Hills' steeply sloped and high landslide risk areas.

Figure V-2 focuses on the West Hills in relation to lowlands west of Hwy 99W. Please note the following:

- The large high risk landslide area within the amended UGB is separated by a moderate risk landslide area just outside the UGB before reaching another band of high-risk landslide area.
- The West Hills are flanked to the north and south by high-risk earthquake liquefaction areas. As described earlier in Section II, Figure II-4 shows severe risk landslide shaking areas in Baker Creek and Cozine Creek alluvial plains.

Figure V-2 Composite Map: West Hill Slope, Landslide, High Earthquake Liquefaction Risk

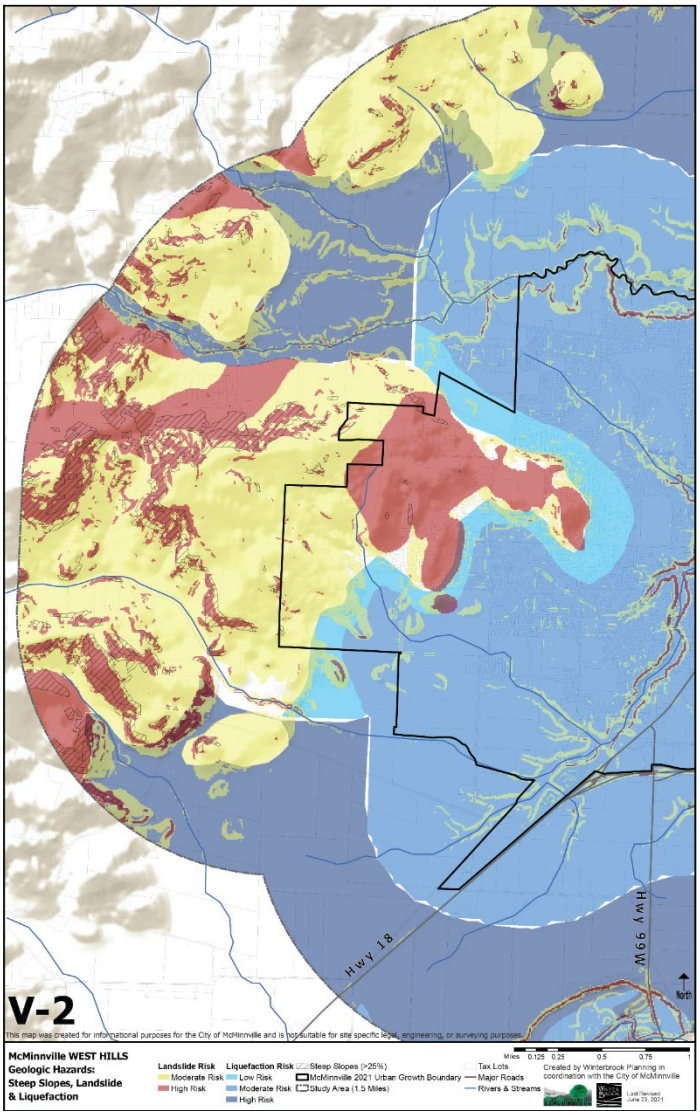


Figure V-3 shows the eastern (Valley) portion of McMinnville study area generally east of Highway 99W. The primary natural hazard in this area is flooding. Landslide hazard areas define the outer boundaries of floodplains that are subject to bank failure in high water conditions or in a major earthquake event. Note the areas of high-risk earthquake liquefaction hazards to the north and south of the UGB. In addition, the Yamhill River floodplain

southwest of the McMinnville Airport contains a severe earthquake shaking hazard area as shown in Section II on Figure II-4.

Figure V-3 Composite Map: East Valley Floodplain, Landslide and Liquefaction Risk

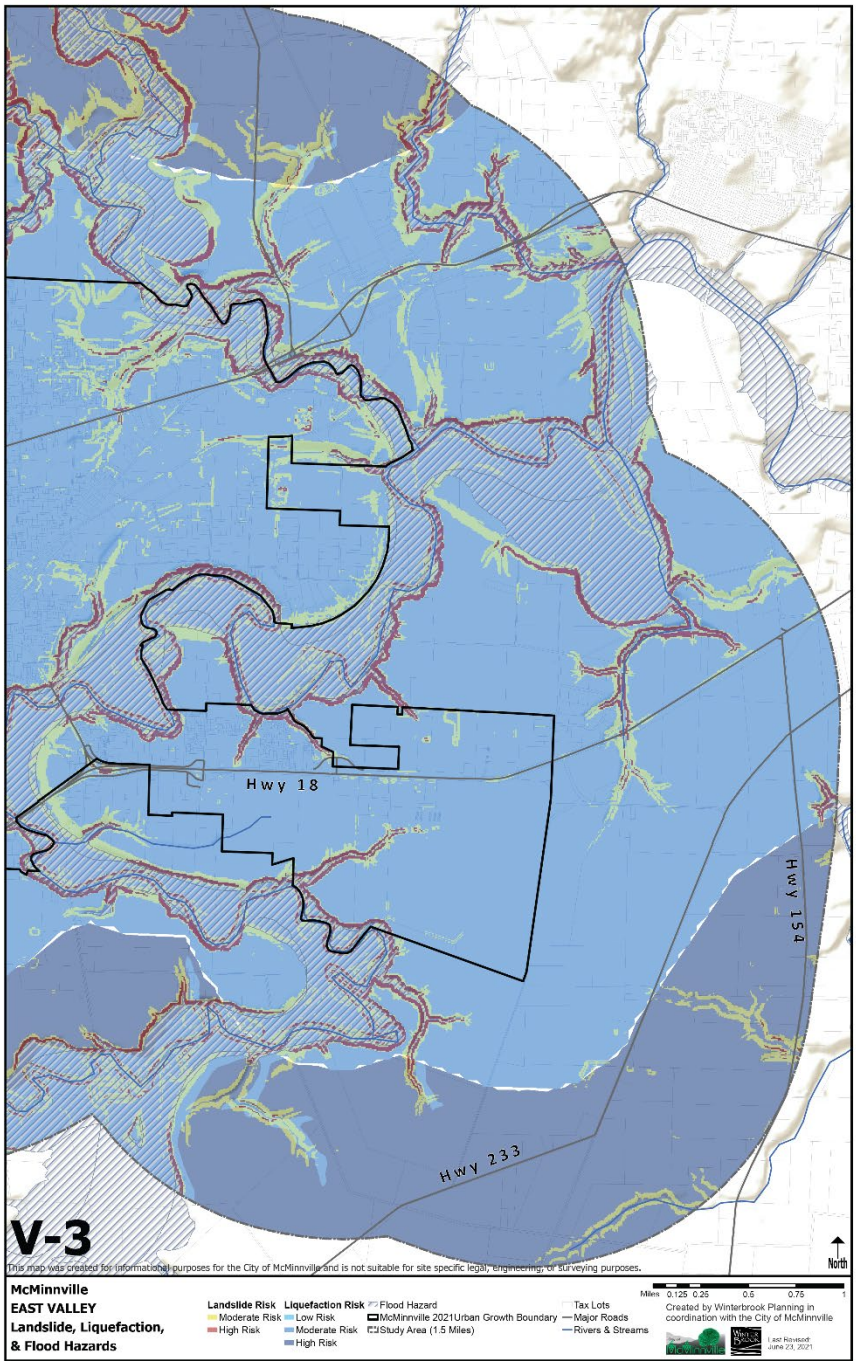


Figure V-4 combines wildfire, landslide and flood hazard risks and focuses on the West Hills and low-lying areas west of Highway 99W.

- Overall, there is some correlation between wildfire and landslide risk Higher wildfire risk areas correlate more with rural residential development in forested hillside areas with limited access.
- Note that low wildfire risk areas correlate with undeveloped areas because wildfire risk focus on impacts to people and structures. Thus, yellow areas shown on Figure V-4 still have wildfire risk – but are unlikely to damage structures; however, the danger still exists from larger scale wildfires.
- Note also that high wildfire risks occur near vegetated stream and river corridors.
- Finally, the CWPP and the McMinnville Fire Department has observed (6/24/20) that grasslands and grain crop areas are also susceptible to wildfire risk.

Figure V-4 Composite Map: West Hills Wildfire, Landslide, and Floodplain Risk

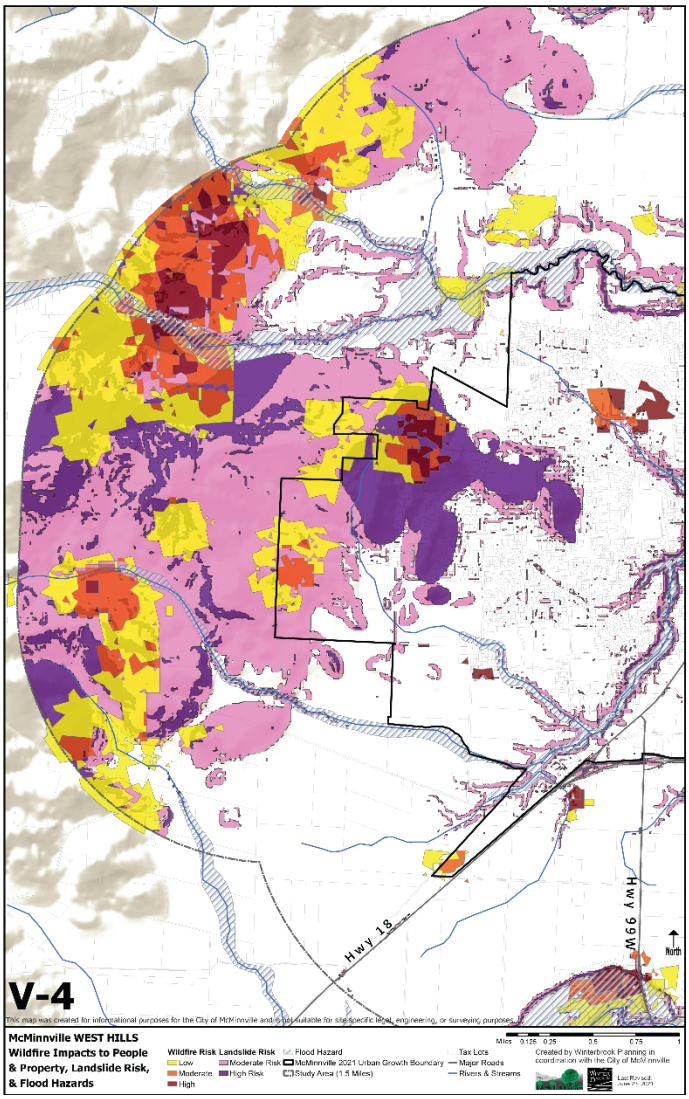
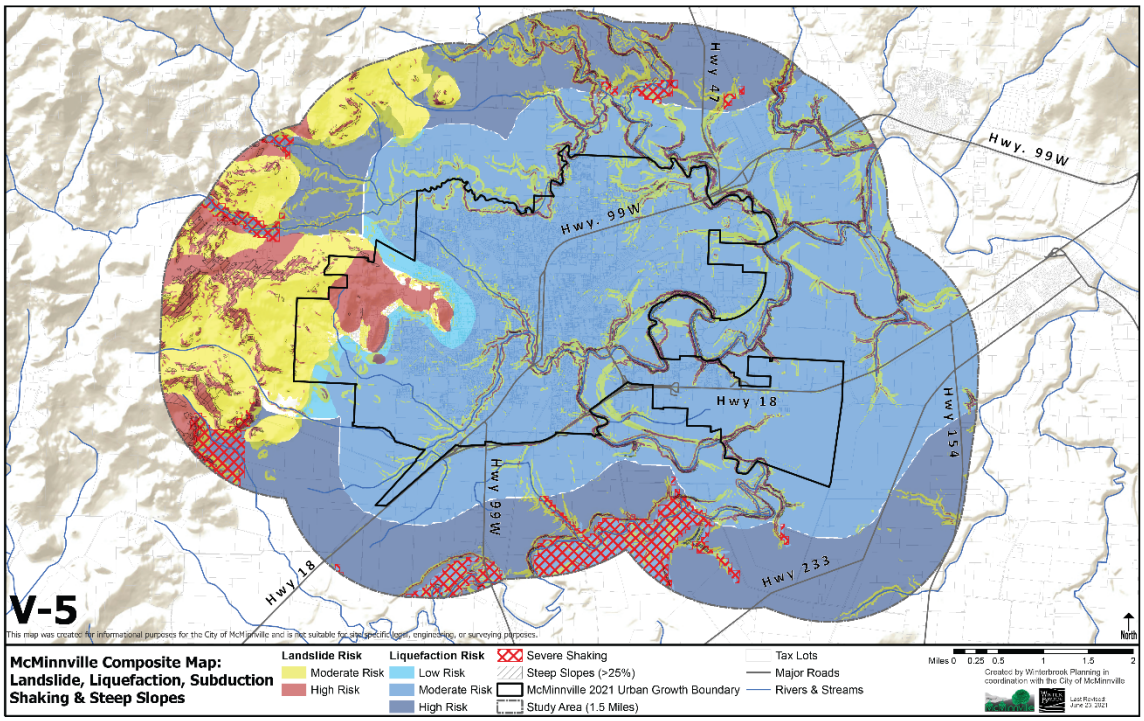


Figure V-5 combines geological hazard risks including landslides, earthquake shaking and liquefaction, and slopes of 25% or greater. As discussed in Section II of this report:

- The entire amended McMinnville UGB is subject to moderate earthquake liquefaction risk and (as shown on Figure II-4) very strong earthquake shaking risk.
- There is a band of moderate geological risk area that extends north, northwest, west, southeast, and south of the amended UGB for about a half to three-fourths of a mile.
- Beyond this relatively buildable band, there are:
    - High risk earthquake liquefaction hazard areas (to the north and south;
    - Severe risk earthquake shaking hazards to the south, southwest and northwest; and
    - High risk landslide areas with slopes of 25% or greater to the west.

Figure V-5 Composite Map: Landslide, Liquefaction, Subduction Shaking, and Steep Slopes



Combined Hazard Risk Summary

Figures II-4 through II-VI and Figures V-1 through V-5 show interrelationships among geological and flooding hazards. In summary:

- Although there is a correlation between slopes of 25% and greater and high landslide risk in the West Hills and therefore should be considered unbuildable – consistent with the findings of the 2020 Buildable Lands Inventory.
- Geological hazards (landslide and earthquake liquefaction / shaking) exist on slopes of 15% or less. Therefore, the composite geological maps are a better indicator than steep slopes to determine where geological studies and erosion control measures should be required.
- The composite geological and flooding maps show landslide hazards at the edge of most floodplains and the presence of high earthquake liquefaction and severe shaking hazards within all floodplain boundaries. Even relatively minor flood events can trigger bank failures in such areas. Since a major subduction

earthquake would undoubtedly trigger bank failures next to the 100-year floodplain, extending protection to adjacent landslide areas makes sense.

- The composite geological maps show an inverse relationship between earthquake risk on the one hand and landslide risk in the West Hills. Except for floodplain areas in the West Hills and Valley, earthquake liquefaction and shaking risk areas tend to end where landslide areas begin.
- Together, these high to severe geological hazards form a continuous ring located from 0.5 to 0.75 miles to the southeast, south, southwest, west, northwest and north of the amended McMinnville UGB.
- The composite wildfire, geological and flooding maps show that moderate and high wildfire hazards are associated with forested rural residential development in the West Hills. Wildfire hazard areas sometimes occur in moderate-to-steep slope hazard areas and vegetated floodplains throughout the study area.

The overlaps that exist among these types of hazards and supports the concept of a combined natural hazards overlay comprehensive plan map designation. As discussed in Section VII of this report, Winterbrook recommends the assignment of one of two natural hazard subdistricts based on combined natural hazard risk scores in specific geographic subareas. The methods for drawing subdistrict maps are discussed in Chapter VII.

VI. Natural Hazard Program Management Options

In Sections II-IV of this report, we inventoried three types of natural hazards:

- Geological Hazards (including landslides and subduction and crustal earthquakes)
- Flooding Hazards
- Wildfire Hazards

In Section V we analyzed the McMinnville NHMP and the Yamhill County CWPP and determined that substantial overlaps exist among these three general types of hazards.

In Section VI we analyze management options for each of these natural hazard categories based on:

1. Recommendations found in the draft 2020 McMinnville NHMP.
2. Management practices in six comparator cities described in Appendix 1.
3. Advanced natural hazards inventory work related to geological and wildfire hazards found in the draft McMinnville NHMP and Winterbrook's experience in preparing comprehensive natural hazard inventories and management programs for other Oregon jurisdictions.

McMinnville NHMP Multi-Hazard Action Items

The McMinnville NHMP includes five relevant "multi-hazard" recommendations that will be followed for each of the three natural hazard categories:

Table VI.1 McMinnville NHMP Recommended Natural Hazard Mitigation Measures

Policy Number	Policy Text	Evaluation
Multi-Hazard #2	Incorporate mitigation planning provisions into community planning processes such as comprehensive, capital improvement, land use, transportation plans, zoning ordinances, community development practices, etc.	**Section VII includes recommendations for amending the McMinnville Comprehensive Plan to include natural hazard inventory and management policies proposed to be implemented in the McMinnville Zoning Ordinance.**
Multi-Hazard #7	Develop and maintain GIS mapped hazard areas within the UGB.	**Sections II-V include a series of geological, flooding and wildfire hazards maps within the McMinnville UGB and within potential UGB expansion areas.**
Multi-Hazard #10	Establish a process to coordinate with state and Federal agencies to maintain up-to-date hazard data, maps and assessments.	**Section VII includes a policy to coordinate with state and federal agencies through periodic updates of the McMinnville NHMP and the Yamhill County CWPP.**

Policy Number	Policy Text	Evaluation
Multi-Hazard #11	Limit (e.g., reduced density, etc.) or prohibit development in high hazard areas.	**Section VI considers options to limit development in medium and high hazard areas – and to prohibit development in some high hazard areas. Section VII includes recommendations for a consolidated Natural Hazards Overlay District that limits or prohibits development depending on the hazard level and cumulative hazard impacts. As proposed, the NHOD would be applied to land within the McMinnville study area to guide future urban growth. Application of the NHOD outside the McMinnville City Limits would require an amendment to the Urban Growth Management Agreement (UGMA) between the City and Yamhill County.**
Multi-Hazard #12	Encourage mitigation practices in developments at risk to natural hazards.	**Section VI considers mitigation options and Section VII recommends specific mitigation measures.**

Geological Hazards

The text below considers (a) McMinnville NHMP geological hazards measures / action items and (b) geological hazards mitigation programs (comprehensive plan policies and development standards) in six comparator cities.

