10.200 Areas Subject to Natural Hazards

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10.200 AREAS SUBJECT TO NATURAL HAZARDS

Statewide Planning Goal 7: Areas Subject to Natural Hazards

"Protect people and property from natural hazards"

Statewide Planning Goal 7 requires that development not be allowed to locate in known areas of natural hazards where it would be at risk of property damage and/or loss of life without appropriate safeguards. Comprehensive plans are to provide an inventory of known natural hazard areas and require measures to prevent or minimize risks to people and property. Goal 7 defines natural hazards as: "floods (coastal and riverine), landslides, earthquakes and related hazards, tsunamis, coastal erosion and wildfires". At a minimum and where applicable, local governments must address the areas where these hazards can occur. At their discretion, they may also identify and plan for other kinds of natural hazards as well.

10.210 AREAS PRONE TO FLOODING

Background

Overview – Flooding in Gresham

Because of Gresham's topography, flooding does not pose as significant a hazard to broad areas of the community as it may for other cities within the northern Willamette Valley and along the lower reaches of the Columbia River. The only major river near Gresham is the Columbia River but a dike located near the shoreline (along N.E. Marine Dr.) as well as a dam system upriver essentially protects Gresham from any severe flooding that would otherwise be caused by this large intrastate waterway. In addition, Multnomah County Drainage District #1 maintains the dike and a system of drainage ditches and pump stations immediately south of the dike, from Troutdale to the Willamette River in Portland. These facilities help to minimize flooding in the entire Columbia River South Shore area.

However, waters from major flood events (e.g. 100 year floods) do inundate lands adjacent to other less significant water bodies in the area. These are the Columbia Slough, Johnson Creek, Fairview Creek and, to a lesser degree, Kelly Creek and Burlingame Creek. The 100-year floodplain areas associated with these streams are shown on Map # 1.

Within these areas flooding can pose a significant hazard. Its effects range from inconvenience to the potential for loss of life and property. Development and other activities within the floodplain such as filling and removing vegetation can make flooding worse by decreasing the area available for the storage and conveyance of floodwaters. When this occurs floodwaters are displaced onto lands not previously subject to flooding. Also, the velocity of floodwaters is often increased. Furthermore, buildings and bridges within the floodplain can function as dams during flooding and cause greater upstream inundation.

Urban development also increases the potential for flooding. This is because buildings and impermeable surfaces such as pavement cover lands that rainwater was once able to soak into.

Natural features like wetlands and riparian areas function as "natural sponges" that absorb and then gradually release surface water runoff. When these features are lost to urban development and replaced by pavement and buildings, storm water immediately flows into streams. This increases both the velocity and volume of water that the floodplain must accommodate. Often the result is an increase in the height of the floodplain and greater flooding.

The annual flood season in northern Oregon extends from October to April. The greatest potential for flooding occurs during December and January, when water-laden soils and streams can no longer convey runoff from heavy winter rains. This is often accompanied by runoff from the melting of lower elevation snow in the Cascades, such as occurred during the 1996 winter flood. Infrequent but intense rain events of relatively short duration can also cause local flooding during the summer months. An example is a two-hour thunderstorm that occurred in Gresham on 8/25/04, which flooded parking lots and streets.

The FEMA Program & Gresham's Participation

Gresham participates in the National Flood Insurance Program, which is administered by the Federal Emergency Management Agency (FEMA). FEMA develops national standards for developing in floodplains and conducts floodplain insurance studies. Floodplain insurance studies are used by FEMA to identify 100 yr. floodplains (or "flood hazard areas"), assess risks of developing in floodplains and to establish flood insurance rates. A 100-year flood, which is also called the "base flood," has a 1 percent chance of occurring in any one year. Other federal, state, and local sources are used to estimate the floodplain's location if an area subject to flooding has not been mapped by FEMA. FEMA provides Gresham with maps and a study that identifies the 100-year floodplain of major streams as well as the elevation/cross section of the floodplain at various points along a particular stream. These maps and study are made available to the public at the City's Permits Center. The most recent FEMA floodplain study for Gresham, The Flood Insurance Study and Flood Insurance Rate Maps for Multnomah County, Oregon and Incorporated Areas, will go into effect on February 1, 2019.

The Flood Insurance Program enables property owners to obtain federally subsidized flood insurance. The program also makes an area eligible for disaster relief if extensive area-wide flooding ever occurs. Participation in the program by local jurisdictions requires them to adopt the FEMA standards and apply them to new development within the mapped 100-year floodplains. They primarily require the first habitable floor of buildings to be elevated at least one foot above the 100-year floodplain elevation as well as requiring that foundations, basements, utilities, etc. be flood proofed and anchored. The City first adopted the original FEMA standards in 1980. The current version of these standards is found in the Community Development Code's Flood Plain Overlay District (Section 5.0100). The overlay district was adopted in 1988. Since then the federal government has updated the FEMA standards and the City has made the commensurate changes to the district.

The floodplain as defined by FEMA is divided into two parts: the floodway and the flood fringe. The floodway is the inner part of the floodplain (nearest to the stream) that conveys the highest velocity floodwaters and it is the most dangerous portion. It is the minimum area needed for the passage of the floodwaters so that upstream flood elevations are not increased. Floodplain management regulations require preservation of an adequate floodway area to discharge the waters of a 100-year flood without cumulatively increasing the water surface elevation by more than one foot. Consequently, new development generally has to avoid encroaching into the floodway. The flood fringe is the outer area of the floodplain that surrounds the floodway and where floodwaters are usually relatively still. The flood fringe is still subject to flooding but does not contribute appreciatively to the passage of flood flows. Both the floodway and flood fringe are delineated on the FEMA maps.

Metro Title 3 Floodplain Management Performance Standards

Flooding and its hazards is also a regional issue. Areas subject to flooding overlap many local jurisdictional boundaries. Title 3 of the Metro Functional Plan, in addition to having water quality protection standards, has standards intended to protect the flood storage capacity of floodplains. The principal requirement calls for new development in floodplains to use a "balanced cut and fill"

approach. Balanced cut and fill means that any placement of fill within the floodplain must be compensated by the removal of an equal volume of earth somewhere else in the floodplain portion of a development site. This helps to preserve the storage capacity of the floodplain and prevents it from enlarging and affecting lands not previously subject to flooding. In 1998 Gresham amended its Flood Plain Overlay district (Section 5.0125) to add Metro's Title 3 Floodplain Management Performance Standards.

Other Gresham Measures to Minimize Flooding

Multiple capital projects have been conducted by City of Gresham to attenuate the impacts of flood flows. Most notably, Gresham has constructed multiple regional water quality facilities that function to detain and slowly release storm flows. Gresham has also constructed large-scale wetland improvements within the floodplain, enhancing floodplain capacity and reducing erosive stream flows. Both types of projects protect streams and contributes to regional flood attenuation needs. Additional projects of both types are planned for the future. Gresham led a large-scale floodplain modeling update of Gresham's watersheds, starting in 2010. In 2012, the City's floodplain mapping effort was joined with a related FEMA initiative to update Sandy River basin floodplain mapping, and administration of these two projects were combined under FEMA. The result of these studies is the 2019 Flood Elevation Study and Flood Insurance Rate Maps for Multnomah County, Oregon and Incorporated Areas dated February 1, 2019.

The City has had requirements for developers to provide on-site stormwater detention for new development since the early 1990's. These standards also require maintenance of water quality. They are found in Appendix A5.200 of the development code and are titled "Surface Water Management Systems." Design standards for the required storm water detention and water quality facilities are found in the "Gresham Public Works Standards Manual". They require new development to capture and temporarily detain stormwater from its impervious surfaces by using detention ponds, swales, underground tanks, large diameter pipes, etc. Stormwater detention and treatment systems are required to be designed to accommodate storm or rainfall intensity events that, depending upon conditions and the type of development, vary from the 2-year to 25-year storm.

Gresham also promotes green development practices to retain storm water and allow it to infiltrate into the ground instead of contributing to flooding. For example, the City reconstructed S.E. Yamhill Street in Rockwood into a "green street". Green streets allow stormwater to infiltrate into the ground through the use of pervious surfaces, bio-swales and drywells rather than draining it into catch basins and pipes and then discharging it into streams. Also, Gresham will promote the protection of riparian areas along significant streams and wetlands to allow surface water to soak into the ground.

Green streets and other green stormwater practices will also be applied to Gresham's future urban growth areas, Pleasant Valley and Springwater. The urban development plans/standards for these areas will emphasize directing new development away from floodplains and protecting them as part of an environmental zone. In addition, development standards for these areas will require using natural

storm water management processes (e.g. infiltration, planting trees for greater evapotranspiration) to reduce the runoff and flood hazard potential from new development.

Summary of Major Issues

The following are some of the issues, circumstances and conditions, which were considered in the update of this Comprehensive Plan chapter.

- Flooding in Gresham is confined to relatively small areas near its creeks. The Marine Drive dike and the other drainage facilities located in the South Shore area, which are maintained by Multnomah County Drainage District #1, help prevent major flooding by the Columbia River.
- The City first adopted the FEMA regulations for developing in floodplains in 1980.
- The Community Development Code's Flood Plain Overlay District was adopted in 1988. It has been amended since to be consistent with new FEMA rules.
- The most recent FEMA floodplain study for Gresham is the Flood Elevation Study for Multnomah County, Oregon and Incorporated Areas dated February 1, 2019.
- Flooding is a regional issue because many waterways, such as Johnson Creek, cross jurisdictional boundaries. In response, Metro adopted flood plain management regulations as part of its Functional Plan (Title 3) in 1997. Metro standards require "balanced cut and fill" when fill is placed within the 100-year floodplain. Gresham incorporated these standards into its Community Development Code in 1998.
- Gresham seeks to reduce flooding impacts of existing and new development by constructing regional storm water detention facilities; requiring new development to provide on-site storm water detention; protecting undeveloped riparian and floodplain areas and where possible utilizing green practices.

GOAL, POLICIES, AND ACTION MEASURES

GOAL

Protect life and property from flood hazards.

Policies

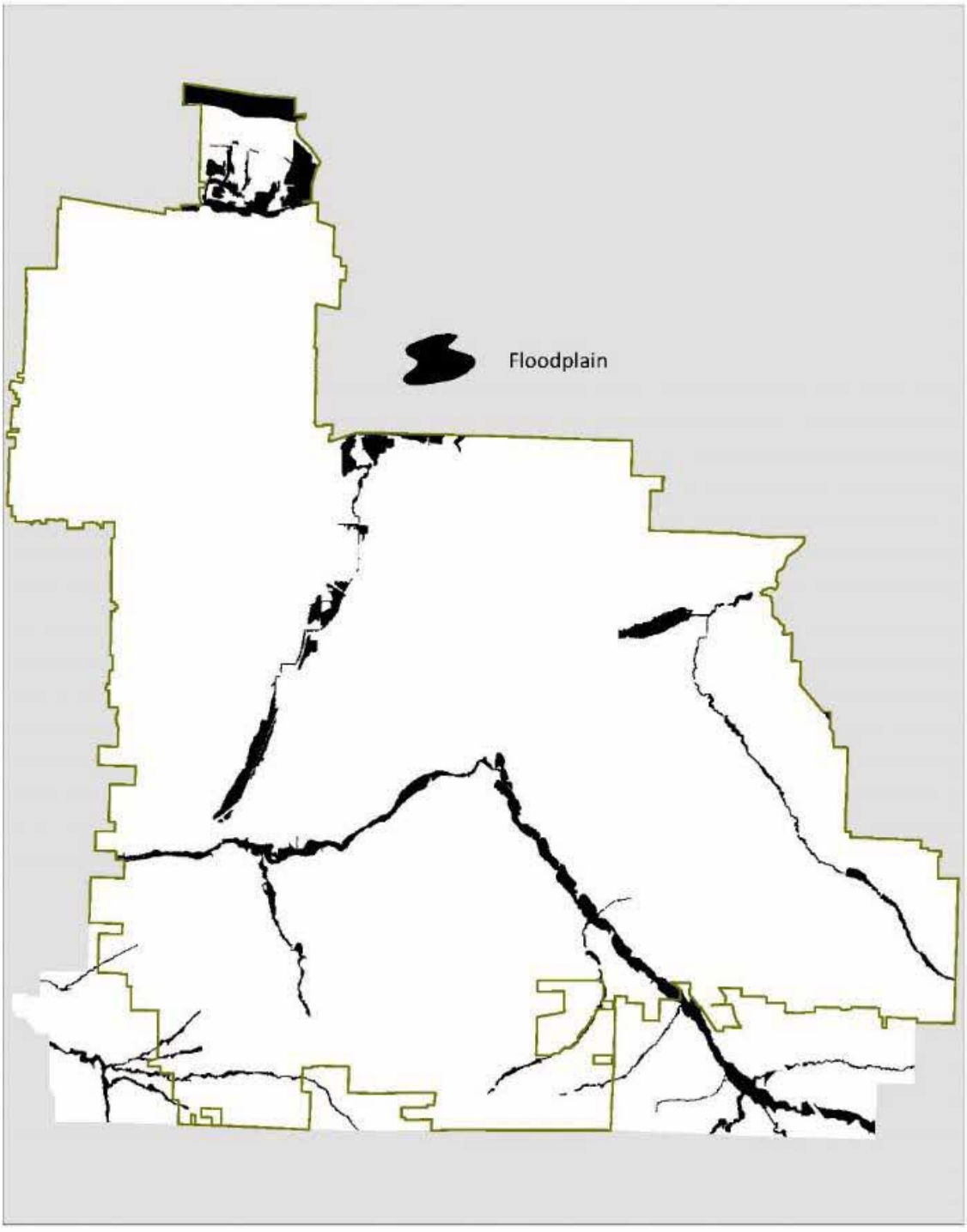
1. The City shall take measures to protect the floodwater conveyance and storage capacity of its floodplains.
2. The City shall continue to participate in the National Flood Insurance Program, comply with Federal Emergency Management Agency (FEMA) and Metro Title 3 Floodplain Management Standards, and when necessary, amend its Flood Plain Overlay District map and standards accordingly.

