



Memorandum

Date: July 13, 2004

To: Rebecca Lind, Principal Planner, City of Renton

From: Lisa Grueter, Senior Planner

Subject: Overview and Comparison of Aquifer, Flood Hazard, Geologic Hazard, and Habitat Conservation Regulations to State Example Critical Areas Code

INTRODUCTION/PURPOSE

The Washington State GMA provides that local governments should manage growth by discouraging sprawl, accommodating a range of housing types and employment, and protecting environmentally sensitive areas, among other goals (RCW 36.70A.020). GMA requires protection of wetlands, aquifer recharge areas used for potable water, fish and wildlife habitat conservation areas, frequently flooded areas, and geologically hazardous areas (RCW 36.70A.030). Since the original GMA was instituted in 1991, GMA has been amended with respect to critical areas, particularly to require the use of “best available science” in critical area policies and regulations and consideration of anadromous fish species.

Partly in response to GMA, the City of Renton adopted Critical Area Regulations between 1989 and 2000. The City regulations currently address:

- Aquifer Protection Areas
- Geologically Hazardous Areas
- Habitat Conservation Areas
- Frequently Flooded Areas; and
- Wetlands

The City Critical Area Regulations “reserve” a section to address the protection of streams and lakes, which otherwise are minimally addressed in the City’s Tree Cutting and Land Clearing regulations (25 foot setback from waterbodies).

Given the status of the stream regulations, the focus of the City’s efforts to comply with the GMA best available science provisions relates to streams, and a series of recommendations by the consultant team are found under separate cover. However, to document the City’s compliance with best available science for the remaining GMA critical area topics and effectively use the City’s resources, the consultant team has prepared more limited scope reviews and evaluations. These limited scope reviews include an evaluation of wetland regulations

available under separate cover, as well as a comparison of the City’s aquifer, flood hazard, geologic hazard, and habitat conservation regulations and the State Department of Community Development’s Example Code contained in *this* memo.

An overview of the overall work program, definitions of best available science, and summaries of case law is provided under separate cover in separate memos.

OVERVIEW KEY POLICY ISSUES: AQUIFER, FLOOD HAZARD, GEOLOGIC HAZARD AND HABITAT CONSERVATION REGULATIONS

Based on a comparison of the State Example Code and City Critical Area Regulations for aquifer protection areas, flood hazards, geologic hazards, and habitat conservation, the City’s regulations address similar purposes/intents and have similar standards to the State Example Code, while being tailored to the City’s environmental and regulatory context. We note some differences that are generally minor, and we provide some suggestions to strengthen the City’s regulations for these critical areas.

The subject critical areas and the City’s procedures are addressed individually in remaining sections of this document:

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For each critical area topic we describe:

- The critical area’s location
- Studies used by the City to formulate their current regulations
- State agency input, prior or current
- Comparison with the state DCTED example code
- City policy considerations
- Recommendations

A summary of the recommendations is provided below.

Summary of Recommendations

- **Aquifer Protection Areas:** The City’s regulations are similar to the State Example Code in intent, and are tailored to the City’s critical aquifers. A minor amendment to replace the aquifer protection zone map in RMC Figure 4-3-050Q1 with map patterns that better distinguish between Zone 1 Modified and Zone 2 is proposed. It would not change the areas regulated by each zone, nor the aquifer regulations. A discretionary code amendment could be included to allow the City to require a hydrogeologic assessment if a proposal has a potential to significantly affect groundwater quantity or quality. Other amendments or added regulations are not recommended.

- **Flood Hazard Regulations:** The City's flood hazard regulations are similar to Federal and State model regulations. It is recommended that the City continue with its Flood Hazard regulations with the following adjustments:
 - Add the State DOE requested amendments to address updates to the Federal/State Model Flood Damage Prevention Ordinance, or to address other clarifications, in order to maintain flood insurance eligibility (listed in Section 2).
 - Where appropriate, require projection of future flow conditions for development in unmapped areas or for bridge construction proposals.
- **Geologic Hazards:**
 - The City's geologic hazard regulations compare favorably to the State Example Code. Minor recommendations regarding adding general performance standards and requiring peer review of geotechnical reports for critical facilities in geologic hazard areas are suggested in Section 3.
 - A more significant difference between the State Example Code and City regulations relates to volcanic hazard areas, which are not addressed in Renton's regulations. The USGS has identified a potential volcanic hazard impact related to inundation from the Green River due to lahar sedimentation. It is recommended that critical facilities in such areas be required to analyze potential impacts due to inundation from lahar sedimentation and to provide emergency management plans. These facilities would already be submitting other critical area reports and procedural complications are not anticipated. See Section 3.
- **Habitat Conservation:** The City regulations provide a comparable review process for habitat conservation areas. Minor recommendations to enhance regulations are suggested to reference State standards for bald eagles, and to clarify that activities adjacent/abutting to designated habitat conservation areas may be regulated.
- **Critical Areas Regulations Procedures:** The City's procedures provide for structured review of development applications and determination of appropriate conditions. To meet Washington Administrative Code rules that direct the City to consider best available science where variations to regulations are proposed, to address common performance standards, and to clarify the application of regulations, some amendments are recommended below.
 - It is recommended that the City amend/clarify that applicants are responsible for other Agency permits.
 - The City should include best available science review criteria for administrative buffer reductions, administrative modifications, and administrative and Hearing Examiner variances.
 - Submittal requirements for projects which impact critical areas and propose mitigation plans, or which propose buffer reductions, should demonstrate how the mitigation plan relates to best available science.
 - The City has historically not applied a building setback in addition to a buffer requirement most likely to balance property rights and critical area protections. There may be instances where the City would want the authority to require a building setback to ensure long-term maintenance of development without eroding a buffer's protectiveness. A general standard allowing the City to condition a proposal to apply a building setback could be included. It would be discretionary.

Further discussion of each critical area topic is provided in the following report sections.

1. Aquifer Protection Areas

Location

The City of Renton water supply is obtained from four sources:

- The Cedar Valley Sole Source Aquifer
- Springbrook Springs
- Maplewood Production Aquifer
- Well 5A

These sources are protected by designating aquifer protection area zones (APA zones) and restricting land use, limiting and restricting hazardous materials, and establishing construction activity standards, fill quality reporting, and stormwater management requirements within the zones. Renton's APA zones are defined as follows:

- Zone 1: The land area situated between a well or well field owned by the City and the three hundred sixty five (365) day groundwater travel time contour.
- Zone 1 Modified: The same land area described for Zone 1 but for the purpose of protecting a high-priority well, wellfield, or spring withdrawing from an aquifer that is partially protected by overlying geologic strata. Uses, activities, and facilities located in this area are regulated as if located within Zone 1 except as provided by C.6(a)(iii) [Exemptions] of this section.
- Zone 2: The land area situated between the three hundred sixty five (365) day groundwater travel time contour and the boundary of the zone of potential capture for a well or well field owned or operated by the City. If the aquifer supplying water to a well, well field, or spring is naturally protected by overlying geologic strata, the City may choose not to subdivide an APA into two (2) zones. In such a case, the entire APA will be designated as Zone 2.

Maps in Appendix B identify the designated APA zones and the City's wellfields. Based on the sensitivity of the aquifers to contamination, Zone 1, Zone 1 Modified, and Zone 2 provide varying levels of protection from hazardous materials contamination with Zone 1 providing the most protection and Zone 2 the least. City staff proposes a minor amendment to replace the aquifer protection zone map in RMC Figure 4-3-050Q1 with map patterns that better distinguish between Zone 1 modified and Zone 2 (see Appendix B).

By far, the most important aquifer in terms of the City's water supply is the "Cedar Valley Sole Source Aquifer." Eighty-six percent of Renton's water in 2003 was supplied by this aquifer. (2004 City of Renton Drinking Water Quality Report)

The aquifer consists of coarse-grained sediments deposited at the mouth of the prehistoric Cedar River during the last glacial period. The water table is about 23 feet from the surface. The aquifer is replenished by groundwater flow from the Cedar Valley. It is highly permeable, and there are numerous sources of contamination within the capture zone of the wellfields. The State Department of Health's contamination susceptibility is considered moderate to high. (City of Renton Water System Plan, Appendix Q, Wellhead Protection Plan, May 1999)

The Cedar Valley Aquifer has been designated as a Sole Source Aquifer by the US Environmental Protection Agency. No commitment for federal financial assistance may be made if the EPA finds that a federal financially assisted project may contaminate the aquifer through an aquifer recharge zone that creates a significant hazard to public health. (Federal Register Vol. 53, No. 191, October 3, 1988, Notices). Maps in Appendix B identify the Cedar Valley Sole Source Aquifer Project Review Area designated by the EPA. It encompasses the entire Cedar River drainage since recharge to the aquifer may originate as precipitation anywhere in the basin (ibid.). The large majority of the Cedar Valley Aquifer recharge area is outside the Renton City Limits and the King County Urban Growth Area, meaning most of it is considered to be in a designated rural area of King County.

Studies

The following studies represent the best available science used by the City to define and regulate aquifers:

- City of Renton Water System Plan, Appendix Q, Wellhead Protection Plan, May 1999. It includes the following Chapters:
 - Executive Summary
 - Introduction
 - Water Supply Sources
 - Delineation of Capture Zones
 - Contaminant Source Inventory, Risk Assessment and Notification of Owners and Agencies
 - Contingency Plan for the Loss of the Downtown Wellfield
 - The Aquifer Protection Program
 - References
 - Appendix A – Technical Description of Renton Groundwater Model, Particle Tracking Approach, and Model Input Parameters
- “Explanation of Aquifer Code Amendments, August 2002” by City of Renton Water Utility. This document summarizes the results of a computer model simulating groundwater flow in three dimensions related to the Cedar Valley Sole Source Aquifer and the Maplewood Production Aquifer. The model and analysis were conducted by Pacific Groundwater Group, an experienced local firm providing consulting services in hydrogeology and related environmental issues. The model was constructed using a United States Geological Survey (USGS) computer code called Modflow. This method of delineating capture zones was approved by the State of Washington Department of Health in 1999.

The documents also make reference to prior studies by the USGS in 1995 and CH2MHill, a recognized consulting firm, in 1989.

Regulatory Overview

The City’s Aquifer Protection Area Regulations include the following:

- Designation of Zone 1, Zone 1 Modified, and Zone 2 Aquifer Protection Areas (APAs) as described above.
- Establishing Operating and Closure Permit requirements for facilities in all Zones

- Requiring removal of existing facilities in Zone 1 if they store/handle/treat/produce hazardous materials in quantities greater than 500 gallons
- Performance standards, all APA Zones
 - Requiring secondary containment
 - Requiring hazardous materials monitoring and providing standards for release restrictions, including in Zone 1 added site monitoring and site improvement standards to protect against hazardous materials release
 - Limiting application of pesticides and nitrates near wells and springs
 - Establishing wastewater disposal requirements
 - Establishing surface water management requirements
 - Regulating pipelines
 - Providing construction activity standards and fill material requirements
 - Regulating existing solid waste landfills
- Zone 1 Modified is similar to Zone 1 except that:
 - Existing facilities are not subject to the 500 gallon hazardous material quantity and they would not have to relocate or reduce inventory
 - Existing septic tanks are allowed and new septic tanks would be allowed if City sewers were not available
 - Infiltration of stormwater would be allowed as with Zone 2
 - Existing facilities would not be subject to site improvements (e.g. groundwater monitoring, paving, stormwater management improvements, etc.)

State Agency Input

Most recently, the State of Washington Department of Community, Trade and Economic Development (under the Office of Community Development) reviewed the City's 2002 APA regulation amendments to delineate APA Zones for the Springbrook Springs and Maplewood Wellfield. They noted that: "It appears that BAS was used in delineating and protecting your Aquifer Protection Areas. We recommend that you document this. For example, you can include the information in your findings of fact, attach reports or studies as appendices, or adopt by reference the reports and studies. ...Congratulations ... for the good work your draft amendments to your critical area regulations for aquifer protection embody..." In response to the request to document BAS, the City added the following statement to the City's Critical Areas Regulations: "Zones of an APA are designated to provide graduated levels of aquifer protection. Zone boundaries are determined using best available science documented in the City of Renton Wellhead Protection Plan, an appendix of the City of Renton Water System Plan, as periodically updated."

Comparison with State DCTED Example Code

The City of Renton's standards provide strong protection of the City's aquifers, particularly in terms of minimizing the potential for contamination. The City's regulations address the large majority of topics addressed in the State Example Code, including rating and mapping APA zones, regulating facilities, land uses, and activities, and prohibiting activities that could negatively impact aquifers.