McMinnville NHMP – Recommended Measures

The draft McMinnville NHMP (Table MA-1 McMinnville Action Items) proposes specific mitigation measures / action items for each moderate-to-high risk geological hazards.

Table VI.2 McMinnville NHMP Recommended Geological Hazard Measures

Policy Number	Policy Text	Evaluation
Earthquake #5	Educate property owners about structural and non-structural retrofitting of vulnerable buildings and encourage retrofit.	**Section VII includes a policy recommendation to this effect.**
Earthquake #6	Develop an outreach program to educate and encourage homeowners and tenants to	**Section VII includes a policy recommendation to this effect.**

Policy Number	Policy Text	Evaluation
	secure furnishings, storage cabinets, and utilities to prevent injuries and damage.	
Landslide #1	Utilize technology, geologic resources and other available data (such as DOGAMI LIDAR data) to identify and map potential areas for landslides - high, moderate and low.	**Sections I -V of this report include available GIS data sources and tools to identify and map potential landslide areas – both singularly and in combination with earthquake, wildfire and flooding hazards.**
Landslide #2	Develop a process to limit future development in high landslide potential areas - permitting, geotechnical review, soil stabilization techniques, etc.	**Section VI considers procedural and substantive options to limit development in moderate and high hazard areas. Section VII includes recommendations for a consolidated Natural Hazards Overlay District that includes permitting, geotechnical review and stabilization measures for landslide and earthquake areas.**
Landslide #3	Development in steeply sloped areas (greater than 15%) should be subject to specific development requirements to control erosion.	**Sections II-V identify the importance of steep slopes in determining the location of severity of landslide and wildfire hazards. Section VI considers the use of a 15% slope threshold for triggering specific erosion control requirements. Section VII includes recommendations for a consolidated Natural Hazards Overlay District that includes slope and other geological triggers for erosion control review. This overlay could be applied within the Natural Hazards Study Area to evaluate risk when considering future UGB expansion areas.**
Landslide #4	Complete an inventory of locations where critical facilities, other buildings and infrastructure may be subject to landslides.	**Section VII includes a policy recommendation to this effect.**

Best Geological Hazard Mitigation Practices in Comparator Cities

Winterbrook has provided a detailed summary of comprehensive plan policies and mitigation practices for geological hazards (steep slopes, earthquakes, and landslides) in six comparator communities (Ashland, Grants Pass, Albany, Newberg, Redmond and Bend). **Please see Appendix 1 Best Natural Hazard Mitigation Practices in Comparator Cities.**

The cities of Albany, Ashland, Bend, Grants Pass and Newberg limit development in mapped steeply sloped areas.

- The threshold for application of hillside steep slope standards varies from 12 – 25% slope.
- Most of these cities require the implementation of recommendations from geological studies and erosion control measures prior to development.
- Some cities require reduced residential densities based on slope percentage (slope density ratio).
- Some cities allow for density transfer – often through the planned unit development process.

Table VI.3 summarizes geological hazard management practices by city.

Table VI.3 Summary of Geological Hazard Management Practices by City

City	Percent Slope Threshold	Geotechnical Report Required?	Slope Density Ratio?	Density Transfer Allowed?	Earthquake Impacts Regulated by Zoning?	Other Standards
Albany	12%	Yes	Yes	Yes	Not directly – may be addressed in geotechnical report	Yes – see below
Ashland	25%	Yes	Yes	Yes	Not directly – may be addressed in required geotechnical report	Yes – see below
Bend	10-20%	Maybe	No	Yes	Not directly – may be addressed if geotechnical report required	Yes – see below
Grants Pass	15%	Yes	No	No	Not directly – may be addressed in required geotechnical report	Yes- see below
Newberg	20%	Maybe	No	No	Not directly – may be addressed in required geotechnical report	Yes – see below
Redmond	N/A	Maybe	No	No	Not directly – may be addressed if geotechnical report required	Yes – see below
McMinnville	N/A	No	No	No	No	Yes – see Section VII of this report

- **Albany has several measures that guide implementation of hillside development policies:**
  - Measure 6. Require proposed hillside development to provide for the preservation and, if possible, enhancement of the site's natural features during all phases of the design and development process. This includes consideration of soils, vegetation, hydrology, wildlife habitat, views and visual orientation, both from the site and to the site, and unusual or unique natural features.
  - Measure 10. Require that all excavation and fill work and structural foundation work be approved by a registered engineer whenever the slope is greater than 30% or where there exists probability of geologic hazards such as perched water tables and/or landslide areas. Where appropriate, such approval shall include information from a soils engineer and engineering geologist.

- Measure 11. Increase minimum lot sizes (or minimum lot area per unit) on hillside areas, allowing higher densities for cluster developments approved through Planned Development as outlined in the following table:

Slope %	Standard Dev.	(RS 6.5 Lot)	PUD Devel.	(RS 6.5 Avg)
13 to 20	1.25	8125	1.00	6500
21 to 25	1.50	9750	1.15	7475
26 to 30	2.00	13000	1.40	9100
31 above	3.00	19500	2.00	13000

Albany's **Hillside Overlay District** applies to mapped areas of the city (primarily West Albany) with 12% or greater slope. Allowed density decreases as slope increases; however, density transfer is allowed through the PUD process when 20% of the site remains open space. Cut and fill activity should be minimized. A licensed engineer must approve excavation plans and foundation design.

- **Ashland's Physical and Environmental Constraints Overlay Zone** (Chapter 18.62) applies to mapped "Flood Plain Corridor Land, Hillside Land (slopes $\geq$ 25%, or Severe Constraint Land (including wildfire lands, floodways and slopes $\geq$ 35%)).
  - *"The above classifications are cumulative in their effect and, if a parcel of land falls under two or more classifications, it shall be subject to the regulations of each classification. Those restrictions applied shall pertain only to those portions of the land being developed and not necessarily to the whole parcel."*
  - Geotechnical engineering studies are required for development on slopes of 25% or greater.
  - Slopes $\geq$ 35% are considered unbuildable (maximum of 1 unit per acre provided geotechnical report recommendations are followed). No new lots may be created on such slopes. Hazardous or unstable areas of the site must be avoided.
  - The maximum cut slope height is 15 feet and the maximum fill slope height is 20 feet.
  - Trees must be protected based on an arborist report and must consider fire protection plan requirements in designated wildfire areas.

  On-site density transfer is allowed from non-buildable to buildable areas of the site (contiguous land under common ownership). The maximum allowable density on buildable areas of the site is twice the allowable density in the underlying zoning district.

- **Bend** maps and regulates development on "**sensitive lands"** which include both Goal 7 natural hazards and Goal 5 natural resources. Natural hazards included in the definition of "sensitive lands" include slopes of 10% or greater and land within the 100-year floodplain.
  - The Bend Comprehensive Plan includes policies to (a) coordinate with DOGAMI to identify fault lines in the community and (b) to review development "on slopes in excess of 10 percent shall give full consideration to the natural contours, drainage patterns, and vegetative features of the site to protect against temporary and long-term erosion." However, we could find no specific development standards to implement these policies.
  - Although the Bend Development Code defines steep slopes as 10% or greater (BDC 16.05.060), the threshold for requiring grading and erosion control permits (and possibly engineering reports) is slopes of 20% or greater. As part of grading permit review, the city "may" require an

engineering or geologist report if "the City determines that special circumstances warrant such information."
    - Minimum densities are determined after excluding "sensitive lands." (BDC 2.1.600) However, density transfer is allowed from land with slopes of 25% or greater to buildable areas on the same site if "sensitive lands" are protected by a conservation easement or dedication. There do not appear to be any restrictions on the amount of density that can be transferred.

- **Grants Pass** evaluated soil types for erosion and shrink-swell potential. The comprehensive plan identified slopes greater than 15 percent on the Slope Hazards map and found that development on slopes between 15 and 35 percent should be reviewed by a soils scientist and an engineer, while development on slopes over 35 percent should require geotechnical review.
    - The Grants Pass Slope Hazard District encompasses areas of at least 15 percent slope and contains two classes of slope: Class A (between 15 and 25 percent) and Class B (greater than 25 percent).
    - Development within the Slope Hazard District requires a Steep Slope Development Report and Grading and Erosion Plans. Class A documentation requires a licensed engineer stamp, while Class B requires a geotechnical engineer or engineering geologist stamp.
    - Restrictions on development within the Slope Hazard District include erosion control measures and retaining wall height is limited to 20 feet.

- **Newberg's Comprehensive Plan** identifies "hazardous areas" as areas with slopes 20 percent or greater, or with geological limitations. Development may be permitted in hazardous areas if consistent with sound engineering and planning criteria.
    - Comprehensive Plan Policy 5 states that "In other areas of potential or existing hazards, development shall be subject to special conditions. Reasonable development may be permitted in these areas when it can be shown, based on sound engineering and planning criteria, that adverse impacts can be mitigated and kept to a minimum. Hazardous areas shall be considered to be lands with slopes 20% or greater, potential and existing slide areas, fault areas, and areas with severe soil limitations."
    - **The Newberg Development Code** does not appear to have specific geological development regulations. However, sloped areas are regulated by Title 13 Public Utilities and Services, which "may require" additional erosion and sediment controls on slopes of 10 percent or more.

- **Redmond's Comprehensive Plan** includes several policies related to natural hazards:
    - Policy 4. Natural hazards that could result from new developments, such as runoff from paving projects and soil slippage due to weak foundation soils, shall be considered, evaluated and provided for.
    - Redmond's **Urbanization Study** indicates that "Redmond has no land that is unavailable for development due to physical constraints: steep slopes, wetlands, riparian areas, and floodplains. This is due to the city's location and the fact that the dry canyon is mostly in public ownership."
    - However, evaluation of hazards may be required during site and design review:

  The Redmond Development Code (RDC 8.3030) states that "Special Studies, Investigations and Reports. Special studies, investigations and reports may be required to ensure that the proposed development of a particular site does not adversely affect the surrounding community, does not create hazardous

conditions for persons or improvements on the site. These may include traffic impact studies impact of contaminated soils, soil conditions, flooding of waters and excessive storm water runoff, tree preservation, and other concerns of the development's impact on adjacent properties or public facilities."

Flood Hazards

The text below considers (a) McMinnville MHMP flood hazard measures / action items and (b) flood hazard mitigation programs (comprehensive plan policies and development standards) in six comparator cities.

McMinnville NHMP – Recommended Flood Hazard Measures

The draft McMinnville NHMP (Table MA-1 McMinnville Action Items) proposes specific mitigation measures / action items for flood hazards.

Table VI.4 McMinnville NHMP – Evaluation of Recommended Flood Hazard Mitigation Measures

Policy Number	Policy Text	Evaluation
Flood #1	Ensure continued compliance in the National Flood Insurance Program (NFIP) through enforcement of local floodplain management ordinances.	**The Comprehensive Plan already includes a policy to this effect.**
Flood #2	Work with FEMA to update FIRMs. Request DOGAMI debris flow and lidar data be included in FIRM updates. Use the updated FIRMS for land use and mitigation planning.	**Section III Flood Hazard Inventory relies on existing flood hazard information. Section VII includes a policy to update the flood hazard inventory in the future based on DOGAMI debris flow and lidar data.**
Flood #4	Develop and maintain GIS mapped critical facility inventory for all structures and residential and commercial buildings located within 100-year and 500-year floodplains.	**Section VII includes a policy recommendation to this effect.**

Best Flood Hazard Management Practices in Comparator Cities

As discussed below, the cities of Albany, Ashland, Bend, Grants Pass, Newberg and Redmond all limit development in mapped floodplain areas. **Please see Appendix 1 Best Natural Hazard Mitigation Practices in Comparator Cities** for a more detailed discussion of comprehensive plan policies and development regulations that limit development in flood hazard areas.

Table VI.5

City	Prohibit Development in Floodway	Limit Development in Flood Plain	Density Transfer Allowed?	Erosion Control Measures?	Other Standards
Albany	Yes	Yes	Yes	Yes	Yes – see below
Ashland	Yes	Yes	Yes	Yes	Yes – see below
Bend	Yes	Yes	No	Yes	Yes – see below
Grants Pass	Yes	Yes	No	No	Yes- see below
Newberg	Yes	Yes	No	No	Yes – see below
Redmond	Yes	Yes	No	No	Yes – see below
McMinnville	Yes	Yes	No	No	Yes – see Section VII of this report

Summary of Flood Hazard Management Practices by City

The Cities of Ashland, Albany, Bend, Grants Pass, Newberg and Redmond all have standard floodplain management programs consistent with FEMA standards. Development, if allowed within the 100-year floodplain, must be constructed one foot above flood level and meet other standards.

- Ashland's **Physical and Environmental Constraints Overlay Zone** regulates natural hazards as well as natural resources. Ashland integrates its floodplain management program with related natural resources (wetland and stream corridor) programs. In addition to designated floodplain areas, Ashland limits development in areas that have historically experienced flooding.
- Bend defines the 100-year floodplain as **"sensitive lands"** along with other natural hazards and natural resources (including wetlands and stream corridors).

Wildfire Hazards

Most comparator cities do not have reregulate wildfire hazards in their land use regulations. The text below considers (a) McMinnville NHMP wildfire hazard measures / action items and (b) wildfire hazard mitigation programs (comprehensive plan policies and development standards) in six comparator cities.

McMinnville NHMP – Recommended Measures

The draft McMinnville NHMP (Table MA-1 McMinnville Action Items) proposes specific mitigation measures / action items for wildfire hazards.

Table VI.5 McMinnville NHMP – Evaluation of Recommended Flood Hazard Mitigation Measures

Policy Number	Policy Text	Evaluation
Wildfire #1	Coordinate wildfire mitigation action items through the Yamhill County Community Wildfire Protection Plan.	**The CWPP was last revised in 2015. The revised version was considered in this report.**
Wildfire #3	Develop, implement, and enforce vegetation management codes/plans to reduce wildfire risk.	**Section V considers options for vegetation management measures – depending on the location of the wildfire hazard. Section VII includes recommendations for a consolidated Natural Hazards Overlay District that includes vegetation management provisions – again depending on the location of the hazard.**

Best Practices in Comparator Cities

Most comparator cities have participated in county community wildfire protection planning efforts. However, only Ashland has mapped and adopted zoning standards to protect life and property in designated wildlife hazard areas. **Please see Appendix 1 Best Natural Hazard Mitigation Practices in Comparator Cities** for a more detailed discussion of comprehensive plan policies and development regulations that limit development in wildfire hazard areas.

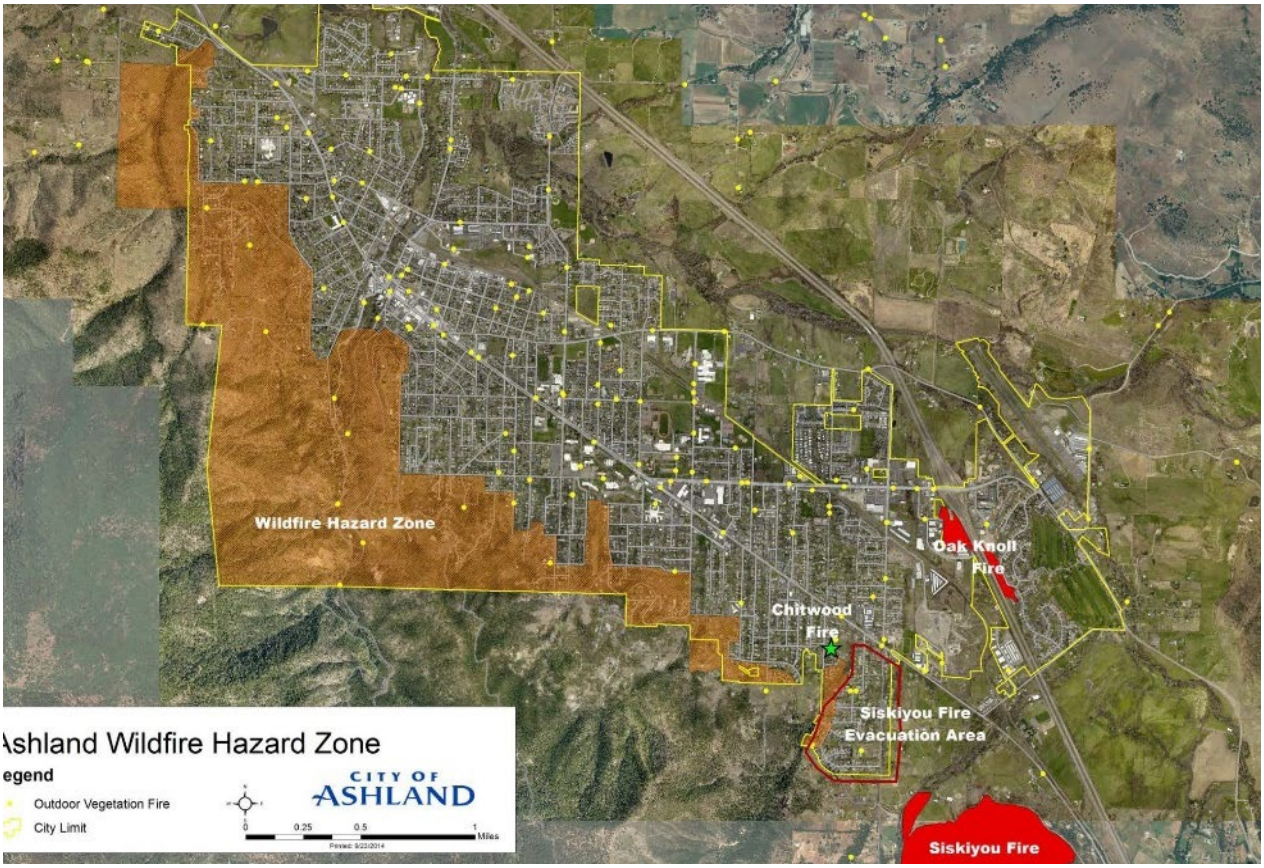
Ashland Wildfire Mitigation Program

Ashland's standards for wildfire mitigation mirror standards required by the Goal 4 administrative rule for structures in commercial forest zones. Ashland maps urban-wildland interface areas and has adopted several policies to protect life, property, and environmental resources:

- Policy 46. Require installation and maintenance of a 40-foot fuel break around each dwelling unit or structure.
- Policy 47. Require multi-dwelling unit developments to install and maintain a perimeter fuel break to prevent fire from entering the development, or to prevent a fire spreading from the development and threatening the Ashland Watershed. (Width of break is dependent on topography, aspect, vegetation, types and steepness of slopes.)
- Policy 48. Where vegetation needs to be maintained for slope stability in a fuel break area, require plantings of fire-resistant or slow-burning plants. The City shall make a list of such plants available to the public. (See "Wildfire Hazard Management in the Urban/Wildland Interface in Southern Oregon," by Claude Curran - May 1978.)
- Policy 49. Require more than one ingress/egress route or road widths wide enough to accommodate incoming fire apparatus and evacuating residents simultaneously in an emergency situation.
- Policy 50. Require roofs to be constructed of fire-resistant materials. Wood shake or shingle roofs are not allowed.