3. The City shall maintain and make available to the public, a current inventory of Gresham's 100-year floodplain areas as mapped by FEMA and the Army Corps of Engineers.
4. The City shall require new development to utilize surface water management practices, which reduce the potential for flooding.
5. The City shall preserve the floodwater storage and conveyance capacity of floodplains in new urban areas, including Springwater and Pleasant Valley, by minimizing development within floodplains.
6. The City shall protect its wetlands, watercourses and their riparian edges in order to safely contain and gradually convey floodwater and allow it to infiltrate into the ground as much as possible.
7. The City shall use federal, state and local sources to estimate the floodplain's location if an area suspected to be subject to flooding has not been mapped by FEMA. The City shall require the applicant to provide the necessary information needed to substantiate flood boundaries and elevations.

Action Measures

1. Provide information to citizens and developers about the public safety, economic and environmental benefits of protecting the water conveyance and storage capacity of the City's flood plains.
2. Coordinate with other agencies, special districts and jurisdictions drainage basin master plans, capital improvement plans and proposed flood protection strategies that affect shared watersheds and streams.
3. Coordinate with the Army Corps of Engineers, FEMA and other responsible state, regional, and local agencies regarding:
    a. Review and update of floodplain maps and regulations needed to comply with federal standards, and
    b. Emergency operations planning necessary to protect life and property during a major flood event.
4. Where practical and as resources become available, restore the floodwater storage and conveyance functions of wetlands and natural watercourses.
5. Promote the public acquisition of property and easements within floodplains needed for the conveyance and storage of floodwaters and which can also be used for complimentary uses such as open spaces, wetlands restoration, passive recreation opportunities and regional stormwater detention facilities.

Map No. 1 – FEMA 100-Year Floodplains



Amended by Ord. 1794 passed 12/18/18; effective 1/17/19

10.211 STEEP SLOPES & LANDSLIDES

Background

Overview

The general term landslide refers to a range of slope movement processes including rock falls, debris flows, earth slides, and other mass movements. The main triggers of landslides are precipitation, earthquakes, and human activity.

Landslides not caused by humans are a natural process; they shape the landscape and contribute to the overall environmental quality of our world. There are benefits to landslides: "The ecological role that landslides play is often overlooked. Landslides contribute to aquatic and terrestrial biodiversity. Debris flows and other mass movement play an important role in supplying sediment and coarse woody debris to maintain pool/riffle habitat in streams. As disturbance agents, landslides engender a mosaic of seral stages, soils, and sites (from ponds to dry ridges) to forested landscapes."[4] However, when a landslide impacts people, property, or assets (e.g., roads, buildings, and infrastructure), and the environment in a harmful way, it is a natural hazard.

Landslides are a part of the natural process but can affect environmental assets. For example, mass erosion due to landslides may be the source of as much as 50% of the sediment found in a watershed. Human behavior and urbanization may lead to removal of vegetation, alteration of topography (e.g., grading, cutting, and filling), erosion, addition of impervious surface, alteration of natural waterways, changes in stormwater flow, increase in people living in an area (compacting soil, increase in trash) and other activities that may result in landslides that impact people, property, and the environment. These factors of human behavior and urbanization are precursors that increase the risk of landslides. This can result in a single landslide event or a series of cascading events, which may be more than one landslide, or a landslide and another hazard. One environmentally specific result of a landslide can be a dramatic increase in the overall amount of sediment deposited into waterways. Sediment can affect surface water collection systems, fish and wildlife, and the natural environment.

And, although landslides are generally thought of as localized events, occurring on individual hillsides or slopes, big rainstorms or earthquakes can cause large, catastrophic landslides (such as the 2014 Oso landslide in Washington State) or hundreds of smaller landslides within a relatively short time across a wide region (such as the Portland metropolitan area in the winter storms of 1996). These are but two of the ways landslides can be natural disasters.

Landslides lead to an estimated 1-2 deaths a year in Oregon, the average annual loss of life is estimated to be nearer to one or two lives per year (Beaulieu and Olmstead, 199913). However, larger

[4] Geertsema, M., Highland, L., & Vaugeouis, L. (2009). Environmental impact of landslides. In K. Sassa & P. Canuti (eds.) Landslides – Disaster risk reduction. Springer, berlin, Heidelberg, doi: https://doi.org/10.1007/978-3-540-69970-5_31

scale events have the potential to cause mass casualties. The winter storms of 1996 led to eight deaths in Oregon due to several individual landslides (Beaulieu & Olmstead, 199914).

As the state's population grows, easy-to-develop lands tend to be the first areas developed, leaving more difficult-to-develop areas such as landslide- or other hazard-prone areas. Landslide hazard areas are often areas with steep slopes and higher elevation. These areas can be desirable lands for development, e.g., view properties, that command high prices. They can be complicated to develop, but they become "worth it." Developing in landslide hazard areas puts more people, structures, and infrastructure in hazard areas. Landslides can have direct and indirect effects on people. Landslide materials blocking roads are probably the most common impacts from landslides. A landslide in January 2017 undermined a section of NW Newberry Road in Multnomah County, forcing a road closure until April 2019 (Multnomah County, 201815). For people who use these roads to commute and transport goods, the effect can be costly in both time and money.

Oregon is a landslide prone state, with economic losses potentially exceeding $100 million in direct damage from landslides during severe winter storms. Even without these large events, landslides are a chronic hazard in Oregon, with annual average maintenance and repair costs for landslides in the state estimated at over $10M. A study for the Portland region found approximately 1,700 landslides have occurred within the City of Portland during the last 90 years (1928-2016). Of these landslides, approximately 830 occurred during the severe storms in 1996. From these historical data, researchers estimated an average of 20 landslides per year in the City of Portland. They also estimate annual loss from landslides in the City of Portland ranges from $1.5M to $3M. In years with extreme winter storms, this estimate can increase to approximately $64M to $81M. Burns et al. (201819) found that approximately $1.65B in aldn and buildings and almost 6,700 people are located on existing landslides in the Portland metropolitan area. They also found that in some communities, almost 50% of modeled damage and losses in a major earthquake are from landslides triggered by earthquakes. Gresham is included in the Portland area data.

Besides being initiated by natural processes, the following are examples of man-made changes to hillside areas that can increase the susceptibility for landslides to occur:

- **Excavation/Grading:** Excavation is often needed to build homes or roads on sloping terrain. Grading can result in some slopes that are steeper than the pre-existing natural slopes. Since slope steepness is a major factor in landslides, these steeper slopes can be at increased risk for landslides. The added weight of fill and structures can also increase landslide susceptibility.
- **Drainage Alterations:** Man-made alterations to natural drainage patterns can be a factor that triggers landslides. Broken or leaking water/sewer lines can be problematic as can surface drainage retention facilities that direct water onto slopes. Lawn irrigation and minor alterations to small streams can also result in landslides. Also, surface drainage from the impervious surface areas of development reduces the opportunity for water to be absorbed into the ground and can create flows that cause erosion of slopes and unstable soil conditions.

- **Vegetation Removal:** Removing vegetation, such as trees from hillsides, also increases the potential for landslides. In particular, trees through their root systems are capable of holding very large amounts of soil that help to stabilize steep slopes. A recent study by the Oregon Department of Forestry of active landslide sites on state forestlands found that 75% of such sites had been logged during the last 10 years.

Oregon's Landslide Related Agencies & Programs

The Department of Land Conservation and Development (DLCD) assists state agencies and local jurisdictions in implementing Statewide Planning Goal 7, Natural Hazards. Goal 7 requires jurisdictions to adopt comprehensive plan policies and implementing measures to protect as much as possible, people and property from natural hazards. Landslides are one of the natural hazards mentioned by Goal 7. In 2019 DLCD published *"Landslide Hazards: Land Use Guide for Oregon Communities"* in conjunction with Department of Geology and Mines (DOGAMI). The DLCD natural hazards planning guide, *"Planning for Natural Hazards"*, also addresses landslides. During the last decade, DOGAMI has produced lidar-based, detailed landslide inventory, shallow landslide susceptibility, and deep landslide susceptibility maps for many communities in Oregon. Lidar, a form of laser technology, has significantly increased the ability to locate and map existing landslides. Lidar allows mappers to see the earth's surface with a much higher level of detail than has ever been available, and as the technology continues to improve, so too does the level of detail. Lidar even allows mappers to see the ground beneath vegetation and trees, as if the earth had been stripped bare. This gives geologists the ability to identify and map landslide features that may have previously been unrecognized or overlooked. Additionally, Lidar technology has enhanced DOGAMI's ability to model landslide susceptibility and improved the quality of topographic data such as elevation, slope, and contour lines.

Gresham's Steep Slope/Landslide Related Standards

Gresham relies upon DOGAMI's landslide inventory, shallow landslide susceptibility map and high landslide susceptibility maps published as Interpretive Map 57 as well as the 2014 LiDAR-derived Digital Elevation Model (DEM) produced by DOGAMI's Oregon Lidar Consortium to create a Hillside and Geologic Risk Overlay (HGRO). The HGRO is based on accumulations of landslide hazards.

Gresham has further chosen to protect areas of 35% slope or greater due to their increased likelihood of risk but also their other values (such as aesthetics and tree canopy).

- Among the purposes of this overlay is to ensure that development proposed on or near hillsides conforms to the natural topography and minimizes the potential of earth movement such as landslides. In general, this overlay limits the percentage of each lot and the overall site area with greater accumulation of geologic risk that can be graded (for building pads, driveways, etc.) and essentially requires that sites with slopes greater than 35% be developed through the planned development (PD) process. A PD must dedicate at least 30% of the steeper parts of the site as open space. Also the PD standards allow less housing density (or larger lots) on heavily slope areas. The hillside standards require a geotechnical professional review and certify a

development application in order to mitigate increased hazard that would otherwise be created.

- Gresham also regulates the removal of trees and other vegetation on hillsides through the Hillside and Geologic Risk Overlay.
- Gresham's Building Division reviews building permit applications for compliance with the state building code (adopted IBC and IRC) requirements. These include those standards related to placing structures on sloped sites.
- Gresham's development code (Section 9.0500) has city-wide requirements for grading, drainage, erosion control and stormwater detention/treatment. These include specific design standards that limit the steepness of cuts and fills and the composition and compaction of fills. The erosion control standards are intended to prevent soil movement during construction and the sedimentation of waterways. They require applicants to submit an erosion control plan as part of their permit application and to implement the best management practices that are described in the City's erosion control manual.

Summary of Major Issues

The following are some of the issues, circumstances and conditions, which were considered in the update of this Comprehensive Plan chapter.

- Landslides are natural events that can be exacerbated in intensity and frequency by development related activities such as grading and vegetation removal. They typically occur on steep hillsides such as found in the Columbia River Gorge and on the buttes in south Gresham.
- Geologists acknowledge that Gresham has been the site of a number of landslides and has areas that due to slope, geology, and other factors are at high or moderate risk of a number of different types of landslide and DOGAMI and DLCD have provided guidance in adopting development standards for risk reduction and authorized local jurisdictions to adopt development regulations for these areas in order to protect lives and property.
- Gresham controls development on hillsides with accumulations of Geologic Risk primarily through its Hillside and Geologic Risk Overlay and associated special purpose district map. Gresham also implements applicable state building code standards for locating structures on sloped areas such as through its geotechnical certification requirements for proposed foundations and retaining walls.

GOAL, POLICIES, AND ACTION MEASURES

GOAL

Protect life and property from hazards associated with landslides and unstable soils.

Policies

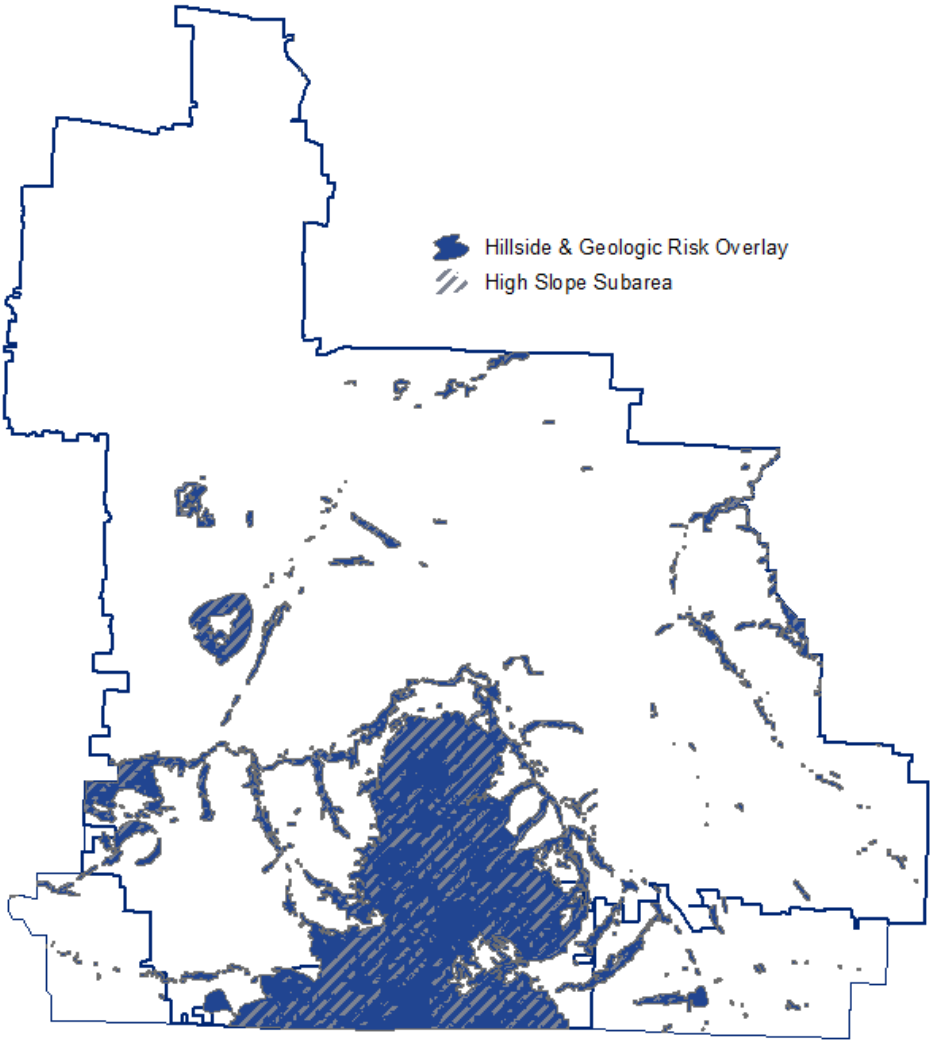
1. The Community Development Code shall discourage land divisions in areas over 35% slopes. Property that is entirely above 35% slopes may be improved to the extent of one dwelling per existing lot of record. Subdivisions of land that are partially above 35% slope shall not generally include development of the portions in excess of 35% slope. Limited development of the portions of the site on greater than 35% slopes may be permitted when these steep slopes encroach into areas which are logical dwelling locations and engineering studies determine that development will be in compliance with accepted engineering design principles. Dwellings planned on greater than 35% slopes may be permitted when located within a Planned Development of 10 or more acres in size; and occur on land which is not susceptible to earth movement or landslide hazards; and where construction and design methods are employed to minimize cuts, fills and other potential adverse impacts.
2. Limited development on greater than 35% slopes may occur for a residence on a vacant lot of record, trails/multi-purpose paths, and for the logical extension and provision of public facilities, utilities, and driveways, where construction and design methods are employed to minimize cuts, fills, and other potential impacts. With these exceptions and those related to planned developments (Policy #1), all other sloped areas of greater than 35% on development sites shall be protected by an easement or by dedication of an open space tract.
3. Land divisions on slopes greater than 35% shall only be allowed through the Planned Development (PD) process. The PD standards for hillside development shall encourage the transfer of density to those site areas with less geologic risk, and limit the amount of sloped areas greater than 35% that can be included as part of building lots.
4. Removal of trees on slopes over 15% shall be restricted to prevent clear cutting and to limit removing trees with a trunk diameter of 8-inches and greater.
5. City development standards for areas with an accumulation of landslide risk shall limit the amount of site area that can be graded, cleared of vegetation, or otherwise disturbed.
6. Development on areas with an accumulation of landslide risk will require a geotechnical professional to review design and certify that a development will mitigate any increased hazard that would otherwise be created and the applicant must certify that development will follow geotechnical specification and recommendations.