Some provisions appearing in the State example code that are not directly addressed in the City's regulations include:

Table 1 Example Code and City of Renton Provisions

| Example Code Provisions | Comment Regarding Applicability in Renton |
|--|---|
| <ul style="list-style-type: none"> Requiring preparation of an aquifer recharge area critical area report by a Qualified Professional, including a hydrogeologic assessment (requirements increase for high impervious surfaces, injection wells, use of hazardous materials, and other factors). | <ul style="list-style-type: none"> The City has prepared a comprehensive analysis of its aquifers, well capture zones, and potential sensitivity to contamination. Individual hydrogeologic analysis may not be needed in most cases. The City requires that an applicant document the hazardous materials used in an annual Operating Permit. If there was a concern about a proposal's potential impacts to aquifer <i>recharge</i> areas, it may be appropriate to require a hydrologic assessment. In order for a proposal to have a significant impact on aquifer recharge it would have to be fairly large in scope. The City would have SEPA authority to require a hydrogeologic study in those cases. Alternatively a discretionary code amendment could be included to allow the City to require a hydrogeologic assessment if a proposal has a potential to significantly affect aquifer recharge. |
| <ul style="list-style-type: none"> Requiring that the proposed activity comply with the water source protection requirements and recommendations of the U.S. EPA, Washington State Department of Health, and King County Health Department. | <ul style="list-style-type: none"> The City does not enforce other agencies rules or permits, and applicants are still required to comply with other agency requirements. The City complies with notice of application, SEPA/NEPA and other permit procedures by which other agencies may be notified. As a public service, the City may advise applicants or educate the public about other agency requirements. See also section 5 of this report where some revisions are recommended to indicate that applicants are responsible for obtaining all other necessary permits. |
| <ul style="list-style-type: none"> Listing Federal and State code requirements for specific uses. | <ul style="list-style-type: none"> See above. |
| <ul style="list-style-type: none"> Restricting activities that would significantly reduce the recharge to aquifers currently or potentially used as a potable water source, or restricting activities that would significantly reduce the recharge to aquifers that are a source of significant baseflow to a regulated stream. | <ul style="list-style-type: none"> The Cedar Valley Aquifer recharge area extends far beyond the City limits, primarily into rural King County. It may be possible that some developments could have localized impacts to stream baseflows or to aquifers depending on location, but the primary issue for the City will be to coordinate with King County and other agencies on proposals outside the City, but within related aquifer recharge areas that supply the City. The City's designation of APA zones even extending beyond City limits, and the US EPA sole source designation for the Cedar Valley Aquifer, provide tools for the City to address developments outside the City when negotiating with or responding to other agencies and their notices of development applications. Also see discussion of hydrogeologic study above. |

The comparison of City and State Example regulations shows consistency in intent and approach to protecting “areas with a critical recharging effect on aquifers used for potable water” (RCW 36.70A.030). One noteworthy area of difference relates to proposals that may have a significant impact on *recharge* to an aquifer used for potable water supplies or which would significantly affect the baseflow of a regulated stream.

Regarding potable water, as noted above, most of the Cedar Valley Aquifer recharge area is outside of the City limits making regional agency coordination more important. The area of recharge in the City limits is largely developed as it includes the historic downtown. Regarding stream baseflow, based on discussions with the City’s consulting biologist for stream regulations (Andy Kindig, AC Kindig & Company, June 30, 2004), it would be an infrequent issue important only for very large projects. The City could use its SEPA authority to require a hydrogeologic study for proposals that may affect stream baseflow. Alternatively a discretionary code amendment could be included to allow the City to require a hydrogeologic assessment if a proposal has a potential to significantly affect aquifer recharge.

City Policy Considerations

City regulations strongly address groundwater protection implementing City Environment Element policies to protect the aquifers from degradation (e.g. Objective EN-I and associated policies).

Although the City regulations place emphasis on groundwater quality issues, City policies provide policy authority to address both groundwater quantity and quality concerns inside and outside the City:

- Policy EN-43 (proposed to be renumbered 50). Emphasize the use of open ponding and detention, grassy swales, clean roof run-off, and other stormwater management techniques that maximize water quality and infiltration where appropriate and which will not endanger groundwater quality.
- Policy EN-46 (proposed to be renumbered 54). Promote the use of interlocal agreements with other agencies to restrict land use in sensitive aquifer recharge areas to minimize possible sources of pollution and the potential for erosion, and to increase infiltration.
- Policy EN-49 (proposed to be renumbered 55). Participate in land use and sewerage decisions in outlying areas of the City's aquifer.

With the Cedar Valley Aquifer, as well as the Springbrook Springs capture area, largely outside of the City limits an important continuing role for the City will be regional agency coordination to ensure proposals do not unduly affect groundwater quantity or quality.

Recommendations

The City’s regulations are similar to the State Example Code in intent, and are tailored to the City’s critical aquifers. A minor amendment to replace the aquifer protection zone map in RMC Figure 4-3-050Q1 with map patterns that better distinguish between Zone 1 modified and Zone 2 is proposed. A discretionary code amendment could be included to allow the City to require a hydrogeologic assessment if a proposal has a potential to significantly affect groundwater quantity or quality. Otherwise, amendments or added regulations are not recommended.

2. Flood Hazard Regulations

Location

Floodplain hazard areas, including the 100-year floodplain and floodways, are designated along the City's major streams including:

- May Creek
- Cedar River
- Black River
- Springbrook Creek

Additionally floodplains of the Green River extend into the City limits along the western city limit boundary shared with Tukwila. See Appendix B for a map of 100-year floodplains.

Studies

City regulations are based upon the following federally prepared, regionally prepared or consultant prepared inventories, models, analyses, and/or evaluations by experts, considered to be sources of best available science for the City's flood hazard regulations:

- Flood Insurance Study. The areas of special flood hazard are identified by the Federal Insurance Administration in a scientific and engineering report entitled the *Flood Insurance Study for the City of Renton*, dated September 29, 1989.
- Federal Model Ordinance. A Model Flood Damage Prevention Ordinance is required to be adopted by jurisdictions that participate in the National Flood Insurance Program. The City of Renton adopted the required regulations in 1987.
- State Model Flood Damage Prevention Ordinance Amendments. The State of Washington periodically amends the Federal Model regulations in excess of the Federal requirements. The City has reflected these amendments in the past.
- King County's 1993 *Flood Hazard Reduction Plan* which promotes, among other things, elevation of structures above the 100-year flood level, and compensatory storage.
- City of Renton 1997 *Eastside Green River Watershed Plan and Environmental Impact Statement*.
- On June 26, 1997, the Planning/Building/Public Works Department adopted an Administrative Policy Determination regarding the use of the City's hydrologic/hydraulic model results to determine the volume of compensatory storage for Springbrook Creek. The information is based upon the City's *Eastside Green River Watershed Plan and Environmental Impact Statement*.

Regulatory Overview

The City implements the Federal Emergency Management Agency (FEMA) Model Floodplain Management Regulations (RMC 4-3-050I), which allows flood insurance to be sold in the City. It designates areas of flood hazards and applies construction standards for residential and nonresidential development in the flood hazard areas.

State Agency Input

The State of Washington Department of Ecology (DOE) regularly meets with local jurisdictions in Washington to assist with flood hazard regulations and to maintain compliance with Federal requirements. DOE is conducting a community assistance review of the City of Renton's regulations in advance of a meeting scheduled with the City of Renton staff in late July 2004. Since Jones & Stokes requested information about the applicability of some provisions of the Federal Model and State Example Code in Renton, DOE staff provided some early feedback on the City's regulations. The overall review was positive. To maintain consistency with more recent State amendments to the Federal Model or to otherwise improve consistency, DOE identified amendments to the City's ordinance as well as positive features to commend:

- Definitions need to be added or amended, especially "basement" and "development," to specifically implement the flood hazard regulations:
 - BASEMENT means any area of the building having its floor subgrade (below ground level) on all sides.
 - DEVELOPMENT means any man-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations or storage of equipment or materials located within the area of special flood hazard.
 - LOWEST FLOOR needs to cross reference more specifically section 4-3-050.I.3.a.ii.
- RMC 4-3-050.I.3.b.i and ii, Manufactured Homes: Minor revision to indicate that the foundations be "...securely anchored to an adequately ~~designed~~ anchored foundation system to resist flotation, collapse, and lateral movement."
- RMC 4-3-050.I.3.c, Nonresidential Construction.
 - Subsection c.i needs to be amended as follows to ensure the City receives credit towards insurance rates: i. Be floodproofed so that below one foot above the base flood level the structure is watertight with walls substantially impermeable to the passage of water;
 - It was noted that the City is more restrictive regarding *new* nonresidential construction which is required by the City to have the lowest floor elevated one foot above the base flood elevation whereas the Model allows as an option the area below one foot above the base flood elevation to be floodproofed instead of elevated.
- RMC 4-3-050.I.4.a, Increases in Flood Levels Prohibited (in floodway). This was noted as a positive section that goes beyond the Model.
- RMC 4-3-050.I.4.b, the last sentence should be amended to match the most recent State Model: ii. Repairs, reconstruction or improvements to a structure, the cost of which does not exceed fifty percent (50%) of the market value of the structure either: a) before the repair, reconstruction, or repair is started; or b) if the structure has been damaged, and is being restored, before the damage occurred. Work done on structures to comply with existing health, sanitary, or safety codes or to structures identified as historic places ~~shall not be included~~ may be excluded in the fifty percent (50%).
- RMC 4-3-050.I.6, Compensatory Storage. This section was commended as more protective. It exceeds Federal and State Model regulations.

Although amendments are requested to maintain the City's regulations with the FEMA/State Model Floodplain Management Standards, the State DOE emphasized the quality regulations the

City implements, particularly its application of compensatory storage and other features that enhance floodplain protection. (pers. comm. DOE, Chuck Steele, June 25, 2004)

Comparison with State DCTED Example Code

Given that the State DCTED Example Code does not deviate substantially from the Federal/State Model Flood Damage Prevention Ordinance, or the City's current regulations, significant issues are not anticipated. There are some options to consider which are described below. (See Appendix A for a more detailed comparison.)

The State DCTED Example Code incorporates all of the FEMA/State Model Floodplain Management Standards. It also includes additional advisory provisions such as:

- Requiring the use of additional information that is more restrictive than Flood Insurance Rate Maps, e.g. future flow modeled conditions, if available.
- Verification of other agency permits (e.g. federal) required.
- Indicating that structures or subdivisions should occur on buildable areas outside the floodplain on the subject property if possible.
- Ensuring filling and grading do not affect side channel fish migration areas.
- Prohibiting onsite sewage disposal systems in floodways, channel migration zones, and the 10-year floodplain elevation.

Possible approaches for the City's Critical Area Regulation Update are:

- Current Approach: Implement the FEMA/State Model with the City's local amendments for compensatory storage, stricter floodway limitations, and other features; or
- State DCTED Model Approach: Implement the FEMA/State Model with some added features to encourage use of future flow model conditions, development on the non-floodplain portions of a property, and consistency measures with fish habitat (stream) regulations, etc.; or
- Combination of the above.

City Policy Considerations

The City's flood hazard regulations reflect City policies, particularly:

- Policy EN-19 (proposed to be renumbered 26). Limit development within the 100 year floodplain to that which is not harmed by flooding. Roads and finished floors of structures should be located above the 100 year flood level, and new development should provide compensation for existing flood storage capacity due to filling.

In the Year 2000 this policy provided the basis for some of the more protective measures in the current City ordinance, such as compensatory storage and elevating structures above the base flood elevation. These measures also help improve the City's insurance rating. (BWR, January 2000)

Recommendations

It is recommended that the City continue with its Flood Hazard regulations with the following adjustments:

- Add the State DOE requested amendments to address updates to the Federal/State Model Flood Damage Prevention Ordinance, or to address other clarifications, in order to maintain flood insurance eligibility.
- Add the more relevant features of the State DCTED Example Code:
 - Requiring the use of additional information that is more restrictive than Flood Insurance Rate Maps. The primary concern is to regulate mapped flood hazard areas and establish base flood elevations based on Federal studies. However, appropriate situations where the City could require additional future flood information include: development in unmapped areas or bridge construction proposals.
 - As a public service include a notification that other agency requirements are an applicant's responsibility (see amendments proposed in Section 5).

Regarding other State DCTED advisory changes, the following are not a part of the Federal/State Model Flood Damage Prevention Ordinance and appear unnecessary:

- Filling and grading of side channel fish migration areas would not be an outright allowed activity since streams and their riparian buffers would be generally “no touch” (see proposed Stream regulations).
- Most of the floodplain area is platted and developed, and requiring development outside of the floodplain if possible would not be especially practical.

3. Geologic Hazards

Location

Geologic hazards, according to WAC 365-190, include: erosion, landslide, seismic, mine, volcanic, and “other” hazards (e.g. tsunamis, mass wasting, debris flows, etc.). Development in these areas may pose risks to public health and safety. Some of these risks may be reduced by engineering or other methods. If risks cannot be reduced to acceptable levels, building in geologically hazardous areas should be restricted.

Geologic risks in the City of Renton include:

- Erosion hazards
- Landslide hazards
- Seismic hazards
- Coal mine hazards
- Steep slopes, including sensitive slopes 25-40% and protected slopes 40% and greater (often considered to be a landslide hazard)

To a lesser extent there is a potential for volcanic hazards.

