

17.26.080 Geologic hazard areas.**A. Introduction**

1. The purpose of this section is to provide regulations for the protection of public safety, health and welfare in geologically hazardous areas, including: erosion hazard, landslide hazard, seismic hazard, mine hazard, and volcanic hazard areas.
2. This chapter applies to:
 - a. Development activities, actions requiring project permits, and clearing except for the following:
 - i. Non-ground disturbing interior or exterior building improvements;
 - ii. Routine landscape maintenance of established, ornamental landscaping;
 - iii. Non-ground disturbing normal maintenance or repair;
 - iv. Removal of noxious weeds conducted in accordance with chapter [16-750 WAC](#);
 - v. Maintenance, repair, or replacement that does not expand the footprint area of the following existing facilities:
 - A. septic tanks and drain fields;
 - B. wells;
 - C. individual utility service connections; and
 - D. individual cemetery plots in established and approved cemeteries;
 - E. improved public and private road rights-of-way
 - F. utility corridors
 - G. trails
 - H. utility facilities,
 - I. flood protection and bank stabilization structures,
 - J. stormwater facilities; and
 - K. structures;
 - L. Felling or topping of hazardous trees based on review by a qualified arborist
 - M. Minor replacement, modification or installation of drainage, water quality or habitat enhancement projects; and
 - N. All other on-going lawfully established development activities not specifically addressed in this chapter.
 - vi. Data collection and research by nonmechanical means if performed in accordance with state-approved sampling protocols or Endangered Species Act (ESA) Section 10(a)(1)(a), Section 7 consultation ([16 USC § 1536](#));
 - vii. Nonmechanical survey and monument placement;
 - viii. Soils testing or topographic surveying of slopes for purposes of scientific investigation, site feasibility analysis, and data acquisition for geotechnical report preparation provided it can be accomplished without road construction; and
 - ix. Quasi-judicial rezones not accompanied by another permit or approval.
 - b. Emergency activities necessary to prevent an immediate threat to public health, safety, welfare or property, or to prevent an imminent threat of serious environmental degradation, are allowed without prior approval in geologically hazardous areas, based on the criteria set forth in this section:
 - i. The activity must be the minimum necessary to alleviate the emergency;
 - ii. The project proponent shall notify the department prior to any action taken to remedy an emergency. If prior notification is not feasible, the project proponent shall notify the department within 48 hours of the action; and
 - iii. Applications for any required project permits necessary to satisfy compliance with this chapter are submitted to the department within 120 days of the start of the action taken. For activities not requiring permits, compliance with this chapter shall occur within a reasonable time period not to exceed twelve months.

3. Regulation of geologically hazardous areas located within shorelines of the state, as defined in chapter [90.58](#) RCW, shall be accomplished through compliance with the provisions of chapter [17.30 KMC](#). Nothing in this section shall be construed to be inconsistent with RCW [90.58](#).
4. Critical area protective measures required by this chapter shall also constitute adequate mitigation of adverse or significant adverse environmental impacts on geologically hazardous areas pursuant to section 17.14 KMC.
5. The director shall have the authority to adopt administrative rules to implement the provisions of this chapter. Rulemaking authority shall include, but is not limited to, the adoption of best management practices for the regulation of geologically hazardous areas.
6. If the department lacks the necessary expertise, the department may require independent consultant review of the application by a qualified professional to assess compliance with this chapter. If independent consultant review is required, the applicant shall make a deposit with the department to cover the cost of the review pursuant to the currently adopted fee code. Unexpended funds will be returned to the applicant following final decision on the application.
7. The city has designated geologically hazardous areas pursuant to RCW [36.70A.170](#) by defining them and providing criteria for their identification. Project proponents are responsible for determining whether a geologically hazardous area exists and is regulated pursuant to this chapter. The department will verify on a case-by-case basis the presence of geologically hazardous areas identified by project proponents. Specific criteria for the designation of geologically hazardous areas are contained in this Section. While the city maintains some maps of geologically hazardous areas, they are for informational purposes only and may not accurately represent all such areas.
8. The director may expand the boundary of a geologically hazardous area, impose additional or more stringent standards and requirements than those specified in this chapter or impose mitigation requirements to the extent necessary to:
 - a. Protect the public health, safety, and welfare; or
 - b. Mitigate any significant adverse impact from the proposed development activity.
9. The director's decision under this section shall be in writing and shall include findings that demonstrate how the decision meets the following criteria:
 - a. The decision eliminates or substantially reduces a specific public health, safety or welfare concern or a significant adverse impact; and
 - b. The decision is based on sound engineering practices.