   In addition, development within an area identified on the Hillside and Geologic Risk Overlay shall require a geotechnical professional to review designs and verify a development will mitigate any increased hazard that would otherwise be created.
7. Development on areas with an accumulation of landslide risk shall be required to handle surface water runoff in a way that will not destabilize slopes, increase erosion or degrade water quality.

Action Measures

1. The City will continue to protect steep slopes and landslide hazard areas as public open space/wildlife habitat as Metro bond measure funds and other funding sources become available for this purpose.
2. Provide staff resources to inspect hillside developments that are under construction in order to ensure their compliance with erosion control, drainage and slope stability standards as well as compliance with development code limitations on grading and the removal of trees and other vegetation.
3. Encourage and offer incentives for innovative site designs (such as clustering dwelling units) that exceed City standards related to allowed slope disturbance, tree removal, etc., and which propose to set aside a substantial amount of the site as protected open space.
4. Update Gresham's hillside maps/development standards so that they reflect new maps and other current information from DOGAMI, etc. about the location and severity of potential landslide hazards, recommended content for geologic/geotechnical reports and how landslide risks can be minimized.
5. Provide information to the public on the City's website and at the building permits center about preventing landslides and soil erosion on hillsides. This should include landslide hazard maps and information about potential risks, using innovative building design techniques for hillsides, using native plantings to stabilize slopes instead of installing lawn, managing surface water runoff to avoid soil erosion and how to minimize cuts and fills.

Hillside and Geologic Risk Overlay Map



10.212 EARTHQUAKE HAZARDS

Background

Overview

An earthquake is defined as the "perceptible trembling to violent shaking of the ground, produced by the sudden displacement of rocks below the earth's surface." Rocks respond to stress (being squeezed or pulled apart) near the earth's surface by breaking. Where the rocks break and move, a fault is produced. The gradual buildup of tectonic forces along a fault followed by the sudden release of stress is what causes an earthquake. An earthquake's epicenter is the position on the earth's surface directly above the focus of the earthquake. The focus is the location within the earth where underground rock moves and sends out earthquake energy waves which in turn cause ground shaking.

Scientists have measured the energy released from earthquakes for more than 50 years. This energy is measured in terms of "magnitude" on the Richter Scale, invented by Charles Richter in 1934. The largest vibration or seismic wave from an earthquake is measured and recorded on a seismograph. The Richter Scale is logarithmic, that is, an increase of 1 magnitude represents an increase of 10 times in an earthquake wave amplitude (height) as it appears on a seismograph. For example, the seismic waves of a magnitude 6 earthquake are 10 times greater in amplitude than those of a magnitude 5 earthquake, and 100 times greater than a magnitude 4. However, in terms of energy release, a magnitude 6 earthquake is about 30 times greater than a magnitude 5, and 900 times greater than a magnitude 4. Earthquakes with a magnitude of 2 or less are called microquakes and are not usually felt. Magnitude 3 and 4 quakes are commonly felt but rarely cause damage. Damaging ground shaking can accompany a magnitude 5 or 6 event, and major damage can occur from earthquakes of magnitude 7 and above. The Richter Scale has no upper limit.

Earthquakes occur along two types of faults: deep (10-60 miles) subduction zone faults and shallower (0-10 miles) crustal faults. A subduction zone is defined as the location where two tectonic plates collide, with one plate sliding underneath the other. Tectonic plates are approximately 60-mile thick slabs of earth that move and interact with each other, producing not only earthquakes but volcanic eruptions as well. The plates do not slide smoothly past each other. They tend to lock up, build pressure and, at some point, release the pressure dramatically in the form of an earthquake. Subduction zone earthquakes typically affect a much larger area than crustal fault earthquakes and also produce tsunamis. A tsunami is a fast moving and tall, powerful wave caused by the uplift of the sea floor near shorelines. Tsunamis arrive in minutes and are often more destructive to coastal communities than the earthquakes that produce them. In the case of the Northwest, a subduction zone called the Cascadia Subduction Zone is located 300 miles offshore in the Pacific Ocean. There, the denser Juan de Fuca Plate is being subducted or pushed under the more buoyant North American Plate.

Oregon also has many geologically active crustal faults. They are especially prevalent in the Cascades, south-central Oregon (Klamath Falls), northeastern Oregon, the coast range and in the West Hills/downtown area of Portland. These faults are more of a local problem, especially to those who are geographically close to these faults. They are capable of producing magnitude 7 earthquakes and are typically closer to population centers. As a result, a smaller magnitude earthquake could result in as much damage to people and property as an earthquake originating in the Cascadia Subduction Zone.

Although present Northwest residents have not experienced a large earthquake, such earthquakes have happened in the recent geological past. Strong evidence suggests that a large earthquake of at least magnitude 9 occurred along the Cascadia Subduction Zone as recently as 1700. It was powerful enough to create a tsunami that destroyed Native American settlements along the British Columbia, Washington, and Oregon coasts as well as affecting Japan. Geologists believe such subduction zone earthquakes have occurred along the coast every 300 to 800 years for the last 11,000 years. During the last 11 years, smaller scale earthquakes associated with crustal faults have also occurred which nonetheless have caused much property damage. These were the 1993 Scotts Mill earthquake near

Molalla that caused $30 million dollars in damage, the 1993 Klamath Falls earthquake that caused two deaths and $10 million dollars in damage, and the 2001 Olympia, Washington earthquake that caused 400 injuries and $3 billion dollars of damage.

In addition to tsunamis which affect coastal areas, there are three basic hazards associated with earthquakes. These hazards are ground shaking, landslides on steep slopes, and liquefaction near water bodies.

Ground shaking is the motion caused by seismic waves of an earthquake and is the primary cause of earthquake damage. The strength of ground shaking depends on the magnitude of the earthquake, the type of fault movement, and distance from the epicenter. Ground shaking can be amplified or attenuated by near surface soils. Buildings on poorly consolidated and thick soils will typically suffer more damage than buildings on consolidated (i.e. firm, hard) soils and bedrock. Alluvium soils (deposited by rivers) in particular, such as those found in the Willamette Valley and most of the Portland area can amplify seismic waves and increase ground shaking. Building construction and design contributes greatly to the ability of structures to withstand ground shaking. Wood structures tend to suffer less damage than buildings made of brick or un-reinforced masonry. Ground shaking can also rupture utility lines (water, natural gas, etc.) and damage roads and bridges.

Steep slopes can be very hazardous during and after earthquakes. Landslides are the downslope movement of rock, soil, vegetation, etc. Water plays a pivotal role by decomposing and loosening rock, lubricating rock and soil surfaces to allow movement and by making soil particles buoyant which overcomes their inertia to move. In the long rainy season of winter and spring, soils can become saturated with water and an earthquake during this time can trigger a rapidly moving landslide.

Earthquakes can turn soil into quicksand in a process called liquefaction. This typically occurs along river channels, lakes, bays and other major water features where there is a relatively high water table. Earthquake shaking causes the water pressure to increase and the water table to rise. The air spaces between the soil particles soon become filled with water, friction or cohesion is decreased, and the particles can then readily move. Consequently, the strength of the soil decreases and with it the ability to support building foundations, bridges, etc. Granular soils (gravel, sand and silt), because of their loose consolidation, are more susceptible to liquefaction when located next to water bodies.

Oregon's Earthquake Related Agencies & Programs

The Department of Land Conservation and Development (DLCD) assists state agencies and local jurisdictions in implementing Statewide Planning Goal 7, Natural Hazards. Goal 7 requires jurisdictions to adopt comprehensive plan policies and implementing measures to protect as much as possible, people and property from earthquakes and other natural hazards. Also, the Goal 7 guidelines state that local governments should coordinate their land use plans with mitigation programs, response, recovery, and emergency preparedness. DLCD has also developed a guide for local jurisdictions to use for natural hazards mitigation planning titled: *"Planning for Natural Hazards, Oregon Technical Resource Guide, 2000."* In addition to DLCD, the following state agencies and committees are also involved with earthquake awareness/preparedness and other natural hazard issues:

- **Department of Geology and Mineral Industries (DOGAMI) -** Besides regulating mining, DOGAMI produces maps about Oregon's geology and geologic hazards including Oregon's active faults, earthquake history, and seismic risk assessments. Also DOGAMI partners with other state agencies to develop natural hazard-related programs/policies and informs the public about geological hazards through its reports and website.
- **State Building Code Division -** The Oregon Building Code Division adopts statewide building construction standards that are administered by the state, cities, and counties. Recently, the state adopted the International Building Code (IBC), as well as the International Residential Code (IRC), for single family and duplexes with certain amendments. Seismic standards in these codes primarily affect the design and construction of foundations and walls.

Both the IBC and IRC refer to six different seismic zones, Zones A through F. These reflect varying degrees of ground shaking (spectral acceleration) that can occur, with Zone A having the least potential for movement and Zone F the most potential. (Maps that show these zones are available for any zip code from a USGS web site.) This classification is largely dependent on nearness to active faults and the soil type in a particular area. Zone A construction has to meet the least stringent seismic standards in the IBC and IRC, while construction in Zone F has to meet the most stringent. Eastern Oregon is within Zone C, the Willamette Valley and Portland area is within Zone D, and the Oregon coast varies between Zones D and E. The seismic standards that apply to a particular building also depend on what use category it is in. The codes have four use categories, Categories 1 through 4. Minor structures such as storage buildings are in Category 1, most residential and business uses are within Category 2, while high occupancy or critical facilities such as schools, hospitals, police and fire stations, and other emergency services structures are in Categories 3 and 4. Therefore, a Category 4 use within Zone F would be subject to the strictest seismic standards under these codes. In addition, Category 3 and 4 uses are subject to special inspections by independent third parties who have expertise in certain disciplines, such as a geotechnical engineer or a concrete testing firm. The IBC also requires that Category 3 and 4 uses be functional after an earthquake. The previous UBC code only required that such uses be designed so as to protect the lives and safety of their occupants.

Seismic upgrades to an existing building are only required when there is change in occupancy that results in putting the structure in a higher use category.

- **Oregon Seismic Safety Policy Advisory Commission (OSSPAC) -** OSSPAC is a state advisory commission created in 1990 by the governor, to promote public earthquake awareness and preparedness through education, research, and legislation. The 18- member commission is made up of state legislators, representatives from state agencies (DOGAMI, ODOT, Building Codes Division, DLCD, OEM), and from local governments, public interest groups, utility districts, and the private sector. Specifically, the objectives of OSSPAC are to: (1) develop and influence seismic safety policy at the federal, state, and local levels; (2) facilitate and improve public understanding of seismic hazards and encourage the identification of earthquake risk; and (3) support research and special studies, appropriate mitigation measures, and response/recovery actions from earthquakes. In 2000, the committee produced the document

"Oregon at Risk" which is an earthquake educational tool for policymakers, educators, and the general public.

- **Office of Emergency Management (OEM) -** OEM primarily assists local governments in recovery operations following an earthquake or other emergency, and provides information about hazards and risk reduction. It also coordinates with the Federal Emergency Management Agency (FEMA) and administers federal disaster relief funds after the president declares a major disaster. OEM has produced the *"Oregon Emergency Management Plan"* that describes how the various state agencies will make a coordinated response to an emergency. It includes specific response procedures for earthquakes. In addition OEM, in cooperation with other state agencies, produced the *"Natural Hazards Mitigation Plan."* It describes and references all of the risk reduction measures recommended in other plans and sources for various natural hazards including earthquakes.

