

# Chapter 8 - Natural Environment



This chapter identifies Enumclaw’s environmental conditions and issues and describes the link between the natural environment and the community’s future. The Washington State Growth Management Act (GMA) requires all towns, cities, and counties adopt development regulations to protect critical areas (aquifer recharge areas, sensitive fish and wildlife habitat, frequently flooded areas, geologically hazardous areas, and wetlands) and resource lands of long-term significance (agricultural, forest, and mineral lands) and that they incorporate “best available science” in those regulations. The City believes these areas are valuable assets for the ecological balance they provide and also for the aesthetics and quality of life expected by community residents. The intent is to provide (but not exceed) solid policy foundation for the Critical Area Ordinance (CAO). This chapter illustrates previously-identified critical areas and resource lands. Continuing inventory will clarify critical area boundaries and provide additional information on the application of policy and regulations.

## Issues, Goals, Policies, and Programs

Enumclaw’s residents perceive their community as set in a rural place with immediate access to the surrounding fields and undeveloped forest areas. Preservation and continued support of the surrounding natural environmental system is a vital aspect of the community. A healthy natural environment offers aesthetics, the community’s natural beauty and less obvious intrinsic benefits through community health, economics, and safety. Quality of life is enhanced through environmental stewardship by providing:

- Opportunities for recreational activities
- Increased air and water quality

- Preserved open spaces
- Important wildlife habitat
- Unmeasured social and ecological benefits
- A sense of community pride and well-being

**Goal NE – 1: To maintain networks of open space within the City including wildlife habitat corridors, stormwater management, trails, and critical areas.**

## Policies

*1.1 Increase public awareness of the City’s open space system.*

*a. Create a program for education of natural systems and the open spaces of the city.*

*b. Standardize signing and other visual components typical in park development for critical areas.*

*1.2 Encourage corridor development for pedestrian and wildlife routes.*

*a. Keep the City’s Parks and Recreation Plan comprehensive and updated, outlining current and future requirements for open space.*

*b. Provide incentives for encouraging habitat with new development.*

**Goal NE – 2: To use the community’s existing and future natural open space in a manner that preserves the ecological processes of the natural environment, as well as preserving the rural character of the City.**

## Policies

*2.1 Enhance all City parks and recreational facilities and programs with ecological process education.*

*a. Consider as necessary municipal ordinances and development regulations to allow and encourage private and/or public-private partnerships where critical areas are protected.*



*b. Maintain land use regulations that include provisions for setting aside land for park and recreation and natural/critical areas with new development.*

**Goal NE – 3: Protect people, property and environment in areas of natural hazards.**

**Policies**

*3.1 Protect existing flood storage and conveyance functions and ecological values of frequently flooded areas (100 – year floodplain).*

*3.2 Development within the 100-year floodplain should be designed to minimize risk to people, property and the environment.*

*3.3 Avoid or minimize impacts from new development to erosion hazard areas.*

*3.4 Avoid potential impacts to life and property by limiting land disturbance and development in landslide hazard and steep slope areas.*

**Goal NE – 4: To maximize natural open spaces and critical areas for their recreational benefit to the residents of the community.**

**Policies**

*4.1 Provide multiple-uses of land in critical area planning.*

*a. Conduct an inventory of the shorelines and critical areas in the City to determine what uses currently exist and what uses may potentially exist.*

*b. Develop a shorelines and critical areas master plan emphasizing storm water management, wildlife habitat corridors, and recreational opportunities appropriate for shorelines and critical areas such as trails and ball fields.*

**Goal NE – 5: Protect wetlands, water resources and fish and wildlife habitat resources from encroachment and degradation for minimized environmental impacts and protection of community health, safety, and general welfare.**

**Policies**

*5.1 Regularly evaluate and update the Critical Area Ordinance (CAO) to incorporate best available science.*

*5.2 To the extent feasible maintain the quantity and quality of wetlands and riparian areas within the jurisdiction.*

*5.3 To the extent feasible, avoid wetland impacts, preserving and maintaining wetlands in their natural state.*

*5.4 To the extent feasible ensure that development adjacent to wetlands is sited such that wetland functions are protected, an adequate buffer around the wetlands is provided and significant adverse impacts to wetlands are prevented.*

*5.5 When avoiding wetland impacts is not feasible, safeguard the long-term biological function and value of the wetland through effective mitigation or wetland mitigation banking.*

*5.6 In cases of small isolated, low-quality wetlands, consider opportunities for development flexibility, provided that mitigation can be provided to ensure no cumulative impacts to wetland quality and function*

*5.7 Encourage provision for critical areas and resource land opportunities in new development.*

*a. Re-evaluate land use regulations to ensure adequate protection of critical areas.*

*b. Consider incentives for encouraging the provision of resource land protection and retention of natural areas, open space, and critical areas with new development.*



5.8 Consider allowing alterations to wetlands or buffers as needed to allow public agency or utility development projects that avoid, minimize and mitigate impacts to wetland functions to the maximum extent feasible

5.9 Allow reasonable use of private property that reflects appropriate avoidance and minimization measures and that provides mitigation that enhances and protects wetland functions.

6.0 Consider a hazard tree program.

**Goal NE – 6: Maintain and protect surface water and groundwater resources that serve the community and enhance the quality of life.**

**Policies**

6.1 Use incentives, regulations and programs to manage all water resources and to protect and enhance their multiple beneficial uses – including fish and wildlife habitat, flood and erosion control, water quality control and sediment transport, water supply, scenic beauty and recreational opportunities.

6.2 Control stormwater run-off rates, volumes and water quality from all new development and redevelopment to protect water quality, wetlands, natural drainage features and as necessary to protect against community hazard.

6.3 Support enhancement of water quality through corrective and preventative methods including best management practices (BMPs), education, planning, regulation, enforcement, incentives.

6.4 Enhance the treatment of storm retention and detention ponds.

- a. Grade pond slopes no steeper than 5:1.
- b. Introduce native wetland plants and wildlife to enhance function and value.

6.5 Maintain natural and man-made wetlands for

public safety and environmental function to extent feasible.

**NE-7 Ensure that land use and development within shoreline areas is consistent with and implement the City’s adopted Shoreline Master Program.**

**Policies**

7.1 Review all development within shoreline jurisdiction for compliance with the City’s adopted Shoreline Master Program.

7.2 Evaluate and update the City’s Shoreline Master Program consistent with state mandated review cycles.

**NE-8 Preserve and protect artifacts, historic and culturally significant sites within the city.**

**Policies**

8.1 The City will coordinate with local tribes and the State Office of Archaeology and Historic Preservation on development issues related to potential archaeological sites.

**NE-9 Encourage low-impact development techniques that can reduce the consumption of resources and improve public health and safety.**

**Policies**

9.1 Encourage green building techniques such as “LEED”, “Built Green” and “Energy Star” for all construction.

9.2 Encourage, where feasible, low impact development techniques that include pervious paving, bioretention swales and other green building techniques.

9.3 Continue to implement the city’s Green House Gas



*emission policy in Resolution No. 1399 or here after amended (see appendices).*

## **EXISTING ENVIRONMENTAL CHARACTERISTICS**

The City of Enumclaw, on the elevated (640-750 feet) Enumclaw Plateau, is interested in expanding and preserving its rural community. This situation requires enhancing and increasing access to the existing assets, especially the natural setting. The City has Mt. Rainier and the Cascades as an eastern backdrop and the White River defining the community's southern edge.