- Policy 51. Encourage road placement to function as fire breaks in urban/wildland interface developments.
- Policy 52. Require chimneys of wood-burning devices to be equipped with spark arrester caps and/or screens.
- Policy 53. Install all new electrical distribution circuits in the urban/wildland interface underground if technically feasible.
- Policy 54. The City shall encourage and support education/ information programs dealing with wildfire hazards in the urban/wildland interface. Information shall be made available through the City Building and Planning Departments to developers and builders wishing to build in the urban/wildland interface.

Figure VI-1 Ashland's Wildfire Hazard Overlay Zone



Ashland integrates natural resource, water quality, and hillside considerations with wildfire mitigation requirements:

- Any development or land division within these areas is required to prepare a Fire Prevention and Control Plan and establish and maintain a fuel modification area (generally crown separation, tall brush removal, tree trimming, etc.).
- "l. Where necessary for erosion control, slope stability, riparian and wetland preservation and enhancement, performing functions considered beneficial in water resource protection, or aesthetic

purposes, existing vegetation may be allowed to be retained consistent with an approved Fire Prevention and Control Plan, or upon written approval of the Staff Advisor in consultation with the Fire Code Official.

- m. Fuel modification in areas which are also classified as Hillside Lands or Water Resource Protection Zones shall be included in the erosion control measures outlined in section 18.3.10.090, Development Standards for Hillside Lands, and management plan for water resource protection zones in section 18.3.11.110.

Composite Approach – Cumulative Impacts

As discussed above, most comparator cities separately regulate flooding with geological hazards (to varying degrees).

- All flood maps and regulations are based on FEMA standards and restrict development within floodplains and floodways.
- Most cities have some variation on hillside development overlay zones triggered by minimum slopes – ranging from 10% to 20%.
- Ashland is unique among comparator cities in have a single multi-hazard overlay zone – supported by a series of hazard-specific maps – that includes development standards for geological, flooding and wildfire hazards.

VII. Natural Hazard Program Recommendations

McMinnville's Existing Natural Hazard Policy Framework

McMinnville Comprehensive Plan (2017)

Winterbrook was able to find two Comprehensive Plan policies directly related to natural hazards:

> ***2.00 The City of McMinnville shall continue to enforce appropriate development controls on lands with identified building constraints, including, but not limited to, excessive slope, limiting soil characteristics, and natural hazards.***
>
> ***9.00 The City of McMinnville shall continue to designate appropriate lands within its corporate imits as "floodplain" to prevent flood induced property damages and to retain and protect natural drainage ways from encroachment by inappropriate uses.***

Policy 71.07 applies the relatively low density R-1 zoning designation to steeply sloped portions of the West Hills:

> ***71.07 The R-1 zoning designation shall be applied to limited areas within the McMinnville urban growth boundary. These include: 1. The steeply sloped portions of the West Hills.***

As noted in the Introduction to this report, McMinnville recently adopted Great Neighborhood Principles that call for consideration of natural features the long-range and land use application planning processes. This report helps to implement these policies.

In addition to these general policies described above, the McMinnville Residential Land Study (ECONorthwest, 2003) excludes slopes of 25% and greater and land within the 100-year floodplain from the buildable lands inventory. It is our understanding that the City requires sprinklers for homes constructed on slopes of 15% or greater.

Otherwise, there do not appear to be any other natural hazard policies in the McMinnville Comprehensive Plan.

McMinnville NHMP Plan Direction

From the McMinnville NHMP (p. MA-13):

> ***Incorporate mitigation planning provisions into community planning processes such as comprehensive, capital improvement, land use, transportation plans, zoning ordinances, community development practices, etc.***
>
> > *Rationale: Comprehensive plans provide the framework for the physical design of a community. They shape overall growth and development while addressing economic, environmental and social issues. Oregon's statewide goals are accomplished through local comprehensive plans. State Law requires local governments to adopt a comprehensive plan and the zoning and land-division ordinances needed to put the plan into action.*
> >
> > *Integration of NHMPs into comprehensive plans and other plans will help to reduce a community's vulnerability to natural hazards, support in mitigation activities, help to*

increase the speed in which action items are implemented and therefore the speed in which communities recover from natural disasters.

Integration of NHMPs into local plans gives the action items identified in the NHMP legal status for guiding local decision-making regarding land use and/ or capital expenditures.

Implementation: Integrate natural hazards information and policies into the comprehensive plan and other plans.

Engage in collaborative planning and integration.

Coordinate future NHMP and comprehensive plan reviews and updates.

Proposed Natural Hazards Comprehensive Plan Amendments

The proposed Comprehensive Plan amendment package would include:

- Natural Hazard Inventory Maps and Descriptions (Sections II-V of this report).
- Natural Hazard Management Policy Framework (a new Chapter XI: Natural Features)
- Natural Hazard Overlay shown on the Comprehensive Plan Map (shown on Figure VII-1)

Proposed McMinnville Zoning Ordinance Amendments

Proposed natural hazards policies call for the adoption of two natural hazards subdistricts (that would overlay the underlying base zones (Residential, Commercial, Industrial, Floodplain and Agricultural Holding). The proposed natural hazards subdistricts are based on a ranking system and policy framework set forth below and would include hazard-specific protection and mitigation standards. The two proposed subdistricts are shown on Map VII-1 and could be referenced in a new Chapter 17.50 Natural Hazard Subdistricts:

- The Natural Hazards Mitigation (NH-M) Subdistrict
- The Natural Hazards Protection (NH-P) Subdistrict

Natural Hazards Inventory

The Natural Hazards Inventory (including text and embedded maps) is included in Sections I-V and VII of this report. Copies of 11" X 17" GIS Inventory maps are provided separately.

Natural Hazards Composite Ranking System

The proposed Natural Hazard composite ranking system is based on two scored variables: the probability of a natural hazard event occurring at a specific location within the 2021 UGB and the vulnerability assessment of the natural hazard event happening. The probability variable is determined by combining the natural hazard inventory maps into a single overlay that describes the combined probability for individual "subareas" (GIS polygons). The vulnerability variable is informed by the 2020 *Oregon Natural Hazards Mitigation Plan* (Oregon NHMP). The terms "subarea" and "polygon" are used interchangeably to describe the composite ranking system. Appendix 2 contains a detailed methodology of the steps used to create the Natural Hazard Overlays.

Natural Hazard Probability

A combined natural hazard probability can be created by assigning a consistent number scoring system and by using a series of GIS manipulations. The number scoring system used in the rank of the probability score is displayed in Table VII.1. The scores were determined in coordination with McMinnville Associate Planner Jamie

Fleckenstein, and they are consistent with the ranking scale used in the Oregon NHMP. The scale runs from 0 to 5, with 0 being no or low probability of the natural hazard event happening at that spatial location and 5 being a high or severe probability of the natural hazard event happening.

- **Natural Hazard Type** shows the types of natural hazards that may be present in any given subarea.
- **Hazard Probability** shows the hazard levels that may be present for each hazard probability in any given subarea.
- **Hazard Probability Score** shows the hazard score for each type and level of hazard probability that may be present in any given subarea.

Table VII.1 Natural Hazard Risk Assessment (2021)

Natural Hazard Type	Hazard Risk Level	Individual Hazard Score
Landslide	Moderate	2
	High	5
Cascadia Subduction Zone Earthquake		
Liquefaction	Moderate	2
	High	5
Shaking	Very Strong	2
	Severe	5
Slope	25%	5
Flood	Floodplain	5
Wildfire	Moderate	2
	High/Severe	5

Natural Hazard Vulnerability – Oregon Natural Hazards Mitigation Plan

The Oregon NHMP was completed in the Fall of 2020. To remain consistent with the State's assessment, the plan was considered and incorporated as part of the natural hazard composite ranking system. The Oregon NHMP presents a series of natural hazard risk assessments for all Oregon counties. For simplification at the state level, these risk assessments were calculated county wide. The Oregon NHMP is broadly based on three variables:

1. The probability of the event happening.
2. The physical vulnerability of the event happening, and
3. The social vulnerability of the event happening.

These variables are summarized for Yamhill County in Table V11.2.

Table VII.2 Oregon NHMP Risk Assessment for Yamhill County

Hazards for Yamhill County	Probability	Physical Vulnerability				Social Vulnerability	Vulnerability (Social + Physical)		Risk (Prob. + Physical Social)	
		State Buildings	State Critical Facilities	Local Critical Facilities	Total Combined & Rescaled		Total Combined & Rescaled	Vulnerability	Total Combined & Rescaled	Risk
Earthquake	4	3	3	2	2.67	4	3.33	Very High	3.56	Very High
Flood	4	1	1	2	1.33	4	2.67	Moderate	3.11	High
Landslide	5	1	1	2	1.33	4	2.67	Moderate	3.44	Very High
Volcanic	1.5	1	1	1	1	4	2.5	Moderate	2.17	Low
Wildfire Hazard	2	1	1	1	1	4	2.5	Moderate	2.33	Moderate
County Total									**2.92**	**High**

Physical vulnerabilities were determined by assessing the concentration of state-owned or leased facilities and local critical facilities. Social vulnerabilities were based on Centers for Disease Control and Prevention (CDC) social vulnerability index. The Oregon NHMP uses 2016 data and aggregates at the County level, normalizing it with other Oregon Counties, grouping counties into quintiles, and then included state determined "sensitivity" and "adaptive capacity" rankings.

Because the state assessment is county wide, the probability of the natural hazard event occurring is based on the county-wide probability, regardless of spatial sensitivity to the event within the county. For example, wildfire hazards that are more probable in the west hills would be assigned the same probability in that location as if they were to occur in the City center or suburban areas. Since more detailed spatial probability of a natural hazard event occur is available – as detailed in the inventory maps of this report – the composite mapping relies only on the combined physical and social vulnerabilities determined by the Oregon NHMP. The probabilities of the natural hazard event occurring are replaced with the more spatially sensitive information contained in the inventories. The vulnerability index was only applied to a subarea when there was a moderate or high/severe probability of that natural hazard event occurring.

Combined (Cumulative) Ranking Applied Individually to Hazard Subareas

Using GIS, Winterbrook assigned a combined natural hazard risk score based on both the probability of the event happening and the state determined vulnerability of the event happening. This score was calculated for each spatial subarea (polygon) within the 2021 McMinnville UGB. Total probabilities and vulnerabilities were summed and averaged to produce a total risk score on a scale from 0 to 5, where 0 is low to no risk of the natural hazard event and 5 is high/severe risks of multiple hazard events. Each polygon now has 10 contributing variables. The combined natural hazard risk is detailed in Table V11.3.

Table VII.3 Combined Natural Hazard Risk by Natural Hazard Type in McMinnville

Natural Hazard Type	Probability of the Hazard in McMinnville		Social + Physical Vulnerability
Landslide	Moderate	2	2.67
	High	5	2.67
Cascadia Subduction Zone Earthquake			(Earthquake) 3.33
Liquefaction	Moderate	2	
	High	5	
Shaking	Very Strong	2	
	Severe	5	
Slope	➢25%	5	-
Wildfire	Moderate	2	2.50
	High/Severe	5	
Flood	Floodplain	5	2.67
	Floodway	5	

For discussion purposes, the McMinnville study area can be divided into two generalized areas in relation to hazard characteristics: low-lying (Valley) areas and higher-elevation areas (West Hills). Characteristics of Valley and West Hills areas in relation to combined hazard scores are summarized below. Note that the entire McMinnville 2021 UGB has a "very strong" probability of shaking. This hazard is included in the combined natural hazard risk calculations for consistency but does not affect subdistrict determination. Because of this, policies are recommended to address "very strong" shaking risks.

Valley Area Hazard Characteristics

The Cascadia Subduction Earthquake and flooding pose the greatest long-term threats to life and property in low-lying areas. Moderate earthquake liquefaction risk and "very strong" shaking hazards are present on most land within the UGB. These areas overlap with the 100-year flood plain and would trigger river and stream bank failures in the event of a major earthquake.

Valley area hazard scores have several inter-related characteristics:

- Due to the presence of moderate earthquake liquefaction and shaking hazards in most UGB subareas, the highest combined hazard risk score *outside* the 100-year floodplain is 2.75.
- Because floodplain polygons (score of 5) also have moderate earthquake liquefaction and very strong shaking hazards, the combined hazard score for most floodplain subareas is 3.571. Floodplain polygons are also likely to have also has moderate to severe wildfire risk (due to riparian vegetation) and moderate to high landslide risks (bank failure).
- Steep slopes in the valley are also more likely to correlate with floodplain and floodway areas. When outside of the floodplain and floodways, steep slopes occur with moderate to high landslide risks in most areas.

West Hills Area Hazard Characteristics

In the West Hills, landslide, steep slope, and wildfire hazards are common and often overlap. Earthquake liquefaction and shaking risk areas may also be located within the floodplains of Cozine and Baker Creeks.

- Subareas with moderate to severe wildfire risks have a combined score between 0.983 and 2.55. These wildfire risk areas often have moderate to high landslide risks.
- Subareas with steeps slopes always overlap with moderate to high landslide risk areas.
- Some moderate liquefaction areas are present along the tributaries of Cozine and Baker Creeks.

Natural Hazards – Combined Risk Categories and Related NH Subdistricts Map

There are three broad categories of natural hazards in the McMinnville 2021 UGB. These categories relate to proposed Natural Hazards Subdistricts (NH-M and NH-P) and are based on the subarea combined hazard risk score (probabilities and vulnerabilities). Table VII.4 summarizes how Winterbrook applied the cumulative hazard score for each of the 87 subareas in the Natural Hazards Study Area to determine the level of natural hazard protection.

Table VII.4 Designation of NH Subdistricts Based on Ranking of Natural Hazards Subareas

Combined Subarea Hazard Risk	Natural Hazard Overlay Subdistrict
0 to 0.99	No NH-Subdistrict
1 to 1.499	Natural Hazard Mitigation Subdistrict (NH-M)
1.5 to 3.517	Natural Hazard Protection Subdistrict (NH-P)

- **Subareas that have one or more high risk hazards areas with a combined hazard risk of 1.5 or more would be subject to the proposed Natural Hazard Protection (NH-P) Subdistrict** The NH-P prohibits most types of development; however, uses such as public utilities and resource enhancement are subject to hazard-specific development standards as well as building and fire codes. This category includes land within (a) floodplains and adjacent landslide and wildfire risk areas, and (b) some West Hills subareas with a combination of steep slopes, high landslide risk and moderate to high wildfire risk.
- **Subareas that have one or more moderate-to-high hazard risks with a combined hazard risk between 1 and 1.499 would be subject to the proposed Natural Hazards Mitigation (NH-M) Subdistrict**. Uses allowed by the underlying zoning district are allowed in the NH-M Subdistrict and are subject to hazard-specific development standards as well as building and fire codes. Much of the land within the West Hills falls within this category. Additional areas along creek tributaries, but outside of the floodplain, are included in this subdistrict. A larger mitigation area in the northeast is associated with dense tree groves and therefore severe wildfire hazards.
- **Subareas that are subject to moderate liquefaction or moderate wildfires only have a combined hazard risk of less than 1 and would not be subject to zoning regulation – but are subject to seismic building codes, fire codes and construction standards**. Most of the land within the UGB falls into this category.

Figure VII-1 shows the proposed Natural Hazards Overlay with Natural Hazards Mitigation (NH-M) and Protection (NH-P) Subdistricts that are derived from GIS data and based on Tables VII.1 and VII.2.

- The Natural Hazards Overlay would be shown on the comprehensive plan map.
- The subdistricts would be included in the McMinnville Zoning Ordinance and shown on the McMinnville Zoning Map.

As discussed in the Chapter XI Natural Features policy framework below, the McMinnville Urban Growth Management Agreement with Yamhill County could also be amended to apply Chapter XI policies and natural hazards overlay maps and regulations within the Natural Hazards Study Areas.