Gresham's Seismic Risk & Preparedness Measures

Metro and DOGAMI have created a map ("Portland Metropolitan Relative Earthquake Hazards Map") that shows the various areas of the region and their relative risk of being subject to earthquake hazards, either from a subduction zone or crustal fault earthquake. These hazards are ground shaking, slope instability, and liquefaction. The map is divided into four zones: Zones A, B, C, and D. Areas in Zone A have the greatest risk being subject to one or more of the above earthquake hazards while areas in Zone D have the least risk. Most of the Zone A and B areas on the regional map are located in downtown Portland/ inner eastside and northwest Portland, the West Hills, as well as the west side of the region, particularly the Beaverton, Tigard and Tualatin areas. Zone D, the area with the least risk, affects most of east Multnomah County and Gresham.

However, there are two areas of Gresham, comprising about 20% of the city, where the higher risk zones apply. These are the Columbia River shoreline area in the north part of the city and the buttes in the south part. The shoreline area, between the river and slough, is within Zone A (greatest risk) and Zone B because of its shallow water table and the potential for liquefaction during an earthquake. The slopes of Grant Butte and Gresham Butte are within Zones B and C because of their potential for slumping and landslides.

Gresham has addressed the potential damage from earthquakes in the following areas:

- The Gresham Emergency Operations Plan (EOP) sets forth the City's action plan and describes how its departments will respond to various natural hazards and other emergencies. Section III-B of the plan addresses earthquakes. In addition to structural damage to buildings, the plan states that an earthquake of between 6.0 and 8.0 on the Richter Scale may include fires/explosions, disruption of vital services such as water and power, looting, and flooding from dam failures on the Columbia and Sandy rivers. The emergency actions listed in the EOP that describe how the City would respond to an earthquake take these possible consequences into account.

- The City's Building Codes Division of the Community Development Department (CDD) reviews building permit applications for compliance with IBC and IRC requirements. The division has a structural engineer who reviews plans for buildings subject to the above-described state seismic standards.
- The Hillside and Geologic Risk Overlay does not directly address seismic risks, however it does help mitigate one of the most common secondary risks, landslides.

Summary of Major Issues

The following are some of the issues, circumstances, and conditions that were considered in the update of this comprehensive plan chapter.

- Oregon has a geologic history of large-scale Cascadia Subduction Zone earthquakes that have affected a wide area of the Pacific Northwest, as well as localized crustal fault earthquakes of smaller magnitude. If the epicenter of a crustal fault earthquake is located in or near an urban area, it is still capable of causing much damage and loss of life.
- There are four earthquake related hazards: tsunamis, ground shaking, liquefaction near water bodies, and landslides on steep slopes. The latter three could affect the Portland area.
- There are five state entities involved with earthquake awareness and preparedness. These are: the Department of Land Conservation and Development (DLCD), Department of Geology and Mineral Industries (DOGAMI), State Building Codes Division, Oregon Seismic Safety Policy Advisory Commission, and the Office of Emergency Management.
- Compared to the rest of the region, most of Gresham and east Multnomah County has been found by DOGAMI to have the least risk of experiencing major earthquake damage. However, the Columbia River shoreline area and the slopes of the buttes have the potential for liquefaction and landslides, respectively.
- Gresham has addressed the potential for damage from earthquakes through its Emergency Operations Plan, applying building code seismic standards to new structures and ensuring that development on hillsides is designed and constructed in a way that takes into account seismic risks and the potential for landslides.

GOAL, POLICIES, AND ACTION MEASURES

GOAL

Protect life and property from earthquake damage.

Policies

1. The City shall coordinate with Oregon Department of Geology and Mineral Industries (DOGAMI), Metro, and other agencies in the maintenance of up-to-date earthquake hazard maps and related information.
2. The City shall, as required and as new seismic risk information becomes available, adopt regulations to protect the public from earthquake hazards.
3. The City shall coordinate its earthquake emergency response planning with the Federal Emergency Management Agency (FEMA), Multnomah County Emergency Management Department, neighboring cities, and other government agencies.
4. The City shall require new development to comply with all applicable seismic building and development code standards for minimizing earthquake damage.
5. In regard to public facilities:
    a. The City shall design and construct public facilities in a way that takes into account potential earthquake hazards.
    b. The City shall upgrade the seismic resistance of existing public facilities to meet current standards, as funds become available.

Action Measures

1. Maintain and make available to the public, current earthquake hazards information such as earthquake hazards maps, earthquake preparedness tips for homes/schools/businesses, and seismic-related building code standards for developers.
2. Integrate earthquake safety planning into City operations.
3. Review and modify as necessary, to reflect current resources and new seismic information, the City's Emergency Operations Plan that describes how the City's departments will respond to an earthquake and its after-effects.
4. Assess potential earthquake damage to the City's infrastructure and plan for corrective measures, especially in the most seismically vulnerable parts of Gresham, i.e. near the Columbia River shoreline and on the slopes of the buttes.

(Amended by Ord. 1620 passed 2/21/06; effective 3/23/06)
(Amended by Ord. 1464 passed 12/1/98; effective 1/1/99)
(Amended by Ord. 1346 passed 1/17/95; effective 2/16/95)

10.220 NATURAL RESOURCES

10.221 NATURAL RESOURCES, FISH AND WILDLIFE HABITAT, WATER RESOURCES AND ECOLOGICALLY AND SCIENTIFICALLY SIGNIFICANT AREAS

Summary of Findings

Natural resource catalogue efforts at the city of Gresham have been evolved from the time of the City's original Inventory of Significant Natural Resources and Open Spaces (1988), which was a "windshield and limited field work" inventory, to today's sophisticated GIS date-derived records that are refined where possible with field site visits to confirm presence and extent of jurisdictional features and compared against aerial photo interpretation results. Since 2001, resource catalogues have included this combination of GIS analysis, field review, and comparison with aerial photos. These composite methods have been used to identify the present catalogue of protected resources and risk mitigation areas, including: water quality resource wetlands, streams, riparian corridors, upland habitat areas, floodplain management areas, and geologic risk areas. These resources provide complex ecological functions that impact public safety, water quality, habitat values, and community livability, as discussed below. Policies and strategies within this category are intended to protect the most significant of these resources while allowing appropriate degrees and types of development where impacts to these resources can be minimized (Sections 2.300 to 2.370 - Findings document).

Policies and codes outlined in this section have been developed by the City to comply with federal and state regulations to protect water quality, reduce pollutant impacts, and provide habitat for federally listed salmonid species, and have been developed to ensure substantial compliance with Metro's Urban Growth Management Functional Plan Title 3 (which complies with Oregon Land Use Planning Goals 6 and 7) and Title 13 (which complies with Oregon Land Use Planning Goal 5).

Natural Resources Policy

It is the policy of the City to assist in protecting the quality and quantity of the following resources:

1. Surface water resources
2. Floodplain function
3. Groundwater, aquifer, and drinking water protection
4. Fish and wildlife habitats.
5. Visual resources (scenic views and sites).
6. Mineral and aggregate resources.
7. Energy sources.

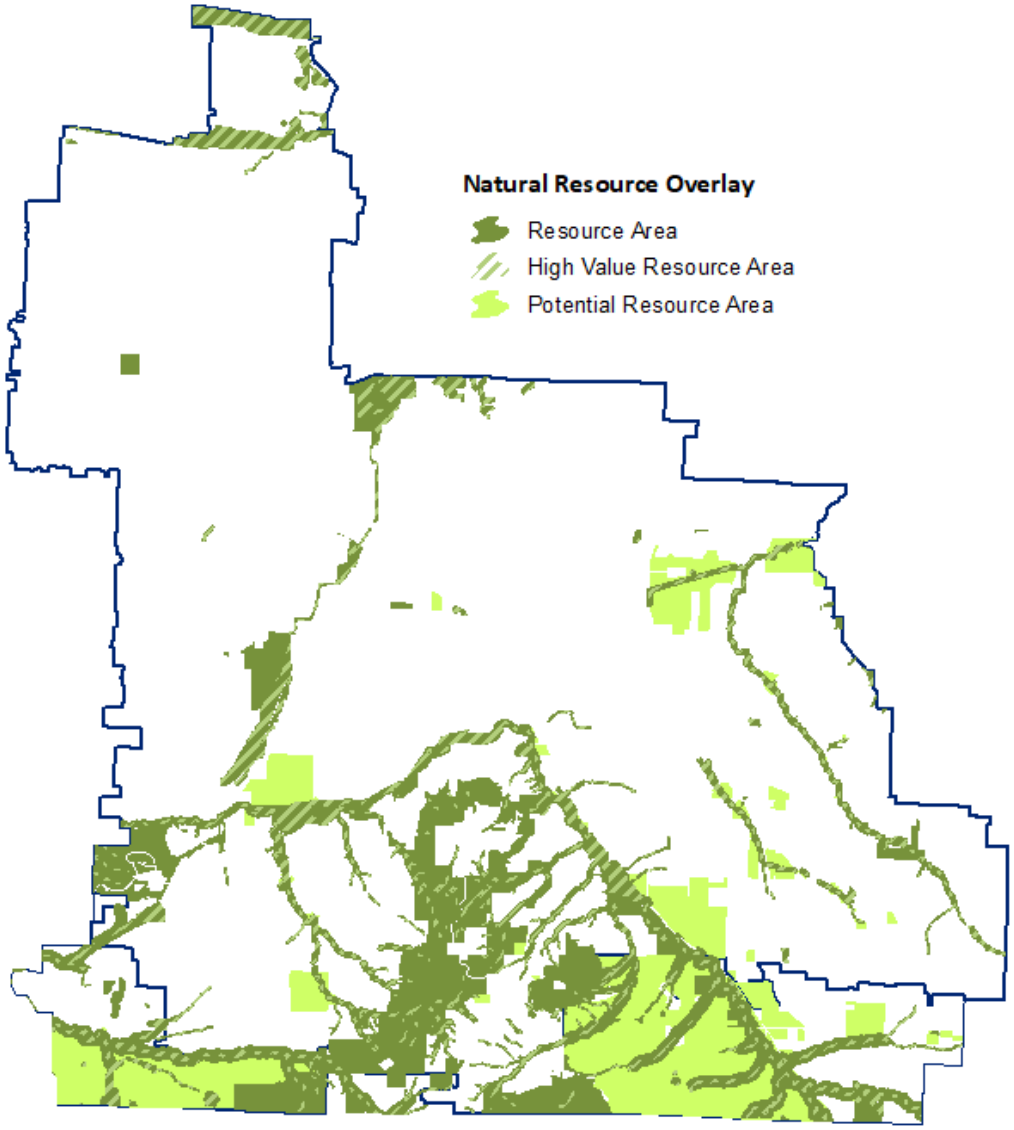
8. Significant and unique natural features, such as a major stand of trees.

The City will assess the impacts on these resources when a development project is proposed. The project developer and city staff shall outline measures to preserve or mitigate negative impacts on these natural resources.

Implementation Strategies

1. The City shall maintain catalogue of natural resources based upon best available data, comprised of those resources features found to be most significant to the community. This catalogue will be accompanied by a description of resource characteristics, and significance, within an analysis of conflicting uses, and a summary of economic, social, environmental, and energy (ESEE) consequences of permitting or restricting conflicting uses.
2. Based on catalogue and associated ESEE analysis, shall be adopted in the Community Development Code and Standards document to restrict development actions on specific sites identified in the Inventory when such actions would have adverse impacts.
3. Sites as specified as Open Space in the Inventory of Significant Natural Resources and Open Spaces or catalogued as Natural Resources shall be designated on the Community Development Special Purpose District Map as special purpose districts. Such district designations shall include Natural Resource (NRO) and Open Space (OS).
4. Sites included in the catalogue of natural resources and ESEE analysis shall be designated on the Community Development Special Purpose District Map as special purpose districts. Such district designations shall include Floodplain (FO), Hillside and Geologic Risk (HGRO), Natural Resource (NRO). These districts shall function as special purpose overlay districts.
5. Measures shall be adopted in the Community Development Code and Standards document to restrict development proposed within or adjacent to an NRO site. These measures shall require any such development to take place in a manner which minimizes adverse impacts on the resource site.
6. Within wetland sites as identified through Gresham's Local Wetland Inventory, or which meet the City's and Metro's criteria for a regulated Title 3 wetland, development shall be permitted only in connection with an approved plan for mitigation. Such mitigation plan may include creation of a functionally equivalent wetland area elsewhere, in conformance with mitigation policies of the Oregon Department of State Lands, the US Army Corps of Engineers, and the Oregon Department of Environmental Quality's 401 Water Quality Certification Program, and if the proposed mitigation is within the same watershed (at the 5th field Hydrologic Unit Code scale).

Natural Resource Overlay Map



A. VISUAL RESOURCES

Summary of Findings

Visual resources contribute substantially to the attractiveness and livability of Gresham. While scenic views are available from many points, there are view corridors focusing on Mt. Hood and the Columbia River which are of sufficient significance to warrant some degree of protection. Likewise, the scenic backdrops comprised of the hills and buttes in the southerly portion of the city provide welcome visual relief in the urban environment and should be protected against severe degradation (Section 2.350 - Findings document).

Implementation Strategies

1. The Community Development Standards document shall require specific landscaping and design standards for multi-family, commercial and industrial uses in order to enhance the urban landscape and prevent or minimize obscuring community views of Mt. Hood, the Columbia River, and local hillsides.
2. Removal of trees on slopes over 15% shall be restricted to prevent clearcutting.
3. Because of the outstanding scenic quality of the view of the Columbia River from Marine Drive, standards shall be included in the Community Development Standards document to limit the height of all new structures built on property lying north of Marine Dr. in order to preserve the quality of this visual resource.
4. The Community Development Standards document shall include a design review process to improve the visual quality of streetscapes, and to preserve outstanding views of Mt. Hood in designated view corridors through measures including landscaping and building height standards and limitations on signage.
5. The Community Development Standards document shall require underground utilities for all new land developments, except for electric power transmission lines over 50,000 volts, primary feeder lines, and transformer vaults.

B. GRESHAM BUTTE SCENIC VIEW

Summary of Findings

The City has had a long commitment regarding the protection of Gresham Butte. In 1980, the City adopted the Hillside Physical Constraint District (HPCD) rules which regulate development on sloped properties such as those found on the Butte. Then, in 1999, the Gresham City Council approved the establishment of the Gresham Butte Plan District (GBPD) which covers roughly 95 acres on the top of the butte. The GBPD increased lot sizes to an average of one acre, and included fire suppression, transportation and stormwater rules.