Geologic hazard maps prepared by the City are found in Appendix B. A volcanic hazard map from the USGS is also found in Appendix B.

Studies

The City’s development of geologic hazard regulations relied on several technical reports or professional literature prepared for the City or agencies by experts, or by input from expert consulting geologists, as follows (Bucher, Willis & Ratliff, January 26, 2000):

City Specific Reports

Azous, Amanda (January 1992). *Critical Areas in the City of Renton: Geological Hazardous Areas, Mineral Lands and Wildlife Habitat Resources*. Prepared for City of Renton Planning/Building/ Public Works Department. Renton, Washington.

GeoEngineers, Inc. (1991). *Summary Report: Critical and Resource Areas Evaluation*. Prepared for the City of Renton. Authors Donald W. Tubbs, Senior Geologist, and Jon W. Koloski, Principal. Renton, Washington.

David Evans and Associates, Inc. (January 16, 1992). *Draft Environmental Impact Statement for City of Renton Land Use Element*. Prepared for City of Renton Planning/Building/Public Works Department. Renton, Washington.

Consulting firms were also contacted to review definitions, or to offer expertise including Dale Snyder, consulting soil scientist and geologist, Agra Earth and Environmental, GeoEngineers Inc. and Golder and Associates. (Bucher, Willis & Ratliff, January 26, 2000)

Other Technical Reports and Professional Literature

Arendt, Randall G. (1996). *Conservation Design for Subdivisions*. Prepared for the Natural Lands Trust, American Planning Association, and American Society of Landscape Architects. Island Press, Washington D.C.

City of Seattle, Landslide Policy Group (June 1, 1998). "Landslide Policies for Seattle." Seattle, WA.

Corish, Kathy (December 1995). *Clearing and Grading Strategies for Urban Watersheds*. Prepared for the United States Environmental Protection Agency. Metropolitan Washington Council of Governments, Washington D.C.

Duerksen, Christopher J. and Suzanne Richman (August 1993). *Tree Conservation Ordinances*. Planning Advisory Service, Report 446. Prepared for American Planning Association and Scenic America. Chicago, Illinois.

Olshansky, Robert B. (November 1996). *Planning for Hillside Development*. Planning Advisory Service, Report 466. Prepared for American Planning Association. Chicago, Illinois.

Schueler, Tom and the Center for Watershed Protection (December 1995). *Site Planning for Urban Stream Protection*. Prepared for Metropolitan Washington Council of Governments. Washington D. C.

Regulatory Overview

In the late 1980s the City adopted a Greenbelt Ordinance that regulated a variety of environmental hazards including steep slopes, landslides, coalmine hazards and seismic hazards. The ordinance applied regulations through an overlay map. The source of the Greenbelt map was not well documented, and there were no mapping criteria. In the Year 2000, the City repealed the Greenbelt Ordinance and added geologic hazard regulations in a comprehensive Critical Areas ordinance. The adopted Geologic Hazard regulations:

- **Classify hazards using criteria.** Based upon a report prepared by GeoEngineers Inc. for the City of Renton in 1991, the regulations include criteria for landslide hazards, erosion hazards, seismic hazards, and coal mine hazards. Maps of these hazards are to be used as references.
- **Address exemptions** within Geologic Hazard areas. The exemptions include: conservation activities; research and site investigation; existing agriculture; utility relocation out of the geologic hazard area; maintenance and repair of existing parks, trails, roads, facilities and utilities; vegetation management and essential tree removal for utilities, roads and public parks; remodeling, replacing, removing existing structures; existing use maintenance and repair; existing single family residence modification; existing grandfathered activities; trails within buffers, and emergency activities.
- **Require peer review** of geotechnical reports for properties with slopes 25% or greater, and Medium, High or Very High Landslide Hazards. Independent peer review of geotechnical reports may be required for properties with High Erosion, High Seismic, Medium Coal Mine, or High Coal Mine Hazards. For any of the hazards, conditions of approval may include modifying construction techniques, design, drainage, project size/configuration, or seasonal constraints on development.

- **Address slopes between 25-40% that do not have identified erosion or landslide hazards**, by requiring peer review of geotechnical reports, erosion control plans, and weekly erosion control inspections. The regulations would also authorize conditions of approval which may include modifying construction techniques, design, drainage, project size/configuration, seasonal constraints on development, vegetation stabilization, sequencing or phasing of construction, clearing and grading limits, and other measures. These same potential conditions of approval apply to lands with Medium and High Landslide Hazards and High Erosion Hazards.
- **Restrict development on slopes over 40%**. Exceptions include man-made slopes (e.g. from legal mining operations) pursuant to a modification, a single family dwelling on a lot of record pursuant to a variance, public utilities needed to protect slope stability, and public road widening where alternative locations are infeasible. Modifications may be allowed such as allowing fill at the base of a 40% slope. As with other modifications, report submittal, and review criteria would apply.
- **Restrict the creation of lots having a predominant 40%+ slope.**
- **Require a buffer of 50 feet from a Very High Landslide Hazard Area**, which may be increased or decreased administratively based upon a geotechnical report.
- **Provide a review process for Coal Mine Hazards.** The regulations require a report to document potential Coal Mine Hazards, authorize conditions of approval, and indicate requirements for mitigation during construction.
- **Establish detailed report preparation requirements** for each potential hazard located on a site.

Overall, the regulations provide greater protection from geologic hazards than the City's previous Greenbelt regulations. In comparison to prior Greenbelt ordinance standards, the regulations were crafted to specifically address hazards, establish specific mapping criteria, institute report requirements, and require performance standards and conditions.

State Agency Input

State agencies were provided an opportunity to review the Year 2000 critical areas regulations update. Agencies will be afforded an opportunity for review through this year's GMA Comprehensive Plan Amendment/Development Regulation Amendment cycle.

Comparison with State DCTED Example Code

The City's regulations are comparable to the State DCTED Example Code as shown in a matrix in Appendix A.

- The City designates, classifies, and maps geologic hazards. Renton's hazard criteria are similar to the State Example Code definitions, which are based on WAC 365-190. Mapping sources are similar for some hazards and in other cases more specific to the criteria prepared specifically for Renton by GeoEngineers Inc. A comparison of definitions and criteria is provided in Appendix A.
- The City makes limited exemptions in geologic hazards, and is more protective by not "exempting" new construction under a certain square footage limitation as the State Example Code allows.

- The City’s permit process requires a detailed report by a qualified professional as summarized in Appendix A. Stricter than the State Example Code, third party peer review is mandatory in Renton when certain hazards are present, i.e. for properties with slopes 25% or greater, and Medium, High or Very High Landslide Hazards. Independent peer review of geotechnical reports may be required for properties with High Erosion, High Seismic, Medium Coal Mine, or High Coal Mine Hazards.
- The City establishes general performance standards and has the authority to condition development in hazard areas. Generally, the City’s performance standards are less specific than the State Example Code. However, the City’s detailed report requirements, peer review process, and ability to condition based on site-specific analysis should allow for appropriate consideration of hazards and mitigation. Some potential minor improvements to the City’s regulations are proposed below.
 - To strengthen the City’s general performance standards, the City may consider adding the following review criteria found in the State Example Code:
 - The proposal will not increase the threat of the geological hazard to adjacent properties beyond pre-development conditions;
 - The proposal will not adversely impact other critical areas.
 The criteria could also state that the development must be safely accommodated, similar to the language already found under “conditions of approval.”
 - The State Example also would restrict critical facilities (e.g. government, hospitals, etc.) from locating in geologic hazard areas unless there is no practical alternative. Between all the geologic hazards in Renton, and particularly seismic hazard areas, that would eliminate most of the City that is also accessible to key highways. City regulations would (for any type of development) require a geotechnical report, and the City has the ability to condition development. The cost to develop in particular hazard areas would also tend to help critical facilities to avoid these areas where possible. As an alternative to restricting location of critical facilities, the City could require peer review of geotechnical reports.

A more noteworthy difference between the City’s geologic hazard regulations and the State Example Code relates to volcanic hazards. This is discussed further below.

Volcanic Hazards

The City’s regulations do not address volcanic hazards, most likely because consultants indicated the risk was generally low and because mapping was not generally available by King County, although available from other sources:

- GeoEngineers Inc. 1991: “Volcanic hazards within Renton and its sphere of influence are generally low. However, essential facilities should be reviewed to assure that they can continue to function following a volcanic ashfall 2 inches in thickness, which is likely the worst consequence of a moderate volcanic eruption.”
- Amanda Azous, 1992: “The primary concern with respect to volcanic hazards is from mudflows and associated flooding which may result from volcanic activity on Mount Rainier. King County is currently revising its mapping and is modeling the potential for volcanic hazards in the County. Development sites near the Green River are the most likely

areas of concern within the City limits. The City's major concern is that adequate engineering standards are employed when building in a volcanic hazard area."

Since the time of the Renton reports above King County has not completed modeling. The USGS completed a study in 1998. The USGS report¹ maps the following type of hazard in the Renton vicinity: a fraction less than 1% annual probability of tephra² fall in the Renton vicinity from any major Cascade volcano including Mt. Rainier; and potential for inundation from post lahar sedimentation between the Green River and SR-167. See Appendix B.

The USGS report's general recommendations for volcanic hazards in the vicinity of Mount Rainier include:

Communities, businesses, and citizens can undertake several actions to mitigate the effects of future eruptions, debris avalanches, and lahars. Decisions about land use and siting of critical facilities can incorporate information about volcano hazards. Areas judged to have an unacceptably high risk can be left undeveloped. Alternatively, development can be planned to reduce the level of risk, or even include engineering measures to mitigate risk. For example, areas along the channels and flood plains of lahar-prone rivers could be set aside for open space or recreation, and valley walls or high terraces could be used for houses, schools, and businesses.

State Example Code provisions include the following performance standards for developments in volcanic hazard areas:

Volcanic and Tsunami Hazard Areas. Activities on sites containing areas susceptible to inundation due to volcanic or tsunamis hazards shall require an evacuation and emergency management plan. The [city/county] may use the performance standards for coastal high hazard areas (see Chapter X.40, Frequently Flooded Areas) as guidance in reviewing new structures proposed in volcanic and tsunami hazard areas.

Reviewing previous report recommendations prepared for Renton, USGS mapping, and the State Example Code, the City could consider the following approaches to address volcanic hazards:

- Target regulations to essential facilities as identified by GeoEngineers. Require such facility proposals in the Lower Green River Inundation Area (Appendix B) to demonstrate adequate engineering standards regarding volcanic hazard risks and an evacuation and emergency management plan. "Critical facilities"³ have extra requirements in the standard 100-Year floodplain in Section 4-3-050.I.5, and much of the floodplain hazard area is within the Lower Green River Inundation Area. These floodplain regulations could be cross-referenced.

¹ U.S. Department of the Interior, U.S. Geological Survey (Revised 1998). *Volcano Hazards from Mount Rainier, Washington*. Open-File Report 98-428. By R.P. Hoblitt¹, J.S. Walder, C.L. Driedger, K.M. Scott, P.T. Pringle, J.W. Vallance.

² Tephra is a general term for fragments of volcanic rock and lava regardless of size that are blasted into the air by explosions or carried upward by hot gases in eruption columns or lava fountains. Tephra includes large dense blocks and bombs, and small light rock debris such as scoria, pumice, reticulite, and ash.
(<http://volcanoes.usgs.gov/Products/Pglossary/tephra.html> accessed June 30, 2004)

³ CRITICAL FACILITY: A facility for which even a slight chance of flooding might be too great. Critical facilities include, but are not limited to schools, nursing homes, hospitals, police, fire and emergency response installations, and facilities that produce, use or store hazardous materials or hazardous waste.

Being in seismic hazard areas and potentially flood hazard areas these facilities would already have to provide critical area reports based on the potential hazards, and could also address volcanic hazards.

- Require that new development of any kind in the Lower Green River Inundation Area provide documentation that demonstrates adequate engineering standards regarding volcanic hazard risks. Development in this area already would have to submit a geologic hazard report to address seismic hazards and potentially floodplain hazards.
- Delay implementing volcanic regulations to work with King County and Tukwila on standard regulations. Tukwila regulations currently do not address volcanic hazards. King County has adopted volcanic hazard standards but they are not effective pending a County modeling effort (referenced since early 1990s). However, this is noted as an omission in the County’s best available science review since the USGS has published some studies.⁴
 - King County’s regulations for the Green River (pending modeling) include: Within volcanic hazard areas located along the White river downstream from Mud Mountain dam and the Green and Duwamish rivers, the department shall evaluate development proposals for critical facilities for risk of inundation or flooding resulting from mudflows originating on Mount Rainier. The applicant shall design critical facilities to withstand, without damage, the effects of mudflows equal in magnitude to the prehistoric Electron mudflow.

The approach considered in the City’s proposed amendments are to target regulations to critical facilities similar to the approach recommended by GeoEngineers.