Newaukum Creek lies on the northwesterly boundary of the UGA, while Boise Creek follows the southwesterly boundary of the UGA. There are also several wetlands within the planning area. Enumclaw lies within the Buckley-Alderwood soil association, which consists of poorly drained and moderately well drained soils. These soils are nearly level to rolling and have dense, slowly permeable and very slowly permeable glacial till. Soils in the area include: Alderwood gravelly sandy loam; Buckley silt loam; Alderwood-Kitsap soil; Beausite gravelly, sandy loam; Ovall gravelly loam; and Pilchuck loamy fine sand (U.S. Department of Agriculture Soil Conservation Service, King County Soil Survey, 1973). These soils may experience severe to very severe erosion hazard. In the White River Basin, soils formed on mudflow deposits (Mount Rainier Osceola Mudflow) are poorly drained and have a slow permeability. Ecology (1995) reports that these mudflow deposits create an aquitard that confines the underlying aquifer and perches water tables in the overlying aquifers. Water moves laterally along the top of the contact until it intercepts a stream channel after initial infiltration.

These unusual geological attributes define

Enumclaw's natural environment aspects. The community's topography and surface water behavior increase its environmental susceptibility. It is important to identify and recognize those critical areas that exist in the community for preservation and protection.

## **SHORELINES**

Since the early 1970s, the Washington State Shoreline Management Act (SMA) has required jurisdictions to develop shoreline master programs (SMP) for areas with significant shorelines. Washington state, in partnership with the Department of Ecology requires cities with areas designated as "Shorelines of the State" to update their SMPs in accordance with the SMA. Under the Growth Management Act (GMA) a community's shoreline master program goals and policies is considered part of the Comprehensive Plan.

The City of Enumclaw adopted its first Shoreline Master Program (SMP) via Ordinance 2509 in June of 2012. The SMP implements the requirements of the Washington State Shoreline Management Act (SMA) (RCW 90.58) within the City of Enumclaw. The SMP contains goals, policies and regulations that address shoreline use, environmental protection of shoreline areas and public access to areas within shoreline jurisdiction. Shoreline jurisdiction is mapped on Figure 8.1. The goals and policies in the City's SMP as adopted by Ordinance 2509, or as subsequently amended, are hereby incorporated by reference as an element of this Comprehensive Plan.

## **CRITICAL AREAS**

Critical areas need special consideration during the comprehensive planning process because of their distinctive environmental characteristics.



These areas are considered critical because their natural state often has unique, fragile, and valuable environmental and ecological processes or resources that are vulnerable to development and other human influences. The State of Washington identifies five primary types of critical areas requiring consideration and protection including:

- Aquifer Recharge Areas
- Fish and Wildlife Habitat Conservation Areas
- Frequently Flooded Areas
- Geologically Hazardous Areas
- Wetlands.

Preserving and protecting critical areas from negative impacts of development enhances the public health, safety, and welfare and protects private property from natural disasters, such as flooding and landslides. Enumclaw has development regulations requiring that certain precautions be followed during development adjacent or within critical areas. The regulations require special review before any critical area can be altered, requiring that there be no net loss to the critical area's ecological function. Site-specific situations may not permit alteration or development to occur at all.

### **Aquifer Recharge Areas**

Aquifers are areas below the earth's surface storing and/or with the potential to store ground water. Aquifers occur as either confined or unconfined sources of ground water. As water works its way down from the land surface it is unable to enter a confined aquifer because an impermeable material, such as clay or rock, blocks it. Aquifer recharge occurs when water enters confined aquifers through breaks or cracks in the impermeable cover. Generally, shallow unconfined aquifers, usually overlying confined aquifers, are recharged as unobstructed water moves

downward from the surface. Much of the Enumclaw area has an unconfined aquifer over another confined aquifer because the Osceola mudflow is impervious. This creates a high water table (unconfined aquifer) near the surface.

Water infiltrates the soil and percolates through it and surficial rocks to the water table recharging the water system. Under the influence of gravity and pressure, ground water moves down a hydraulic gradient toward an area where the water table either coincides with or lies above the land surface, its discharge area. Recharge areas (hills and uplands) generally are broad and lie at greater elevations than the usually smaller discharge areas (rivers, lakes, swamps, and oceans). The distinction between recharge and discharge is not always clear.

Aquifer recharge areas have a critical recharging effect on aquifers used as a source of potable drinking water. They are particularly vulnerable to contamination because of the rapid infiltration of water in these areas. Aquifer protection is essential to community, public health, and safety. Once groundwater is contaminated it becomes very difficult and costly, if not impossible, to clean up. Figure 8.2 identifies King County's designated soils that have high surficial permeability in the Enumclaw region.

### **Fish and Wildlife Habitat Areas**

Sensitive fish and wildlife habitat areas are necessary for the survival of endangered, threatened, rare, or sensitive species. These habitats contain basic elements of the ecological function of the physical landscape. To protect this habitat, efforts must preserve existing habitat corridors, establish new ones, minimize fragmentation to habitat patches, and minimize edge effects where development adjoins habitat areas. The Washington Department of Fish



and Wildlife Priority Habitats and Species Program identified areas of particular concern (Figure 8.3) within the river corridors or near wetlands.

Wildlife habitat is the geographic area containing the food, water, and cover needed for survival and propagation of a species. Species differ in needed habitat but often relate to specific plant communities. Past resource activity and residential expansion altered variety, number, and distribution of wildlife. Chinook, Chum, Coho, and Pink Salmon; and Steelhead, Dolly Varden, and Cutthroat Trout are some fish found in the Enumclaw planning area. Unsuitable water quality and low stream flow are the most damaging habitat degradation for fish kills and fry mortality. Erosion from upstream building can cause siltation of breeding areas. Poorly applied herbicide and insecticides can kill needed food and shade plants and building can clear riparian vegetation needed for shade.

#### **Wetland Areas**

Wetlands are those areas inundated or saturated by ground or surface water at a frequency and duration sufficient to support (and during normal conditions do support) a prevalence of vegetation typically adapted for life in saturated soil conditions. Where the vegetation was removed or altered, a wetland can be determined by presence or evidence of hydric or organic soil, or by documentation of previous wetland vegetation. Wetlands typically include swamps, marshes, bogs, and similar areas.

Figure 8.4 identifies potential wetlands surrounding and within the City. Wetlands may be discovered beyond the mapped inventory. All wetlands are regulated by the Enumclaw CAO or the SMP which also include development standards.

#### **Frequently Flooded Areas**

Frequently flooded areas are found within the 100-year flood plain (Figure 8.5), which are subject to a one percent or greater chance of flooding in any given year. Frequently flooded areas perform important hydrologic functions and may present a risk to persons and property. Streams, lakes, wetlands, and closed depressions may qualify as frequently flooded areas; shorelines based on the mapped Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) for the Enumclaw area are catalogued by King County GIS.

#### **Geologically Hazardous Areas**

Geologically hazardous areas (Figure 8.6) may not be suited for development, consistent with public health, safety, or environmental standards, because of their susceptibility to erosion, landslide, seismic, volcanic, mine collapse, or other geological events.