The HPCD was substantially updated in 2003 and refined the way in which density calculations were done for properties such as those found on Gresham Butte and also required the submittal of a Soils and Geology Report outlining the geologic conditions of the land and an evaluation of potential hazards. In 2009, the City adopted the Habitat Conservation Area Overlay District (HCA) which provided more protection for fish and wildlife and upland habitat when construction and development occur within those specified areas. Parts of the Butte are subject to HCA rules.

The HPCD was renamed to the Hillside and Geologic Risk Overlay in 2021 at the same time the HCA was replaced with the Natural Resource Overlay

In 2013, the Gresham Butte Neighborhood Association requested that the Gresham City Council initiate a review of development rules that could impact the scenic views provided by the Butte. This

project, Gresham Butte Scenic View, was included on the 2014 Council Work Plan and was continued to the 2015 Council Work Plan. This project was intended to:

- Update the City's Community Development Plan findings, goals, policies and action measures relating to the preservation of Gresham Butte's scenic view. There are no goals or policies specific to Gresham Butte's scenic view and, although there are five implementation strategies[1] regarding visual resources, none of them are specifically targeted to the protection of Gresham Butte.
- Review and update current rules and development processes that allow for development on the Butte that could impact the scenic view it provides. There are no development rules for Gresham Butte that would help preserve its view or acknowledge that certain types of development (such as tall structures) could potentially impact that view. Which parcels actually comprise the area known as Gresham Butte is currently undefined.
- Examine land use processes and notice requirements for development on the Butte to make modifications which provide for more extensive notice. The Code does not acknowledge that development on the Butte may affect properties in many areas of the city due to the potential visual impact of development. Development on the Butte is handled under the same review types and receives the same public notice as the development of property off of the Butte.

GRESHAM BUTTE SCENIC VIEW GOAL

The scenic view provided by Gresham Butte will be preserved and protected.

Gresham Butte Scenic View Policies

1. Ensure that all development on Gresham Butte is designed to maintain its natural aesthetic and scenic quality to the greatest extent possible.
2. Ensure that development on Gresham Butte does not alter the naturally landscaped scenic skyline provided by the Butte.
3. Encourage the creative use of design, lighting, colors and materials for new structures proposed for Gresham Butte so they present a complementary appearance and act as an extension of the natural landscape.

Gresham Butte Scenic View Action Measures

1. Amend the Development Code rules such that developments and structures have minimal impact upon the scenic view provided by Gresham Butte.
2. Revise the rules for Special Use Reviews that involve land intensive development or tall structures such that the natural area is preserved to the greatest extent possible.

1 Implementation Strategies are now called Action Measures

3. Modify rules and processes that currently allow projections above the maximum height requirement such that the scenic ridgeline of Gresham Butte is further protected.
4. Modify development and design rules so that project elements are encouraged to blend into the natural environment of Gresham Butte and not create detrimental impacts.
5. Periodically review all development rules for Gresham Butte to ensure that its scenic value is protected.
6. Revise Gresham's Tree Code to define measures to protect the tree cover in the Gresham Butte Scenic View District.

GRESHAM BUTTE PUBLIC INVOLVEMENT GOAL

Gresham citizens will have an enhanced opportunity to participate in land use decisions on Gresham Butte.

Gresham Butte Public Involvement Policies

1. Ensure that land use development review types reflect the significant impact of development on Gresham Butte to both Gresham citizens and the surrounding area.
2. Require that public notice for land development proposals on Gresham Butte be provided in sufficient number such that all Gresham citizens have an opportunity to comment.

Gresham Butte Public Involvement Action Measures

1. Examine current land use reviews to determine if an upward classification of review type is warranted for certain development proposals and structures that could impact the scenic vista provided by Gresham Butte.
2. Expand the current requirement for land use notices so that more property owners, neighborhood associations and Gresham residents receive notice of development activity on Gresham Butte.

C. MINERAL AND AGGREGATE RESOURCES

Summary of Findings

There are three sand and gravel quarries and one clay pit and brick manufacturing plant operating in Gresham. Protection of these resources is necessary to sustain urban development. Mineral and aggregate resources face depletion from urban development which covers the resource and consumes the product. Many aspects of surface mining operations are incompatible with adjacent land uses. Reclamation of depleted surface mine areas and adequate buffering of less intensive, adjacent areas must be ensured (Section 2.360 – Findings document).

Implementation Strategies

1. The Community Development Standards document shall establish standards which provide for the efficient mining of mineral and aggregate resources and ensure the reclamation of surface mining sites in conformance with state regulations.
2. The Community Development Standards document shall require a public hearing prior to establishment or expansion of surface mines for mineral and aggregate resources.
3. The Community Development Standards document shall contain standards and criteria governing the establishment or expansion of surface mines for mineral and aggregate resources to ensure that such operations will be buffered from adjacent properties and that adverse impacts to public health, safety, and welfare will be minimized.

(Amended by Ord. 1754 passed 06/16/15; effective 07/16/15)

10.222 ENERGY SOURCES

Introduction

The current energy sources used in Gresham come primarily from outside the city. These sources include electricity generated from solar, wind, hydropower and fossil fuels such as coal. It also includes fuel oil, natural gas and wood fuels. The city does have potential for renewable energy within Gresham. Sources include wind, solar, biomass, geothermal energy and micro-hydropower. Energy system technologies continue to advance, so additional opportunities could develop in the future.

Gresham's dependence on imported energy could be reduced by developing locally produced energy, particularly from renewable energy sources. The benefits of incorporating renewable energy systems into the community are numerous. They can provide a sustainable quality of life and make us more energy independent. The systems can also provide the city with diverse energy supplies while reducing greenhouse gases linked to climate change as well as stimulate the economy and encourage high-quality developments.

The term "renewable energy" is defined as "energy derived from sources that do not use up natural resources (fossil fuels, etc.) or harm the environment." Energy sources for renewable energy include the sun, wind, the decomposition of organic matter, heat from the earth, and the movement of water and ocean waves.

Renewable energy systems come in different scales and produce different amounts of energy and include (but are not limited to):

- **Solar power:** There are two kinds of active solar energy systems for deriving energy from the sun – solar hot water and solar photovoltaic systems. A solar hot water system preheats the water that goes into the water heater, which reduces the amount of electricity or gas that water heater consumes. A photovoltaic system produces electricity that reduces the purchase of electricity from a utility.

- **Wind:** Wind turbines convert wind energy into electricity. A wind turbine works by having the wind turn its blades or rotor, which spins a shaft connected to a generator that makes electricity. The higher and more constant the wind speed the more electricity is produced, up to the maximum output of the turbine.
- **Biomass:** Biomass energy technologies utilize the solar energy that is stored as carbohydrates in plant materials. Carbohydrates are the organic compounds that make up biomass. Biomass is a renewable energy source because the growth of new plants replenishes the supply. This alternative energy source is typically done on a large scale on farms or by utilities or industry rather than in a residential setting.
- **Geothermal:** Geothermal energy is generated from heat stored in the earth. Geothermal resources range from the modest but constant heat (50-70 degrees) generated at shallow depths in the ground that is found nearly everywhere to the extreme heat generated by hot water and steam found at much greater depths in certain areas, such as southern and central Oregon.
- **Micro-hydro:** Micro-hydro energy is generated from the movement of water through a turbine either in a pipe or in a stream. The energy source is small scale and reliable during the peak winter season.

Issues involved in allowing renewable energy systems include the need to protect community health, safety, quality of life, environmental quality, and the quality of the built environment.

ENERGY GOALS, POLICIES, AND ACTION MEASURES

GOALS

1. ***Gresham will incorporate renewable energy systems to the maximum extent feasible.***
2. ***Gresham will be known as a world-class location for renewable energy jobs and innovation.***
3. ***Energy use, generation, distribution and storage will:***
    - ***Sustain or enhance community health, safety, quality of life, environment quality and the quality of the building environment.***
    - ***Promote a stable and equitable economy that includes affordable energy.***

Policies

1. Ensure City programs and codes promote energy use, generation, distribution and storage that sustain or enhance community health, safety, quality of life, environmental quality and the quality of the built environment.
2. Encourage innovation, such as through Development Code flexibility, removing barriers to adoption of new renewable energy systems and considering incentives.

3. Apply the appropriate level of review and regulation necessary for renewable energy projects to protect community health, safety, quality of life, environmental quality and the quality of the built environment.
4. Incorporate renewable energy use in City facilities where feasible. This should consider financial feasibility.
5. Encourage public and private use of renewable energy.
6. Promote Gresham as an attractive center for renewable energy jobs.
7. Ensure the benefits of energy are distributed equitably and any potential negative effects are not concentrated unfairly.

Action Measures

1. Develop Development Code provisions to remove barriers to renewable energy systems and clarify the approval process for such systems. The Development Code standards should:
    - Allow the right systems in the right location;
    - Address the potential effects on adjacent properties, community health, safety, quality of life, environmental quality and the quality of the building environment; and
    - Be easy to use and understand
2. Work to meet the City's Internal Operations & Facilities Sustainability Plan.
3. Promote renewable energy technologies and associated jobs as staffing allows through mechanisms such as:
    - Outreach, educational and promotional materials;
    - Internal and external partnerships with agencies, non-profits, utilities and other entities;
    - Tracking of renewable energy efforts; and
    - Supporting group efforts to implement district energy systems or the bulk purchase of renewable energy systems.

(Amended by Ordinance 1724 passed 1/15/13; effective 2/14/13)

10.223 ENERGY CONSERVATION

Introduction

Conservation of energy at the local level is achieved through programs aimed at fostering energy efficient land use patterns and transportation modes, and by encouraging renewable energy systems. Programs to encourage energy efficiency include infilling land with new development; increasing the densities of land uses; configuring the City to reduce travel distances from residences to work and to

activity areas; and encouraging alternate renewable energy use experimentation. Reductions in energy consumption are also promoted to decrease reliance on foreign energy sources (**Section 2.382** – Findings document).

ENERGY CONSERVATION GOAL AND POLICIES

GOAL

Gresham will promote energy conservation.

Policies

1. Have an efficient urban land use form that promotes energy conservation.
2. Conserve energy through programs aimed at fostering energy efficient transportation modes.
3. Encourage new renewable energy systems in the city.
4. Ensure a reduction of energy consumption where feasible.

(Amended by Ordinance 1724 passed 1/15/13; effective 2/14/13)

10.230 ENVIRONMENTAL QUALITY

Summary of Findings

The overall environmental quality of Gresham is satisfactory. The present level of environmental quality is a valuable community asset which makes Gresham a desirable community. The environmental quality of the city may be jeopardized, however, by continued growth and development. There are no major air, water, land, or thermal point-source polluters in Gresham. Area-wide sources of pollution, in the form of urban growth and development, pose a threat to maintenance of the existing environmental quality. The potential for non-point pollution of the aquifer from sub-surface sewage disposal should continue to decrease as sewers are extended into mid-Multnomah County. (Sections 2.400 to 2.461 – Findings document).

Policy

It is the City's policy to enhance the quality of Gresham's air, water, and land resources and to retain the relatively peaceful nature of the City's living and working environments.

10.231 AIR QUALITY – AIR QUALITY BACKGROUND

Introduction

Air quality can dramatically affect a local jurisdiction's quality of life and the health of its citizens. Air pollution knows no boundaries and its negative impacts can be harmful and widespread. Consequently,

it is a matter of national and international significance. Thus the federal government has taken the lead in developing laws and standards for the states to follow.

In 1970 the Clean Air Act was adopted as federal law. Subsequent amendments in 1977 and 1990 significantly expanded the scope of air quality regulations throughout the nation.

The Clean Air Act and its subsequent amendments are meant to reduce air pollution through a variety of regulatory and market based means. The Clean Air Act covers the entire nation. However the states do much of the work to carry it out. The law allows individual states to have stronger pollution controls if they wish. However, states are not allowed to have weaker regulations than those set for the whole country.

Pursuant to the law, the EPA sets limits on how much of a pollutant can be in the air anywhere in the United States. This ensures that all citizens have the same basic health and environmental protections.

Under the authority of the Federal Clean Air Act, the Environmental Protection Agency has established national ambient air quality standards (NAAQS) for pollutants considered harmful to people and the environment. These standards are set at levels that are meant to protect the health of the most sensitive population groups, including the elderly, children and people with respiratory diseases.

Common air pollutants covered by the NAAQS include Ozone, Lead, Particulate Matter, Carbon Monoxide, Nitrous Oxide, Sulfur Dioxide and Volatile Organic Compounds (VOC's).

Background

Oregon Department of Environmental Quality (DEQ) and State Implementation Plans (SIP)

The Clean Air Act and its enforcement by the Oregon Department of Environmental Quality guides air quality programs and regulatory actions at the local level. This is because the state must implement the act through legislation and administrative rules. These actions, in turn, affect every jurisdiction in Oregon.

Oregon, like other states must develop State Implementation Plans (SIPs) that explain how each will do its job to implement the Clean Air Act. A State Implementation Plan is a collection of regulations a state will use to clean up polluted areas and maintain areas that have achieved compliance with Clean Air Act standards. The federal Environmental Protection Agency (EPA) must approve each SIP. If the EPA does not approve a SIP it can take over enforcing the Clean Air Act.

The EPA has approved Oregon's State Implementation Plan. It is the Oregon Department of Environmental Quality's (DEQ) job to oversee the SIP and to implement other aspects of the Clean Air Act. Per its federally mandated responsibilities DEQ also has responsibilities that encompass:

- Operating the vehicle inspection program, which protects air quality in the Portland and Medford areas;
- Administering air quality permits for industry including both major and minor sources of pollution;

- Abatement of air pollution from wood burning;
- Overseeing asbestos abatement;
- Administering the Oxygenated Fuels Program
- Visibility in federal designated wilderness areas and national parks
- Enforcement of air quality laws.
- Assisting small businesses with air quality related issues, and
- Air pollutant monitoring

The agency uses a combination of technical assistance, inspections and permitting to help public and private facilities and citizens understand and comply with state and federal environmental regulations.