C. The following define the different types of geologic hazard areas:

1. Erosion Hazard Areas

- a. Classification. Erosion hazard areas are those areas identified by the presence of soils that are recognized as having a severe erosion hazard by the Natural Resources Conservation Service, Cowlitz Area, Washington.
- b. Development Standards. For erosion hazard areas see KMC 17.26.080(C)(2)(b) Development Standards. Erosion Hazard Areas and Landslide Areas.

2. Landslide Hazard Areas.

- a. Classification. Landslide hazard areas are those areas meeting any of the following criteria:
 - i. Areas of historic failure, such as areas designated as quaternary slumps, earthflows, mudflows, or landslides;
 - ii. Any area with the following:

- A. Slope greater than 12 percent; and
 - 1. Steep hillsides intersecting geologic contacts with a relatively permeable sediment overlying a relatively impermeable sediment or bedrock; or
 - 2. Springs or groundwater seepage.
 - B. Any slope 40 percent or steeper with a vertical relief of 10 or more feet.
 - C. Slopes that are parallel or subparallel to planes of weakness, such as bedding planes, joint systems, and fault planes;
 - D. Slopes having gradients greater than eighty percent and subject to rock fall during seismic shaking;
 - E. Areas potentially unstable as a result of rapid stream incision, stream bank erosion, and undercutting by wave action;
 - F. Areas located in a canyon, on an active alluvial fan, or that are presently subject to inundation by debris flows or catastrophic flooding;
 - G. Areas identified as being medium or high probability of slope instability based on Washington State Department of Natural Resources soils-based stability model or the most current map adopted by the city and filed with the city clerk;
 - H. Areas identified as being medium or high probability of slope instability based on field visits along with reasonable assumption of city staff or other qualified experts with localized knowledge of present site conditions.
- b. Development Standards. Erosion Hazard Areas and Landslide Hazard Areas.
- i. Development Standards for Landslide Hazard Areas and Erosion Hazard Areas. Any allowed or regulated activity on areas identified as landslide or erosion hazards or their buffers shall conform to the following standards:
 - A. Buffers.
 - 1. An undisturbed fifty-foot buffer, as measured on the surface, is required from the top, toe, and along all sides of any existing landslide or eroded area, within a critical area;
 - 2. Based on the results of the geotechnical assessment, the director may increase or decrease the buffer or require additional areas including buffers as indicated; and
 - 3. The buffer shall be clearly staked before and during any construction or clearing.
 - B. General Design Guidelines.
 - 1. Structures should be clustered where possible to reduce disturbance and removal of vegetation;
 - 2. Foundations should conform to the natural contours of the slope; and
 - 3. Roads, walkways, and parking areas should be designed to parallel the natural contours of the site.
 - C. Grading.
 - 1. Clearing, grading, and other construction activities shall not aggravate or result in slope instability or surface sloughing;

2. Undergrowth shall be retained to the maximum extent feasible;
3. No dead vegetation (slash), fill, or other foreign material shall be placed within a landslide or erosion hazard area, other than that approved for bank stabilization or if such fill is consistent with authorized activities specified in a geotechnical report; and
4. Minimize ground disturbance to the maximum extent feasible by not allowing clearing from May 1st to October 1st of every year.

D. Erosion Control.

1. There shall be minimum disturbance of trees and vegetation in order to reduce erosion and maintain existing stability of hazard areas;
2. Vegetation removal on the slopes of banks between the ordinary high-water mark and the top of the banks shall be minimized because of the potential for erosion;
3. Vegetation and organic soil material shall be removed from fill site prior to the placement of fill;
4. Thinning of limbs of individual trees is preferred over tree removal as a means to provide a view corridor; and
5. Vegetative cover or engineered ground covers shall be placed on any disturbed surface to the extent feasible.