Figure VII-1 Proposed McMinnville Natural Hazards Overlay – Study Area

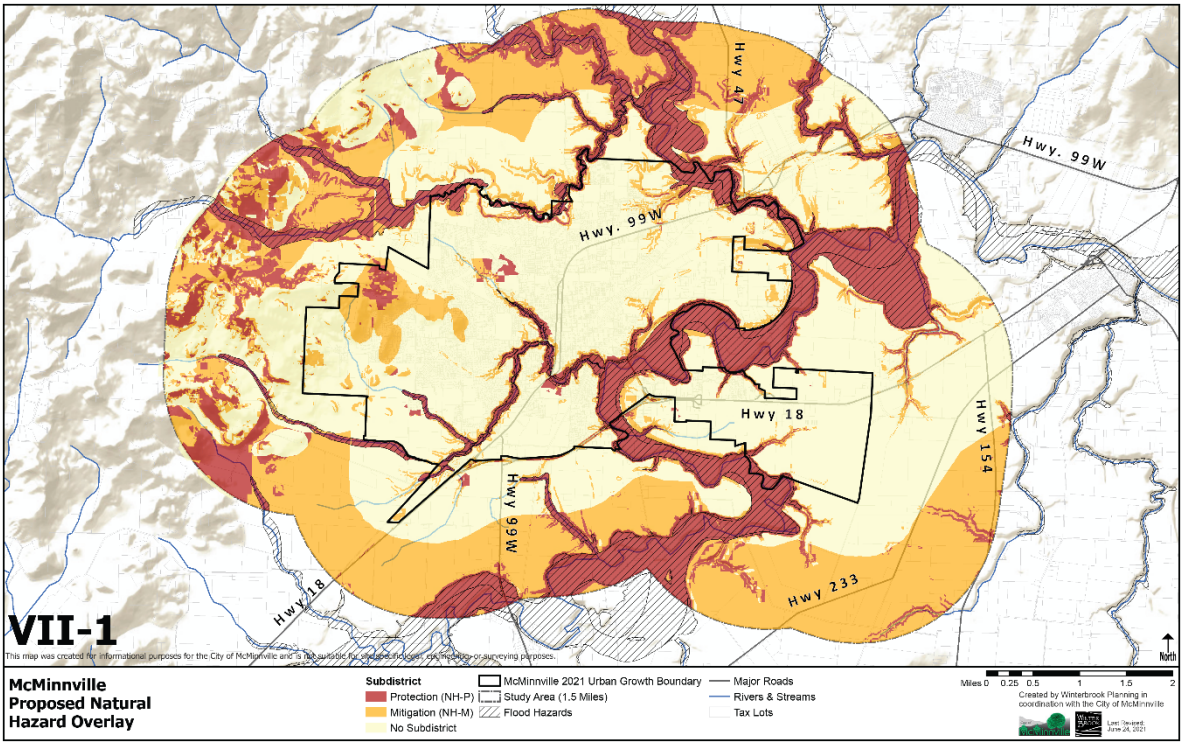
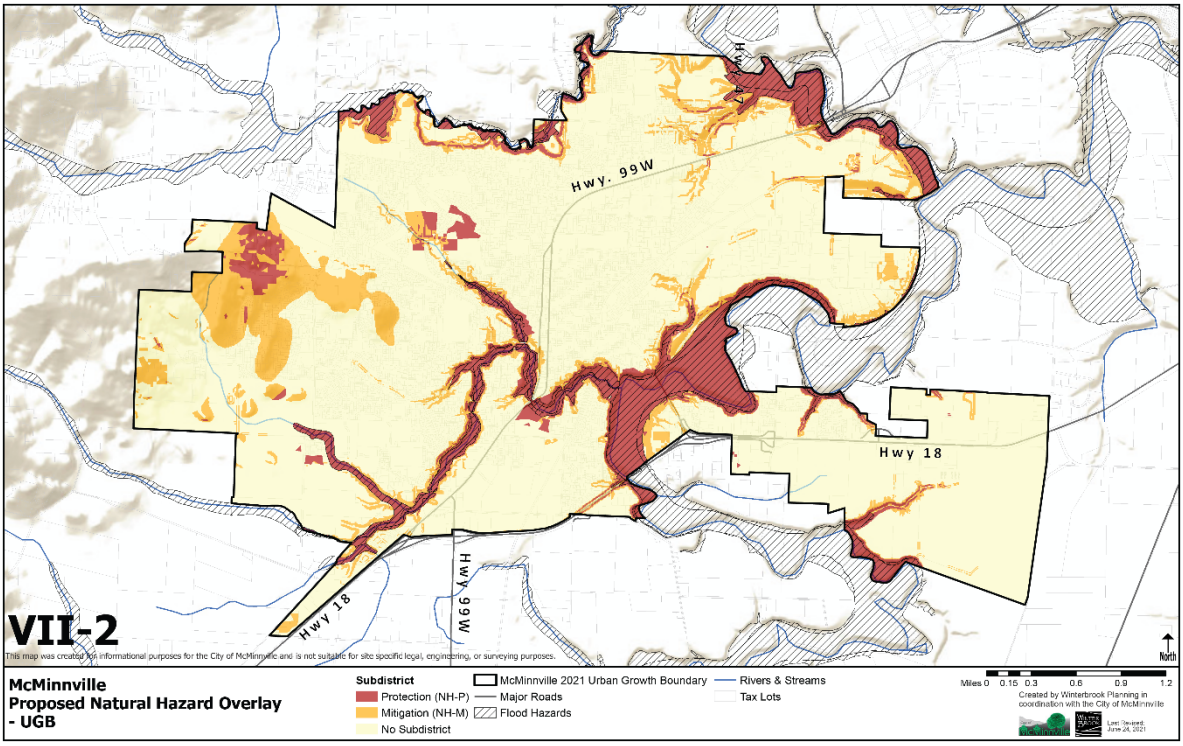


Figure VII-2 Proposed McMinnville Natural Hazards Overlay – 2021 Urban Growth Boundary



Recommended Natural Hazards Policy Framework

Winterbrook recommends that the following policy framework be added to the McMinnville Comprehensive Plan as a new Chapter XI: Natural Features.

Multi-Hazard Policies

Policy 197.00 The City of McMinnville shall adopt and maintain a Natural Hazards Inventory as part of the McMinnville Comprehensive Plan (Volume I). The inventory shall include maps and text that identify the location, type and risk level for three types of natural hazards: geological hazards (including steep slopes, earthquakes and landslides), flood hazards (land within the 100-year floodplain) and wildfire hazards within the study area (the UGB and the unincorporated outside the UGB).

Policy 197.00.010 The City of McMinnville shall apply public works construction standards, seismic building codes and fire and life safety codes wherever natural hazards are identified in the Natural Hazards Inventor – including limited, moderate and high combined risk subareas described in Table VII.1 of the Natural Hazards Inventory.

Policy 197.00.020 The City of McMinnville shall establish a **Natural Hazards (NH)** overlay zone to manage the cumulative effects of inventoried natural hazards in "moderate and high combined risk subareas" as described in Tables VII.1 and VII.2 of the Natural Hazards Inventory.

Policy 197.00.030 As shown on Figure VI-2, the NH overlay zone shall include two subdistricts based on cumulative ranking criteria found in Tables VII.1 and VII.2 of the Natural Hazards Inventory:

1. **The Natural Hazards Mitigation Subdistrict (NH-M)**. The NH-M is intended to mitigate hazard impacts based on objective development standards for each applicable hazard type and the recommendations of required site-specific hazard studies.
2. **The Natural Hazards Protection Subdistrict (NH-P).** The NH-P Subdistrict is intended to prohibit most types of development and may allow for residential density transfer. Where development is allowed it shall be subject to objective development standards for each applicable hazard type and the recommendations of required site-specific hazard studies.

Policy 197.00.040 The NH-M and NH-P Subdistricts shall include objective development standards for each type of natural hazard identified the Natural Hazards Inventory, including landslide, earthquake (liquefaction and shaking), floodplains and wildfire hazards. Floodplains shall be protected by the underlying F-P Flood Hazard zone and the NH-P Subdistrict.

1. Specific information regarding the location and severity for each type of hazard in each subdistrict are available in 11" X 17" format and in the City's GIS data base.
2. In cases where hazard-specific development standards overlap, the more restrictive standard shall apply.

Policy 197.00.060 Based on objective development standards and required hazard studies, the City of McMinnville may impose conditions of land use approval to protect life and property and mitigate natural hazard impacts in natural hazard subareas. Such conditions may include, but are not limited to, conservation easements or dedication of hazard areas to the City.

Policy 197.00.060 Land division applications shall not result in a lot that lacks sufficient buildable area to meet the minimum lot size and development standards applicable in the underlying zoning district.

Policy 197.00.070 New residential, commercial and industrial construction shall be prohibited within the NH-P Subdistrict with the following exceptions:

1. Public facilities and environmental restoration projects may be permitted under objective development standards.

2. Agricultural and forest uses are permitted within the NH-P Subdistrict in areas zoned for exclusive farm and commercial forest use.

3. Residential density transfer from land within the NH-P Subdistrict to contiguous property under the same ownership that is outside both the NH-M and NH-P Subdistricts may be allowed. The maximum density allowed in the transfer area shall be the maximum density allowed in the next higher residential zoning district. For example, density transfer from the NH-P land with an underlying R1 zone to land outside the Natural Hazards Overlay (NH-P and NH-M) shall be capped at the density allowed in the R2 zone.

4. In situations where density transfer is not feasible, one dwelling unit may be allowed on a vacant residential tract under common ownership that is outside the 100-year floodplain *if* consistent with the recommendations of a geotechnical engineering study and any conditions required by the review authority.

Policy 197.00.080 In cases where application of NH-P provisions would prohibit all reasonable economic use of an existing tract of land under common ownership, the City may grant an exception to allow a use permitted in

the underlying zoning district that is not permitted in the NH-P Subdistrict. In making this decision, the applicant and City must:

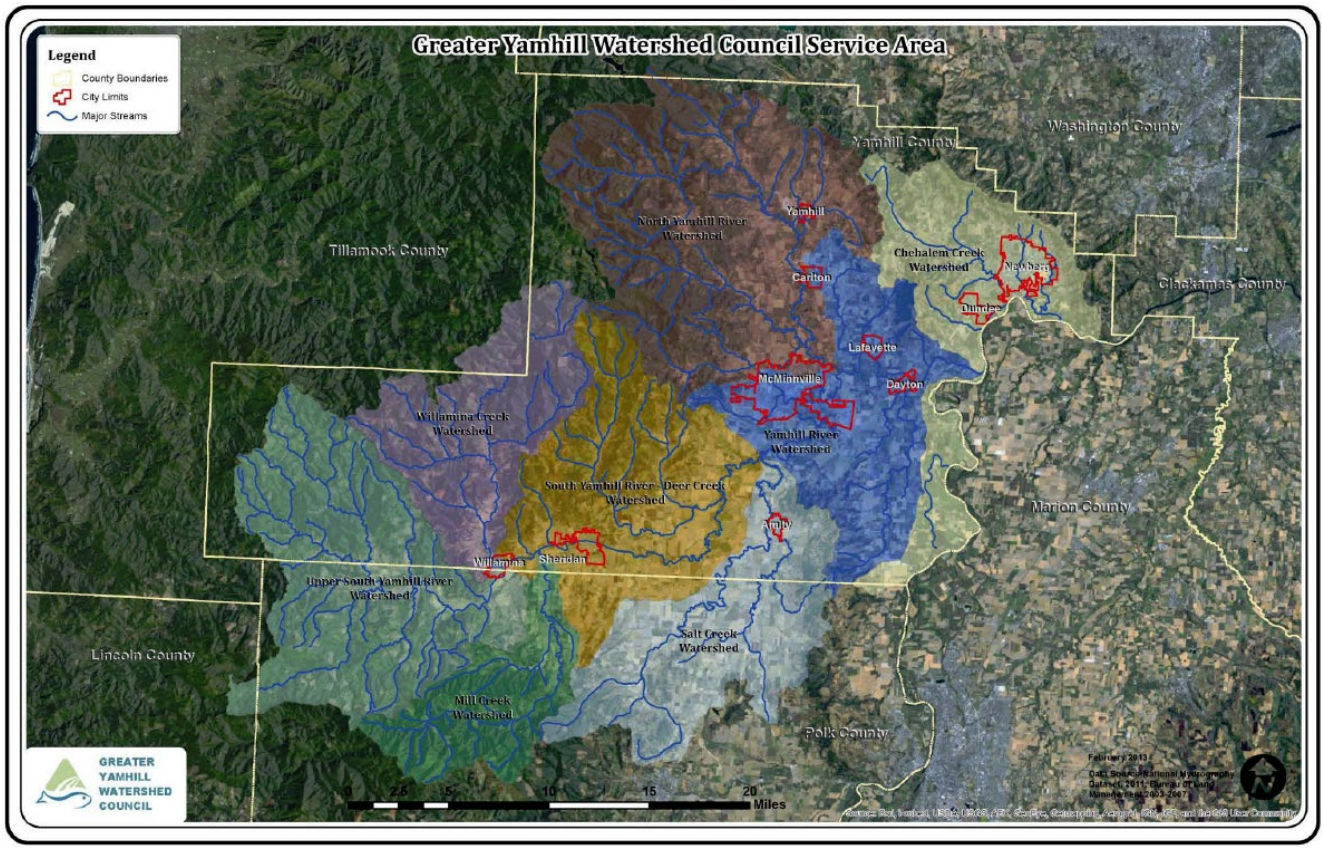
1. Consider first whether the exception provisions of Policy 197.00.070 would relieve the hardship;
2. Consider potential uses that are allowed in the NH-P Subdistrict that could provide reasonable economic value;
3. Consider alternative development layouts and land use intensity that minimize impacts from natural hazards on people and property and other values associated with natural hazard areas;
4. Limit the intensity of the allowed land use to the minimum necessary to retain reasonable economic value of the subject tract; and
5. Meet all applicable development standards that apply to natural hazards in the NH-P zone.

Policy 197.00.090 The City of McMinnville shall coordinate with Yamhill County to apply McMinnville Comprehensive Plan Chapter XI Natural Features Policies to unincorporated land within the Natural Hazards Study Area, including the application of the NH overlay zone (the NH-M and NH-S subdistricts) and related development standards. In cases of conflict with state law governing farm and forest land, state law will prevail over the NH overlay zone standards. For example, agricultural and forest uses allowed in Agricultural and Forest zones shall continue to be allowed; and the more restrictive fire mitigation standards in the County's forest zones will prevail over the less restrictive City fire mitigation standards.

Policy 197.00.100 The City of McMinnville shall coordinate with the Oregon Department of Geology and Mineral Industries (DOGAMI), the Department of Land Conservation and Development (DLCD), the McMinnville Fire Department, and Yamhill County in updates of the Yamhill County Multi-Jurisdictional Natural Hazards Mitigation Plan, the McMinnville Addendum to County NHMP, and the Yamhill County Community Wildfire Protection Plan. Updates to these plans will be considered in future updates to Chapter XI of the McMinnville Comprehensive Plan.

Policy 197.00.110 The City of McMinnville shall coordinate with the Greater Yamhill Watershed Council to facilitate watershed restoration and improvement projects in natural hazard areas such as floodplains and slide hazard areas. Shared natural hazard mitigation goals include: (1) removal of invasive vegetation species (that that increase fuel for wildfires and clog waterways) and replacement with native species that reduce erosion, are more fire resistant and are less likely to clog waterways; and (2) restoration and enhancement of wetlands that provide flood control.

Figure VII-3 Greater Yamhill Watershed Council Service Area



Policy 197.00.120 New development applications shall include a Tree Removal and Mitigation Plan within the NH-M and NH-P Subdistricts. To minimize erosion and landslide potential and to maintain water quality, removal of more than three trees over 6 inches dbh[10] in a calendar year shall require a Tree Removal and Mitigation Plan prepared by a certified arborist. The plan shall ensure replacement of lost trees with fire resistant native trees and vegetation. The following exceptions to this policy shall apply where:

1 Tree removal is permitted in the underlying Yamhill County farm or forest zone.
2 The proposal is part of a watershed restoration or enhancement project sponsored by a relevant Watershed Council that meets applicable City development standards.
3 The proposal is part of a fire protection program approved by the City of McMinnville Fire Department or RFPD. (See Wildfire Hazard Policies below.)
4 The proposal is necessary to meet fuel reduction standards in wildfire hazard areas pursuant to Wildfire Policies 200.050.00 and 200.060.00.

[10] Diameter at breast height – or 4'6" above ground.

Geological Hazard Policies

Policy 198.00 Geological hazards appear on the McMinnville Natural Hazards Inventory and include: (1) Slopes of 25% or more; (2) Moderate, high and severe risk earthquake (liquefaction and shaking) risk areas; and (3) Moderate and high-risk landslide hazard areas.

Policy 198.10 The NH-P and NH-M Subdistricts shall apply to subareas with geological hazards as shown on Map VII-2 of the Natural Hazards Inventory. Specific geological hazards found in each subdistrict are available in 11" X 17" format and in the City's GIS data base.

Policy 198.20 Residential and commercial construction in areas with moderate or high geological risk hazards – as indicated on the Natural Hazards Inventory – shall meet the seismic and slope stability provisions of the Oregon State Building Codes. The Building Official may require a geotechnical engineering study prior to approval of construction.

Policy 198.30 The City of McMinnville shall require erosion control measures prior to grading or construction in subareas with:

1. Slopes of 15% or greater, and
2. Landslide hazards in the NH-M and NH-P Subdistricts.

Policy 198.040.00 The City of McMinnville shall require geological reconnaissance studies with the submission of land development applications where geological hazards are present within the NH-M and NH-P Subdistricts. The recommendations of the geological reconnaissance study shall become conditions of land use approval unless specifically exempted or modified by the review authority.

Policy 198.50 Where recommended in a required geological reconnaissance study – or where determined necessary by the City Engineer or Building Official in moderate risk landslide hazard areas that are not included in the NH-M Subdistrict – a geotechnical engineering study may be required prior to grading, land development or construction.

Policy 198.60 The City of McMinnville shall retain the services of a qualified geologist or geological engineer to review geological studies prepared for land use applicants.

1. The City Engineer shall determine whether a second professional opinion is required.
2. The costs of peer review shall be borne by the applicant.

Policy 198.70 The City shall consider adopting standards for public street and utility construction to moderate or higher geological hazard areas.

Policy 198.80 Because trees contribute to slope stability and reduce erosion, tree removal shall be limited in the NH-M and NH-P Subdistricts pursuant to Policy 197.120.00.

Flood Hazard Policies

Policy 199.00 Flood hazards areas are located within the designated 100-year floodplain. The City of McMinnville will continue to prohibit most types of development within the 100-year floodplain consistent with the City's F-P Flood Hazard Zone.

Policy 199.10 Natural geological and wildfire hazards associated with the 100-year floodplain, including but not limited to overlapping landslide areas, will be addressed in NH-P Subdistrict development standards. Overlapping wildfire and geological hazards found in NH-P Subdistrict that overlay the F-P Flood Hazard Zone are available in 11" X 17" format and in the City's GIS data base.

Policy 199.20 The City of McMinnville is committed to continued participation in the National Flood Insurance Program (NFIP) through enforcement of local floodplain management regulations.

Policy 199.30 The City of McMinnville will work with the Federal Emergency Management Agency (FEMA) to update Flood Insurance Rate Maps (FIRM). The City will request Oregon Department of Geology and Mineral Industries (DOGAMI) debris flow and lidar data be included in FIRM updates.

Policy 199.40 The City of McMinnville will develop and maintain GIS maps of critical facilities identified in the McMinnville NHMP for all structures and residential development and commercial buildings within the 100-year and 500-year floodplains.

Policy 199.50 Because wetlands serve an important flood control function, wetland fill and removal shall not be permitted within the 100-year floodplain unless there is no reasonable alternative for a planned public works project.