Oregon Statutes and Administrative Rules

ORS Chapter 468a is devoted entirely to air quality. In addition DEQ's Environmental Quality Commission has the authority to develop and adopt State Administrative Rules (OARs). In this regard OAR Division 200 through Division 268) implement the air quality statutes.

Much of the ORS Chapter 468a was newly adopted or amended subsequent to passage of the Clean Air Act. The same is true of the administrative rules. Frequent additions and amendments are made to the statute and administrative rules to address both new federal requirements and local needs. For example rules have either been recently adopted, or are pending, pertaining to field burning, wood stoves, ozone-damaging volatile organic compounds and air borne toxic chemicals.

Air Quality in the Portland Metropolitan Region

The human, environmental and economic health of local communities can be profoundly affected by air pollution. In years past, the Portland Metro Region had air quality problems that were threatening the region's environmental health and economy.

In the late 1970s and early 80's state and federal air quality standards were consistently exceeded in the Portland Region. This was a very serious problem. The situation improved somewhat in the 1980's. Still, from 1982 to the early 1990s there were numerous incidents of air pollution limits being surpassed. Finally in 1991, DEQ designated the Region as not meeting Federal Clean Air Standards for ground level ozone and carbon monoxide. Fortunately, air-pollution has been significantly improved since then and DEQ did not have to enforce mandatory pollution control programs. Now, due to new pollution control technology on vehicles and industries, and the development of other pollution prevention programs, Oregon hasn't had a carbon monoxide violation in several years. It is important to note that DEQ's inspection vehicle program has been a major contributor to reducing air-pollution in the Portland region.

Most air pollution comes from everyday activities – driving, home heating, outdoor-cooking; operation of lawn and garden equipment, use of wood stoves, paints, personal care products such as hair sprays,

etc. About 90% of air pollution is generated from these everyday activities. Cars and trucks are the major sources. In the Portland region less than 10% of air pollution is created by industry. Gresham and the rest of the Portland Metropolitan Region are part of the Willamette Valley air shed. Air pollution within the air shed is influenced by the topography and climate of the Willamette Valley basin and by the concentration of human activities that emit air contaminants. However, Gresham has a locational advantage over other Portland area communities because of its proximity to the Columbia River Gorge. Often, strong easterly winds from the Gorge disperse air-pollutants that would otherwise build up in the local area.

Air quality planning in this region is focused on meeting the National Ambient Air Quality Standards and compliance deadlines set by the EPA and enforced by DEQ. Failure to meet these standards could result in loss of transportation funding from state and federal sources; increased health risks to citizens and environmental damage. Also activity of industries that cause point source air pollution could be curtailed. This could result in unemployment and other economic hardships.

Air pollutants that affect Gresham and the rest of the Portland region originate from three broad categories.

- Point (direct) sources, which emit large volumes of pollutants from specific locations such as industrial sites;
- Area sources which individually discharge small levels or pollutants from numerous sites such as woodstoves, lawn and garden equipment, solvents, backyard burning, etc, and
- Mobile sources, which are predominantly automobiles.

Management of "Indirect" (Mobile) and (Direct) Point Sources of Air Pollution

The Oregon Environmental Quality Commission (EQC) has found that "Indirect Sources" are air contamination sources as defined in ORS 468A.005. Therefore the EQC adopted Administrative Rules within OAR Division 254 to control the concentration of air pollution from motor vehicle trips and aircraft operations associated with these land uses. These include but are not limited to hospitals; parking facilities; retail, commercial and industrial facilities; recreation, amusement sports and entertainment facilities and educational facilities.

Within the Portland air quality maintenance area, DEQ requires approval of an indirect source permit before an entity can construct or expand a parking facility or other land use which would create new or additional parking capacity of 1000 or more spaces. The exception is within the Central City area of Portland. Within the Portland Core, a permit is required before development of a facility that would require 800 parking spaces.

DEQ can require an Indirect Source Emission Control Program (ISECP) as a condition of permit approval. The ISECP is intended to reduce mobile source emissions resulting from these projects. The ISCEP may include, but is not limited to, a variety of mitigating measures such as, posting transit route and scheduling information; construction and maintenance of bus shelters and turn-out lanes;

maintaining mass transit fare reimbursement programs; limiting traffic volume so as not to exceed the carrying capacity of roadways, and altering the level of service at controlled intersections.

Air Containment Discharge and Title V Permit Programs

The Oregon Department of Environmental Quality manages the state's Air Containment Discharge Permit (ACDP) Program. There are six categories of these types of permits that cover more than 100 activities per DEQ's administrative rules. ACDP's are used primarily to manage minor sources of air contamination. However they are also required for any new major source or major modification at an existing major source.

DEQ also manages the state's "Title V" permit program. This is a comprehensive operating permit program for Oregon's "major" industrial sources of air pollution. As defined in the program, a "major source" of air emissions has the potential to emit 100 tons of any criteria pollutant. Or, for emitters of hazardous air pollutants, a major source has the potential to emit 10 tons of any single hazardous air pollutant or 25 tons of any combination of hazardous air pollutants. Approximately 130 sources are currently permitted under the Oregon Title V Operating Permit Program.

There are no significant point- source air polluters in Gresham. Several large light industrial and warehousing / distribution businesses are located in the Columbia South Shore industrial area. These include the Albertson's Distribution Center, Honda of America, Boyd's Coffee Company, and Boeing. None of these activities qualify as a "smoke-stack" industry. Nearby farming and aggregate mining activities, combined with the right climate conditions sometimes contributes to suspend particulate matter pollution.

Coordination of Air Discharge Permits with Local Government

State law requires DEQ and applicants seeking air discharge permits to coordinate their actions with local governments to ensure consistency with local comprehensive land use plans.

Specifically, DEQ's Division 18 administrative rules require a Land Use Compatibility Statement from local governments when there is any:

- New development that requires an air discharge permit;
- Physical expansion on a property or proposed use of additional land for a facility operating under a discharge permit, or
- Physical change or change of operation of an air pollutant source that results in a net significant emission rate increase as defined by OAR 340-200-0020.

Furthermore any new air discharge permit renewal requires a Land Use Compatibility Statement if one has not been previously submitted.

Local planning offices have the responsibility to certify whether or not the business or facility under review meets all local planning requirements. This includes submitting findings of fact for any local reviews or land use approvals.

In Gresham, the Statement of Land Use compatibility is processed concurrently with the procedures for obtaining a development permits. For an action that does not require a development permit, the Gresham Development Code requires the City Manager to process a Statement of Land Use Compatibility as a Type I permit.

The Link Between Air Quality, Transportation and Land Use

The federal Environmental Protection Agency has designated the Portland – Vancouver Metropolitan area a maintenance area for ozone and carbon monoxide. This means that the area has had a history of non-attainment but is now consistently meeting the National Ambient Air Quality Standard. Activities and projects cannot occur in the region that would result in violation of the federal standards.

Metro and the U.S. Department of Transportation (USDOT) are required to determine that implementation of Metro's Regional Transportation Plan (RTP) and its Transportation Improvement Program (MTIP) does not lower air quality in the region below acceptable limits. This "air quality determination" is necessary before Metro can adopt its Regional Transportation Plan and before the USDOT can acknowledge it. This impacts East Multnomah County and Gresham because the area has several key projects identified in the RTP.

Without an "air quality determination" Metro would not be eligible to receive federal transportation funds. Furthermore USDOT's conformity designation requires that no goals, directives, recommendations or projects identified in the RTP have adverse impacts on the State Implementation Plan. Also the RTP must support prompt implementation of any Transportation Control Measure (TCM) identified in the SIP.

In January 2001, the USDOT determined that the project list associated with the Financially Constrained portion of the Regional Transportation Plan was consistent with the air quality objectives of the State Implementation Plan. The transportation related ozone and carbon monoxide emissions produced by implementing projects on the financially constrained list are expected to be within the limits imposed by the State Implementation Plan.

The land use, transportation and air quality connection is obvious since most of the region's air pollution comes from automobiles. Alternatives to automobile use are essential if the Portland Region is to maintain and improve its air quality. The Metro 2040 Plan and Regional Transportation Plan embody the guiding principles necessary to create a region that can be easily traveled by a variety of transportation modes including transit, walking and biking.

Furthermore the State Transportation Planning Rule, Division 12 was substantively amended in 1999 to promote the development of safe, convenient and economic transportation systems. The goal is to reduce reliance on the automobile so that air pollution, traffic and other livability problems faced by urban areas in other parts of the country might be avoided. The rule promotes changes in land use patterns and the transportation system that make it more convenient for people to walk, bicycle, use transit, and generally drive less to meet their daily needs. This will help to reduce air, water and noise

pollution, conserve energy and reduce emissions of greenhouse gasses that contribute to global climate change.

In the last several years, Gresham has taken several land use / transportation actions to reduce automobile use including:

- Adoption of a Transportation System Plan (TSP) and implementing land use regulations and design standards in conformance with the Regional Transportation System Plan and the State Transportation Planning Rule;
- Adoption of zoning districts and standards that promote the development of compact, transit supportive land use.
- The development of efficient and comfortable transit centers stations;
- An active program to develop safe and useable bike and pedestrian facilities and connections throughout the community, and
- Development of transportation-efficient and environmentally sensitive urban development plans for the Pleasant Valley urban growth area.

Open Burning

Open burning causes a substantial number of citizen complaints in the Gresham area. Air pollution caused by open burning can be a serious local problem. Unregulated open burning can be a serious nuisance and health threat. For example, DEQ prohibits the burning of specific materials such as animal wastes, wire, rubber materials, automobile parts, petroleum treated materials, etc.

Open burning is regulated and enforced by DEQ and often by local fire departments / districts. For example it is against the law to conduct open burning that:

- Unreasonably interferes with enjoyment of life or property.
- Creates a public or private nuisance or
- Is a hazard to public safety

DEQ regulations prohibit certain types of open burning in selected areas of the state. In the Willamette Valley, burning control areas are established around cities based on population. For example any city with a population of 45,000 or more has a six-mile special control area. Within these control areas specific materials are not to be burned. These materials are in addition to those prohibited by DEQ. These include waste from commercial establishments, slash from forestry operations and debris from construction, demolition activity and land clearing.

Within the Willamette Valley, DEQ analyzes air quality and weather data daily to determine if ventilation is sufficient to allow open burning, and notifies the State Fire Marshal accordingly. The Fire Marshal forwards this information to all fire districts in the valley. State regulations also give DEQ the

authority to prohibit open burning anywhere in the state on a day-to-day basis depending upon air quality and weather conditions

The State Fire Marshal can also make a separate determination to prohibit open burning based upon safety conditions. The issuance of fire permits is the responsibility of fire departments. These agencies can also restrict open burning based on local conditions for fire hazard.

Open burning associated with a residence ("backyard burning") is prohibited in and around the Portland Metropolitan area unless a hardship is demonstrated and DEQ has issued a "hardship" permit. In East Multnomah County this area extends to 182nd Avenue. Residential property owners east of 182nd are allowed to burn yard debris on DEQ approved days.

The City of Gresham does not require "backyard" burning permits. However, Gresham's City Code was amended in 1998 and 2000 to require solid waste franchisees to provide curbside collection service of yard debris and delivery to a City-approved processor (Section 7.25.225).

Also, the City, through the Gresham Department of Environmental Services, strongly encourages citizens to compost yard debris or dispose of the material in a way that does not require burning or hauling to a landfill.

Summary of Major Issues

State and Federal Laws

1. Through the Clean Air Act, the federal government acting via the States has the responsibility for ensuring nation-wide clean air-standards. The Oregon Department of Environmental Quality (DEQ) is the state's regulatory agency responsible for implementing the Clear Air Act's Standards.
2. The Environmental Protection Agency has approved Oregon's federally mandated State Implementation Plan (SIP). The SIP is required to show how the state's plans comply with EPA air quality standards.
3. The Portland region's serious air-quality problems of the 1970's and 80's have been significantly reduced through a combination of voluntary and regulatory actions prompted by Clean Air Act mandates.
4. State Law requires "Land Use Compatibility Statements" to ensure actions which require environmental permits are coordinated with local comprehensive land use plans.

Transportation, Land Use and Air Quality

5. The Portland – Vancouver Metropolitan area has been designated by DEQ / EPA as an Air Quality Maintenance Area for Ground Level Ozone and Carbon Dioxide. The area has had a history of non-attainment but is now consistently meeting the National Ambient Air Quality

Standard. Activities and projects cannot occur in the region that would result in violation of DEQ / EPA standards.

6. The United States Department of Transportation (USDOT) has found that implementation of the Financially Constrained Project List of Metro's Regional Transportation Plan (RTP) will not cause regional air quality to fall below standards set by the State Implementation Plan.
7. Automobiles contribute the highest percentage of the region's air pollution. Alternatives to the internal combustion engine and automobile travel are essential if the Portland Region is to maintain and improve its air quality. Indirect Source Permits are required for major land uses that concentrate more than 1,000 parking spaces in a specific location.
8. The Metro 2040 Plan and Regional Transportation Plan embody the guiding principles necessary to create a region that can be easily traveled by a variety of non-polluting transportation modes including transit, walking and biking.
9. The State Transportation Planning Rule, OAR Division 12 was substantively amended in 1999 to promote the integration of land use and transportation planning so that the air-quality and other livability problems faced by urban areas in other parts of the country might be avoided.

Open Burning

10. Open burning is often the subject of citizen complaint in the Gresham area.
11. It is against the law to conduct open burning that unreasonably interferes with enjoyment of life or property, creates a public or private nuisance, or is a hazard to public safety.
12. DEQ enforces open burning laws rules. The agency and the State Fire Marshal allow open burning on specific days based on weather conditions. DEQ also prohibits the burning of certain materials.
13. The City of Gresham does not issue "back-yard" burning permits.
14. Gresham now requires solid waste franchisees to provide curbside collection of yard debris and delivery of the material to an approved processor. This program substantially reduces the extent of backyard burning.

AIR QUALITY – GOAL, POLICIES, AND RECOMMENDED ACTION MEASURES

GOAL

Improve air quality and reduce air pollution.