All soils and bare rock surfaces are subject to the natural erosive forces of chemical weathering, and physical erosion. Erosion is the natural process of wearing away the land as a result of water and wind. Wind erosion occurs when the wind blows exposed soils, resulting from excavation and construction activities, farming activities, and any other activities where vegetative cover has been removed, leaving the soil exposed. Severe and very severe erosion hazard in Enumclaw are identified through soil types including: Alderwood gravelly, Sandy loam; Alderwood-Kitsap soil; Beausite gravelly, Sandy loam; Ovall Gravelly loam; and Pilchuck loamy fine sand.

Slope stability is dependent on the interaction of many factors, including soils, climate, slope of underlying geologic material, vegetative cover,



proximity to surface water, ground water content, and proximity to earthquake fault activity. When one or more of these factors is altered, unstable slope conditions may occur, and when these factors are altered by development activity, landslide potential is increased, even in historically stable areas. Soils listed in the King County soil survey that have severe building limitations are also included.

Certain soils lose their ability to support structures when shaken by an earthquake, flowing like a fluid after a seismic event (liquefaction). Shaking can cause ground surface failure including surface settlement, cracking, and landslides. The Puget Sound region is seismically active and with its soils of unconsolidated glacial and alluvial deposits, is highly susceptible to earthquake damage. The U.S. Geological Survey (USGS) identifies four seismic risk zones in the U.S. with the Puget Sound Basin classified in Zone 3 (major earthquake frequency and damage). Enumclaw is in a local subzone of the USGS Zone 3.

Enumclaw’s risk from volcanic activity is not high, according to the USGS Preliminary Assessment of Potential Hazards from Future Volcanic Eruptions in Washington map. The community is near a zone of “Low Risk” lahar (clay-rich mudflow) from Mt. Rainier running along the White river. The City is also in the “Low to High” tephra- hazard zone for Mt. St. Helens of 5-35 centimeters. There are no mapped volcanic hazards within the city planning area.

### Natural Resource Lands

Natural resource lands play a vital role in the region. Resource lands are distributed among three categories; agricultural lands, forest lands, and mineral resource lands. The State requires lands with commercial significance be protected and conserved.

### Agricultural Resource Lands

Agricultural resource lands are those lands not already characterized by urban growth and are of long-term significance for the commercial production of horticultural, viticulture, floricultural, dairy, apiary, vegetable, and animal products, or the food and fiber for the consumption of livestock, or other products and processes normally associated with farming.

Agricultural activity near Enumclaw is distributed on the land to the west, north, and south. Land within the city limits and the UGA is fertile but has given way to urban or suburban use. The agricultural lands surrounding the UGA are socially and culturally important to the community, and should be preserved for their long-term economic and cultural significance.

### Forest Resource Lands

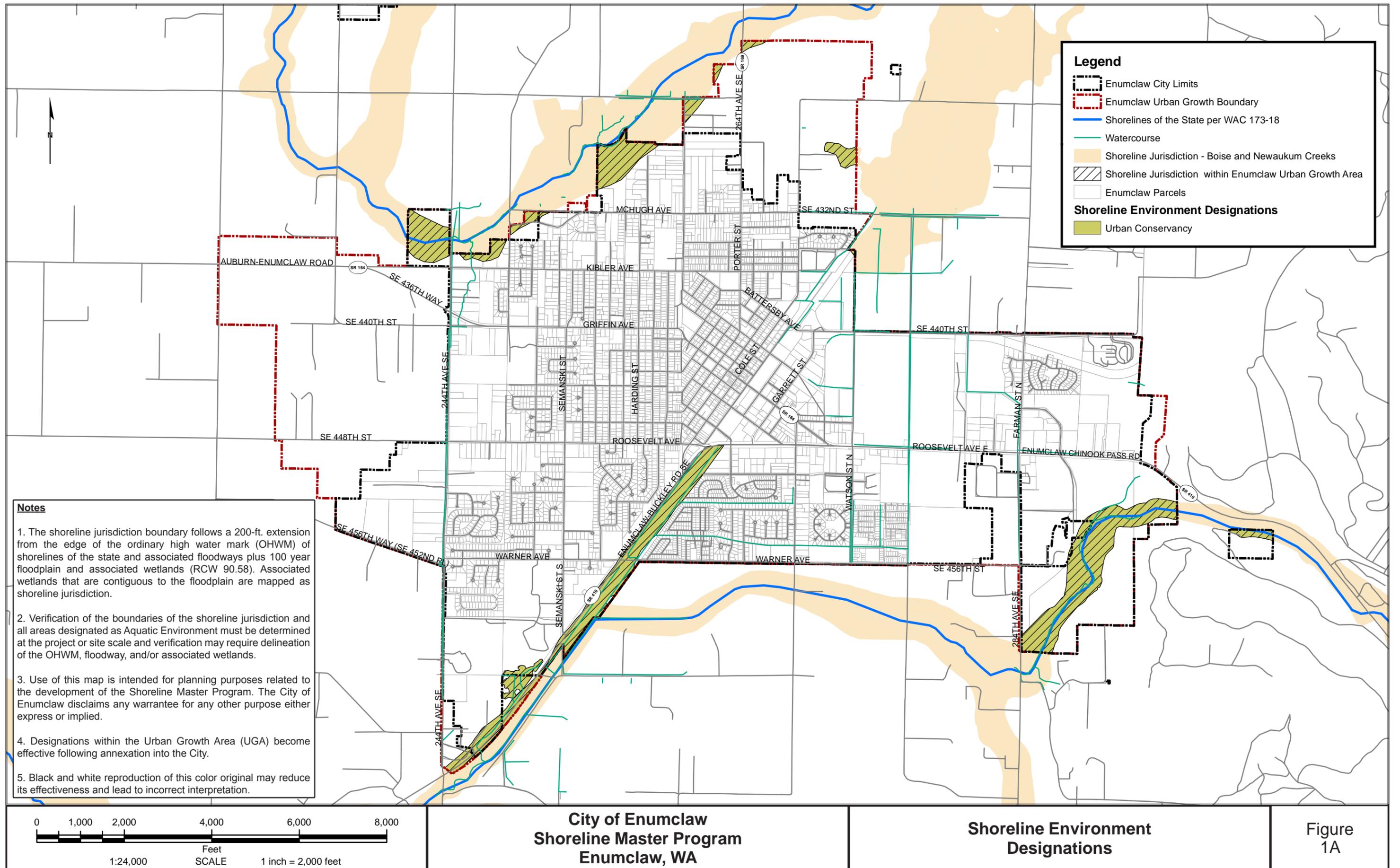
Forest resource lands are those lands not already characterized by urban growth and are of long-term significance for the commercial production of timber and other wood fiber normally associated with forestry practices. The City of Enumclaw does not have commercially viable forestlands within its boundaries, but to the east are vast tracts of timber lands.