City Policy Considerations

The City’s geologic hazard regulations balance Comprehensive Plan policies related to managing risk, protecting environmental features, and accommodating growth targets (Bucher, Willis & Ratliff, January 26, 2000). General environmental objectives/policies implemented by the City’s geologic hazard regulations include:

Objective EN-A: Protect, restore and enhance environmental quality through land use plans and patterns, surface water management programs, park master programs, development reviews, incentive programs and work with citizens, land owners, and public and private agencies.

Policy EN-1. Prevent development on lands where development would create hazards to life, property, or environmental quality.

⁴ Per King County’s Executive Report - Best Available Science Volume II, Assessment – February 2004: “...The Washington State Department of Natural Resources Division of Geology and Earth Resources and the United States Geological Survey have completed the mapping that is required, but the proposed CAO does not adopt that mapping by reference or incorporation.”

“The referenced modeling is not described though it is referred to in the text as ‘required.’ It is presumed that the modeling will comprise a detailed series of simulations of eruptions and subsequent pyroclastic flows, Lahars, lateral blast events, and the like. These simulations combined with historical information and geologic data and mapping, will allow development of proper zonation around the volcano. Until existing maps are adopted and modeling completed, King County will be unable to properly regulate development and construction in Volcanic Hazard Areas and public and private property remain at risk.”

City Environment Element policies also specifically relate to erosion, landslide, steep slope, and coal mine hazards.

Recommendations

The City's geologic hazard regulations compare favorably to the State Example Code. Minor recommendations regarding adding general performance standards and requiring peer review of geotechnical reports for critical facilities in geologic hazard areas are suggested in the "Comparison" section above.

The one more significant difference relates to volcanic hazard regulations. Options to address the issue are made, primarily to review critical facilities in such areas. These facilities would already be submitting other critical area reports and procedural complications are not anticipated. See the "Comparison" section above.

4. Habitat Conservation

Location

In addition to streams, riparian areas, and wetlands described under separate cover, the City of Renton and its Potential Annexation Area contain habitats supporting other wildlife species. State Classification Guidelines for Critical Areas (WAC 365-190-080) identify several types of wildlife habitats to be addressed in Critical Areas Ordinances:

- Areas with which endangered, threatened, and sensitive species have a primary association;
- Habitats and species of local importance;
- State natural area preserves and natural resource conservation areas.

Other considerations may include: creating a system of fish and wildlife habitat with connections between larger habitat blocks and open spaces, and buffer areas around habitats.

A key source of information about wildlife, including those endangered, threatened, and sensitive, is available from the Washington State Department of Fish and Wildlife (WDFW) Priority Habitat and Species (PHS) Program. Through this program the State provides information on fish and wildlife habitat location, and priorities for species and habitat management and conservation, including measures to protect resources as land use decisions are made. WDFW uses the information to screen forest practices permits and SEPA reviews, for landscape planning and ecosystem management, and other purposes. It is a source of information for GMA planning efforts by counties and cities as well.

Priority habitats in the City of Renton include wetlands, riparian corridors, and urban natural open space. The lake, rivers, and creeks support anadromous fish runs. Other priority species include bald eagles, osprey, great blue herons, and other waterfowl. (WDFW 2003; WDFW 1997)

Studies

In developing its Habitat Conservation regulations, first instituted formally in 2000, the City reviewed the following scientific and technical resources prepared by consulting experts or by State agencies (BWR, January 26, 2000):

David Evans and Associates, Inc. (January 16, 1992). *Draft Environmental Impact Statement for City of Renton Land Use Element*. Prepared for City of Renton Planning/Building/Public Works Department. Renton, Washington.

David Evans and Associates, Inc. (December 1991). *City of Renton Fish and Wildlife Habitat*. Prepared for City of Renton Planning/Building/Public Works Department. Renton, Washington.

Jones and Stokes Associates (June 1991). *Critical Areas Inventory: City of Renton Wetlands and Stream Corridors*. Prepared for the City of Renton, Planning/Building/Public Works Department. Renton, Washington.

Washington State Department of Fish and Wildlife, Priority Habitats and Species Division (May 1991). *Management Recommendations for Washington's Priority Habitats and Species*. Elizabeth Rodrick and Ruth Milner, Technical Editors. Olympia, Washington.

Washington State Department of Fish and Wildlife, Priority Habitats and Species Division (January 1996). *Priority Habitats and Species List: Habitat Program*. Olympia, Washington.

Regulatory Overview

The City's Habitat Conservation Regulations address:

- **Criteria defining "critical habitat."** Critical habitat includes: species that are listed as endangered, threatened, sensitive, monitor, or priority by Federal or State agencies; heron rookeries or raptor nesting areas, Category 1 wetlands; and shorelines designated as Natural or Conservancy in the Shoreline Master Program.
- **Habitat assessments.** Reports are required, and peer review may be required.
- **Native Growth Protection Areas.** Critical habitats are to be placed in Native Growth Protection Areas.
- **Disturbance.** If a critical habitat area is to be altered, impacts are to be avoided, minimized or compensated. Mitigation may be required based upon submitted reports, or information from State or Federal agencies.

Proposed critical area regulation amendments for streams would remove "shorelines designated as Natural or Conservancy in the Shoreline Master Program" since streams and shorelines would have a separate proposed set of regulations including buffers, and clarify that Habitat Conservation regulations apply to non-salmonid species, while stream regulations address primarily salmonid species. (See stream related reports under separate cover.)

State Agency Input

State agencies were provided an opportunity to review the Year 2000 critical areas regulations update. Agencies will be afforded an opportunity for review through this year's GMA Comprehensive Plan Amendment/Development Regulation Amendment cycle.

Comparison with State DCTED Example Code

Similar to the State Example Code, the City designates habitat conservation areas, primarily by referencing State and Federal designated endangered, threatened, sensitive, and priority species. It requires a habitat assessment report and includes general performance standards that require impact avoidance/sequencing and mitigation. It allows for State and Federal Agency input. The City may condition proposals that impact habitat conservation areas.

The State Example Code adds some other designations of habitat conservation areas, such as State DNR Natural Heritage Program to identify rare plant species and high quality ecosystems and land useful or essential for connecting habitat block and open spaces. However, in Renton's case, a review of the DNR database showed no records in or near the Renton City limits. The PHS mapping referenced by Renton, with its identification of urban natural open space, riparian corridors, and other mapped features identifies some "connecting habitat."

The State's Example Code provides a similar process as Renton's and also provides some specific standards that make implementation more efficient, but less discretionary. State performance standards include consistency with Washington State Bald Eagle Protection Rules. Developments must comply with WDFW buffers or land use restrictions in management plans. Subdivisions wholly within habitat conservation areas may also be restricted.

A key issue for the City of Renton is the extent to which protection measures are specified in regulations given the variety and complexity of species and habitats, particularly those not otherwise addressed as a critical area. The City's approach to habitat conservation regulations allows the City to determine the value of the habitat assessment reports and agency input, and condition development. State PHS species' recommendations would be considered in the habitat assessment reports on a case-by-case basis. State management recommendations would be reviewed in those reports for applicability to the local conditions and situation.

Some potential measures the City could take to enhance its implementation of its current Habitat Conservation regulations include the following:

- The regulations could cross-reference more specific State standards for bald eagles since that species is found in Renton: "Bald eagle habitat shall be protected pursuant to the Washington State Bald Eagle Protection Rules (WAC 232-12-292)"; and
- The regulations could clarify that activities adjacent/abutting to designated habitat conservation areas may be regulated.

City Policy Considerations

The City regulations regarding habitat conservation implement Comprehensive Plan Policy EN-50 (to be renumbered 56) regarding identification and protection of unique and significant wildlife habitat.

Recommendations

The City regulations provide a comparable review process for habitat conservation areas. Potential minor measures to enhance the City's regulations are suggested – to reference State standards for Bald eagles, and to clarify that activities adjacent/abutting to designated habitat conservation areas may be regulated.

5. Critical Areas Regulations Procedures

Regulatory Overview

Either in the City's Critical Areas Ordinance (RMC 4-3-050) or in administrative sections such as 4-1, 4-8, and 4-9, Renton's regulations provide comprehensive critical areas procedures, such as defining regulation purposes, applicability and exemptions, submittal requirements, general performance standards, review criteria, variances and exceptions, and enforcement.

Comparison with State DCTED Example Code

The City regulations include common procedural requirements and standards as noted above and in Appendix A. Some areas addressed in the State Example Code, which are omitted or indirectly included in the Renton regulations, include the following:

- **Relationship to other regulations:**
 - Regulations apply as an overlay and in addition to other development standards (implied in City regulations);
 - Any individual critical area adjoined by another type of critical area is required to have the buffer and meet requirements that provide the most protection to all critical areas involved (stated in some cases; implied generally in City regulations);
 - If there are any conflicts with other regulations the regulations that provide more protection apply (implied);
 - Compliance with critical area provisions does not constitute compliance with other federal, state and local regulations and permit requirements (implied in City regulations).
- **Best Available Science** – critical area reports and decisions to rely on best available science (repeat criteria from WAC⁵). Variances also to consider best available science.
- **Critical area identification form:** An applicant would submit this form to identify critical areas present. Following submission, the decisionmaker can waive requirements because there are no critical areas or no potential impacts to critical areas or indicate that a critical area is present and require study. The agency's determination (waivers or applicable critical area requirements) is based on the identification form is published as part of a notice of application.
- **Exemptions:** Between the State Example Code's list of exempt or "allowed" activities, and the City's exemption list, there are few differences. Renton includes additional exemptions in a few areas, although the City exemption regulations would require a critical areas report unless waived:

⁵ Best Available Science (BAS) definition and sources: BAS -- information generated from a valid scientific process that involves peer review, replicable methods, logical conclusions/reasonable inferences, quantitative analysis, information placed in context, and provision of references. BAS Sources may include research, monitoring, inventory, surveys, modeling, assessment, synthesis, and expert opinion.

According to WAC 365-195-915, counties and cities should include the best available science in determining whether to grant applications for administrative variances and exemptions from generally applicable provisions in policies and development regulations adopted to protect the functions and values of critical areas. Counties and cities should adopt procedures and criteria to ensure that the best available science is included in every review of an application for an administrative variance or exemption.

Table 2 Comparison of Exemption Categories

| Exemption/Allowed Activity | State Example | City of Renton |
|---|-----------------------------------|-----------------------|
| Conservation, Enhancement, Education, and Related Research and Site Investigation | E | E |
| Agricultural, Harvesting, Vegetation Management | A (excludes existing agriculture) | E |
| Surface Water Facilities | | E |
| Roads/Parks/Utilities – Relocation, Maintenance, Within Rights-of-Way, Existing Expansion 10%, Essential Tree Removal | E, A (excludes 10% expansion) | E |
| Small Wetlands, Temporary Wetland Impacts | | E |
| Maintenance and Construction – Existing Uses and Facilities | E, A | E |
| Emergency Activities | E | E |
| Hazardous Materials – Federal or State Pre-emption, Use of Materials with no Risk to the Aquifer as Listed, de minimus amounts, materials in sealed units, etc. | | E |
| Trails and Open Space | A | E |
| Forest Practices (not conversions) | A | |
| Chemical Applications of herbicides, pesticides, fertilizers or other hazardous substances in accordance with Federal/State Requirements | A | |
| Navigational Aids and Boundary Markers | A | |

Notes: A = Allowed without Critical Areas Report; E = Exempt

The main differences are with surface water facilities and wetlands exemptions. With regard to surface water facilities a critical areas report and compliance with performance standards is still required to meet the exemption to help protect critical area functions. Wetland exemptions are discussed in the separate Best Available Science Review by Parametrix dated June 28, 2004.

- **Notice on Title:** Requires title notices of the existence of critical areas.
- **Building Setbacks:** A standard 15-foot setback is required from the edge of all buffers or from critical areas if buffers are not required. The purpose is to allow enough space for construction and maintenance without impact to the critical area or buffer.

Key issues for Renton’s regulations include review criteria related to the use of best available science and whether to apply standard building setbacks from critical areas as a general standard.

City Policy Considerations

General environmental objectives/policies implemented by the City’s regulations include:

Objective EN-A: Protect, restore and enhance environmental quality through land use plans and patterns, surface water management programs, park master programs, development reviews, incentive programs and work with citizens, land owners, and public and private agencies.

Policy EN-1. Prevent development on lands where development would create hazards to life, property, or environmental quality.

Additional general/framework policies, proposed in the 2004 Comprehensive Plan amendments, include:

Policy EN-2. Ensure that development on lands supporting endangered or threatened species occurs in a way that maintains adequate habitat.

Policy EN-3. Use the best available science to determine critical area buffers and maintain achievable ecological functions of those buffers. Buffers should be protected per Policy U-85, Utilities Element, Surface Water policies.

Policy EN-4. Implement clustered development as a method of conserving additional private opens space, or providing public parks and trails.