Policies

1. The City shall work in partnership with the Oregon Department of Environmental Quality and Metro to maintain and improve air quality consistent with state and federal standards.

2. The City shall ensure, through coordination with the Oregon Department of Environmental Quality, that existing and future land uses with the potential for air discharges, comply with state air quality standards.
3. The City shall reduce air pollution by coordinating its economic development, land use and transportation planning efforts to be supportive of an efficient urban form and non-auto transportation modes including transit, pedestrian and bicycle travel.
4. The City shall adopt and maintain a Transportation System Plan (TSP) and implementing regulations which reduces the potential for air pollution by requiring of development:
   a. A well-connected and efficient road system;
   b. Opportunities for transit, bike and pedestrian travel; and
   c. A land use pattern supportive of non-automobile transportation modes.

Action Measures

1. Gresham will coordinate land use applications with the potential for air-discharges with the Oregon DEQ to ensure all necessary air quality permits and conditions are met.
2. Gresham will seek ways to reduce air pollution associated with its municipal operations such as:
   a. Implementing best industry practices;
   b. Utilizing lesser polluting fuels in city vehicles;
   c. Limiting the use of chemicals, including ground maintenance activities, and where possible, supporting the use of non-polluting alternatives.
3. Reduce the need for automobile use by encouraging the location of affordable housing along major transit corridors but not concentrate affordable housing in any area of the City.
4. Coordinate emergency operations planning with DEQ and other state and regional offices to address the possible accidental air discharge of toxic materials from area industrial and commercial operations.
5. Work with DEQ to abate nuisance impacts and potential health hazards associated with incidents of open burning.
6. Promote public education about the alternatives to open burning such as:
   a. Recycling paper products
   b. Composting yard debris,
   c. Reusing and recycling old lumber and other construction materials; and
   d. Taking non-recyclable material to landfills.

7. Implement policies and take actions to reduce congestion on major streets to lessen localized impacts of automobile travel through means such as signal timing, access management, intersection improvements, etc.
8. Promote public education regarding ways individual actions can reduce air pollution.
9. Encourage the preservation and planting of trees and other landscaping as a means to improve air quality.

(Amended by Ord. 1581 passed 12/16/03; effective 1/15/04)

10.232 WATER RESOURCE QUALITY – WATER RESOURCES QUALITY BACKGROUND

Introduction

Within Gresham's Urban Services Boundary portions of the following watersheds:

- West Gresham
- Fairview Creek to the /Columbia Slough Watershed, which brain to the Willamette River
- Johnson, Butler and Kelley Creeks, which drain to the Willamette River Watershed
- Burlingame, Kelly, and Beaver Creeks, which drain to the Sandy River Watershed

Portions of each of the drainage basins are within a large area that has groundwater resources-water-bearing layers of silts, sands and gravels. This includes the very important Troutdale Gravel Aquifer. This aquifer supplies water to the Columbia Southshore Wellfield. Wells in this area are essential to provide back-up water supply to the Portland Water Bureau and its customers.

Each drainage basin is a complex system of topography, vegetation hydrology, and geomorphology. Water flows through each via a network of interconnected streams and drainage ways, underground channels, and aquifers. Water quality problems in one drainage basin not only can affect the nearest stream system and possibly aquifers, but also all other downstream waters and, sometimes, groundwater resources.

Water pollution, like air pollution, knows no boundaries and can be widespread and harmful. Consequently, the federal government has enacted national laws requiring conformance to minimum standards. Local and state governments are required to conform to federal laws such as the Clean Water Act. In Oregon, the Department of Environmental Quality has the responsibility of implementing the act.

Gresham created a separate Stormwater Division in its Department of Environmental Services in 1993. This was partly in response to growing awareness of the importance of water quality and expanding federal, state and regional rules and mandates. The City's Stormwater Division is primarily responsible for management of the surface water quality within Gresham. Among its many responsibilities is assuring conformance with federal and state water quality laws and rules.

Within the Portland Metropolitan region, water quality impairment, loss of habitat, and loss of stream complexity has contributed to diminished biodiversity. Remnant populations of federally protected salmonids are still present in the Johnson and Kelley Creek systems, with evidence of slightly increasing numbers since 2010. Efforts to improve water quality and other habitat features for these ESRA-listed species have been coordinated with water quality improvements within City of Gresham programming within the Department of Environmental Services which oversees public works, water quality, and natural resources programming and community outreach. In addition to those efforts, new development activity will have to be evaluated for its impact on water quality; existing resources will need to be protected, restoration of area creeks and their related buffers will continue to be needed, and the development process will need to ensure that unavoidable impacts are fully mitigated. Water quality protections were adopted by Gresham Community Development Code in 2002 with inclusion of language intended to comply with Metro Title 3 standards, which provided regional implementation guidance for Oregon Land Use Planning Goals 6 and 7. Habitat protections have been incorporated into Gresham's land use code via compliance with Metro Title 13 (Nature in the Neighborhoods) and through Title 13, with Oregon Land Use Planning Goal 5.

Water Quality Issues

Throughout Gresham, urbanization and other activities have caused the loss of naturally permeable surfaces capable of absorbing and filtering precipitation and runoff. Drainage ways and streams have been filled, directed into culverts or hardened channels and development has occurred in wetlands and floodplains. This has prevented these resources from storing and filtering stormwater. Also, riparian vegetation has been removed, leaving water bodies exposed to direct sunlight, which significantly increases water temperature. Elevated water temperatures are inhospitable to many forms of aquatic life, especially for many fish species such as salmon, trout and steelhead.

Excess rainwater, often carrying pollutants from impermeable surfaces, flows rapidly through piped drainage systems and open drainage ditches into our local streams and wetlands. This situation can cause significant problems, including flooding; hydromodification of the stream channel, which includes downcutting of the channel, widening of stream channels, and bank erosion; sedimentation, damage to fish and wildlife habitat, and damage to the stormwater system. Furthermore, decreased infiltration due to impervious surfaces and the loss of wetlands, floodplains and riparian soils diminishes water storage which can lead to other serious impacts, including reduced dry-weather flows, degraded water quality, loss of aquifer capacity, land subsidence and the loss of fish and wildlife habitat.

The potential for groundwater pollution affecting aquifers is a regional concern. If solvents and other toxic materials get in the aquifers, the region's access to drinkable water would be compromised. As Gresham becomes more reliant on groundwater as a drinking water source, protection of groundwater from spills, illicit discharges, and other pollutants is critical.

Surface and groundwater water pollution from both point and non-point sources negatively affect Gresham's surface and ground water quality. Non-point source pollution is the result of many different

activities, such as chemicals used for landscape maintenance and agriculture, soil erosion, car washing, and inappropriate disposal of household cleaning agents. The total aggregate effects of non-point source water pollution can be very serious. On the other hand, point source pollution comes from specific, identifiable locations such as industrial uses.

The Federal Clean Water Act and Related Rules and Regulations

The United States Congress passed the Clean Water Act (CWA) in 1972. The CWA is the cornerstone of surface water quality protection in the United States. The objective of the Act is to restore and maintain the chemical, physical and biological integrity of the nation's waters. It was the first comprehensive federal approach to water quality regulation and established national standards for effluent discharges and water quality standards. The Clean Water Act was strengthened by subsequent amendments in 1972, 1987 and 1990, which added federal control of toxic water pollutants, stormwater and oil spills. Also significant is that it also allows the federal government to enforce its provisions.

The Oregon Department of Environmental Quality (DEQ) has the responsibility for developing water quality standards to comply with CWA standards. Oregon DEQ's objective is to protect beneficial uses of rivers, streams, lakes and estuaries. Beneficial uses include drinking water, cold water fisheries, industrial water supply, recreation and agricultural uses. DEQ monitors water quality and reviews available data and information to determine if these standards are being met. If they are not, the agency can legally enforce compliance.

In addition to the CWA, the Safe Drinking Water Act and the Endangered Species Act have related water quality protection requirements that Gresham must meet. Also, the state and Metro have adopted rules and policies applicable to local jurisdictions that are intended to implement federal requirements.

The following summarizes the seven federal, state and regional water quality regulatory programs under the Clean Water Act that Gresham and other Oregon jurisdictions must comply with.

National Pollutant Discharge Elimination System (NPDES) Permit for Municipal Separate Storm Sewer Systems

DEQ administers this federally mandated permit program, which requires local jurisdictions to develop and implement management practices that reduce the pollutants carried by stormwater into state waters. State waters include all natural water bodies, plus those waters that connect to other natural water bodies.

Water Quality Standards and Total Maximum Daily Loads (TMDLs)

To comply with federal requirements, Oregon DEQ adopted water quality standards that protect beneficial uses such as drinking water, cold water fisheries, recreational contact, agriculture and other uses. DEQ's standards cover parameters such as bacteria, pH, turbidity, dissolved oxygen, temperature,

and total dissolved gas, certain toxic and carcinogenic compounds, habitat and flow modification, and aquatic weeds or algae. Gresham's water resources must not show a violation of these standards. If a water body doesn't meet the standards, DEQ is required to set a TMDL. A TMDL is a calculation of the maximum amount of a pollutant that a water body can receive and still meet water quality standards, and an allocation of that amount to the pollutant's sources. Because Gresham surface waters violate one or more water quality standards at some point during the year, DEQ established TMDLs that required further efforts by Gresham to clean up stormwater and protect and restore riparian areas, as well as wetland and stream functions. The City has been making progress on these goals in part through a City-developed TMDL Implementation Plan and the NPDES permit process.

There are three water bodies within Gresham that are listed by the Oregon Department of Environmental Quality (DEQ) as "water quality limited" and have TMDLs established. All surface waters draining to listed water bodies are also considered water quality-limited and are to be addressed in a Designated Management Agency's response. DEQ is required by the federal Clean Water Act to maintain a statewide list of water bodies that do not meet federal water quality standards. This list is called the 303(d) list because of the section of the Clean Water Act that establishes the requirement. Parameters are removed from the 303(d) list once a TMDL is set for them, although an approved TMDL does not indicate that the waterbody is meeting the water quality standards. Table 1, below, is the current list of Gresham streams and other water bodies that do not meet current standards.

Table 1. 303(d) Listings and TMDLs for Gresham Water Bodies
Water Quality Limited Water Bodies Within Gresham (10/10/03)[2]

Waterbody	Parameter	Time of Year	Year 303(d) Listed	Year TMDL Approved
Beaver/Kelley Creek	*E. coli*	Summer	2002	2005
Beaver/Kelley Creek	Dieldrin	Year Around	2018	Not known
Beaver/Kelley Creek	DDT	Year Around	2018	Not known
Beaver/Kelley Creek	Chlordane	Year Around	2018	Not known
Beaver/Kelley Creek	Biocriteria	Year Around	2018	Not known
Beaver/Kelley Creek	Dissolved Oxygen	Year Around	2018	Not known
Johnson Creek	Temperature	Summer	1998	2003
Johnson Creek	Dieldrin	Year Around	1998	2003
Johnson Creek	DDT	Year Around	1998	2003
Johnson Creek	Endosulfan	Year Around	2018	Not known
Johnson Creek	Endrin Aldehyde	Year Around	2018	Not known

2 Water quality limited waterbodies are those for which traditional, technology-based approaches are not adequate to protect beneficial uses from excessive pollution. The parameters listed have been, or are, on the 303(d) list. Parameters are removed from the 303(d) list once a TMDL is set for them. This does not indicate that the waterbody is safe for all its many uses.

Johnson Creek	Iron	Year Around	2018	Not known
Johnson Creek	*E. coli*	Year Around	1998	2006
Johnson Creek	Biocriteria	Year Around	2018	Not known
Johnson Creek	Mercury	Year Around	2006	2019
Fairview Creek	*E. coli*	Winter/Spring/Fall	1998	2006
Fairview Creek	*E. coli*	Year Around	1998	2006
Columbia Slough	Iron	Year Around	2002	Not known
Columbia Slough	Manganese	Year Around	2002	Not known
Columbia Slough	Chlorophyll a	Spring/Summer/Fall	Pre-1996	1998
Columbia Slough	Dissolved Oxygen	Year Around	Pre-1996	1998
Columbia Slough	pH	Spring/Summer/Fall	Pre-1996	1998
Columbia Slough	Phosphorus	Spring/Summer/Fall	Pre-1996	1998
Columbia Slough	Bacteria	Year Around	Pre-1996	1998
Columbia Slough	DDT/DDE	Fish Tissue: Year Around	Pre-1996	1998
Columbia Slough	PCBs	Fish Tissue: Year Around	Pre-1996	1998
Columbia Slough	Lead	Year Around	Pre-1996	1998
Columbia Slough	Dieldrin	Fish Tissue: Year Around	Pre-1996	1998
Columbia Slough	2,3,7,8, TCDD (dioxin)	Fish Tissue: Year Around	Pre-1996	1998
Columbia Slough	Mercury	Year Around	2006	2019

Other Regulations and Local Efforts

Wellhead/Well Field Protection

The 1986 federal Safe Drinking Water Act requires states and local agencies to establish wellhead protection zones to safeguard groundwater for drinking. In Gresham, this area is based on a groundwater model simulation of the 30-year time of travel to municipal production wells owned and operated by Portland, Gresham, and the Rockwood PUD. There are currently two separate areas with similar requirements: the Columbia Southshore Wellhead Protection Area and the Cascade wellfield Protection Area. Both areas are subject to Best Management Practices (BMPs) that are aimed at providing appropriate levels of protection for groundwater.

The Gresham City Council, in January 2003, adopted a wellhead protection program for the area in and around the Columbia Southshore Wellfield. In 2013, Gresham City Council expanded the program to cover the Cascade Well Field. The City's Well Field Protection Program includes regulatory standards involving the storage, handling and use of solvents and other toxics that could pollute the groundwater resource. In addition to protecting groundwater in Portland, Gresham and Fairview, the City is discussing expanding the wellhead protection program into the Cities of Troutdale and Wood Village.