### Mineral Resource Lands

**Mineral resource lands are those lands not already characterized by urban growth and are of long-term significance for the production or extraction of aggregate and other mineral substances, including sand, gravel, and other valuable metals. Careful consideration in addressing mining operations is needed so that adjacent land uses are not severely impacted. It is also important to consider the value**



**of new mineral extraction, as well as alternative land uses in and adjacent to mining areas. There are no mining activities with long-term commercial significance in Enumclaw.**



**Notes**

1. The shoreline jurisdiction boundary follows a 200-ft. extension from the edge of the ordinary high water mark (OHWM) of shorelines of the state and associated floodways plus 100 year floodplain and associated wetlands (RCW 90.58). Associated wetlands that are contiguous to the floodplain are mapped as shoreline jurisdiction.
2. Verification of the boundaries of the shoreline jurisdiction and all areas designated as Aquatic Environment must be determined at the project or site scale and verification may require delineation of the OHWM, floodway, and/or associated wetlands.
3. Use of this map is intended for planning purposes related to the development of the Shoreline Master Program. The City of Enumclaw disclaims any warrantee for any other purpose either express or implied.
4. Designations within the Urban Growth Area (UGA) become effective following annexation into the City.
5. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

**City of Enumclaw  
Shoreline Master Program  
Enumclaw, WA**

**Shoreline Environment  
Designations**

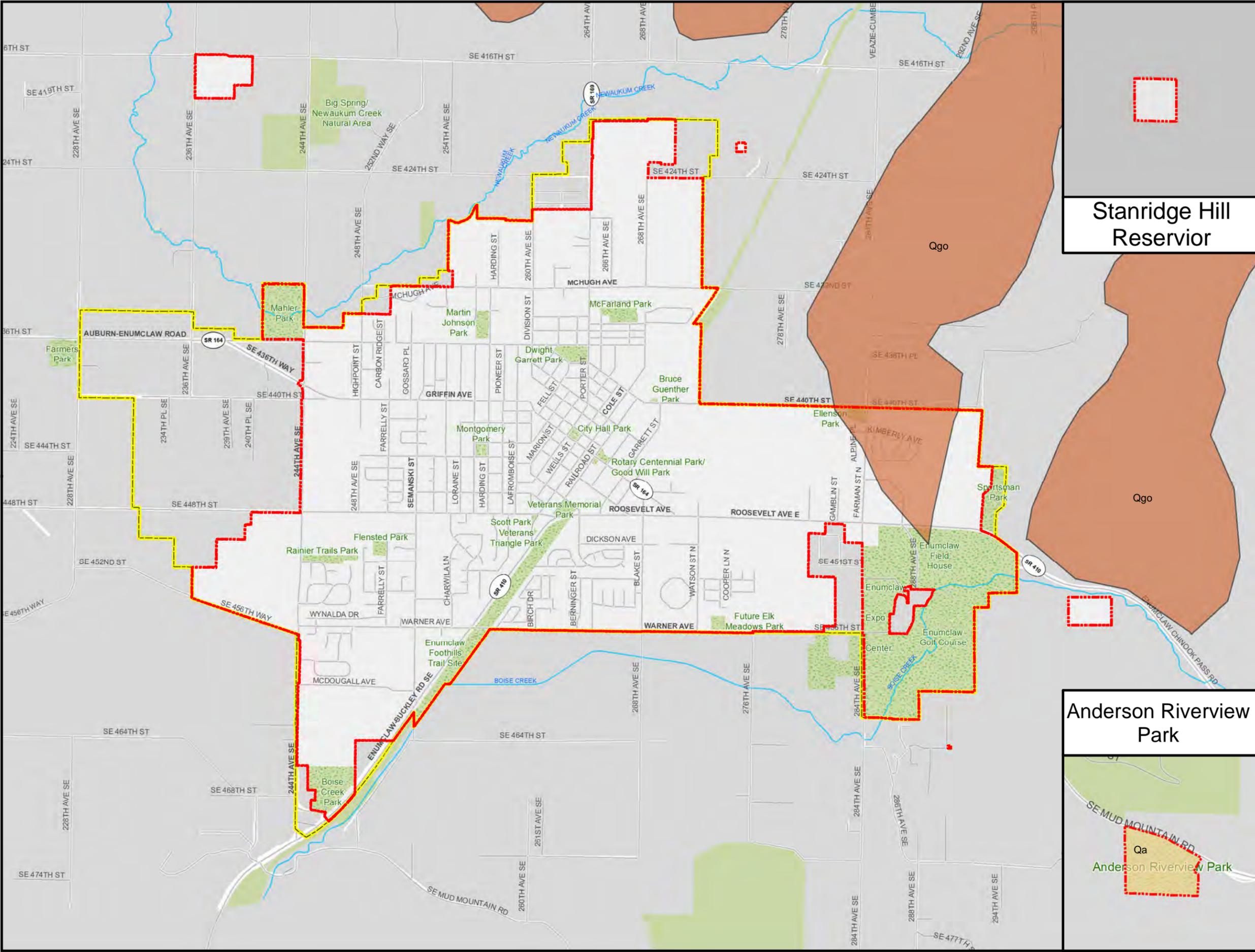
Figure  
1A

Figure 8.1 Shoreline Jurisdiction

**AQUIFER RECHARGE AREA MAP**

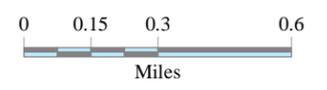
**LEGEND**

- High Permeable Units**
- Qa
  - Qgo
  - Enumclaw City Boundary
  - Urban Growth Boundary
  - Roads
  - Creeks
  - City Owned Parks
  - Other Parks
  - King County



**Stanridge Hill Reservoir**

**Anderson Riverview Park**



*The City of Enumclaw makes every effort to provide correct information, but makes no representation as to the completeness or accuracy of this map.*