Recommendations

The City's procedures provide for structured review of development applications and determination of appropriate conditions. To meet Washington Administrative Code rules that direct the City to consider best available science where variations to regulations are proposed, to address common performance standards in addition to buffers, and to clarify the application of regulations, some amendments are recommended below.

- The City should include best available science review criteria for administrative buffer reductions, administrative modifications, and administrative and Hearing Examiner variances as follows:

BAS Modification/Variance Criteria: The decision to grant the [administrative buffer reduction/administrative modification/variance] is based on consideration of the best available science as described in WAC 365-195-905; or where there is an absence of valid scientific information, the steps in RMC 4-X [below] are followed.

Absence of Valid Scientific Information. Where there is an absence of valid scientific information or incomplete scientific information relating to a critical area leading to uncertainty about the risk to critical area function of permitting an alteration of or impact to the critical area, the [Department Administrator/Hearing Examiner] shall:

1. Take a "precautionary or a no-risk approach," that appropriately limits development and land use activities until the uncertainty is sufficiently resolved, or determine that protection can be ensured by using an approach different from that derived from the best available science provided that the applicant demonstrates on the record how the alternative approach will protect the functions and values of the critical area; and
2. Require application of an effective adaptive management program that relies on scientific methods to evaluate how well regulatory and nonregulatory actions protect the critical area. An adaptive management program is a formal and deliberate scientific approach to taking action and obtaining information in the face of uncertainty. An adaptive management program shall:
 - a. Address funding for the research component of the adaptive management program;
 - b. Change course based on the results and interpretation of new information that resolves uncertainties; and

c. Commit to the appropriate timeframe and scale necessary to reliably evaluate regulatory and nonregulatory actions affecting protection of critical areas and anadromous fisheries.

- Submittal requirements for projects that could impact critical areas and propose mitigation plans, or those that propose buffer reductions, should demonstrate that best available science was used in determining the reduced standard and/or in developing mitigation plans:

The mitigation plan shall include a written report identifying:

A review of the best available science supporting the proposed request for a reduced standard and/or the method of impact mitigation; a description of the report author's experience to date in restoring or creating the type of critical area proposed; and an analysis of the likelihood of success of the compensation project.

- The City regulations do not specifically require a building setback in addition to a buffer requirement, although the Critical Area Regulations do provide staff latitude to apply conditions, and SEPA provides another review and mitigation process. Focusing on buffers and not specifying an additional building setback may be due to the City's consideration of site-specific conditions, or potentially to balance property rights and critical area protections. There may be instances where the City would want the authority to require a building setback to ensure long-term maintenance of development without eroding a buffer's protectiveness. A general standard allowing the City to condition a proposal to apply a building setback could be included. It would be discretionary:

Building Setback: The Reviewing Official may require a building setback from a critical area or buffer to ensure adequate protection of the critical area/buffer during construction and on-going maintenance of the activity. A requirement for a building setback shall be based on the findings of a critical area report or a peer review required for the activity.

- It is recommended that the City clarify that applicants are responsible for other permits:

Advise applicants of their responsibilities to obtain federal, state, or other local permits:

Compliance with the provisions of this Title does not constitute compliance with other federal, state, and/or other local agency regulations and permit requirements that may be required. The applicant is responsible for complying with these requirements, apart from the process established in this Title.

6. References

The following references were used to prepare this report. Also refer to each individual section for references used by the City in the preparation of its Critical Area Regulations.

- Azous, Amanda (January 1992). *Critical Areas in the City of Renton: Geological Hazardous Areas, Mineral Lands and Wildlife Habitat Resources*. Prepared for City of Renton Planning/Building/ Public Works Department. Renton, Washington.
- Bucher, Willis & Ratliff Corporation (January 26, 2000). "Development of the Proposed Sensitive Areas Ordinance – Revised Memo." From Lisa Grueter, Senior Planner, to Rebecca Lind, Principal Planner, City of Renton Economic Development, Neighborhoods and Strategic Planning Department. Seattle, WA.
- City of Renton (2004). 2004 City of Renton Drinking Water Quality Report. Renton, WA.
- City of Renton (August 2002). "Explanation of Aquifer Code Amendments, August 2002" by City of Renton Water Utility. Renton, WA.
- City of Renton (May 1999) *Water System Plan: Appendix Q, Wellhead Protection Plan*. Renton, WA.
- Environmental Protection Agency (June 8, 1988). "Sole Source Designation of the Cedar Valley Aquifer, King County, WA." [FRL-3457-7] Federal Register Vol. 53, No. 191, Monday October 3, 1988, Notices.
- GeoEngineers, Inc. (1991). *Summary Report: Critical and Resource Areas Evaluation*. Prepared for the City of Renton. Authors Donald W. Tubbs, Senior Geologist, and Jon W. Koloski, Principal.
- Kindig, Andy, A.C. Kindig & Company. Personal communication, June 30, 2004.
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- Washington State Office of Community Development (October 28, 2002). Letter, Charles Bates, Assistant Planner, Growth Management Services, to the Honorable Jesse Tanner, Mayor Renton.
- Washington State Department of Fish and Wildlife (2003). Priority Habitats and Species database. Olympia, WA.

APPENDIX A

COMPARISON CHART: AQUIFER PROTECTION, FLOOD HAZARD, GEOLOGIC HAZARD, AND HABITAT CONSERVATION REGULATIONS

| Procedural Systems | | |
|--|---------------|---------------------------------|
| Provision | Renton | State DCTED Example Code |
| Purpose and General Provisions | | |
| Purpose | X | X |
| Authority | X | X |
| Relationships to Other Regulations | 0 | X |
| Administrative Procedures (conform to standards, including timing, fees, appeals) | X | X |
| Fees | X | X |
| Severability | X | X |
| Administrative Rules | X | X |
| Interpretation as minimum requirements | X | X |
| Jurisdiction – Critical areas (critical areas, buffers, within 300' of water bodies/wetlands, perimeter from bald eagle) | X [1] | X |
| Protection of Critical Areas to equal or greater functions and values; use mitigation sequencing. | X [2] | X |
| Best Available Science | | |
| Best Available Science | 0 | X |
| Applicability, Exemptions, and Exceptions | | |
| Applicability | X | X |
| Exemptions | X | X |
| Exceptions – Public Agency and Utility | X [3] [4] | X |
| Exceptions – Reasonable Use | X [4] | X |
| Allowed Activities | | |
| Allowed Activities (without Critical Area Report but with BMPs) | X [5] | X |
| Critical Area Review Process | | |
| General Requirements | X [6] | X |
| Critical Area Preapplication Consultation | X [7] | X |
| Critical Area Identification Form | 0 [8] | X |
| Public Notice and Initial Determination | X [9] | X |
| Critical Area Report | | |
| Critical Area Report – Requirements | X [10] | X |
| Critical Area Report – Modifications to Requirements | X | X |
| Mitigation Requirements | X [11] | X |
| Mitigation Sequencing | X [11] | X |
| Mitigation Plan Requirements | X | X |
| Innovative Mitigation | X [12] | X |
| Determination Process | | |
| Determination | X [13] | X |
| Review Criteria | X [13] | X |
| Favorable Determination | X [13] | X |
| Unfavorable Determination | X [13] | X |
| Completion of the Critical Area Review | X [13] | X |
| Appeals | X [13] | X |
| Variations | | |
| Variations | X [10] | X |
| Unauthorized Alterations and Enforcement | | |
| Unauthorized Critical Area Alterations and Enforcement | X | X |
| General Critical Area Protective Measures | | |
| Critical Area Markers and Signs | X [14] | X |
| Notice on Title | 0 | X |
| Native Growth Protection Areas | X | X |
| Critical Area Tracts | X | X |
| Building Setbacks | 0 | X |
| Bonds to Ensure Mitigation, Maintenance, and Monitoring | X | X |
| Critical Area Inspections | X | X |
| Notes: | | |
| [1] Critical areas plus any required buffers. | | |
| [2] Requirements for critical habitats, wetlands, and stream by performance standards. Not applicable to aquifer recharge areas, geologic hazards, or flood hazards. | | |
| [3] In some individual performance standards there are such agency/utility exceptions, e.g. protected slopes, or via modification or variance processes. | | |
| [4] Modification, administrative variances and hearing examiner variances procedures identify single family dwellings on legal lots or public agency/utility projects as cases for consideration. | | |
| [5] Exemptions are close to the Example Code's "allowed" activities. However, a critical area report may be required by City, and some exemptions have standards. | | |
| [6] Reviewing official given responsibility to ensure requirements are fulfilled. | | |
| [7] Preapplication review is optional, but strongly encouraged, and free. | | |
| [8] Usually identified during preapplication stage or via SEPA. | | |
| [9] Some formal administrative interpretations are listed as part of a Notice of Application. Determinations that there are no critical areas or granting report waivers are not a part of NOAs. | | |
| [10] No specific BAS requirement. Analysis of critical area to be made by qualified professional in accordance with standards. | | |
| [11] Mitigation sequencing specifically required for critical habitats, wetlands, and streams. For aquifer, flood hazard, and geologic hazard areas, conditions of approval are possible, and mitigation of impacts would be required. | | |
| [12] Allowed under streams and wetlands specifically. Other critical areas include more general performance standards and conditions. Innovative mitigation not precluded. | | |
| [13] Each report content requirement/performance standard varies by critical area. Any staff determinations may be appealed. | | |
| [14] Native growth protection areas to be marked permanently. | | |

Key:
X = Addressed
0 = Not Addressed
N/A = Not Applicable
R = Revision Recommended by State

Aquifer Recharge Areas

| Provision | Renton | State DCTED Example Code |
|---|--|--------------------------|
| Definition | X | X |
| Critical Aquifer Recharge Areas Designation. Critical aquifer recharge areas (CARAs) are those areas with a critical recharging effect on aquifers used for potable water as defined by WAC 365-190-030(2). CARAs have prevailing geologic conditions associated with infiltration rates that create a high potential for contamination of ground water resources or contribute significantly to the replenishment of ground water. These areas include the following: | X | X |
| A. Wellhead Protection Areas (boundaries of the ten (10) year time of ground water travel or boundaries established using alternate criteria approved by the Washington State Department of Health). | X | X |
| B. Sole Source Aquifers designated by the U.S. EPA. | X | X |
| C. Susceptible Ground Water Management Areas. Susceptible ground water management areas are areas that have been designated as moderately or highly vulnerable or susceptible in an adopted ground water management program developed pursuant to WAC 173-100. | N/A | X |
| D. Special Protection Areas. Special protection areas are those areas defined by WAC 173-200-090. | N/A | X |
| E. Moderately or Highly Vulnerable Aquifer Recharge Areas. Aquifer recharge areas that are moderately or highly vulnerable to degradation or depletion because of hydrogeologic characteristics are those areas delineated by a hydrogeologic study prepared in accordance with the state Department of Ecology guidelines. | N/A | X |
| F. Moderately or Highly Susceptible Aquifer Recharge Areas: moderately or highly susceptible to degradation or depletion, meeting the criteria established by the state DOE. | N/A | X |
| Aquifer Recharge Area Susceptibility Ratings. Aquifer recharge areas shall be rated as having high, moderate, or low susceptibility based on soil permeability, geologic matrix, infiltration, and depth to water as determined by the criteria established by the State Department of Ecology. | X | X |
| Mapping of Critical Aquifer Recharge Areas | X | X |
| A. The approximate location and extent of critical aquifer recharge areas are shown on the adopted critical areas maps. | X | X |
| B. These maps are to be used as a guide, may be continuously updated as new critical areas are identified, and are a reference. | X | X |
| Activities Allowed in Critical Aquifer Recharge Areas. The following activities are allowed and do not require submission of a critical area report: | X | X |
| A. Construction of structures and improvements, including additions, resulting in less than five percent (5%) or 2,500 square feet (whichever is greater) total site impervious surface area that does not result in a change of use or increase the use of a hazardous substance. | X [1] | X |
| B. Development and improvement of parks, recreation facilities, open space, or conservation areas resulting in less than five percent (5%) total site impervious surface area that do not increase the use of a hazardous substance. | X [1] | X |
| C. On-site domestic septic systems releasing less than 14,500 gallons of effluent per day and that are limited to a maximum density of one (1) system per one (1) acre. | N/A - See Prohibited for Sole Source [2] | X |
| Other: Deminimus hazardous materials quantities, existing fuel oil systems, equipment fueling in containment area, other limited exemptions. | X | |
| Report Content Requirements | X | X |
| Preparation by a Qualified Professional | 0 | X |
| Hydrogeologic Assessment (requirements increase for high impervious surfaces, injection wells, use of hazardous materials, and other factors). | 0 | X |
| Other: Operating Permit or Closure Permit Application | X | |
| Performance Standards – General Requirements | X | X |
| A. Activities may only be permitted in a critical aquifer recharge area if the applicant can show that the proposed activity will not cause contaminants to enter the aquifer and that the proposed activity will not adversely effect the recharging of the aquifer. | X [3] | X |
| B. The proposed activity must comply with the water source protection requirements and recommendations of the U.S. Environmental Protection Agency, Washington State Department of Health, and the [local health district]. | 0 | X |
| C. The proposed activity must be designed and constructed in accordance with the [locally adopted surface water management or water quality regulations]. | X | X |
| Performance Standards – Specific Uses | X | X |
| A. Storage Tanks, underground and above ground. | X | X |