Underground Injection Control (UIC) Rules

The DEQ administers the federal UIC program in Oregon, pursuant to the federal Safe Drinking Water Act. The UIC program manages injection of fluids into the ground. All stormwater injection UICs within the City of Gresham must be registered and meet regulatory requirements set by DEQ. The City has a Water Pollution Control Facility (WPCF) permit from DEQ that regulates all of the City-owned and operated UICs within Gresham. All new public facilities are required to constructed in a manner that meets DEQ rules, and all private UICs must be registered with DEQ, which requires the owner to obtain a permit and/or meet DEQ's rule authorization.

Endangered Species Act (ESA)

The ESA prohibits the "taking" of a member of any species listed as 'threatened' or 'endangered,' and allows the U.S. Fish and Wildlife Service (USFWS) or National Oceanic Atmospheric Agency (NOAA)-Fisheries to impose some prohibitions for listed species. The ESA defines "take" to mean "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct." The requirement is important for Gresham because the City's surface waters are either current habitat for threatened species, or are upstream from such habitat. It has been found that negligent loss or degradation of habitat resulting from land development or water quality degradation can be considered a taking. The jurisdiction that permitted or allowed the offending development can be held liable.

The ESA requires jurisdictions to look at all the activities that occur under their authority that could harm threatened or endangered species. For Gresham and other cities, this not only includes land use regulations, but also management of floodplains and surface water quality and quantity, and the, maintenance and other operations associated with running a city.

The City has integrated ESA considerations into their everyday operations, providing training to Operations and Maintenance staff, engineering staff, and Planning staff on the state and federal protections for ESA-listed species and associated habitat, including streams and wetlands. The City also adopted Metro Title 13 (Nature in the Neighborhood), and through these Title 13 standards, is complying with the habitat protection objectives of Oregon Land Use Planning Goal 5.

Metro Urban Growth Boundary Functional Plan – Title 3

Gresham has been in compliance with Metro Functional Plan – Title 3, Water Quality. The City adopted required erosion control and floodplain standards in 2000. In 2002, required Water Quality Resources Area (WQRA) protection standards and maps were adopted.

Title 3 requires floodplain regulations to ensure "balanced cut and fill" in floodplains. These provisions were intended to prevent importation of fill into floodplains that would decrease the resource's overall water storage capacity. The City adopted Floodplain Management standards in relation to these Title 13 standards, which also complied with Oregon Land Use Planning Goal 7.

Metro Urban Growth Boundary Functional Plan – Title 13

Gresham has been in compliance with Metro Functional Plan – Title 13, "Nature in the Neighborhoods". In 2009, Gresham adopted the safe harbor standards of Metro's Title 13 model ordinance for the annexed areas within the City's Urban Growth Boundary.

Locally Enacted Regulations, Standards and Green Practices

Gresham has adopted regulations and standards requiring the provision of surface water management systems and stormwater quality control. These provisions form the basis of the city's current regulations to ensure development does not harm water quality and cause the City to be in non-compliance with DEQ standards. They are applied to all major development in the City. In 2019, Gresham updated the City's Stormwater Management Manual to ensure compliance with the most current DEQ regulations as they pertain to Phase 1 (over 100,000 in population) jurisdictions that carry National Pollutant Discharge Elimination System (NPDES) permits. The manual reflects the most current Best Management Practices for green stormwater infrastructure proven to be successful in protecting natural stream function and water quality.

Gresham updated their Temperature TMDL plan in 2020, building upon 13 years of efforts to prioritize and implement riparian area improvements to protect the stream and wetland adjacent vegetation that moderates diurnal temperature fluctuations, attenuates run-off that can negatively impact stream and wetland structure and function, and enhances infiltration and precipitation thereby improving groundwater recharge and local bank storage.

The emphasis continues to be the volving science behind green infrastructure that can support or mimic the natural hydrologic cycle to the extent possible. This is done by promoting, to the degree practicable, that surface water is treated on the site where it occurs or infiltrated after treatment; providing as much pervious surface as possible; using natural drainage systems such as vegetated swales and ditches, and preserving and restoring natural streams, wetlands and floodplains.

Summary of Major Issues

1. Urbanization and other human activities in and around Gresham have caused substantial loss of naturally permeable surfaces and supporting vegetation across the landscape capable of absorbing and filtering surface water. This included loss of wetlands, floodplain area, natural drainage ways, healthy riparian vegetation, and stream channel complexity. This has impaired the natural hydrologic system of Gresham's water resources and reduced the ability of these critical resources' ability to store, cool and filter surface water.
2. Surface and groundwater water pollution from both point and non-point sources negatively affect Gresham's surface and groundwater quality.
3. The potential for groundwater pollution affecting the Troutdale Aquifer that borders the Columbia River is a regional concern. If solvents and other toxic materials used in industrial

processes get in the aquifer, the region's access to drinkable water would be compromised. Shallow aquifers in the general area have already been contaminated.

4. Through the Clean Water Act, the federal government requires the states to establish and enforce specific water quality standards. In Oregon the Department of Environmental Quality has this responsibility, with additional oversight by the US Environmental Protection Agency.
5. Gresham is required to manage surface water quality and quantity to address five categories of federal state and regional surface water quality laws and related implementing rules. These include:
    - National Pollutant Discharge Elimination System (NPDES) Permit for Municipal Separate Storm Sewer Systems
    - Oregon DEQ Water Quality Standards and Total Maximum Daily Loads (TMDLs)
    - Well Field/Well Head Protection and Underground Injection Control per the 1986 Federal Safe Drinking Water Act
    - Endangered Species Act
    - Metro Regional Functional Plan Tiles 3 and 13

WATER QUALITY – GOAL, POLICIES, AND RECOMMENDED ACTION MEASURES

GOAL

Prevent surface and ground water pollution and improve water quality.

Policies

1. The City shall require new development to comply with all land use regulations and other standards necessary to properly manage surface water quality and quantity according to the City's obligation under the Clean Water Act.
2. The City shall ensure, through coordination with the Oregon Department of Environmental Quality, that existing and future land uses with the potential for water discharges, comply with state and federal water quality standards.
3. The City shall establish and maintain water quality plans, regulations and standards consistent with federal, state and Metro laws and rules as necessary to protect surface and groundwater quality and quantity.
4. The City shall protect the water quality, conveyance, storage functions and associated environmental values of streams, wetlands, 100-year floodplains and other natural drainageways and water bodies.

5. The City shall protect, and where practicable, restore water quality and the physical and biological integrity of the area's system of wetlands, rivers and streams and associated natural vegetation buffers supporting water quality, water quantity, and habitat protections.
6. Related to surface water management, the City shall encourage and support water quality protective development strategies that preserve or mitigate loss of natural hydrologic functions related to pollutant removal, bank storage, groundwater support, flow attenuation, velocity reduction and sediment reduction.
7. The City shall require that surface water treatment and management of run-off quantities occur on-site for development projects that require development permit approval.
8. The City's surface water management program shall protect public safety and property and shall be based on long-term practicability and effectiveness.
9. The City shall, prior to approval of an Underground Injection Control (UIC), require documentation of compliance with DEQ groundwater rules. A letter from DEQ approving a UIC rule authorization application constitutes adequate documentation for a UIC.
10. The City shall require that development be a sanitary sewer system per the Gresham Community Development Code and applicable Oregon DEQ rules and standards.
11. The City continues to implement measures to protect water quality necessary to sustain viable habitat for fish species, particularly those listed by the National Marine Fisheries Service as threatened or endangered.
12. The City shall enforce all regulations and standards to protect wetlands, waterways, riparian buffers and other natural resource areas that contribute to water quality, groundwater protection, and flood attenuation consistent with Metro Title 3, and habitat and resource protection consistent with Title 13.

Action Measures

1. Continue to updated adopted stormwater standards to promote the use of "best water management practices" to achieve the City's water quality objectives.
2. Maintain and when necessary update wellhead / well field protection measures to prevent contamination of groundwater including that which sustains the existing Southshore wellfield.
3. Periodically review and update the City's water quality related plans, policies, regulations and standards to ensure consistency with federal, state and regional requirements.
4. Work with agricultural interests, Multnomah and Clackamas Counties, the Oregon Department of Agriculture, watershed advocacy groups and others to improve water quality and reduce agricultural runoff in Gresham.
5. Work with other jurisdictions, agencies and advocacy groups to address water quality issues that have inter-jurisdictional impacts.

6. Educate the public about the need to protect water quality and provide opportunities for citizens to be involved in restoration and enhancement projects involving area streams, wetlands and rivers.
7. Plan and implement programs to protect and restore the water quality functions of wetlands, stream corridors and other riparian areas such as:
   a. Acquisition of property and conservation easements;
   b. Stream restoration and wildlife habitat enhancement projects;
   c. Erosion control/prevention including protection of hillsides stream banks from actions that cause hydromodification, erosion and landslides;
   d. Restoration of stream and wetland buffers; and
   e. Provision of wetland and stream mitigation options within the affected watersheds that Gresham is working to protect.
8. Maintain an accurate inventory of stream corridors and their respective environmental conditions as a basis from which to restore their contribution to water quality.
9. Ensure all City operations and public improvement projects are conducted in ways to protect water quality consistent with all applicable regulations.
10. Encourage the use of green practices and use of green building methods and other emerging and innovative water quality technologies to improve water quality in Gresham.

(Amended by Ord. 1464 passed 12/1/98; effective 1/1/99)
(Amended by Ord. 1581 passed 12/16/03; effective 1/15/04)
(Amended by Ord. 1789 passed 11/20/18; effective 1/1/19)

10.233 NOISE POLLUTION

Summary of Findings

Noise is a recognized cause of physical and psychological stress which has been directly related to various health problems. Motor vehicle traffic noise is the major contributor to the ambient noise level in Gresham. Portions of northern Gresham also lie within the Portland International Airport (PIA) noise contour levels, and are evaluated annually by the Port of Portland for noise impacts. Ambient noise level is most bothersome on Gresham's heavily traveled streets (Section 2.431 to 2.437 - Findings document).

Policy

It is the City’s policy to create and maintain a quiet and healthful environment for those who live, work, and play in Gresham.

Implementation Strategies

1. The Community Development Standards document shall ensure that future "noise sensitive" developments are designed and located so as to minimize the intrusion of noise from motor vehicle traffic and/or neighboring noisy uses.
2. The Community Development Standards document shall ensure that new commercial, industrial, and public developments are landscaped and designed such that Department of Environmental Quality (DEQ) noise standards are met and neighboring "noise sensitive" properties are not negatively impacted by the new land use or associated activities.
3. The city shall seek a response and/or assistance from the Department of Environmental Quality (DEQ) when reviewing commercial or industrial uses in or near residential areas to prevent degradation of previously quiet environments.

10.234 LAND RESOURCE QUALITY

Summary of Findings

Land quality in Gresham is not currently threatened by large-scale waste and process discharges. There is no solid waste site within the city and the municipal sewerage system will eventually serve annexed areas currently using sub-surface sewage disposal. Normal human activity and economic processes in Gresham contribute to the quantity of regional waste and process discharges. METRO has the authority to provide solid and liquid waste disposal in the metropolitan area, and has approved a regional landfill site in eastern Oregon. Solid waste from the metropolitan area will be transported to the site (Sections 2.440 to 2.461 Findings document).

Policy

It is the City's policy to maintain and improve, if possible, the current quality of Gresham's land resources.

Implementation Strategies

1. The city shall actively participate with the Metropolitan Service District (MSD) and the Department of Environmental Quality (DEQ) in the solid waste site selection process.
2. The city shall discourage solid waste sites in Gresham which would adversely affect neighboring land uses or which are unsuitable because of natural conditions at the site, including but not limited to:
    a. Depth to water table.
    b. Soil conditions.
    c. Impacts upon drainage.

d. Water quality degradation or similar problems.

3. The Community Development Standards document shall require that subsurface sewage disposal systems be approved only under conditions which assure that groundwater resources will not be degraded.

4. The city shall ensure that future land use activities with significant waste and process discharges conform to all State and Federal environmental quality standards.

5. The city shall seek a response or assistance from the Department of Environmental Quality or any other interested State or Federal agency when reviewing proposed land uses with potential for significant waste and process discharges.

10.235 THERMAL POLLUTION

Summary of Findings

Temperature has been identified by the DEQ as a parameter of concern for streams with Gresham's Urban Service Boundary, and developed Water Quality Improvement Plans to be implemented by Gresham and studies other Designated Management Agencies. DEQ is currently updating the Temperature TMDL elements of the Water Quality Improvement Plans for the Sandy River and the Lower Willamette and the tributaries to those rivers.

Policy

It is the City's policy to minimize the removal of streamside vegetation which would adversely impact stream temperatures.

Implementation Strategies

1. The Community Development Plan and related Gresham Community Development Code implements multiple protections of sensitive resources, including streams, wetlands, floodplains, and the critical land and vegetation adjacent to hose resources that helps protect the ecological functions of a healthy riparian area. Gresham's Environmental Overlays (Natural Resources Overlay, Floodplain Overlay, and Hillside and Geologic Risk Overlay) include limits to encroachment into sensitive areas, protection of high value resources such as the areas closest to streams and wetlands, veteran trees, and floodways.

2. The City is implementing, and in compliance with, state (DEQ) and federally (EPA) current Water Quality Improvement Plans for shading area streams. These Temperature TMDL efforts have been in place since 2007, with annual reporting to DEQ on progress in increasing riparian tree cover to increase stream shade and moderate diurnal summer temperature fluctuations in area waterways. As DEQ periodically updates the regulating documents, Gresham will update their Temperature TMDL Implementation Plan to remain in full compliance.

3. Gresham Community Development Code will continue to be updated in consideration of the most current federal water quality regulations, as implemented by US Environmental Protection Agency and Oregon Department of Water Quality to ensure implementation for these measures that protect water quality – including maximizing bank storage, groundwater recharge, attenuation of erosive stream flow, minimization of hydromodification and slope failure, moderation of diurnal temperature fluctuations adjacent to wetlands and waterways, and capture of sediments and pollutant sources – are informed by current regulatory obligations under the Clean Water Act.

(Amended by Ord. 1464 passed 12/1/98; effective 1/1/99)