Policy 199.60 The City of McMinnville will coordinate with the Greater Yamhill Watershed Council (or its affiliates) regarding stream and river restoration and enhancements projects to restore native vegetation, improve bank stability and improve water quality.

Policy 199.70 Because trees and vegetation reduce streambank failure and improve water quality, tree removal shall be limited in the NH-M and NH-P Subdistricts pursuant to Policy 197.120.00.

Wildfire Hazard Policies

Policy 200.00 Moderate, high, and severe wildfire hazard areas appear on the Natural Hazards Inventory and are generally associated with the West Hills and vegetated floodplains.

1. Where wildfire hazards subareas overlap with geological or floodplain hazards, they may be subject to NH-P or NH-M Subdistrict requirements, consistent with the ranking criteria found in the Natural Hazards Inventory and as shown on Natural Hazards Inventory Map VII-1.
2. Existing fire standards in Yamhill County forest zones shall continue to apply.

Policy 200.10 City staff shall coordinate with the McMinnville Fire Department and RFPD to encourage fire safety planning and education – especially in Wildfire Urban Interface zones and designated Fire Reduction Areas in the West Hills. The City of McMinnville shall continue to coordinate wildfire mitigation action items through the Yamhill County Community Wildfire Protection Plan.

Policy 200.20 Residential, commercial and industrial development shall not be permitted in wildfire risk subareas in the NH-P Subdistrict; However, exceptions may be permitted pursuant to Natural Hazard Policies 197.070.00 and 197.080.00.

Policy 200.30 Development density in wildfire risk areas in the NH-M Subdistrict may be limited where necessary to provide adequate space for fuel breaks in areas that are threatened by two or more natural hazards.

Policy 200.40 In the NH-P and NH-M Subdistricts with identified wildfire hazards, applicants for land divisions and new development (excluding home remodels or additions) shall prepare a Fire Prevention and Control Plan in coordination with the McMinnville Fire Department or RFPD. The plan shall be prepared by a certified arborist and shall consider necessary tree and vegetation removal, erosion control and replacement of lost trees and vegetation with native, fire-resistant trees and vegetation.

Policy 200.50 Based on the Fire Prevention and Control Plan, the following wildfire mitigation standards shall be met:

1. Installation and maintenance of at least a 40-foot fuel break around each new dwelling or structure.
2. Where vegetation needs to be maintained for slope stability in a fuel break area, require plantings of fire-resistant or slow-burning plants. The City shall make a list of such plants available to the public.
3. Provision of one or more than one ingress/egress route or road widths wide enough to accommodate incoming fire apparatus and evacuating residents simultaneously in an emergency situation.
4. Roofs and siding with fire-resistant materials. Wood shake or shingle roofs are not allowed.
5. Design road placement to function as fire breaks in urban wildland interface developments.
6. Chimneys of wood-burning devices to be equipped with spark arrester caps and/or screens.
7. Underground electrical distribution circuits if technically feasible.
8. Sprinkler systems in all dwelling units and occupied buildings.

NATURAL HAZARDS

PROPOSED AMENDMENTS TO THE MCMINNVILLE MUNICIPAL CITY CODE – TITLE 17, ZONING ORDINANCE

New proposed language is represented by **bold underline font**, deleted language is represented by ~~strikethrough font.~~

ZONING*

Chapters:

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* Prior ordinance history: Ord. 3380 as amended by Ords. 3392, 3441, 3497, 3557, 3565, 3603, 3614, 3633, 3677, 3694, 3707, 3742, 3764, 3803, 3817, 3888, 3898, 3925, 3933, 3966, 3967, 3968, 3983, 3995, 4001, 4011, 4017, 4025, 4043, 4046, and 4066.

Chapter 17.48

F-P FLOOD AREA ZONE

Sections:

17.48.005 Purpose. The purpose of a floodplain is to establish and regulate land uses in those areas designated as hazardous due to periodic flooding in order to protect the community from financial burdens through flood damage losses. Further, this zone is intended to protect natural floodways and drainage ways from encroachment by uses and/or indiscriminate land filling or diking which may adversely affect the overall stream and downstream flood levels, **wetland water quality or flood control values, tree canopy, native vegetation and water quality.** Finally, the floodplain zone shall set aside an area which shall, for the most part, be preserved in its natural state or farmed to provide open spaces, natural habitats, and recreational places. (Ord. 4128 (part), 1981; Ord. 3380 (part), 1968).

17.48.010 Established—Area Included. In accordance with Section 17.09.010, all property within the corporate limits of the City lying within Special Flood Hazard Areas (100-year flood) identified by the Federal Insurance Administration in the report entitled "The Flood Insurance Study for Yamhill County, Oregon and Incorporated Areas," (effective date March 2, 2010), and accompanying Flood Insurance Rate Maps (FIRM) is

declared to be flood area zone property and subject to the requirements of this Chapter. (Ord. 4921 §4A, 2010; Ord. 4128 (part), 1981; Ord. 3380 (part), 1968).

17.48.020 Boundaries Indicated on Map. The boundaries for the zone established by Section 17.48.010 shall be indicated on the McMinnville Zoning Map. (Ord. 4128 (part), 1981; Ord. 3380 (part), 1968).

17.48.025 Definitions. For the purpose of this section refer to Section 17.06.030 for Flood Area related definitions. (Ord. 4952 §1, 2012).

17.48.030 Permitted Uses. In an F-P zone, the following uses and their accessory uses are permitted (subject to the provisions of Section 17.48.060 **and Chapter 17.49 Natural Hazard Subdistricts**):

A. Farming;
B. Public park and recreation facility, not requiring the use of any structure;
C. Sewage pump station. (Ord. 4684 §1, 1998; Ord. 4128 (part), 1981; Ord. 3380 (part), 1968).

17.48.040 Conditional Uses. In an F-P zone, the following uses and their accessory uses may be permitted, subject to the provisions of Section 17.47, Section 17.48.045, Section 17.4and Chapters **17.49**, 17.72 and 17.74:

A. Boat landing and launching facility;
B. Open land recreation facility requiring the use of any structure;
C. Removal of sand, gravel, topsoil, or rock;
D. Landfill or diked land, including culvert and bridge installations, subject to the following procedures:
    1. Preliminary submittal of the proposal shall be made to the Planning Department, which shall check the proposal to ensure its compliance to the ordinance. Said proposal shall then be submitted to the Planning Commission.
    2. The City shall provide written notice to the City Recorder's office in adjacent communities, Yamhill County, and the Oregon Department of Land Conservation and Development prior to any alteration or relocation of a watercourse (i.e., stream channel), and shall submit a copy of that notification to the Federal Insurance Administration.
    3. The Planning Department shall prescribe the form and information required for applications made for any conditional use listed in this subsection. No application shall be accepted unless it complies with such requirements and is verified as to the correctness thereto. There shall be included, as a part of the application, an accurate map. Such plans shall be in triplicate, drawn at a scale of not larger than one inch equals fifty feet nor smaller than one inch equals five hundred feet, and shall show:
        a. 100-year flood projection elevation on the subject site. State source of information.
        b. Property boundaries and dimensions.

c. Ground elevations shown by contour lines of not less than two-foot vertical intervals. State source of information.
d. Existing and proposed structures.
e. Dimensions and elevations of existing and/or proposed fill.
f. Location of stream channel in relationship to items “a” through “e” above.
g. A typical valley cross-section showing the channel of the stream, elevation of land areas adjoining each side of the channel, cross-sectional areas to be occupied by the proposed fill and high-water information.
h. Profile showing the slope of the bottom of the channel or flow line of the stream, and the slope line of the proposed fill.
i. Specifications of fill material, grading, channel improvement or maintenance plans, dimensions, and restoration of completed project.
j. **The location of applicable natural hazard on or adjacent to the subject site.**

E. Weapons Training Facility subject to the following conditions:
1. The property on which the facility is located must be owned or leased by a Federal, State, or local government agency for the exclusive use of public safety personnel engaged in firearms or other related training;
2. The facility must be located no closer than 2,640 feet (one-half mile) to any land planned and zoned for residential use; and
3. Only those firearms or weapons authorized by a government agency and utilized for law enforcement related purposes shall be allowed within the area approved for a weapon training facility. Possession of other firearms or weapons at a weapon training facility site shall be considered a violation of this ordinance.

F. Wireless communications facilities, not to include antenna support structures and their associated facilities, subject to the provisions of Chapter 17.55 (Wireless Communications Facilities). (Ord. 4921 §4C, 2010; Ord. 4732, 2000; Ord. 4684 §2, 1998; Ord. 4559 §1, 1994; Ord. 4128 (part), 1981; Ord. 3380 (part), 1968).

17.48.045 Conditional Use Factors. The Planning Commission shall consider the following factors and special conditions when making a decision regarding a conditional use in the floodplain zone:

A. Factors to be Considered:
1. The danger to life and property due to increased flood heights or velocities caused by any proposed fill.
2. The danger that materials may be swept onto other lands or downstream to the injury of others.
3. The importance to the community of the service provided by the proposed facility.
4. The availability of alternative locations not subject to flooding.
5. The compatibility of the proposed use with existing development and development anticipated in the foreseeable future.

6. The relationship of the proposed use to the comprehensive plan and floodplain management program for the area.
7. The compatibility of the proposed use with the potential of the site and the surrounding floodplain area for open space, natural habitats, and recreational places.
8. The impact of the proposed use on fish, wildlife habitat, **and water quality.**
9. **The danger to life and property from landslides, wildfire or earthquakes due to excavation, vegetation removal and construction of the proposed use.**
10. Such other factors which are relevant to the purposes of this section.

B. Special Conditions. Upon consideration of the factors listed above and the purposes of this section, the Planning Commission may attach such conditions to the granting of a conditional use permit as it deems necessary to further the purposes of this portion of the zoning ordinance. The following such conditions, but not exclusively limited thereto, may be included:
1. Limitations on periods of use and operation, and upon the area to be filled and the elevation of the fill as well as to the kinds of material which may be so emplaced.
2. Imposition of operational controls, sureties, and deed restrictions.
3. Requirements for construction of channel modifications, dikes, levees, and other protective measures.
4. Limitations on the removal or destruction of critical fish and wildlife habitat including any area of riparian vegetation. (Ord. 4128 (part), 1981; Ord. 3380 (part), 1968).
5. **Limitations imposed by applicable natural hazard overlay zones per Chapter 17.49.**

[17.48.050 Signs. Moved to Chapter 17.62 (Signs), by Ord. 4900 November 5, 2008.]

17.48.060 Use Limitations. In an F-P zone, the following limitations shall apply:
A. No residence shall be constructed;
B. A lot shall not be less than one acre in area;
C. Within the floodway and flood fringe, no encroachment will be allowed which causes any increase in the flood height or which would result in hazardous velocities (see floodway schematic). To demonstrate compliance with this requirement, the applicant shall submit an engineering certification stating the proposed development will not impact the pre-project base floodway and flood fringe elevations. The certification shall be signed and sealed by a professional engineer and be supported by the appropriate technical data and studies, which are typically based upon the standard step-backwater computer model utilized to develop the 100-year floodway and flood fringe shown on the appropriate Federal Insurance Rate Map (FIRM) and tabulated in the adopted Flood Insurance Study. (Ord. 4921 §4D, 2010; Ord. 4684 §3, 1998; Ord. 4128 (part), 1981; Ord. 3380 (part), 1968).

17.48.070 Use of Other Base Flood Data. When base flood elevation data has not been provided (FIRM zones A), the applicant shall provide alternative base flood elevation as available from a Federal, State, or other source in order to comply with this chapter. (Ord. 4921 §4E, 2010)

17.48.080 Endangered Species Act Requirements. Certain fish, wildlife and plant species within the city may be protected by the federal Endangered Species Act (ESA) and therefore:

A. Before granting any development or building permit within the F-P zone, the applicant shall submit a Flood Habitat Assessment Report from a qualified expert indicating that the applicable requirements of the Endangered Species Act are satisfied;

B. All mitigation recommendations contained within the qualified report shall be included as permit conditions of approval; and

C. No authorization granted through this section shall be constructed to guarantee compliance with Endangered Species Act.

This whole chapter is new to the McMinnville Municipal Code

Chapter 17.49

NATURAL HAZARD OVERLAY SUBDISTRICTS

Sections:

17.49.00 Natural Hazard Subdistricts Generally. Natural Hazard Subdistricts (NH Subdistricts) implement the Natural Hazard Policies of the McMinnville Comprehensive Plan and are intended to protect life and property from inventoried natural hazard areas pursuant to Statewide Planning Goal 7 – Natural Hazards.

- **A. NH Subdistricts are based on adopted natural hazard inventories – which include maps showing significant resource sites and supporting reports documenting the criteria and methods used to determine local resource site significance.**
- **B. NH Subdistricts implement McMinnville Comprehensive Plan Chapter XI Natural Features policies related to Natural Hazards.**
- **C. NH Subdistrict boundaries appear on the official City Zoning Map.**
- **D. NH Subdistrict standards apply in addition to standards of the underlying base zone. In cases of conflict, the more restrictive NH Subdistrict standards control.**

17.49.10 Definitions. The following definitions apply within the NH-P and NH-M Subdistricts.

- **A. Landmark and Significant Trees. Please see definitions in Chapter 17.58 Trees.**
- **B. Native Plants. "Native plant species" are those listed on the Portland Plant List, which is incorporated by reference into this chapter.**
- **C. Fire Resistant Plants. Fire-resistant plants burn at a relatively low intensity, slow rates of spread and with short flame lengths.[1] In addition to listed species, fire-resistant tree and plant species may be determined based on the professional opinions of licensed landscape architects, certified arborists or foresters. Fire-resistant vegetation has the following characteristics:**
  1. **Growth with little or no accumulation of dead vegetation (either on the ground or standing upright).**
  2. **Non-resinous plants.**
  3. **Low volume of total vegetation (for example, a grass area as opposed to a forest or shrub-covered land).**
  4. **Plants with high live fuel moisture (plants that contain a large amount of water in comparison to their dry weight).**
  5. **Drought-tolerant plants (deeply rooted plants with thick, heavy leaves).**
  6. **Stands without ladder fuels (plants without small, fine branches and limbs between the ground and the canopy of overtopping shrubs and trees).**
  7. **Plants requiring little maintenance (slow-growing plants that, when maintained, require little care).**

[1] A handbook entitled *Fire-resistant Landscape Plants for the Willamette Valley* (OSU Extension Service, 2015) provides a list of fire-resistant shrubs and plants applicable to the McMinnville area.

8. **Plants with woody stems and branches that require prolonged heating to ignite.**

Note: This list may be modified based on the professional opinions of licensed landscape architects, certified arborists, or foresters.

D. **Fuel Reduction Area. An area where vegetation or material capable of allowing a fire to spread unchecked has been treated, cleared or modified to slow the rate and intensity of an advancing wildfire and to create an area for fire suppression operations. Establishment of a fuel reduction area does not include stripping the ground of all native vegetation.**

E. **Highly Flammable Trees and Plants. Plant species that have characteristics which make them more volatile by encouraging easy ignition and the spread of fire through their foliage due to low moisture content, dense dry leaves, needles, grass-like leaves, or volatile resins and oils. Highly flammable trees and plants generally include coniferous and resinous trees and shrubs.[2] In addition to listed species, highly flammable tree and plant species may be determined based on the professional opinions of licensed landscape architects, certified arborists, or foresters.**

F. **The McMinnville Natural Hazards Map. A map that identifies earthquake, steep slope, landslide, wildfire, and flood hazard areas within the McMinnville Urban Growth Boundary. This generalized, composite map is based on the McMinnville Natural Hazards Inventory – adopted 2023.**

G. **Certified Engineering Geologist.** A registered geologist who is certified in the specialty of engineering geology under provisions of ORS 672.505 to 672.705.

H. **Geotechnical Engineer.** A professional engineer, registered in the State as provided by ORS 672.002 to 672.325, who by training, education and experience is qualified in the practice of geotechnical and soils engineering practices.

17.49.20 Purpose and Intent of the Natural Hazard Subdistricts.

The purpose and intent of this chapter are to comply with the McMinnville Comprehensive Plan, minimize the cumulative risks associated with inventoried natural hazards, while allowing reasonable economic use of land within the McMinnville city limits.

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[2] Highly flammable trees and plants include at least the following:

A. Trees (including but not limited to):Acacia (*Acacia* sp.); Arborvitae (*Thuja* sp.); Cedar (*Cedrus* sp.); Cedar/Cypress (*Chamaecyparis* sp.); Cypress (Cupressus sp.); Douglas fir (*Pseudotsuga menziesi*); Fir (Abies sp.); Hemlock (Tsuga sp.); Juniper (*Juniperus* sp.); Pine (*Pinus* sp.); Sequoia (*Sequoia* sp.); Spruce (*Picea* sp.); and Yew (*Taxus* sp.).

B. Shrubs (including but not limited to): Blackberry (*Rubus armeniacus*); Juniper (*Juniperus* sp.)' Laurel sumac (*Malosma laurina*); Oregon grape (*Mahonia aquifolium*); Rosemary (*Rosmarinus* sp.); Scotch broom (*Cytisus scoparius*); and Wild Lilac (*Ceanothus* sp.).

C. Grasses and Ground Cover (including but not limited to): Dry annual grasses; Large bark mulch; and Pampas grass (*Cortaderia selloana*).

A. Comprehensive Plan. This chapter is designed to implement the Natural Hazard Policies found in Chapter XI Natural Features of the McMinnville Comprehensive Plan.
B. Reasonable Economic Use. This chapter is intended to allow reasonable economic use of property while establishing standards to avoid or mitigate cumulative risks related to earthquake liquefaction and shaking hazards, steep slope and landslide hazards, wildfire hazards and flood hazards.
C. Disclaimer. The degree of Natural Hazard protection required by this chapter is considered reasonable for regulatory purposes and is based on scientific and engineering considerations. Larger hazard events can and will occur on rare occasions. Landslide risks may be increased by man-made or natural causes.
    1. Areas impacted by other natural hazards may differ from those shown on the McMinnville Natural Hazards Map.
    2. This Chapter does not imply that land outside the natural hazard areas or that uses permitted within such areas will be free from earthquake, steep slope, landslide, wildfire or flooding hazards. Nor does it imply that land outside of mapped hazard areas will be free from damage in a hazard event.
    3. This Chapter shall not create liability on the part of the City of McMinnville, any officer or employee thereof, or the Federal Insurance Administration, for any hazard damages that result from reliance on this chapter, or any administrative decision lawfully made based on the provisions of this chapter.
    4. Compliance with the minimum standards established by this chapter is not intended to relieve any private party from liability for the design or construction of development which causes damage or injury by aggravating an existing and known hazard.