2015 Comprehensive Plan  
 CJP 7-27-2015 - used for illustrative purposes only  
 G:\TBD

Figure 8.2 Enumclaw's Aquifer Susceptibility

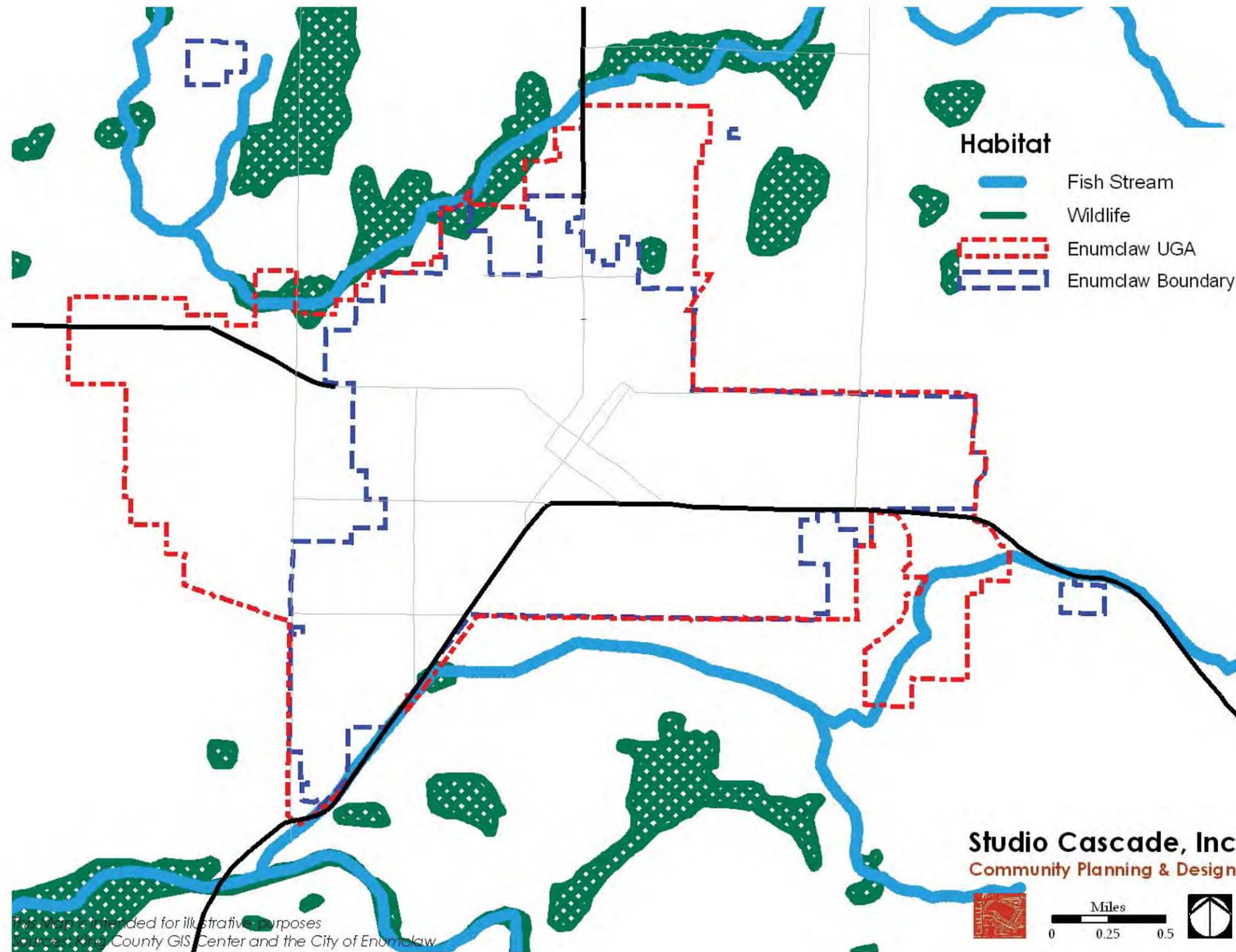
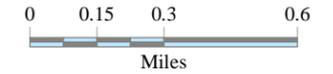


Figure 11.2 Enumclaw's Habitat

**STREAMS & CREEKS**

**LEGEND**

-  Streams
-  Urban Growth Boundary
-  Enumclaw City Boundary
-  Roads
-  City Owned Parks
-  Other Parks



*The City of Enumclaw makes every effort to provide correct information, but makes no representation as to the completeness or accuracy of this map.*

2015 Comprehensive Plan  
 CP 9-25-2015 - used for illustrative purposes only  
 G:\TBD

**Stanridge Hill Reservoir**

**Anderson Riverview Park**

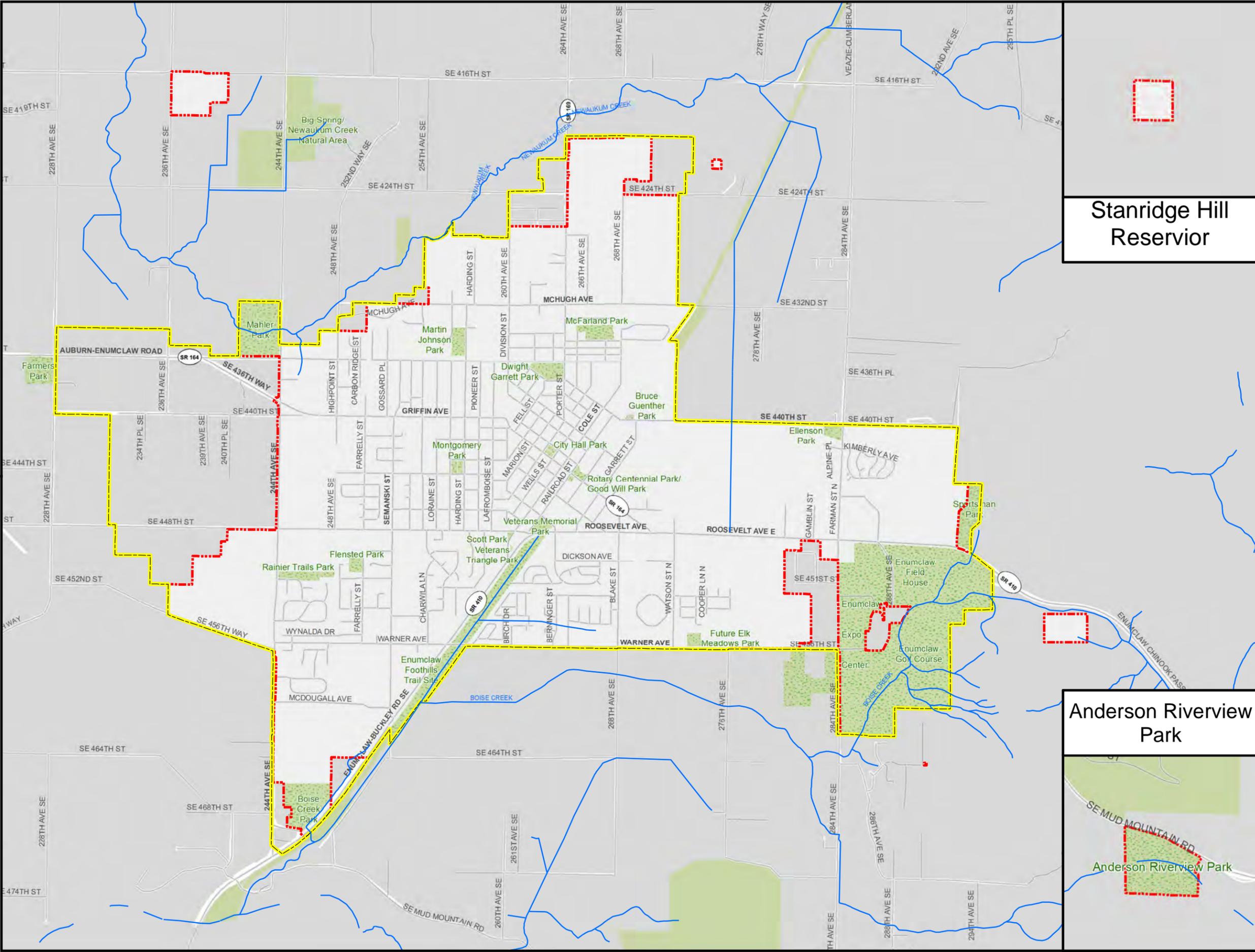
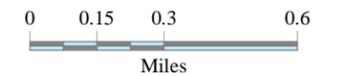


Figure 8.3 Enumclaw's Habitat & Streams

**NATIONAL WETLANDS INVENTORY MAP**

**LEGEND**

-  National Wetlands Inventory
-  Enumclaw City Boundary
-  Urban Growth Boundary
-  Roads
-  Creeks
-  City Owned Parks
-  Other Parks



*The City of Enumclaw makes every effort to provide correct information, but makes no representation as to the completeness or accuracy of this map.*