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Aquifer Recharge Areas

| Provision | Renton | State DCTED Example Code |
|--|----------|--------------------------|
| B. Vehicle Repair and Servicing on impermeable pads; no dry wells. | X [4] | X |
| C. Residential Use of Pesticides and Nutrients. | X | X |
| D. Use of Reclaimed Water for Surface Percolation or Direct Recharge. | X | X |
| E. State and Federal Regulations, uses conditioned in accordance with the applicable state and federal regulations. | 0 | X |
| Other. Wastewater disposal, surface water requirements, pipeline requirements, construction activity standards, fill material requirements, reg's for existing solid waste landfills. | X | |
| Uses Prohibited From Critical Aquifer Recharge Areas. | X | X |
| A. Landfills. Landfills, including hazardous or dangerous waste, municipal solid waste, special waste, woodwaste, and inert and demolition waste landfills; | X | X |
| B. Underground Injection Wells. | X [4][6] | X |
| C. Mining | X [5] | X |
| D. Wood Treatment Facilities. | X [6] | X |
| E. Storage, Processing, or Disposal of Radioactive Substances. | X | X |
| F. Other Prohibited Uses or Activities | X | X |
| 1. Activities that would significantly reduce the recharge to aquifers currently or potentially used as a potable water source; | 0 | X |
| 2. Activities that would significantly reduce the recharge to aquifers that are a source of significant baseflow to a regulated stream; and | 0 | X |
| 3. Activities that are not connected to an available sanitary sewer system, prohibited from critical aquifer recharge areas associated with sole source aquifers. | X [2] | X |
| 4. Surface impoundments (WAC173-303 -- dangerous waste and 173-304 -- solid waste). | X | |
| 5. Hazardous waste treatment, storage and disposal. | X | |
| 6. Transfer Stations. | X | |
| 7. Recycling of hazardous materials. | X | |
| 8. Underground hazardous materials storage and distribution. | X | |
| 9. New fuel oil systems for heating. | X | |
| 10. Petroleum pipelines. | X | |

Notes:

- [1] De minimus use of hazardous materials is exempt.
- [2] New septic systems prohibited.
- [3] Hazardous materials release restrictions.
- [4] Dry wells for waste disposal or stormwater runoff are not allowed. Facilities with more than 20 gallons of hazardous materials are subject to secondary containment. Hazardous materials stored outdoor in secondary containment must be covered to preclude precipitation.
- [5] Mining requires a conditional use permit in any land use zoning district.
- [6] Although wood waste and injection wells are not specified as prohibited, definitions and performance standards regulate them. Regulations prohibit any activity that could contaminate the aquifer from occurring over a surface in which the hazardous substance could get into the ground. Facilities with more than 20 gallons of hazardous materials are subject to secondary containment. Hazardous materials stored outdoor in secondary containment must be covered to preclude precipitation.

Renton Water Utility Website. Our Underground Water Source

Ninety-three percent of Renton's water is supplied by the Cedar Valley Aquifer. As Renton's only water source, it has been designated a "sole source" by the U.S. Environmental Protection Agency. This means no federal financial assistance can be given to a project which might contaminate the aquifer and create a public health hazard.

The aquifer is an underground layer of sand and gravel running 3 1/2 miles long, and furnishing Renton residents with 6.5 million gallons of water each day. At some points, the groundwater contained in our aquifer is only 23 feet below ground, making it very sensitive to pollutants.

Fed by rain and snow falling on the aquifer and higher adjacent ground, the aquifer is also replenished by groundwater flow from the Cedar Valley. It is highly permeable, and contaminants reaching these recharge areas often find their way into our drinking water.

Studies: [City of Renton Wellhead Protection Plan as an appendix to the City of Renton Water System Plan \(considered to be BAS\)](#). See H.1.b.

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Flood Hazard Regulations

| | Renton | State DCTED Example |
|--|--------|---------------------------|
| Designation | | |
| Area on Flood Insurance Maps | X | X |
| <i>Areas Identified by Director when Base Flood Elevation is not available</i> | 0 | X |
| <i>Use of Additional Information That is More Restrictive or Detailed</i> | X [1] | X |
| Flood Elevation Data When Base Flood Data is Not Available | X | X |
| Flood Insurance Maps - Most Current Information to be the Basis of Regulation | X | X |
| Maintenance of Records | X | X |
| | | |
| Frequently Flood Areas - Report Requirements | X | |
| Prepared by Qualified Professional | X | X |
| Areas to be addressed (site area; areas of special flood hazard; and flood areas within 200 feet of proposed project) | X [2] | X |
| Site and Construction Plans | X | X |
| Water Course Alteration (<i>generally restricted</i> ; where necessary, identify extent, maintenance program, compliance documentation) | X [3] | X |
| | | |
| Warning and Disclaimer of Liability | X | X |
| | | |
| Performance Standards - General | X | X |
| Development Permit | X | X |
| <i>All Other Necessary Permits From Other Agencies Verified</i> | 0 | X |
| Where Regulatory Floodway Not Defined: New Construction Not Permitted in Zones A1-30 and AE Unless Base Flood is not increased by more than 1 foot | N/A | X |
| Areas without Base Flood Elevation Data | X | X |
| Construction Materials and Methods | X | X |
| <i>Structures Shall Be Located on Buildable Areas Outside Floodplain, Unless There is No Such Area</i> | 0 | X |
| Methods that Minimize Flood Damage | X | X |
| Utility Protection | X | X |
| Elevation Certificate Following Construction | X | X |
| Anchoring | | |
| Anchoring Requirement - All New Construction | X | X |
| Manufactured Homes | X | X |
| <i>Fill and Grading - No side channel blockage, may not restrict channel migration, may not increase flood hazard</i> | 0 | X |
| | | |
| Performance Standards - Specific Uses | X | X |
| Residential Construction | X | X |
| Must be Above Base Flood Elevation | X | X |
| Areas Below Lowest Floor (Equalize Hydrostatic Flood Forces) | X | X |
| Manufactured Homes Must Be Elevated | X | R [4] |
| Recreational Vehicles (Temporarily Located; or Ready for Highway Use; or Meet Manufactured Home Anchoring) | X | X |
| Nonresidential Construction | X | X |
| Above Base Flood Elevation | X | R [4] |
| Areas Below Lowest Floor (Equalize Hydrostatic Flood Forces) | X | X |
| Utilities | X | X |
| Infiltration of Flood Waters | X | X |
| Sanitary Sewerage Systems | X | X |
| On-site Waste Disposal Systems | X | X |
| Subdivision Proposals | X | X |
| <i>Adequate Space Outside Flood Areas</i> | 0 | X |

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Flood Hazard Regulations

| | Renton | State DCTED Example |
|--|--------|---------------------------|
| Minimize Flood Damage | X | X |
| Have Adequate Drainage | X | X |
| <i>Show Flood Areas on Plat Maps</i> | X | X |
| Detailed Base Flood Elevation Data | X | X |
| Alteration of Water Courses | X | X |
| <i>Habitat Regulation Consistency</i> | 0 | X |
| <i>Blockage of Side Channels Avoided</i> | 0 | X |
| Notification | X [5] | X |
| Maintenance of Alterations | X | X |
| Performance Standards - Areas of Shallow Flooding | | |
| Residential Structures - Elevated to Highest Grade Adjacent to Building | N/A | X |
| Nonresidential Structures - Elevated to Highest Grade Adjacent to Building or Floodproofed/Watertight | N/A | X |
| Drainage Paths Around Structures on Slopes | N/A | X |
| Recreational Vehicles (Meet Chapter Requirements) | N/A | X |
| Where velocities are 5 ft per second or greater, additional construction standards apply | N/A | |
| Prohibited Uses | | |
| Critical Facilities with no other feasible alternative site | X | X |
| <i>Wells Used for Potable Water (WAC 173-160-171)</i> | X | X |
| <i>On-Site Sewage Disposal Systems</i> | 0 | X |
| Construction in Floodways, unless certified by a registered professional engineer demonstrating no increase in flood levels during base flood, <i>or if fish habitat project</i> | X[6] | X |
| Residential Construction and Reconstruction in Floodway, except repairs or construction that do not increase ground floor area and value is less than 50% of market value. | R [4] | X |
| Variances | X | X |
| Exemptions | X[7] | |
| Other | X[8] | |
| Definitions | R [4] | X |

Notes:

Italicized text are advisory provisions in the State DCTED Model, and not a part of the National Flood Insurance Program Requirement.

[1] Proposed, under review.

[2] Identification of areas within 200 feet of site not required to be addressed.

[3] Regulations do not restrict proposals, but do require State notification. Also have maintenance requirement.

In Shoreline Master Program watercourse alteration limited to specific purposes, e.g. public purposes or habitat benefit.

[4] State Model Flood Ordinance (to comply with FEMA and to set State Standards) has been updated. Additionally, DOE staff have reviewed City flood regulations through a regular State review effort, and have recommended revisions. See text amendments.

[5] Regulations require notice, but do not specify amount of notice. In practice, notice would be given by SEPA review.

[6] Exemptions generally include enhancement, restoration, mitigation.

[7] Exemptions include:

- a. Conservation, Enhancement, Education, and Related.
- b. Agricultural, Harvesting, Vegetation Management.
- c. Flood Hazard Reduction and surface water projects where habitat enhancement, restoration, and federal and/or state authorization is received.
- d. Relocation of existing utilities out of critical area/buffer.
- e. Emergency activities.
- f. Existing activities that have not been changed, altered, expanded, when complying with nonconforming regulations.

[8] Compensatory storage required. Springbrook Creek - required to use City hydrologic and hydraulic model results for 100-year future land use conveyance and storage events, but use FEMA data for finished floor elevations.

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Geologic Hazards

| Provision | Renton | State DCTED Model |
|---|------------|-------------------------|
| Designation, General | X | X |
| Designation, Specific | X | X |
| A. Erosion hazard; | X | X |
| B. Landslide hazard; | X | X |
| C. Seismic hazard; | X | X |
| D. Mine hazard; | X | X |
| E. Volcanic hazard; | 0 | X |
| F. Other geological events including tsunamis, mass wasting, debris flows, rock falls, and differential settlement. | X[1] | X |
| Classification | | |
| Known or suspected risk, or unknown | X[2] | X |
| Mapping | | |
| 1. Coastal Zone Atlas (for marine bluff hazards); | N/A | X |
| 2. U.S. Geological Survey landslide hazard, seismic hazard, and volcano hazard maps; | 0 | X |
| 3. Washington State Department of Natural Resources seismic hazard maps for Western Washington; | 0 | X |
| 4. Washington State Department of Natural Resources slope stability maps; | 0 | X |
| 5. National Oceanic and Atmospheric Administration tsunami hazard maps; | N/A | X |
| 6. Federal Emergency Management Administration flood insurance maps; and | See flood. | X |
| 7. Locally adopted maps. | X[3] | X |
| Allowed Activities | | |
| X.50.050 Activities Allowed in Geologically Hazardous Areas. The following activities are allowed in geologically hazardous areas pursuant to Allowed Activities [Section X.10.160] and do not require submission of a critical area report: | X [4] | X |
| A. Erosion and Landslide Hazard Areas. Except as otherwise provided for in this Title, only those activities approved and permitted consistent with an approved critical area report in accordance with this Title shall be allowed in erosion or landslide hazard areas. | X [4] | X |
| B. Seismic Hazard Areas. The following activities are allowed within seismic hazard areas: | | |
| 1. Construction of new buildings with less than 2,500 square feet of floor area or roof area, whichever is greater, and which are not residential structures or used as places of employment or public assembly; | 0 | X |
| 2. Additions to existing single-story residences that are two hundred fifty (250) square feet or less; and | X [5] | X |
| 3. Installation of fences. | X [6] | X |
| C. Mine Hazard Areas. The following activities are allowed within mine hazard areas: | | |
| 1. Construction of new buildings with less than 2,500 square feet of floor area or roof area, whichever is greater, and which are not residential structures or used as places of employment or public assembly; | 0 | X |
| 2. Additions to existing residences that are two hundred fifty (250) square feet or less; and | X [5] | X |
| 3. Installation of fences. | X [6] | X |
| D. Volcanic Hazard Areas. The following activities are allowed within volcanic hazard areas: | | |
| 1. Construction of new buildings with less than 2,500 square feet of floor area or roof area, whichever is greater, and which are not residential structures or used as places of employment or public assembly; | 0 | X |
| 2. Additions to existing residences that are two hundred fifty (250) square feet or less; and | 0 | X |
| 3. Installation of fences. | 0 | X |
| E. Tsunami Hazard Areas. The following activities are allowed within tsunami hazard areas: | | |
| 1. Construction of new buildings with less than 2,500 square feet of floor area or roof area, whichever is greater, and which are not residential structures or used as places of employment or public assembly; | N/A | X |
| 2. Additions to existing residences that are two hundred fifty (250) square feet or less; and | N/A | X |
| 3. Installation of fences. | N/A | X |
| F. Other Hazard Areas. The [director] may allow the following activities within other geologically hazardous areas, if the activity will not increase the risk of the hazard: | | |
| 1. Construction of new buildings with less than 2,500 square feet of floor area or roof area, whichever is greater, and which are not residential structures or used as places of employment or public assembly; | 0 | X |
| 2. Additions to existing residences that are two hundred fifty (250) square feet or less; and | X [5] | X |
| 3. Installation of fences. | X [6] | X |
| Other Exemptions | X [4] | |
| Report Requirements | | |
| Preparation by a Qualified Professional. | X | X |
| Area to be Addressed: Site and land within 200 feet. | X [7] | X |
| Site and construction plans | X | X |