17.49.30 Applicability and General Provisions. The Natural Hazards Subdistricts apply to mapped Natural Hazards existing throughout the city limits. However, the cumulative severity of natural hazards varies by location. The provisions of this chapter apply to public and private development proposed within three areas – based on the cumulative hazards ranking found in the McMinnville Natural Hazards Inventory:

A. The Area. The following standards apply to public facilities, planned developments, land divisions, and new construction within the city limits:
    1. Oregon Structural Specialty Code Seismic Standards. All land within the McMinnville UGB is subject to moderate to severe earthquake shaking and liquefaction hazards. Oregon Structural Specialty Code and Residential Specialty Code seismic requirements shall apply to new construction in all city zones.
    2. City Erosion Control Standards. City of McMinnville Storm Drainage Design and Construction Standards, including Erosion Control Standards, shall apply to development in all city zones. For

development on sites where the prevailing slope is 10 percent or more, the erosion control plan shall be prepared by an engineer registered in the State of Oregon. The City Engineer may require special erosion control standards for development:

a. On slopes of 15% or greater; or
b. Within the Flood Area Zone; or
c. Within the NH-M and NH-P Subdistricts.

B. The Natural Hazard - Mitigation (NH-M) Subdistrict. The NH-M Subdistrict includes land with cumulative earthquake, landslide and/or wildlife hazard risk that can be mitigated on-site based on the recommendations of required studies. The NH-M Subdistrict therefore requires geological site assessments, geotechnical studies and/or wildfire impact studies that include recommendations to mitigate earthquake, landslide and/or wildfire risks on development sites.

C. The Natural Hazard – Protection (NH-P) Subdistrict. The NH-P Subdistrict generally applies to the 100-year floodplain and areas with high cumulative earthquake, landslide, wildfire and/or flooding risks (1) that are more difficult to or cannot be effectively mitigated on-site, and/or (2) where the location and density of development may be limited. Where development is permitted, it shall occur consistent with the recommendations of geological, geotechnical and/or wildfire impact studies. The Flood Area (F-P) Zone includes additional standards to avoid and/or mitigate flood hazards.

D. Determination of Site-Specific Natural Hazards and Mitigation Standards. The presence and severity of natural hazard types (earthquake liquefaction, earthquake shaking, slide hazards and wildfire hazards) on specific properties is determined by referencing the McMinnville Natural Hazard Inventory GIS database.

1. Specific mitigation standards in this chapter depend on the presence (or absence) of specific natural hazards on a development site.
2. For example, if a dwelling is proposed within a moderate-to-severe wildfire hazard area, the fuel reduction area standards required to mitigate wildfire hazards will apply.

E. Overlap with Natural Resource Subdistricts. Natural Hazard Subdistricts may overlap with Natural Resource Subdistricts, especially near riparian corridors and tree groves. Generally, the review authority shall seek to harmonize subdistrict standards that appear to conflict. However, where standards cannot be read together to achieve a consistent outcome:

1. The more restrictive standards apply, except that,
2. NH-P and NH-M Subdistrict fuel reduction area standards shall prevail in cases of unavoidable conflict with the significant tree and vegetation standards of this chapter.

F. Significant and Landmark Trees. Significant and landmark trees stabilize landslide prone areas and reduce erosion.

1. **Significant and landmark trees as defined in Chapter 17.58 Trees shall not be removed from land within Natural Hazard Subdistricts, except as provided in this chapter and Chapter 17.48 Trees.**
2. **Removal of significant and landmark trees within NH-M and NH-P Subdistricts may be permitted when authorized as part of a land use application subject to the provisions of this chapter.**

17.49.40 Permitted and Conditional Uses. The underlying zoning district determines permitted and conditional uses, subject to additional development limitations and standards required in the NH-M or NH-P Subdistricts.

- **A. Conforming Uses. Existing development within the NH-M or NH-P Subdistrict shall be considered conforming with respect to the development standards of the Subdistrict and may be expanded without meeting the substantive or procedural requirements of Chapter 17.63 Nonconforming Uses.**
- **B. Exempt Uses. When performed under the direction of the City, and in compliance with the provisions of the City of McMinnville Construction Standards on file in the Engineering Division, the following shall be exempt from the provisions of this chapter:**
  1. **Farming activities permitted in the underlying zone.**
  2. **Public emergencies, including emergency repairs to public facilities.**
  3. **Stream restoration and enhancement programs outside of wildfire hazard areas.**
  4. **Invasive vegetation (not including significant or landmark trees) removal.**
  5. **Additions of up to 50% of the habitable floor area of building(s) constructed before the effective date of this ordinance, or date of annexation within the city limits whichever is later, subject to applicable building safety code standards, including applicable seismic and wildfire safety standards.**
  6. **Routine maintenance or replacement of existing public facilities projects.**

17.49.50 Review Procedures. The natural hazard mitigation and protection standards in this chapter usually are applied in conjunction with a development application. Where a use is proposed within, or partially within, the NH-P or NH-M Subdistrict, the following procedures shall apply pursuant to Chapter 17.72 (Applications and Review Process).

- **A. Permitted Uses. Where a use is permitted outright in the applicable base zone (for example, residential, commercial, industrial or public uses), compliance with the standards of this chapter is determined by the Community Development or Planning Director, based on required natural hazard studies, as part of the site plan review process (if applicable), and prior to issuance of a building or construction permits.**
- **B. Land Divisions. When land divisions are proposed pursuant to Chapter 17.53 Land Division Standards, compliance with the standards of this**

chapter is determined by the Planning Director, based on required natural hazard studies.

C. Planned Developments. When planned developments are proposed pursuant to Chapter 17.51 (Planned Development Overlay), compliance with the standards of this chapter is determined by the Planning Commission, based on required natural hazard studies.

D. Density Transfer. The Planning Commission shall review density transfer from land within the NH-P Subdistrict to buildable land, pursuant to Section 17.49.170 Density Transfer.

E. Conditional Uses and Variances.

1. Where a conditional use is proposed, compliance with the standards of this chapter is determined by the Planning Commission, based on required natural hazard studies, prior to issuance of building or construction permits.
2. Where a variance is requested, compliance with the variance criteria in this chapter is determined by the Planning Commission, based in part on required natural hazard studies, prior to issuance of building or construction permits.
3. Public Facilities. Construction of public facilities within natural hazard areas must follow the recommendations of required natural hazard studies.

17.49.60 Natural Hazard Subdistrict Application Requirements.

Development applications for all properties within the NH-M or NH-P Subdistricts shall accurately indicate the site-specific locations of specific types of natural hazard areas based on City GIS maps in relation to the proposed development. City planning staff will assist the applicant by providing GIS maps showing city information sources listed below. Development applications within or partially within natural hazard subdistricts shall include:

A. A site plan showing the proposed development on the site, drawn to a standard scale and including an illustrated scale for use in reductions.

B. Topography showing 2-foot contour intervals and slopes of:

1. 15 to 24.9 percent; and
2. 25 percent and greater.

C. The location of existing and proposed infrastructure necessary to serve the proposed development. Such infrastructure includes streets, driveways, water, sanitary sewer, and storm drainage.

D. The potential hazard impact area showing land uses and tree cover within 200 feet of the subject property.

E. A title block, north arrow, and bar scale.

F. Date(s) of field check(s).

G. A grading plan, if grading is to occur, showing existing and finished contours on the site, at two-foot contour intervals.

H. Information sources, such as soil survey maps and applicable McMinnville Natural Hazard and Natural Resource inventory maps.

I. Relevant City maps applicable to the site and impact area including the Zoning Map, natural hazard, and natural resource subdistrict maps.
J. Aerial photos, including their date and scale.
K. Depending on the type of natural hazard or natural resource identified on a proposed development site, the applicant shall be responsible for:
    1. Showing the precise location of each type of inventoried natural hazard or natural resource present on the development site;
    2. Submitting required flooding, seismic, geological and/or wildfire hazard mitigation studies as prescribed in Section 17.49.060; and
    3. Demonstrating compliance with recommended mitigation measures pursuant to required hazard studies.
L. The location and size of significant and landmark trees within 25 feet of any proposed disturbance area. If development is proposed within a wildfire area, the location and size of significant and landmark trees must be shown within 50 feet of the outer limits of above-ground construction.
M. Any other submittal requirements identified for development in areas with specific types of natural hazards, as specified in this chapter.

17.49.70 Required Natural Hazard Mitigation Reports. Depending on the natural hazards present on a particular property, the applicant for land development shall be responsible for preparing one or more of the following studies within the NH-M and NH-P Subdistricts.

A. Geological Site Assessment is an overview of existing geological conditions that includes recommendations for mitigation measures. The Site Assessment shall be completed and stamped by either a Certified Engineering Geologist or by a Licensed Civil Engineer, licensed in the Specialty of Geotechnical Engineering. At a minimum, the Geological Site Assessment shall include the following elements:
    1. Relevant landslide and earthquake hazard information from the McMinnville Natural Hazards Inventory;
    2. A field investigation of the site and vicinity including a description of geologic hazards that may be present on the site;
    3. An analysis of the geological suitability of the site for proposed development;
    4. A description of any unusual or extreme geologic processes at work on the site, such as rapid erosion, landslide hazard, flood hazard, rockfall, subsidence, debris run-out, or other features;
    5. A description of any geologic hazards that may affect the proposed land use, including but not limited to slope stability, debris flow, flooding, topography, erosion hazard, shallow groundwater, springs, expansive soils, subsidence, fault rupture, landslide hazard, rockfall, debris run out, or any other geologic hazard discovered by the investigation;
    6. Identification of any areas of the site that should be avoided for human-occupied structures;

7. An analysis of the feasibility of developing the site for the proposed land use(s);
8. Identification of any mitigation measures needed to address any anticipated geologic problems; and
9. Recommendations regarding the need for follow-up studies, such as engineering geotechnical reports, additional subsurface exploration, or more extensive soil reports.

B. Geotechnical (Soils Engineering) Report is prepared and stamped by a Licensed Civil Engineer, licensed in the Specialty of Geotechnical Engineering by the Oregon State Board of Engineering Examiners. The Geotechnical Report usually makes specific recommendations to avoid or mitigate geological hazards. At a minimum, the Geotechnical Report shall include the following elements:
   1. Data regarding the nature, distribution and strength of existing soils on the site.
   2. Analysis, conclusions, and recommendations for grading procedures.
   3. Design standards for corrective measures, including buttress fill, when necessary.
   4. A professional opinion on the adequacy of the development site for the intended use considering the proposed grading in relation to soils engineering factors, such as slope stability.
   5. The location of proposed development and public facilities; and
   6. Relevant information from the McMinnville Natural Hazards Inventory.

C. Wildfire Hazard Assessment and Mitigation Plan is prepared, in consultation with the McMinnville Fire Department, by a certified arborist or professional forester with experience in wildfire management. This plan must address wildfire mitigation standards in this chapter and may recommend additional fire safety standards. At a minimum, in addition to site plan requirements, the plan shall include:
   1. The location and dimensions of all existing and proposed structures, parking areas and driveways on the property.
   2. The location, dimension, and grade of fire apparatus access roads and driveways serving all structures on the property.
   3. The location and dimensions of all structures on adjoining properties located within 30 feet of a shared property line.
   4. The location of all existing and proposed fire hydrants.
   5. Site contours showing two foot intervals detailing elevation and slope.
   6. A tree and vegetation management plan showing:
      a. The location, species and size of existing significant trees and landmark trees, including those to be removed and those to be retained, and whether they qualify as “fire-resistant” or “highly flammable” as defined in this chapter.
      b. The location, species and size of shrubs, including those to be removed and those to be retained, and whether they qualify as “fire-resistant” or “highly flammable” as defined in this chapter.

c. Areas where trees will be removed to reduce overlapping tree canopies including a description of the tree species and diameter at breast height (DBH).
d. New trees, shrubs and bushes to be planted including the species, location and size at maturity, and whether they qualify as "fire-resistant" or "highly flammable" as defined in this chapter.

7. The location of and information addressing required fuel reduction area standards as described in Section 17.49.130.
8. A schedule and timetable for vegetation removal and thinning to meet fuel reduction area standards.

17.49.80 Decision Options and Conditions. The Approval Authority may approve, approve with conditions, or deny an application based on the provisions of this chapter. The Approval Authority may require conditions necessary to comply with the intent and provisions of this chapter.

A. Conditions. The required reports shall include design standards and recommendations necessary for the geologist or geotechnical engineer to provide reasonable assurance that the standards of this section can be met with appropriate mitigation measures. These measures, along with staff recommendations, shall be incorporated as conditions into the final decision approving the proposed development.
B. Assurances and Penalties. Assurances and penalties for failure to comply with mitigation, engineering, erosion and water quality plans required under this section shall be as stated in Chapter 17.03 General Provisions.

17.49.90 Land Divisions. No land division or property line adjustment shall be approved that would result in an unbuildable lot or parcel (*i.e.*, a lot or parcel where a permitted or conditional use could not be allowed because it would be unable meet the standards of this chapter).

17.49.95 Verification of Natural Hazards boundaries. A property owner may want to verify the Natural Hazards boundaries to determine the true location of a hazard area and its functional values on a site. This may be through a site-specific survey or a simple site visit in those cases where existing information demonstrates that the Natural Hazard significance rating does not apply to a site-specific area. Applications for development on a site located in a Natural Hazard area may request a determination that the subject site is not subject to the standards of Chapter 17.49. Verifications shall be processed as either a Type I or Type II process as outlined below.

A. Type I Verification.
1. Applicants for a determination under this section shall submit a site plan meeting the requirements of Chapter 17.72, as applicable.
2. An applicant may request a Type I Verification determination by the community development director. Such requests may be approved provided that there is evidence substantiating that all the

requirements of this chapter relative to the proposed use are satisfied and demonstrates that the property also satisfies the following criteria, as applicable:

a. No natural features have been disturbed.

b. No natural features have been changed.

c. The property does not contain a natural hazard area as identified by the city's local natural hazards area maps.

d. Evidence of prior land use approvals that conform to the natural hazards overlay districts, or which conformed to the natural hazard area overlay district that was in effect prior to the Natural Hazards code adoption date _____.

B. Type II Verification. Verifications of the Natural Hazards areas which cannot be determined pursuant to the standards of Chapter 17.49.95(A)(1) may be processed under the Type II permit procedure.

1. Applicants for a determination under this section shall submit a site plan as applicable.

2. Such requests may be approved provided that there is evidence that demonstrates in a report prepared by one or more qualified professionals with experience and credentials in natural resource areas, including wildlife biology, ecology, hydrology and forestry, that a resource function(s) and/or land feature(s) does not exist on a site-specific area.

3. Verification to remove a recently developed area from the Natural Hazards shall show that all of the following have been met:

a. All approved development in the Natural Hazards area has been completed

b. All mitigation required for the approved development has been successful.

c. The previously identified Natural Hazards area on the developed site no longer exist or have been subject to a significant detrimentalimpact.

Natural Hazards – Mitigation (NH-M) Subdistrict

17.49.100 Natural Hazards – Mitigation (NH-M) Subdistrict. The NH-M is intended to mitigate natural hazard impacts based on objective development standards for each applicable hazard type (earthquakes, steep slopes, landslides and wildfires) and the recommendations of required site-specific hazard studies.

17.49.110 Earthquake Mitigation Standards. Buildings and on-site construction projects must meet the seismic standards of the applicable Oregon Structural Specialty Code and Residential Specialty Code seismic requirements per Section 17.49.30.A.

17.49.120 Steep Slope and Landside Mitigation Standards. The following plans and development standards apply to steeply sloped land (15% or greater) and to mapped landslide hazard areas on any proposed development site, as determined by the McMinnville Natural Hazards Inventory.

A. Required Plans.

1. **If slopes of 15% or greater exist on the development site, the applicant shall submit an Erosion Control Plan per Section 17.49.30.A.**
2. **If moderate to high landslide hazard areas exist on the development site, the applicant shall submit a Geological Site Assessment per Section 17.49.60.A.**
3. **The City may contract with an independent geologist or geotechnical engineer to review the Geological Site Assessment.**

B. Development Standards. The applicant's site and building plans shall be consistent with the recommendations of the required Geological Site Assessment, including any changes and conditions required by the review authority after considering the recommendations of the independent peer reviewer.