2015 Comprehensive Plan  
 CJP 6-10-2015 - used for illustrative purposes only  
 G:\TBD

Stanridge Hill Reservoir

Anderson Riverview Park

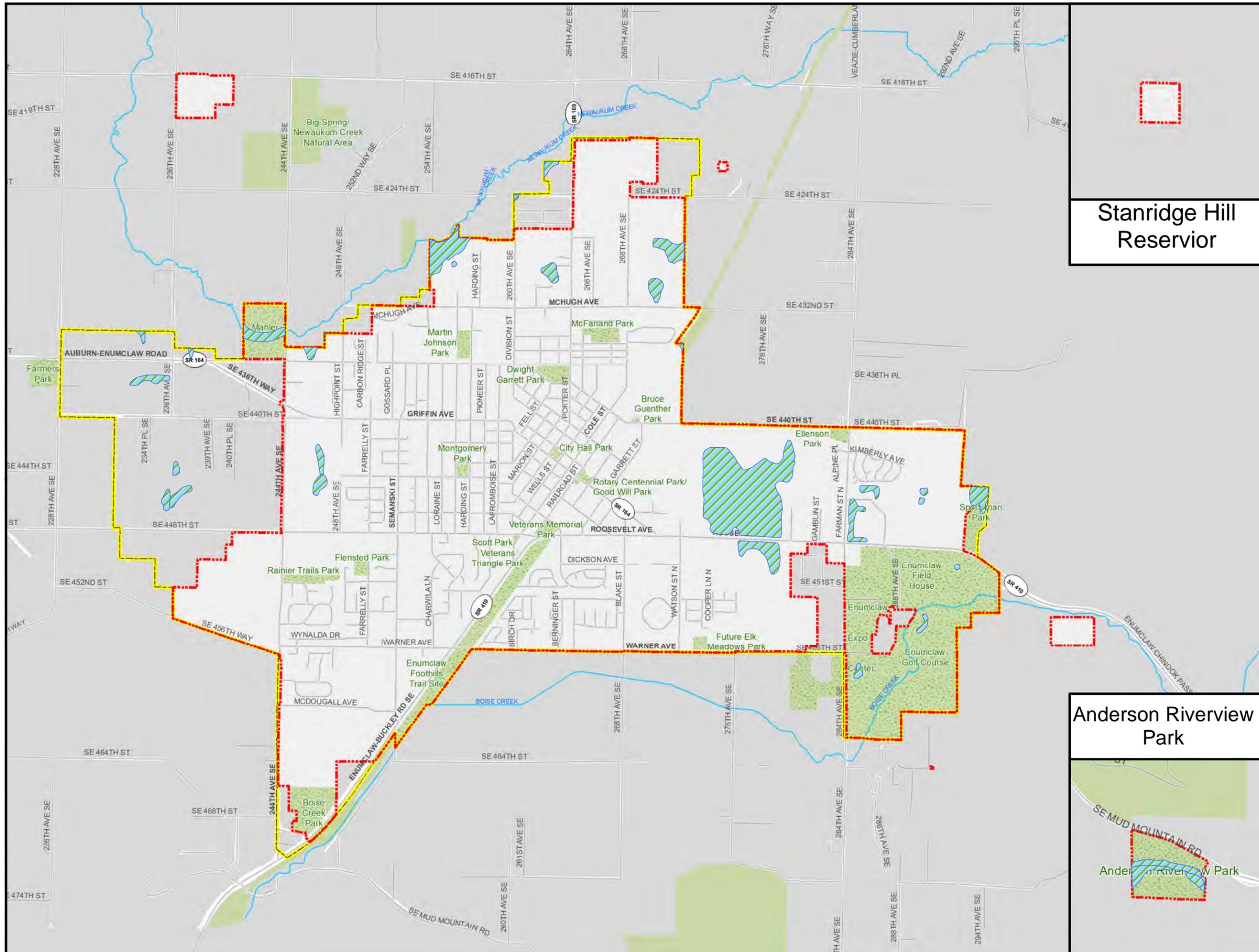
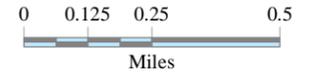


Figure 8.4 Enumclaw's Wetlands

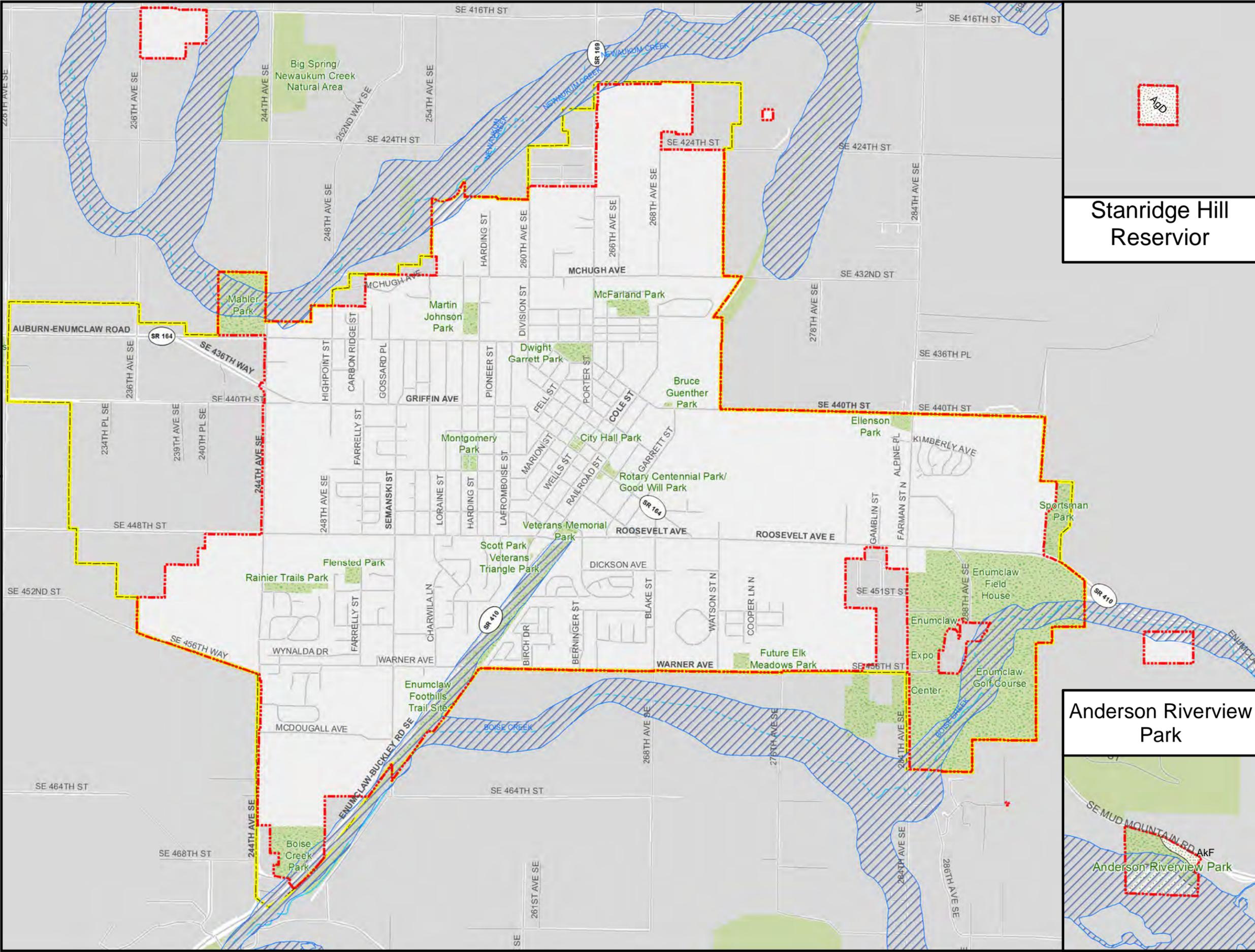
**100- Year Floodplain**

**LEGEND**

-  Enumclaw City Boundary
-  Floodplain
-  Urban Growth Boundary
-  Roads
-  Creeks
-  City Owned Parks
-  Other Parks