E. Drainage.

1. Surface drainage, including downspouts, shall not be directed across the face of a hazard area. If drainage must be discharged from the top of a hazard area to its toe, it shall be collected above the top and directed to the toe by tight line drain, and provided with an energy-dissipating device at the toe for discharge to a swale or other acceptable natural drainage areas; and
2. Stormwater retention and detention systems, including percolation systems utilizing buried pipe, require a geotechnical assessment that indicates such a system shall not affect slope stability and require the systems to be designed by a licensed civil engineer. The licensed civil engineer shall also certify that the systems are installed as designed.

F. Sewage Disposal System Drainfields. For the purpose of landslide or hazard areas, the sewage disposal drainfields shall be located outside of the hazard area buffer, unless otherwise justified by a qualified geotechnical engineer. The septic system drainfield must follow all local government health regulations.

3. Seismic Hazard Areas.

- a. Classification. 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. Areas mapped in the moderate to high risk category on the Liquefaction Susceptibility Map of Cowlitz County, Washington, or the WDNR Interactive Map should be considered in a seismic hazard area.
- b. Development Standards—Seismic Hazard Areas. All development within areas that meet the classification for seismic hazard areas shall comply with the International Building Code. A critical areas permit is not required by these regulations for seismic hazards.

4. Mine Hazard Areas:

- a. Classification. For the purposes of this classification mine hazard areas are:

- i. Abandoned mines and/or workings where locations are known.
- ii. Abandoned mines and/or workings where exact locations are unknown but based upon the best available information there is good cause to believe it is within an area that may be reasonably delineated.

b. Development Standards—Mine Hazard Areas. Development adjacent to a mine hazard area is prohibited unless the applicant can demonstrate the development will be safe. If a proposal is located adjacent to a mine hazard area, a geotechnical assessment may be required.5. Classification. Volcanic Hazard Areas. For the purposes of this classification, all volcanic mudflow hazard areas shall be identified as the five-hundred-year floodplain areas identified in FEMA maps.

5. Volcanic Hazard Areas:

- a. Classification. For the purposes of this classification, all volcanic mudflow hazard areas shall be identified as the five-hundred-year floodplain areas identified in FEMA maps.
- b. Development Standards—Volcanic Hazard Areas. Development shall comply with existing Federal Emergency Management Agency regulations for floodplain management. A critical areas permit is not required by these regulations for development in a volcanic hazard area.

B. Geotechnical Reconnaissance Reports and Geotechnical Investigation Reports.

1. All regulated activities proposed within a geologically hazardous area shall be evaluated by a geotechnical reconnaissance or geotechnical investigation as determined by KMC 17.26.080. If the qualified expert determines that these hazards cannot be fully evaluated with a geotechnical reconnaissance, then a geotechnical investigation shall be required.

2. Geotechnical Investigation Reports. A Geotechnical Investigation Report means a study of geologically hazardous areas where the qualified expert evaluates the hazard areas by performing a subsurface investigation (i.e., borings, test pits, cone penetration tests). A subsurface investigation shall include obtaining soil samples and testing for soil strength. A subsurface investigation is required for landslide and seismic (i.e., liquefaction) hazards, unless the qualified expert can provide compelling evidence as to why a geotechnical investigation is not required.

a. A geotechnical report will be required for any development activity, action requiring a project permit or clearing proposed within:

- i. An erosion hazard area;
- ii. A landslide hazard area;
- iii. Two hundred feet of a mine hazard area; or
- iv. Two hundred feet of any faults;
- v. Within two hundred feet of slopes 20% or greater; or
- vi. Any property of which all or a portion is identified within the Wegman Study Area.

b. The geotechnical report shall be prepared, stamped, and signed by a licensed engineer or geologist and contain the following information relevant to the geologically hazardous area:

- i. The topography at contour intervals of five feet unless the underlying project permit requires a lesser interval;