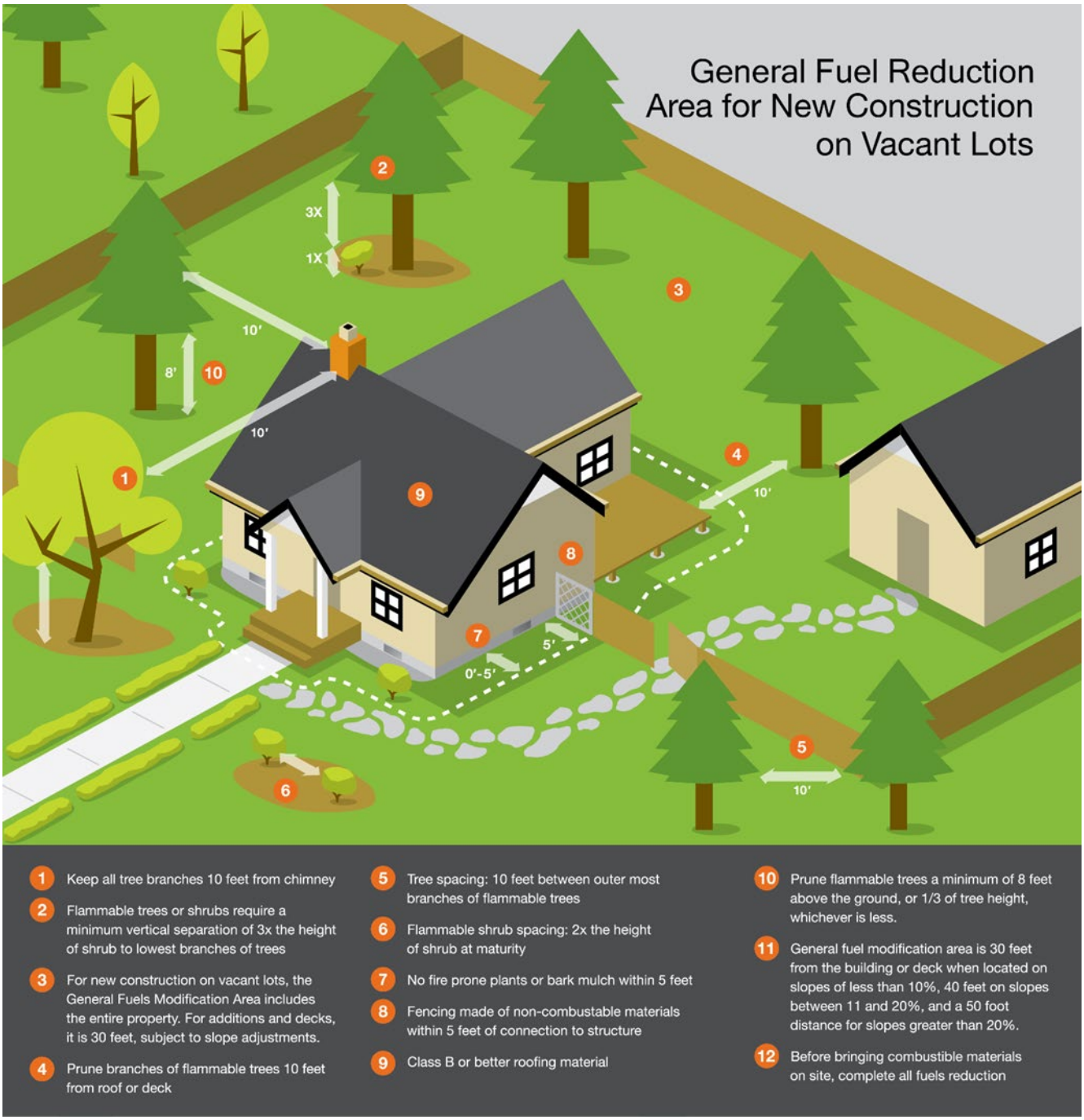
1. **If the Geological Site Assessment recommends a Geotechnical Engineering Study, building and construction plans shall be consistent with the recommendations of this study.**
2. **Generally, development should avoid slopes of 25% and greater, except where consistent with the recommendations of the Geological Site Assessment.**
3. **Removal of landmark trees shall be prohibited – except where the review authority determines that there is no reasonable alternative available to achieve project objectives.**
4. **Removal of significant trees shall be the minimum necessary to meet project objectives or to comply with an approved wildfire mitigation plan.**

17.49.130 Wildfire Assessment and Mitigation Standards. This section supplements base zone development regulations to mitigate potential impacts of wildfire on land with moderate to severe wildlife areas shown on the McMinnville Natural Hazards Inventory Map.

A. Purpose. These standards balance the need to protect riparian corridors, and landmark and significant trees, while reducing fuel loads and facilitating firefighter access to structures in the event of a wildfire.
   1. The following studies and development standards apply to moderate, high and severe wildfire hazard areas on any proposed development site, as determined by the McMinnville Natural Hazards Inventory.
   2. In limited situations, removal or major pruning of significant trees may be required to meet the standards of this section. Removal of landmark trees shall only be considered as a last resort.

B. Required Wildfire Mitigation Plan. If moderate to severe wildfire hazards exist on or adjacent to a development site, or when a development site abuts a significant tree grove, the applicant shall prepare a Wildfire Mitigation Plan as prescribed by Section 17.49.060.C. The plan shall apply for the following land use applications:
   1. When a new habitable building, or an addition to an existing habitable building is proposed.
   2. Applications for Planned Developments and/or Land Divisions.

C. Fuel Reduction Area. To reduce fire spread both from and to structures on the property, and to adjoining properties, the establishment and maintenance of a fuel reduction area shall be required.
   1. The general fuel reduction area shall be measured thirty feet from the exterior walls of habitable structures on development sites with slopes of 10% or less.
   2. In steeply sloped areas, an additional ten feet of fuel reduction area shall be added for each 10% increase in slope. Thus, a 40-foot fuel reduction area would be required for a site with an average slope of 11-20%, and a 50-foot fuel reduction area would be required for a lot with a site with an average slope of 21-30%.



D. Vegetation and combustible materials within the fuel reduction area shall meet the following standards:

1. All standing dead and dying vegetation shall be removed from the property, except when considered ecologically beneficial (*e.g.*, a snag located in a riparian corridor).

2. Newly planted vegetation within 30 feet of any building or deck shall not include highly flammable species. The setback shall be increased by ten feet for each ten percent increase in the average slope of the

property (measured from the proposed building or buildings) over ten percent.

3. Within five feet of a new building, addition, or deck, existing highly flammable vegetation shall be removed. However,
   a. Land divisions and planned developments shall be designed to save landmark trees and minimize impacts on significant trees; and
   b. The placement and design of new buildings on an existing lot shall avoid landmark trees if possible and minimize impacts on significant trees.
4. Within five feet of a new building, addition, or deck, combustible man-made and natural materials are prohibited, including but not limited to bark mulch, stored wood, and accumulation of dry leaves and needles. Exception: Combustible materials may be permitted within five feet of a structure by the Planning Director in consultation with the Fire Marshall, if the portion of the structure adjoining the combustible material is constructed with ignition resistant building materials sufficient to reduce the spread of fire.
5. Tree crowns or limbs shall not extend into the vertical plane of a chimney outlet.
6. Highly flammable significant and landmark trees shall be maintained to provide at least a 10-foot clearance from new structures (and any subsequent additions thereto) measured as follows:
   a. Horizontally from a chimney outlet;
   b. From above the roof of a new building, or addition; and
   c. From the furthest extension of a new building, or addition or deck.
   d. If pruning a tree to meet the above requirements would compromise the health and survival of an existing tree(s), the standards a-c above may be modified by the Community Development or Planning Director in consultation with the Fire Marshall, but at a minimum, the trees shall be pruned to maintain at least eight feet of ground clearance.
7. Canopy spacing of the outermost limbs of highly flammable trees shall be separated by at least 10 feet at mature size within the fuel reduction area.
   a. Groups of trees that form a continuous canopy may be considered as one tree canopy.
   b. Canopy spacing requirements do not apply landmark trees, as defined in Chapter 17.58 Trees, or to fire-resistant trees.
8. Fire-resistant trees (i.e., trees that are not highly flammable) shall be maintained to provide clearance from structures as follows:
   a. 10 feet horizontal clearance from a chimney outlet.
   b. At no time shall tree crowns or limbs extend into the vertical plane of a chimney outlet.
   c. Tree limbs shall be pruned to ensure they do not touch any part of a structure including but not limited to roofs, eaves, and decks.

9. Existing highly flammable trees shall be pruned to provide a ground clearance of a minimum eight feet above the ground, or one-third of the tree height, whichever is less.
10. Existing highly flammable shrubs shall be maintained to provide a clearance from new structures and other flammable vegetation as follows:
    a. Five feet clearance from the furthest extension of a new building, addition, or deck.
    b. Separation from other highly flammable shrubs within the fuel reduction area shall be a minimum of two times the shrub's height at maturity.
11. Newly planted highly flammable shrubs shall be:
    a. A minimum of 30 feet from the furthest extension of any building addition or deck.
    b. Separated from other listed flammable shrubs by a minimum of two times the shrub's height at maturity.
    c. Located outside of the drip line of a highly flammable tree.
12. Where either the tree or vegetation is highly flammable: the vertical clearance between the top of understory vegetation (within the drip line of a tree) and the lowest tree limbs, shall be at least three times the height of vegetation.
13. Existing vegetation may be allowed to be retained consistent with an approved Wildfire Mitigation Plan, or upon written approval of the Planning Director in consultation with the Fire Marshall:
    a. To maintain slope stability;
    b. To preserve or enhance riparian functions and values;
    c. To protect or ensure the health of landmark or significant trees; or
    d. For aesthetic purposes.

E. Fuel reduction in areas steep slope / slide hazard areas, or significant riparian corridors, shall be included in the erosion control measures outlined in Section 17.49.060.

F. The Fuel Reduction Area may be reduced or waived when approved by the Planning Director in consultation with the Fire Marshall, based on a finding that fire risk has been reasonably reduced such as in cases where ignition resistant materials and construction methods, or vegetation type and separation, function to enhance the structure's protection from exterior wildfire exposure.

17.49.140 Reserved for Future Use

Natural Hazard – Protection (NH-P) Subdistrict

17.49.150 Natural Hazards – Protection (NH-P) Protection Subdistrict

The NH-P is intended to avoid, and where avoidance is not feasible, to mitigate natural hazard impacts to life and property from each applicable natural hazard type (earthquakes, steep slopes, landslides and wildfires).

A. Use Limitations and Development Standards. The NH-P Subdistrict includes use limitations and development standards to reduce composite risks to life and property associated with earthquakes, steep slopes, landslides, wildfires and flooding within its boundaries.

B. Mitigation Based on Required Studies. To mitigate for unavoidable impacts, proposed development must follow the recommendations of required site-specific hazard studies.

17.49.160 Use Limitations. The underlying zoning district determines permitted and conditional uses within the NH-P Subdistrict, subject to additional development limitations and standards required by the NH-P Subdistrict. Residential density transfer may be permitted as prescribed in Section 17.49.170. The following use limitations apply to land within the NH-P Subdistrict.

A. Creation of New Lots. Creation of new lots on land within the NH-P Subdistrict shall be prohibited, except when based on site-specific natural hazard impact studies and approved through the Chapter 17.48 Planned Development Overlay.

B. Residential Zones. In residential zones, one dwelling unit shall be permitted for each lot-of-record, provided that:

1. **There is inadequate space to place a residence with a footprint of 2,000 square feet or less on the lot outside of the NH-P Subdistrict.**
2. **The recommendations of required natural hazard impact studies are followed.**
3. **Landmark trees are protected except where there is no reasonable alternative to allow a home with a 2,000 square foot footprint (or less) on a lot-of-record.**
4. **Impacts on significant trees shall be minimized, recognizing that tree removal may be required to meet Section 17.49.130 Wildfire Assessment and Mitigation requirements and fuel reduction requirements.**

C. Large-Format Commercial Development. Large format commercial development as defined in Chapter 17.56 shall not be permitted within the NH-P Subdistrict.

D. Commercial and Industrial Zones. In commercial and industrial zones, existing habitable structures and surface parking areas may be expanded by up to 50% within the NH-P Subdistrict, provided that:

1. **There is inadequate space to expand the structure by 50% outside of the NH-P Subdistrict.**

2. The proposed expansion is located outside mapped high risk landslide and wildfire areas and is designed to minimize the building footprint and loss of significant and landmark trees on land within the NH-P Subdistricts.
3. Outdoor storage areas are prohibited within the NH-P Subdistrict.
4. The recommendations of required natural hazard impact studies are followed.

E. Flood Area Zone (F-P Zone). Public uses are permitted within the F-P Zone, provided that:
1. Impacts on significant and landmark trees are minimized.
2. Scenic views are considered, enhanced and maintained.
3. The recommendations of required natural hazard studies are followed.

17.49.170 Residential Density Transfer. A transfer of development density from undeveloped buildable land within the Natural Hazard Protection zone to other property within the city limits is encouraged. Density transfer may occur through the planned development process, as indicated below. The transferring property does not need to be owned by the property owner of the receiving property, but both property owners need to sign the density transfer application to memorialize the transfer.

A. Development Density to Transfer from National Hazard Protection Zone (NH-P). The land area from which density can be transferred excludes developed and unbuildable areas, such as riparian corridors, slopes 15% or greater, and easements. 100% of the development density of identified qualifying land within the NH-P zone may be transferred to any other residential zone.

B. Development Density in Receiving Area. Up to a maximum 20% reduction in average minimum lot size or lot area per unit requirements, is allowed in order to accommodate the density transfer. Developments utilizing a transfer of density will need to apply for a Planned Development pursuant to Chapter 17.51.

C. If Density Transfer is Not Feasible. In situations where density transfer is not feasible, a maximum of one dwelling unit per 2.5 acres may be allowed on land zoned for residential use within the NH-P Subdistrict, consistent with the recommendations of a geotechnical engineering study and any conditions required by the review authority.

D. Recording of Density Transfer. In all cases where a residential density transfer is used, covenants or other legally binding agreements that run with the land shall preclude the further development of the land from which the density is transferred. The covenants or other legally binding agreements shall be recorded before the transferred density may be used.

17.49.180 Earthquake Mitigation Standards. Buildings and on-site construction projects must meet the seismic standards of the applicable Oregon Structural Specialty Code and Residential Specialty Code seismic requirements per Section 17.49.30.A.

17.49.190 Steep Slope and Landside Mitigation Standards. The following plans and development standards apply to when development is authorized pursuant to Section 17.49.160 on steeply sloped land (15% or greater) and to mapped landslide hazard areas on any proposed development site, as determined by the McMinnville Natural Hazards Inventory.

A. Required Plans.
   1. If slopes of 15% or greater exist on the development site, the applicant shall submit an Erosion Control Plan per Section 17.49.30.A.
   2. If moderate to high landslide hazard areas existing on the development site, the applicant shall submit a Geological Site Assessment per Section 17.49.60.A.
   3. The City may contract with an independent geologist or geotechnical engineer to review the Geological Site Assessment.

B. Development Standards. Where development is authorized pursuant to Section 17.49.160 (Use Limitations), the applicant's site and building plans shall be consistent with the recommendations of the required Geological Site Assessment, including any changes and conditions required by the review authority after considering the recommendations of the independent peer reviewer.
   1. If the Geological Site Assessment recommends a Geotechnical Engineering Study, building and construction plans shall be consistent with the recommendations of this study.
   2. Generally, development should avoid slopes of 25% and greater, except where consistent with the recommendations of the Geological Site Assessment.
   3. Removal of landmark trees shall be prohibited – except where the review authority determines that there is no reasonable alternative available to achieve project objectives.
   4. Removal of significant trees shall be the minimum necessary to meet project objectives or to comply with an approved wildfire mitigation plan.

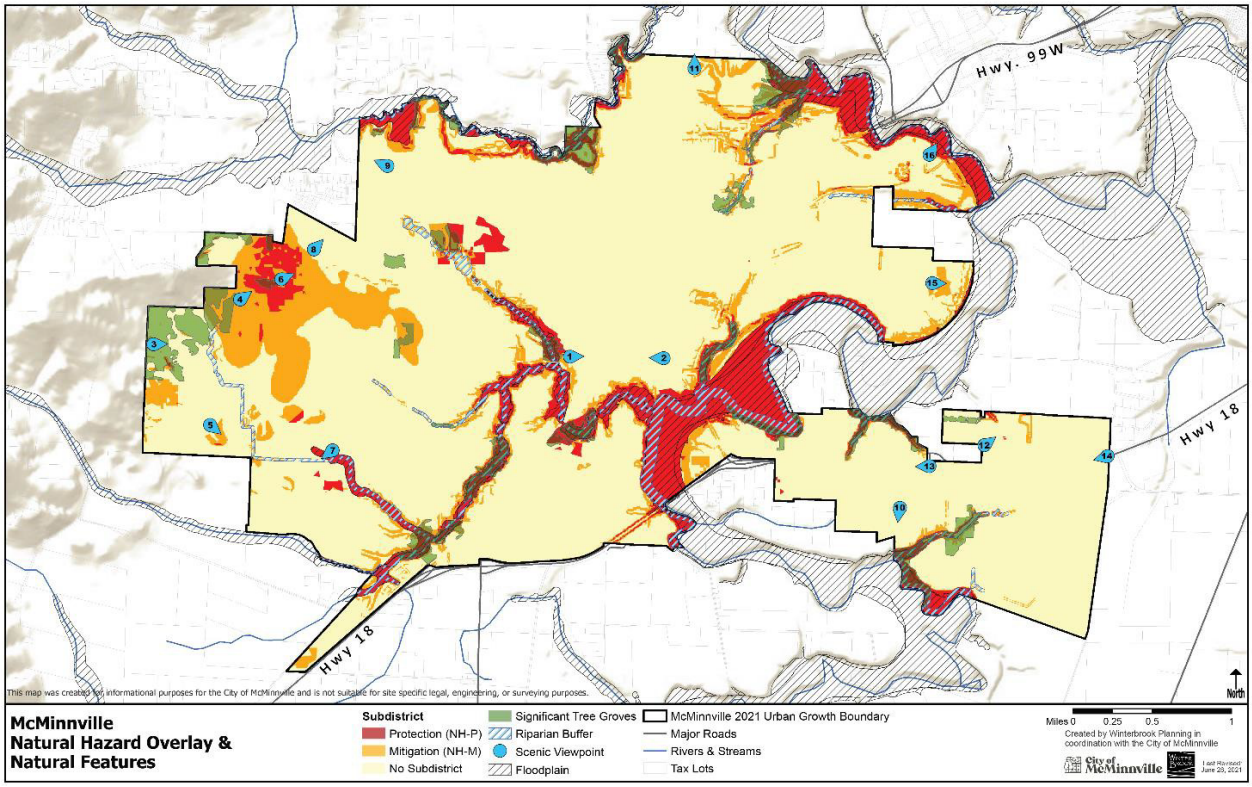
17.49.200 Wildfire Assessment and Mitigation Standards. Where development is permitted pursuant to Section 17.49.160 (Use Limitations), proposed development within mapped moderate to severe wildfire areas within the NH-P Subdistrict shall be subject to the Wildfire Assessment and Mitigation Stan

PROPOSED AMENDMENTS TO THE MCMINNVILLE COMPREHENSIVE PLAN, VOLUME II

This entire chapter is new.

CHAPTER XI
NATURAL FEATURES

GOAL XI 1: PROTECT LIFE AND PROPERTY FROM INVENTORIED NATURAL HAZARDS, INCLUDING FLOODING, GEOLOGICAL AND WILDFIRE HAZARDS.