*The City of Enumclaw makes every effort to provide correct information, but makes no representation as to the completeness or accuracy of this map.*



**Stanridge Hill Reservoir**

**Anderson Riverview Park**

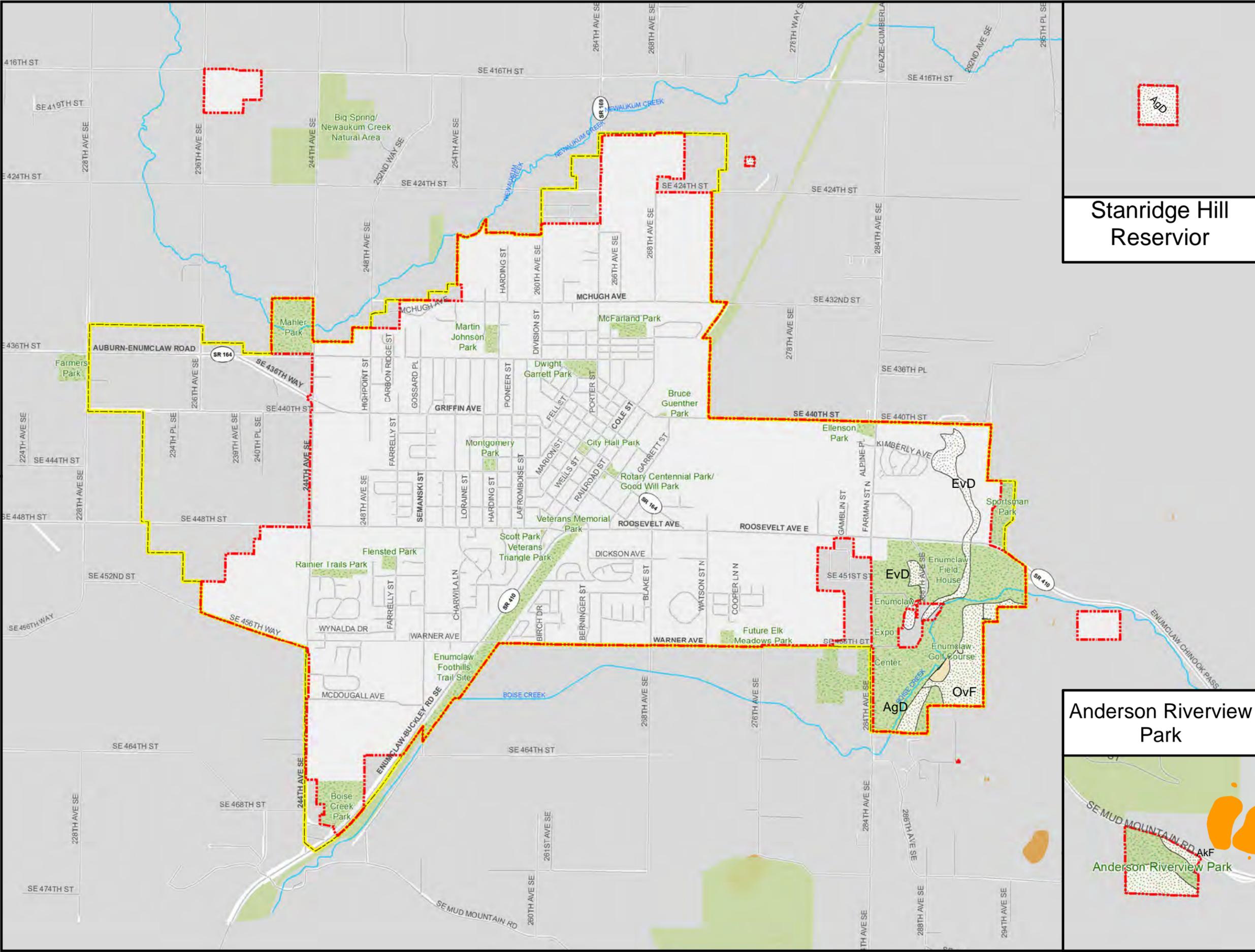


Figure 8.5 Enumclaw's Frequently Flooded Areas

**EROSION AND LANDSLIDE HAZARD AREA MAP**

**LEGEND**

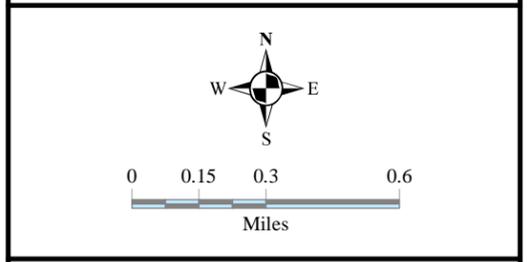
-  Enumclaw City Boundary
-  Urban Growth Boundary
-  Roads
-  Landslide Area
-  Soils with erosion per EMC 19.02
-  Creeks
-  City Owned Parks
-  Other Parks
-  Watershed Analysis Landslides



**Stanridge Hill Reservoir**



**Anderson Riverview Park**

*The City of Enumclaw makes every effort to provide correct information, but makes no representation as to the completeness or accuracy of this map.*

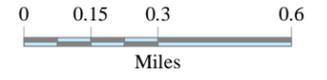
Figure 8.6 Geologically Hazardous Areas

**EARTHQUAKE & SEISMIC HAZARD AREA MAP**

**LEGEND**

**Earthquakes gt 1M depth  
 Earthquake Depth (km)**

- 0.1 - 5.5
- 5.5 - 13.0
- 13.0 - 22.0
- 22.0 - 30.0
- 30.0 - 98.5
- Enumclaw City Boundary
- Urban Growth Boundary
- Roads
- Creeks
- City Owned Parks
- Other Parks



*The City of Enumclaw makes every effort to provide correct information, but makes no representation as to the completeness or accuracy of this map.*