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State

Geologic Hazards

| Provision | Renton | State DCTED Model |
|--|--------|-------------------|
| Geologic characteristics | X | X |
| Analysis of Proposal | X | X |
| Recommendation for minimum buffer/setback. | X | X |
| Mitigation of long-term impacts. | X | X |
| Additional Technical Information Requirements for Specific Hazards. | X | X |
| Performance Standards | | |
| General | | |
| A. Alterations of geologically hazardous areas or associated buffers may only occur for activities that: | | |
| 1. Will not increase the threat of the geological hazard to adjacent properties beyond pre-development conditions; | 0 | X |
| 2. Will not adversely impact other critical areas; | 0 | X |
| 3. Are designed so that the hazard to the project is eliminated or mitigated to a level equal to or less than pre-development conditions; and | X [8] | X |
| 4. Are certified as safe as designed and under anticipated conditions by a qualified engineer or geologist, licensed in the state of Washington. | X | X |
| B. Critical Facilities Prohibited. Critical facilities shall not be sited within geologically hazardous areas unless there is no other practical alternative. | 0 | X |
| Specific | | |
| A. Erosion and Landslide Hazard Areas. Meet general performance standards and: | X | X |
| 1. Buffer Requirement. Height of slope or 50 feet, whichever is greater. Can reduce or increase buffer. | X [9] | X |
| 2. Alterations. Alterations may be allowed subject to criteria. | X | X |
| 3. Design Standards. Meet design standards, unless alternative equals or exceeds standard, and do not include standards that require maintenance. | X [10] | X |
| a. The proposed development shall not decrease the factor of safety for landslide occurrences below the limits of 1.5 for static conditions and 1.2 for dynamic conditions. Analysis of dynamic conditions shall be based on a minimum horizontal acceleration as established by the current version of the Uniform Building Code; | 0 [10] | X |
| b. Structures and improvements shall be clustered to avoid geologically hazardous areas and other critical areas; | 0 [10] | X |
| c. Structures and improvements shall minimize alterations to the natural contour of the slope, and foundations shall be tiered where possible to conform to existing topography; | 0 [10] | X |
| d. Structures and improvements shall be located to preserve the most critical portion of the site and its natural landforms and vegetation; | 0 [10] | X |
| e. The proposed development shall not result in greater risk or a need for increased buffers on neighboring properties; | 0 [10] | X |
| f. The use of retaining walls that allow the maintenance of existing natural slope area is preferred over graded artificial slopes; and | 0 [10] | X |
| g. Development shall be designed to minimize impervious lot coverage; | 0 [10] | X |
| 4. Vegetation Retention. Unless otherwise provided or as part of an approved alteration, removal of vegetation from an erosion or landslide hazard area or related buffer shall be prohibited; | X [11] | X |
| 5. Seasonal Restriction on clearing and grading. | X [11] | X |
| 6. Utility Lines and Pipes. Utility lines and pipes shall be permitted in erosion and landslide hazard areas only when the applicant demonstrates that no other practical alternative is available. | X [12] | X |
| 7. Point Discharges. Point discharges from surface water facilities and roof drains onto or upstream from an erosion or landslide hazard area shall be prohibited except when meeting design standards. | X [11] | X |
| 8. Subdivisions. The division of land in landslide hazard areas and associated buffers is subject to the following: | | |
| a. Land that is located wholly within a landslide hazard area or its buffer may not be subdivided. Land that is located partially within a landslide hazard area or its buffer may be divided provided that each resulting lot has sufficient buildable area outside of, and will not affect, the landslide hazard or its buffer. | X [13] | X |
| b. Access roads and utilities may be permitted within the landslide hazard area and associated buffers if the [city/county] determines that no other feasible alternative exists; and | X [12] | X |
| 9. Prohibited Development. On-site sewage disposal systems, including drain fields, shall be prohibited within erosion and landslide hazard areas and related buffers. | X [14] | X |
| B. Seismic Hazard Areas. Meet general performance standards. | X | X |
| C. Mine Hazard Areas. Meet general performance standards and: | | |
| 1. Alterations. Alterations of a mine hazard area and/or buffer are allowed, as follows: | | |
| a. All alterations are permitted within a mine hazard area with a low potential for subsidence; | X [15] | X |

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Geologic Hazards

| Provision | Renton | State DCTED Model |
|--|--------|-------------------|
| b. Within a mine hazard area with a moderate potential for subsidence and at coal mine by-product stockpiles, all alterations are permitted subject to a mitigation plan to minimize risk of structural damage using appropriate criteria to evaluate the proposed use, as recommended in the hazard analysis; and | X [15] | X |
| c. Within a mine hazard area with a severe potential for subsidence only those activities allowed in accordance with Section X.50.050 will be allowed. | X [15] | X |
| 2. Subdivisions. The division of land in mine hazard areas and associated buffers is subject to the following: | X [15] | X |
| a. Land that is located within two hundred (200) feet of a mine hazard area with a severe potential for subsidence may not be subdivided. Land that is located partially within a mine hazard area may be divided provided that each resulting lot has sufficient buildable area that is two hundred (200) feet away from the mine hazard area with a severe potential for subsidence. Land that is located within a mine hazard area with a low or moderate potential for subsidence may be subdivided. | X [15] | X |
| b. Access roads and utilities may be permitted within two hundred (200) feet of a mine hazard area with a moderate or severe potential for subsidence if no other feasible alternative exists. | X [15] | X |
| 3. Reclamation Activities. For all reclamation activities, including grading, filling, and stockpile removal, submit as-built drawings. | X [15] | X |
| D. Volcanic and Tsunami Hazard Areas. Require an evacuation and emergency management plan. Government may use the performance standards for coastal high hazard areas as guidance . | 0 | X |
| E. Other Hazard Areas. Meet general performance standards. | X [16] | X |

Notes:

- [1] Protected and Critical Slopes
- [2] Typically classified as low, medium, high, or some other class that indicates severity.
- [3] Mapped based on definitional criteria. Original recommendations for criteria/mapping from GeoEngineers 1991, based on NRCS soil types and USGS geologic unit mapping, and other public records.
- [4] Exempt activities must receive letter of exemption and City may require report as appropriate. Exemptions are not based on size but type of activity. Exempt activities include: conservation/education, existing agriculture/harvesting wild food/dead and diseased tree removal; existing or new (if in improved right of way) roads parks and utilities, maintenance/construction for existing uses/facilities, and emergencies. Non-exempt activities require report and compliance with standards.
- [5] No size restriction but may not intrude further into critical area with footprint. Also may need to meet nonconforming use standards.
- [6] Associated with an existing single family residence.
- [7] Address manmade and natural features within 150 feet; address groundwater conditions within 1/4 mile; address mine areas within 100 feet.
- [8] Hazard to be mitigated -- predevelopment level not specified: "Upon review of geotechnical studies, the development permit shall be conditioned to mitigate adverse environmental impacts and to assure that the development can be safely accommodated on the site..."
- [9] Slopes over 40% restricted from development in most cases. Very High Landslide Areas restricted from development, plus there's a 50' buffer. No standard buffer from erosion hazard areas but development can be conditioned as needed.
- [10] Standards are performance based and not as specific. Conditions of approval are authorized and may lead to restrictions similar to Example Code design standards.
- [11] Conditions of approval are authorized and may lead to restrictions similar to Example Code vegetation, erosion control, and point discharge standards. Further, erosion control submittal requirements require some analysis, and there are Tree Cutting and Land Clearing regulations and standards too.
- [12] Protected slopes over 40% have similar standard for utilities and roads. Conditions of approval are authorized and may lead to restrictions similar to Example Code for other erosion or landslide hazard areas.
- [13] Requirement for protected slopes over 40%. Development prohibited in Very High Landslide Hazard Areas. Conditions of approval are authorized and may lead to restrictions similar to Example Code for other erosion or landslide hazard areas.
- [14] No standard prohibition. Conditions of approval are authorized and may lead to restrictions similar to Example Code for erosion or landslide hazard areas.
- [15] Conditions of approval are authorized and may lead to restrictions similar to Example Code. Standards may include:
 Potential mitigation may include, but is not limited to, backfilling and sealing mine entries and shafts, backfilling existing sinkholes, removal or regrading or capping coal mine waste dumps, limiting development on portions of the site, or other measures offering equal protection from the hazard. Upon approval of the plans and specifications, the applicant shall complete the remediation. Hazard mitigation shall be performed by or under the direction of a qualified engineer or geologist. The applicant shall document the hazard mitigation by submitting as-builts and a remediation construction report. Any hazards found during any development activities shall be immediately reported. Any coal mine hazards shall be mitigated prior to recommending construction based upon supplemental recommendations or reports by the applicant's geotechnical professional. Construction shall not be permitted where surface or subsurface investigations indicate the possible presence of combustion in the underlying seam or seams, unless the impact is adequately mitigated in accordance with the recommendations of the applicant's geotechnical professional.
- [16] "Other" includes protected and critical slopes. While other jurisdictions' codes may treat slopes over 40% as a landslide area, Renton regulates them under "protected slopes".

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Non-Stream Habitat Conservation Regulations

| Provision | Renton | State DCTED Model |
|---|--------|-------------------|
| Designations as Habitat Conservation Areas: | | |
| Areas with which State or Federally Designated Endangered, Threatened, and Sensitive Species Have a Primary Association | X | X |
| State Priority Habitats and areas Associated with Priority Species | X | X |
| Habitats and Species of Local Importance | X [1] | X |
| Rare Plant Species and High Quality Ecosystems: State DNR Natural Heritage Program | 0 | X |
| Land Useful or Essential for Preserving Connections between Habitat Blocks and Open Spaces | 0 | X |
| Habitat Assessment Report | | |
| | X | X |
| Performance Standards - General: | | |
| Buffers - required consistent with WDFW management recommendations | 0 [2] | X |
| Seasonal Restrictions - may be applied if species is susceptible during certain periods | 0 [2] | X |
| Restrictions on subdivisions wholly within habitat conservation areas | 0 [2] | X |
| Other | X [2] | |
| Performance Standards - Specific: | | |
| Areas with which Federal and/or State endangered/threatened/sensitive species have a primary association: | | |
| Within habitat conservation area, no development allowed unless provided within a management plan established by WDFW, or applicable state or federal agency. | 0 [2] | X |
| Activities adjacent to a habitat conservation area follow protection measures in accordance with a critical area report by a qualified professional. | 0 | X |
| Bald eagle habitat to be protected consistent with Washington State Bald Eagle Protection Rules. A habitat management plan is to be identified by a professional. | 0 | X |
| Other | X [2] | |

Notes:

[1] Includes heron rookeries, raptor nesting areas, and category 1 wetlands.

[2] Native growth protection area may be required for critical habitat area and associated buffers.

Any alterations require an alternatives evaluation (avoid, minimize, compensate).

City may condition proposal to minimize impacts based on consultant report, and/or peer review, and/or information by State or Federal agencies.

Category 1 wetland requirements would apply in addition to critical habitat requirements.