NATURAL HAZARDS

Multi Hazards

Policies:

197.00 *The City of McMinnville shall adopt and maintain a Natural Hazards Inventory as part of the McMinnville Comprehensive Plan (Volume I). The inventory shall include maps and text that identify the location, type and risk level for three types of natural hazards: geological hazards (including steep slopes, earthquakes and landslides), flood hazards (land within the 100-year floodplain), and wildfire hazards within the UGB).*

197.10 *The City of McMinnville shall apply public works construction standards, seismic building codes, and fire and life safety codes wherever natural hazards are identified in the Natural Hazards Inventory – including limited, moderate, and high combined risk subareas described the Natural Hazards Inventory.*

197.20 *The City of McMinnville shall establish a Natural Features (NF) overlay comprehensive plan designation to manage the cumulative effects of inventoried natural hazards in "moderate and high combined risk subareas" as described in Tables VII.1 and VII.2 of the Natural Hazards Inventory.*

197.30 *The NH overlay plan designation shall be implemented by two subdistricts based on cumulative ranking criteria found in Tables VII.1 and VII.2 of the Natural Hazards Inventory:*

1. ***The Natural Hazards Mitigation Subdistrict (NH-M)**. The NH-M is intended to mitigate hazard impacts based on objective development standards for each applicable hazard type and the recommendations of required site-specific hazard studies.*
2. ***The Natural Hazards Protection Subdistrict (NH-P).** The NH-P Subdistrict is intended to prohibit most types of development and may allow for residential density transfer. Where development is allowed it shall be subject to objective development standards for each applicable hazard type and the recommendations of required site-specific hazard studies.*

197.40 *The NH-M and NH-P Subdistricts shall include objective development standards for each type of natural hazard identified in the Natural Hazards Inventory, including landslides, earthquakes (liquefaction and shaking), floodplains, and wildfire hazards. Floodplains shall be protected by the underlying F-P Flood Hazard zone and the NH-P Subdistrict.*

1. *Maps showing the location and severity of each type of hazard in each subdistrict are available for public review and impacts on individual properties can be determined by city staff via the City's GIS database.*

2. *In cases where hazard-specific development standards overlap, the more restrictive standard shall apply.*

3.

197.60 *Based on objective development standards and required hazard studies, the City of McMinnville may impose conditions of land use approval to protect life and property and mitigate natural hazard impacts in natural hazard subareas. Such conditions may include but are not limited to, conservation easements or dedication of hazard areas to the City.*

197.60 *Land division applications shall not create a lot that lacks sufficient buildable area to meet the minimum lot size and development standards applicable in the underlying zoning district.*

197.70 *New residential, commercial, and industrial construction shall be limited within the NH-P Subdistrict with the following exceptions:*

1. *Public facilities and environmental restoration projects may be permitted under objective development standards.*
2. *Residential density transfer from land within the NH-P Subdistrict to contiguous property under the same ownership that is outside both the floodplain and any applicable Natural Resource or Natural Hazard Subdistrict may be allowed.*
3. *The maximum density allowed in the transfer area shall be the maximum density allowed in the next higher residential zoning district. For example, density transfer from the NH-P land with an underlying R1 zone to land outside the Natural Hazards Overlay (NH-P and NH-M) shall be capped at the density allowed in the R2 zone.*
4. *In situations where density transfer is not feasible, a maximum of one dwelling unit per 2.5 acres may be allowed on land zoned for residential use, consistent with the recommendations of a geotechnical engineering study and any conditions required by the review authority.*

197.80 *In cases where the application of NH-P provisions would prohibit all reasonable economic use of an existing tract of land under common ownership, the City may grant an exception to allow a use permitted in the underlying zoning district that is not permitted in the NH-P Subdistrict. In making this decision, the applicant and City must:*

1. *Consider first whether the exception provisions of Policy 197.70 would relieve the hardship;*
2. *Consider potential uses that are allowed in the NH-P Subdistrict that could provide reasonable economic value;*
3. *Consider alternative development layouts and land use intensity that minimize impacts from natural hazards on people and property and other values associated with natural hazard areas;*
4. *Limit the intensity of the allowed land use to the minimum necessary to retain reasonable economic value of the subject tract; and*

5. *Meet all applicable development standards that apply to natural hazards in the NH-P zone.*

197.90 *The City of McMinnville shall coordinate with Yamhill County to apply McMinnville Comprehensive Plan Chapter XI Natural Features Policies to unincorporated land within the Urban Growth Boundary, including the application of the NH overlay zone (the NH-M and NH-S subdistricts) and related development standards. In cases of conflict with state law governing farm and forest land, state law will prevail over the NH overlay zone standards. For example, agricultural and forest uses allowed in Agricultural and Forest zones shall continue to be allowed; and the more restrictive fire mitigation standards in the County's Forest zones will prevail over the less restrictive City fire mitigation standards.*

197.100 *The City of McMinnville shall coordinate with the Oregon Department of Geology and Mineral Industries (DOGAMI), the Department of Land Conservation and Development (DLCD), the McMinnville Fire Department, and Yamhill County in updates of the Yamhill County Multi-Jurisdictional Natural Hazards Mitigation Plan, the McMinnville Addendum to County NHMP, and the Yamhill County Community Wildfire Protection Plan. Updates to these plans will be considered in future updates to Chapter XI of the McMinnville Comprehensive Plan.*

197.110 *The City of McMinnville shall coordinate with the Greater Yamhill Watershed Council to facilitate watershed restoration and improvement projects in natural hazard areas such as floodplains and slide hazard areas. Shared natural hazard mitigation goals include: (1) removal of invasive vegetation species (that increase fuel for wildfires and clog waterways) and replacement with native species that reduce erosion, are more fire resistant and are less likely to clog waterways; and (2) restoration and enhancement of wetlands that provide flood control.*

197.120 *Tree removal and major pruning within the Floodplain Zone, the NH-M and NH- P Subdistricts shall be limited to minimize erosion and landslide potential and to maintain water quality*

Geological Hazards

Geological hazards appear on the McMinnville Natural Hazards Inventory and include:

1. *Slopes of 25% or more;*
2. *Moderate, high and severe risk earthquake (liquefaction and shaking) risk areas; and*
3. *Moderate and high-risk landslide hazard areas.*

Policies:

198.10 *The NH-P and NH-M Subdistricts shall apply to subareas with geological hazards as shown on the Natural Hazards Inventory. Specific geological*

hazards found in each subdistrict are determined by referencing the McMinnville Natural Hazards Inventory and may be determined for individual properties by referencing the City's GIS database.

198.20 Residential and commercial construction in areas with moderate or high geological risk hazards – as indicated on the Natural Hazards Inventory – shall meet the seismic and slope stability provisions of the Oregon State Building Codes. The Building Official may require a geotechnical engineering study prior to approval of construction.

198.30 The City of McMinnville shall require erosion control measures prior to grading or construction in subareas with:

1. *Slopes of 15% or greater, and*
2. *Landslide hazards in the NH-M and NH-P Subdistricts.*

198.40 The City of McMinnville shall require geological reconnaissance studies with the submission of land development applications where geological hazards are present within the NH-M and NH-P Subdistricts. The recommendations of the geological reconnaissance study shall become conditions of land use approval unless specifically exempted or modified by the review authority.

198.50 Where recommended in a required geological reconnaissance study – or where determined necessary by the City Engineer or Building Official in moderate risk landslide hazard areas that are not included in the NH-M Subdistrict – a geotechnical engineering study may be required prior to grading, land development or construction.

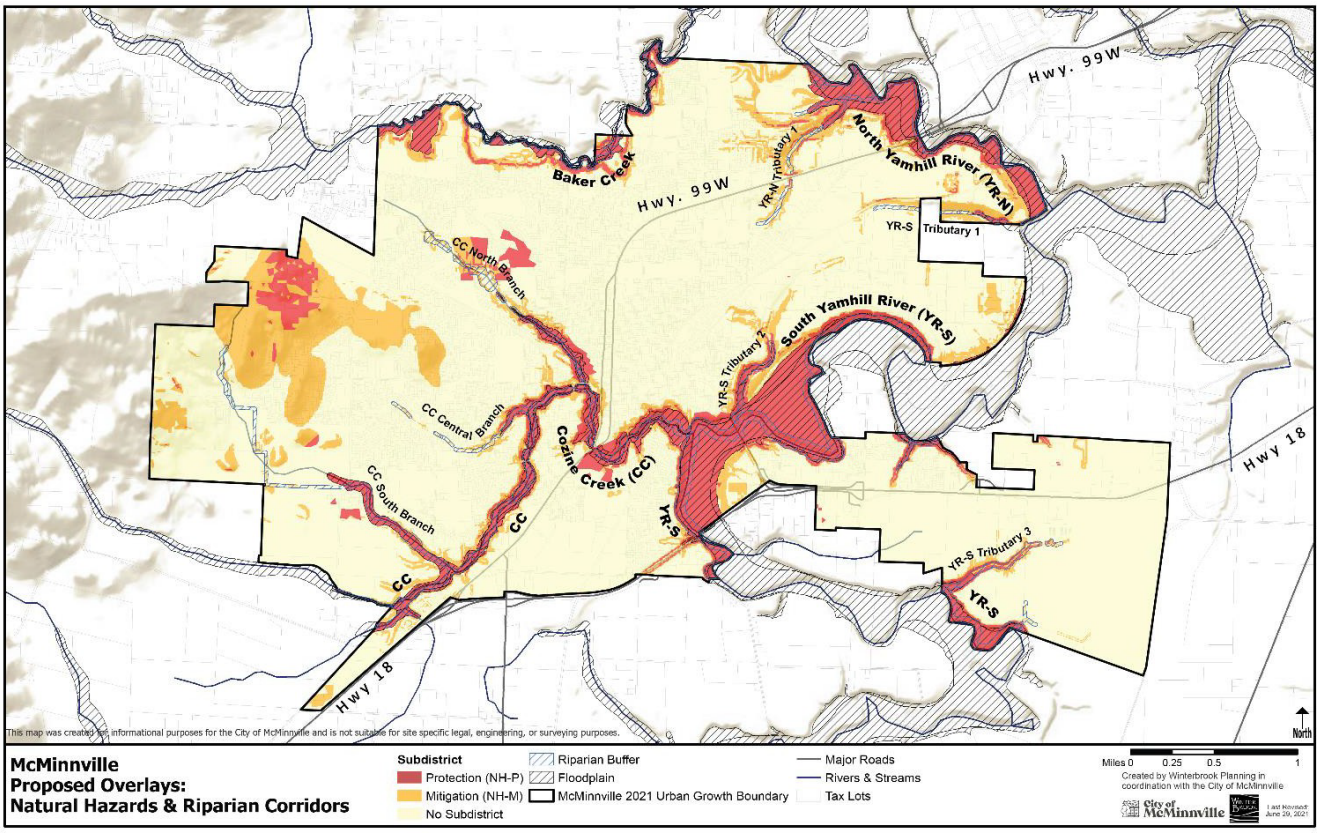
198.60 The City of McMinnville shall retain the services of a qualified geologist or geological engineer to review geological studies prepared for land use applicants.

1. *The City Engineer shall determine whether a second professional opinion is required.*
2. *The costs of peer review shall be borne by the applicant.*

198.70 The City shall consider adopting standards for public street and utility construction to moderate or higher geological hazard areas.

198.80 Because trees contribute to slope stability and reduce erosion, tree removal shall be limited in the NH-M Subdistricts.

Flood Hazards



Policies

199.00 *Flood hazards areas are located within the designated 100-year floodplain. The City of McMinnville will continue to prohibit most types of development within the 100-year floodplain consistent with the City's* ***F-P Flood Area Zone****. Most significant riparian corridors are also located in the F-P Zone.*

199.10 *Land within the F-P Zone is protected by applicable NH-P Subdistrict standards. Natural geological and wildfire hazards associated with the 100-year floodplain, including but not limited to landslide and wildfire hazard areas, are addressed in NH-P Subdistrict development standards.*

199.20 *The City of McMinnville is committed to continued participation in the National Flood Insurance Program (NFIP) through the enforcement of local floodplain management regulations.*

199.30 *The City of McMinnville will work with the Federal Emergency Management Agency (FEMA) to update Flood Insurance Rate Maps (FIRM). The City will request Oregon Department of Geology and Mineral Industries (DOGAMI) debris flow and lidar data be included in FIRM updates.*

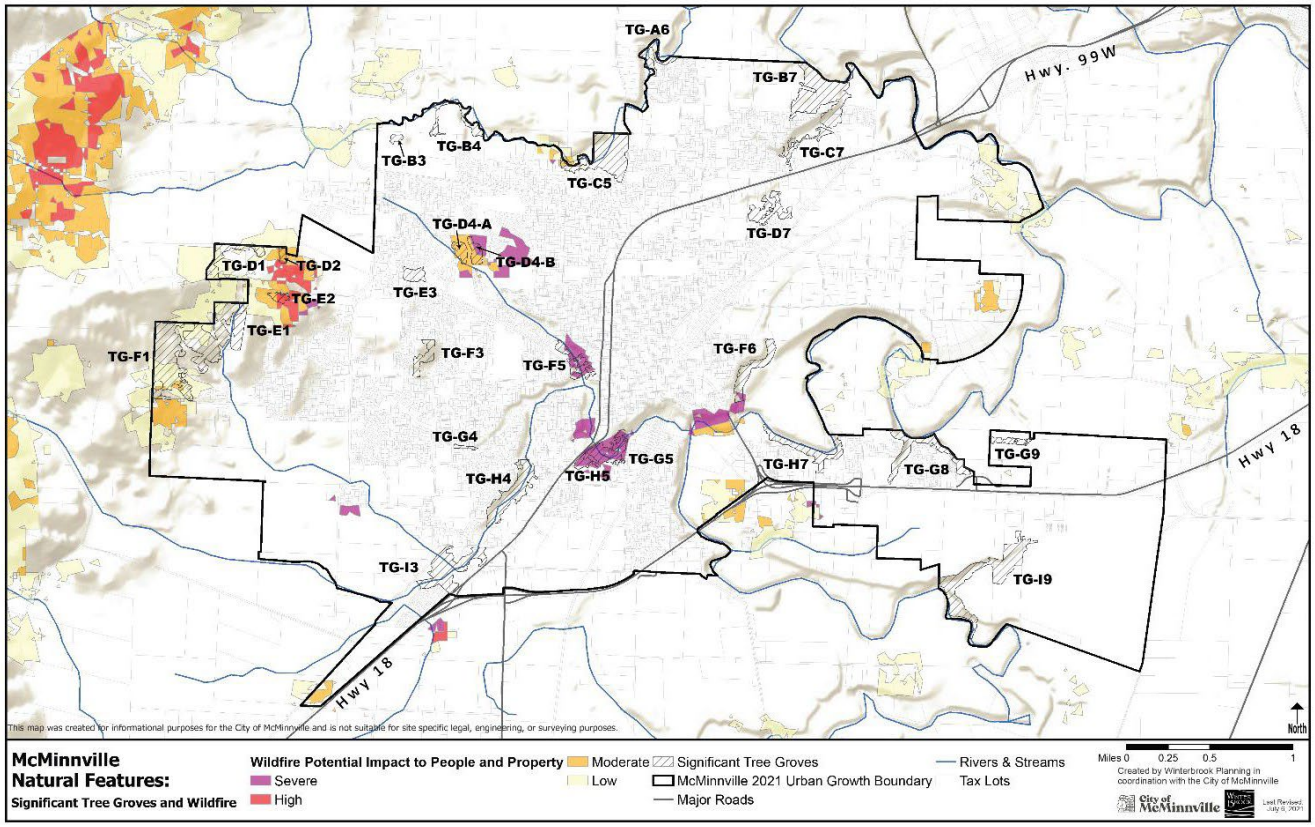
199.40 *The City of McMinnville will develop and maintain GIS maps of critical facilities identified in the McMinnville NHMP for all structures and residential development and commercial buildings within the 100-year and 500-year floodplains.*

199.50 *Because wetlands serve an important flood control function, wetland fill and removal shall not be permitted within the 100-year floodplain unless there is no reasonable alternative for a planned public works project.*

199.60 *The City of McMinnville will coordinate with the Greater Yamhill Watershed Council (or its affiliates) regarding stream and river restoration and enhancements projects to restore native vegetation, improve bank stability and improve water quality.*

199.70 *Because trees and vegetation reduce streambank failure and improve water quality, tree removal shall be limited in F-P Zone.*

Wildfire Hazards



Policies

200.00 *Moderate, high and severe wildfire hazard areas appear on the Natural Hazards Inventory and are generally associated with the West Hills and*

vegetated floodplains. Where wildfire hazards subareas overlap with geological or floodplain hazards, they may be subject to NH-P or NH-M Subdistrict requirements, consistent with the ranking criteria found in the Natural Hazards Inventory and as shown on Natural Hazards Inventory Map VII-1.

200.10 City staff shall coordinate with the McMinnville Fire Department and RFPD to encourage fire safety planning and education – especially in Wildfire Urban Interface zones and designated Fire Reduction Areas in the West Hills. The City of McMinnville shall continue to coordinate wildfire mitigation action items through the Yamhill County Community Wildfire Protection Plan.

200.20 Residential, commercial, and industrial development shall be limited in wildfire risk subareas in the NH-P Subdistrict; However, exceptions may be permitted pursuant to Natural Hazard Policies 197.70 and 197.80.

200.30 Development density in moderate to high wildfire risk areas in the NH-M Subdistrict may be limited where necessary to provide adequate space for fuel breaks in areas that are threatened by two or more natural hazards.

200.40 In the NH-P and NH-M Subdistricts with identified wildfire hazards, applicants for land divisions and new development (excluding home remodels or additions) shall prepare a Fire Prevention and Control Plan in coordination with the McMinnville Fire Department or RFPD. The plan shall be prepared by a certified arborist and shall consider necessary tree and vegetation removal, erosion control, and replacement of lost trees and vegetation with native, fire-resistant trees and vegetation.

200.50 The maximum density allowed within the NH-P Subdistrict shall be one unit per 2.5 acres or shall be subject to the density transfer provisions of Policy 197.70.

200.60 Based on the Fire Prevention and Control Plan, the following wildfire mitigation standards shall be met:

1. *Installation and maintenance of at least a 40-foot fuel break around each new dwelling or structure.*
2. *Where vegetation needs to be maintained for slope stability in a fuel break area, require plantings of fire-resistant or slow-burning plants. The City shall make a list of such plants available to the public.*
3. *Provision of one or more than one ingress/egress route or road widths wide enough to accommodate incoming fire apparatus and evacuating residents simultaneously in an emergency situation.*
4. *Roofs and siding with fire-resistant materials. Wood shake or shingle roofs are not allowed.*
5. *Design road placement to function as fire breaks in urban wildland*

interface developments.

6. *Chimneys of wood-burning devices to be equipped with spark arrester caps and/or screens.*
7. *Underground electrical distribution circuits if technically feasible.*
8. *Sprinkler systems in all dwelling units and occupied buildings.*