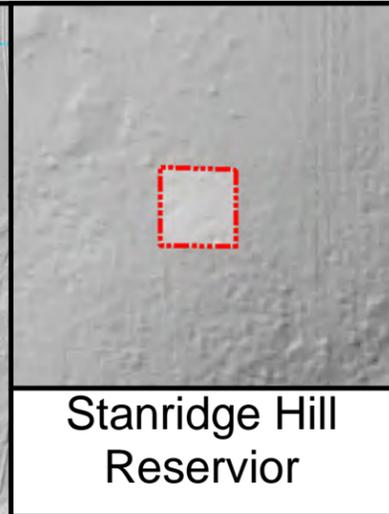
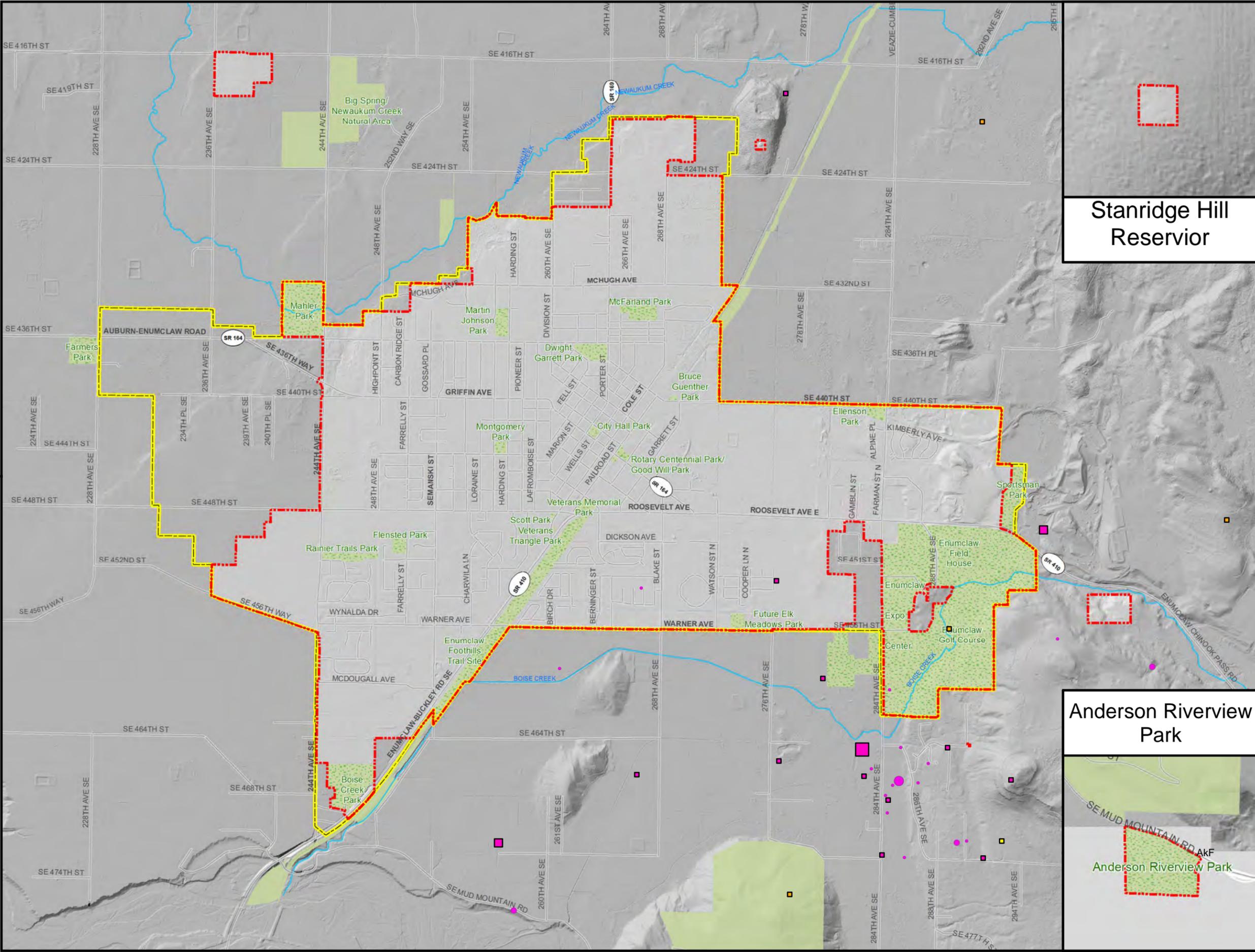


Figure 8.6 Geologically Hazardous Areas

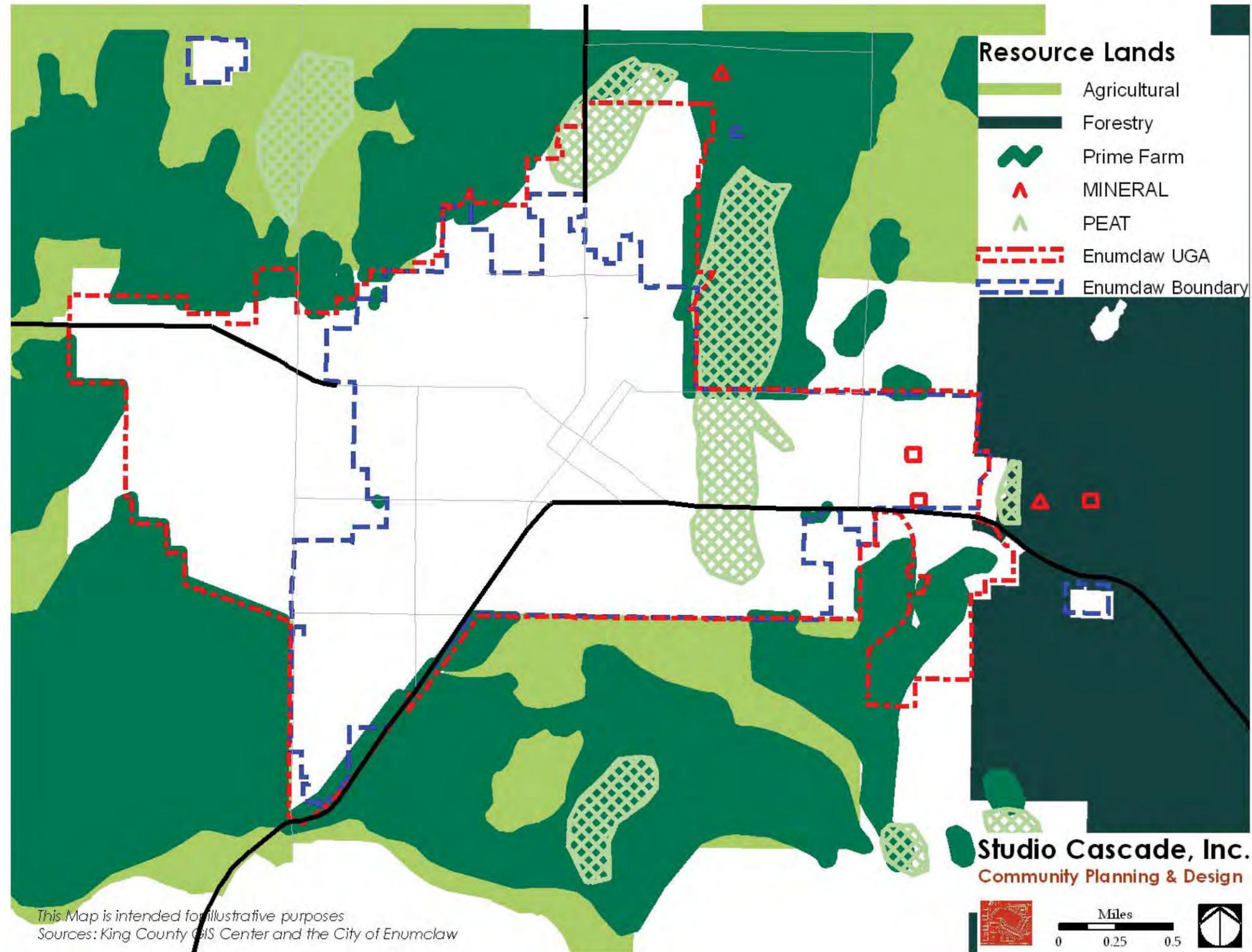


Figure 11.6 Enumclaw Natural Resource Lands