Key:

X = Addressed

0 = Not Addressed

N/A = Not Applicable

R = Revision Recommended by State

Geologic Hazards

| State Example Code Definition | Renton Definition |
|---|---|
| <p>General Definition. Geologically hazardous areas include areas susceptible to erosion, sliding, earthquake, or other geological events. They pose a threat to the health and safety of citizens when incompatible development is sited in areas of significant hazard. Such incompatible development may not only place itself at risk, but also may increase the hazard to surrounding development and use. Areas susceptible to one or more of the following types of hazards shall be designated as a geologically hazardous area:</p> <p>A. Erosion hazard; B. Landslide hazard; C. Seismic hazard; D. Mine hazard; E. Volcanic hazard; and F. Other geological events including tsunamis, mass wasting, debris flows, rock falls, and differential settlement.</p> | <p>Geologic Hazards: Areas which may be prone to one or more of the following conditions: erosion, flooding, landslides, coal mine hazards, or seismic activity. Refer to RMC 4-3-050B4.</p> |
| <p>Erosion Hazard Areas. Erosion hazard areas are at least those areas identified by the U.S. Department of Agriculture's Natural Resources Conservation Service as having a "moderate to severe," "severe," or "very severe" rill and interrill erosion hazard. Erosion hazard areas are also those areas impacted by shore land and/or stream bank erosion and those areas within a river's channel migration zone.</p> | <p>i. Low Erosion Hazard (EL): Areas with soils characterized by the Natural Resource Conservation Service (formerly U.S. Soil Conservation Service) as having slight or moderate erosion potential, and that slope less than fifteen percent (15%).</p> <p>ii. High Erosion Hazard (EH): Areas with soils characterized by the Natural Resource Conservation Service (formerly U.S. Soil Conservation Service) as having severe or very severe erosion potential, and that slope more steeply than fifteen percent (15%).</p> |
| <p>Landslide Hazard Areas. Landslide hazard areas are areas potentially subject to landslides based on a combination of geologic, topographic, and hydrologic factors. They include areas susceptible because of any combination of bedrock, soil, slope (gradient), slope aspect, structure, hydrology, or other factors. Example of these may include, but are not limited to the following:</p> <p>1. Areas of historic failures, such as:</p> <p>a. Those areas delineated by the U.S. Department of Agriculture's Natural Resources Conservation Service as having a "severe" limitation for building site development;</p> <p>b. Those areas mapped by the Washington State Department of Ecology (<i>Coastal Zone Atlas</i>) or the Washington State Department of Natural Resources (slope stability mapping) as unstable (U or class 3), unstable old slides (UOS or class 4), or unstable recent slides (URS or class 5); or</p> | <p>i. Low Landslide Hazard (LL): Areas with slopes less than fifteen percent (15%).</p> <p>ii. Medium Landslide Hazard (LM): Areas with slopes between fifteen percent (15%) and forty percent (40%) and underlain by soils that consist largely of sand, gravel or glacial till.</p> <p>iii. High Landslide Hazards (LH): Areas with slopes greater than forty percent (40%), and areas with slopes between fifteen percent (15%) and forty percent (40%) and underlain by soils consisting largely of silt and clay.</p> <p>iv. Very High Landslide Hazards (LV): Areas of known mappable landslide deposits.</p> <p>(see also Protected Slope)</p> |

| State Example Code Definition | Renton Definition |
|--|---|
| <p>c. Areas designated as quaternary slumps, earthflows, mudflows, lahars, or landslides on maps published by the U.S. Geological Survey or Washington State Department of Natural Resources;</p> <p>2. Areas with all three of the following characteristics:</p> <p>a. Slopes steeper than fifteen percent (15%);</p> <p>b. Hillsides intersecting geologic contacts with a relatively permeable sediment overlying a relatively impermeable sediment or bedrock; and</p> <p>c. Springs or ground water seepage.</p> <p>3. Areas that have shown movement during the Holocene epoch (from ten thousand years ago to the present) or that are underlain or covered by mass wastage debris of that epoch;</p> <p>4. Slopes that are parallel or subparallel to planes of weakness (such as bedding planes, joint systems, and fault planes) in subsurface materials;</p> <p>5. Slopes having gradients steeper than eighty percent (80%) subject to rock fall during seismic shaking;43</p> <p>6. Areas potentially unstable because of rapid stream incision, stream bank erosion, and undercutting by wave action;</p> <p>7. Areas that show evidence of, or are at risk from snow avalanches;</p> <p>8. Areas located in a canyon or on an active alluvial fan, presently or potentially subject to inundation by debris flows or catastrophic flooding; and</p> <p>9. Any area with a slope of forty percent (40%) or steeper and with a vertical relief of ten (10) or more feet except areas composed of consolidated rock. A slope is delineated by establishing its toe and top and is measured by averaging the inclination over at least ten (10) feet of vertical relief.</p> | |
| <p>Seismic Hazard Areas. Seismic hazard areas are areas subject to severe risk of damage as a result of earthquake induced ground shaking, slope failure, settlement, soil liquefaction, lateral spreading, or surface faulting. One indicator of potential for future earthquake damage is a record of earthquake damage in the past. Ground shaking is the primary cause of earthquake damage in Washington. The strength of ground shaking is primarily affected by:</p> <p>1. The magnitude of an earthquake;</p> <p>2. The distance from the source of an earthquake;</p> <p>3. The type of thickness of geologic materials at the surface; and</p> <p>4. The type of subsurface geologic structure.</p> <p>Settlement and soil liquefaction conditions occur in areas underlain by cohesionless, loose, or soft-saturated soils of low density, typically in association with a shallow ground water table.</p> | <p>i. Low Seismic Hazard (SL): Areas underlain by dense soils or bedrock. These soils generally have site coefficients of types S1 or S2, as defined in the Uniform Building Code.</p> <p>ii. High Seismic Hazard (SH): Areas underlain by soft or loose, saturated soils. These soils generally have site coefficients of types S3 or S4, as defined in the Uniform Building Code.</p> |

| State Example Code Definition | Renton Definition |
|---|--|
| <p>Mine Hazard Areas. Mine hazard areas are those areas underlain by or affected by mine workings such as adits, gangways, tunnels, drifts, or airshafts, and those areas of probable sink holes, gas releases, or subsidence due to mine workings. Factors that should be considered include: proximity to development, depth from ground surface to the mine working, and geologic material.</p> | <p>i. Low Coal Mine Hazards (CL): Areas with no known mine workings and no predicted subsidence. While no mines are known in these areas, undocumented mining is known to have occurred.</p> <p>ii. Medium Coal Mine Hazards (CM): Areas where mine workings are deeper than two hundred feet (200') for steeply dipping seams, or deeper than fifteen (15) times the thickness of the seam or workings for gently dipping seams. These areas may be affected by subsidence.</p> <p>iii. High Coal Mine Hazard (CH): Areas with abandoned and improperly sealed mine openings and areas underlain by mine workings shallower than two hundred feet (200') in depth for steeply dipping seams, or shallower than fifteen (15) times the thickness of the seam or workings for gently dipping seams. These areas may be affected by collapse or other subsidence.</p> |
| <p>Volcanic Hazard Areas. Volcanic hazard areas are areas subject to pyroclastic flows, lava flows, debris avalanche, and inundation by debris flows, lahars, mudflows, or related flooding resulting from volcanic activity.</p> | <p>See Report Discussion. Lesser Issue in City.</p> |
| <p>Tsunami Hazard Areas. Tsunami hazard areas are coastal areas and large lake shoreline areas susceptible to flooding and inundation as the result of excessive wave action derived from seismic or other geologic events.</p> | <p>Not Applicable.</p> |

| State Example Code Definition | Renton Definition |
|--|--|
| <p>Other Hazard Areas. Geologically hazardous areas shall also include areas determined to be susceptible to other geological events including mass wasting, debris flows, rock falls, and differential settlement.</p> | <p>SLOPE, STEEP: A hillside, or portion thereof, which falls into one of two (2) classes of slope, sensitive or protected.</p> |

4-8-120.D DEFINITIONS OF TERMS USED IN SUBMITTAL REQUIREMENTS FOR BUILDING, PLANNING, AND PUBLIC WORKS PERMIT APPLICATIONS:

7. Definitions G:

Geotechnical Report: A study prepared in accordance with generally accepted geotechnical practices and stamped by a professional engineer licensed in the State of Washington which includes soils and slope stability analysis, boring and test pit logs, and recommendations on slope setbacks, foundation design, retaining wall design, material selection, and all other pertinent elements. If the evaluation involves geologic evaluations or interpretations, the report shall be reviewed and approved by a geologist. Further recommendations, additions or exceptions to the original report based on the plans, site conditions, or other supporting data shall be signed and sealed by the geotechnical engineer. If the geotechnical engineer who reviews the plans and specifications is not the same engineer who prepared the geotechnical report, the new engineer shall in a letter to the City accompanying the plans and specifications, express his or her agreement or disagreement with the recommendations in the geotechnical report and state that the plans and specifications conform to his or her recommendations. If the site contains a geologic hazard regulated by the critical areas regulations, the preparation and content requirements of RMC [4-8-120D](#), Table 18 shall also apply. (Ord. 4835, 3-27-2000)

Table 18 – Geotechnical Report – Detailed Requirements

| Report Preparation/Content Requirements | Steep Slopes | Landslide – Medium | Landslide – High | Landslide – Very High | High Erosion | Seismic | Coal Mine – Medium | Coal Mine – High | Volcanic Hazards |
|---|--------------|--------------------|------------------|-----------------------|--------------|---------|--------------------|------------------|------------------|
| 1. Characterize soils, geology and drainage. | X | X | X | X | X | X | X | X | X |
| 2. Describe and depict all natural and man-made features within one hundred fifty feet (150') of the site boundary. | X | X | X | X | X | X | X | X | X |
| 3. Identify any areas that have previously been disturbed or degraded by human activity or natural processes. | X | X | X | X | X | X | X | X | X |
| 4. Characterize groundwater conditions including the presence of any public or private wells within one-quarter (1/4) mile of the site. | X | X | X | X | X | X | X | X | |
| 5. Provide a site evaluation review of available information regarding the site. | X | X | X | X | X | X | X | X | X |
| 6. Conduct a surface reconnaissance of the site and adjacent areas. | X | X | X | X | X | X | X | X | |
| 7. Conduct a subsurface exploration of soils and | X | X | X | X | X | X | X | X | |

| Report Preparation/Content Requirements | Steep Slopes | Landslide – Medium | Landslide – High | Landslide – Very High | High Erosion | Seismic | Coal Mine – Medium | Coal Mine – High | Volcanic Hazards |
|--|--------------|--------------------|------------------|-----------------------|--------------|---------|--------------------|------------------|------------------|
| hydrologic conditions. | | | | | | | | | |
| 8. Provide a slope stability analysis. | X | X | X | X | X | | X | X | |
| 9. Address principles of erosion control in proposal design including: Plan the development to fit the topography, drainage patterns, soils and natural vegetation on site; Minimize the extent of the area exposed at one time and the duration of the exposure; Stabilize and protect disturbed areas as soon as possible; Keep runoff velocities low; Protect disturbed areas from stormwater runoff; Retain the sediment within the site area; Design a thorough maintenance and follow -up inspection program to ensure erosion control practices are effective. | X | X | X | X | X | | X | X | |
| 10. Provide an evaluation of site response and liquefaction potential relative to the proposed development. | | | | | | X | | | |
| 11. Conduct sufficient subsurface exploration to provide a site coefficient (S) for use in the Uniform Building Code to the satisfaction of the Building Official. | | | | | | X | | | |
| 12. Calculate tilts and strains, and determine appropriate design values for the building site. | | | | | | | X | X | |
| 13. Review available geologic hazard maps, mine maps, mine hazard maps, and air photographs to identify any subsidence features or mine hazards including, but not limited to, surface depressions, sinkholes, mine shafts, mine entries, coal mine waste dumps, and any indication of combustion in underground workings or coal mine waste dumps that are present on or within one hundred feet (100¢) of the property. | | | | | | | X | X | |
| 14. Inspect, review and | | | | | | | X | X | |

| Report Preparation/Content Requirements | Steep Slopes | Landslide – Medium | Landslide – High | Landslide – Very High | High Erosion | Seismic | Coal Mine – Medium | Coal Mine – High | Volcanic Hazards |
|--|--------------|--------------------|------------------|-----------------------|--------------|---------|--------------------|------------------|------------------|
| document any possible mine openings and potential trough subsidence, and any known hazards previously documented or identified. | | | | | | | | | |
| 15. Utilize test pits to investigate coal mine waste dumps and other shallow hazards such as slope entry portals and shaft collar areas. Drilling is required for coal mine workings or other hazards that cannot be adequately investigated by surface investigations. | | | | | | | X | X | |
| 16. Provide an analysis of proposed clearing, grading and construction activities including construction scheduling. Analyze potential direct and indirect on-site and off-site impacts from development. | X | X | X | X | X | X | X | X | |
| 17. Propose mitigation measures, such as any special construction techniques, monitoring or inspection programs, erosion or sedimentation programs during and after construction, surface water management controls, buffers, remediation, stabilization, etc. | X | X | X | X | X | X | X | X | X |
| <u>18. Critical facilities on sites containing areas susceptible to inundation due to volcanic hazards shall require an evacuation and emergency management plan. The applicant for critical facilities shall evaluate the risk of inundation or flooding resulting from mudflows originating on Mount Rainier in a geotechnical report, and identify any engineering or other mitigation measures as appropriate.</u> | | | | | | | | | X |

Note: An "X" indicates that the requirement applies in the identified critical area.

APPENDIX B

MAPS: AQUIFER PROTECTION, FLOOD HAZARD, AND GEOLOGIC HAZARD

(available in hard copy from Renton ED/N/SP Department)