- ii. Significant geologic contacts, landslides, or downslope soil movement on and within 200 feet of the site;
 - iv. Impervious surfaces, wells, drain fields, drain field reserve areas, roads, easements, and utilities on the site;
 - v. The location or evidence of any springs, seeps, or other surface expressions of groundwater;
 - vi. The location or evidence of any surface waters;
 - vii. Identification of all existing fill areas;
 - viii. The location and extent of all proposed development activity;
 - ix. A discussion of the geological condition of the site including:
 - A. A description of the soils in accordance with the Natural Resource Conservation Service indicating the potential for erosion;
 - B. Engineering properties of the soils, sediments, and rocks on the subject property and adjacent properties and their effect on the stability of the slope;
 - C. A description of the slope in percent gradient;
 - D. The location or evidence of seismic faults and soil conditions indicating the potential for liquefaction; and
 - E. A hazard analysis and finding of risks associated with geologic hazards and the potential impacts to public safety, the hazard area and the subject property;
 - F. The proposed method of drainage and locations of all existing and proposed surface and subsurface drainage facilities and patterns, and the locations and methods for erosion control;
 - G. The extent and type of existing vegetative cover;
 - H. A vegetation management and restoration plan prepared by persons experienced in vegetation management and restoration plans such as botanists, landscape architects and certified arborist, or other means for maintaining long-term stability of slopes;
 - I. Analysis of erosion rates, slope recession rates and potential impacts to existing or proposed development from wave cutting, stream meandering, or other erosional forces to determine the recommended solution for bank or shoreline stabilization or flood protection in conformance with KMC 17.26.070.
 - J. Analysis of soil borings when the geology of an area is uncertain; and
 - K. Any other information determined by the department to be necessary to determine compliance with this chapter including but not limited to the use of LIDAR, technical reports, studies or documents related to geologic hazards and models for estimating how far landslide materials will travel.
- c. All geotechnical technical report shall include a summary or abstract of the report for the property where the development activity is proposed. The abstract shall at a minimum include the type of hazard, extent of the hazard, hazard analysis and geologic conditions. A geotechnical report shall include:
- i. A description of the extent and type of vegetative cover;
 - ii. An estimate of load capacity including surface and groundwater conditions, public and private sewage disposal systems, fills and excavations and all structural development;
 - iii. An estimate of slope stability and the effect construction and placement of structures will have on the slope over the estimated life of the structure;
 - iv. An estimate of the bluff retreat rate that recognizes and reflects potential catastrophic events such as seismic activity or a one-hundred-year storm event;

- v. Consideration of the run-out hazard of landslide debris and/or the impacts of landslide run-out on down slope properties;
- vi. A study of slope stability including an analysis of proposed angles of cut and fill and site grading;
- vii. Recommendations for building limitations, structural foundations, and an estimate of foundation settlement; and
- viii. An analysis of proposed surface and subsurface drainage, and the vulnerability of the site to erosion.
- ix. Erosion and Sediment Control Plan. For any development proposal on a site containing an erosion hazard area, an erosion and sediment control plan shall be required. The erosion and sediment control plan shall be prepared in compliance with requirements set forth in the locally adopted stormwater management regulations.
- x. Drainage Plan. The report shall include a drainage plan for the collection, transport, treatment, discharge and/or recycle of water prepared in accordance with the locally adopted surface water management plan. The drainage plan should consider on-site septic system disposal volumes where the additional volume will affect the erosion or landslide hazard area.
- xi. Mitigation Plans. Hazard and environmental mitigation plans for erosion and landslide hazard areas shall include the location and methods of drainage, surface water management, locations and methods of erosion control, a vegetation management and/or replanting plan and/or other means for maintaining long-term soil stability.
- xii. Monitoring Surface Waters. If the city determines that there is a significant risk of damage to downstream receiving waters due to potential erosion from the site, based on the size of the project, the proximity to the receiving waters, or the sensitivity of the receiving waters, the critical area report shall include a plan to monitor the surface water discharge from the site.

A. The monitoring plan shall include a recommended schedule for submitting monitoring reports to the city of Kelso.

3. Geotechnical Reconnaissance Reports. A Geotechnical Reconnaissance Report means a study of geologically hazardous areas where the qualified expert evaluates the hazard areas with a visual site reconnaissance. A subsurface investigation (i.e., borings, test pits, cone penetration tests) is not required. A reconnaissance level study is acceptable to evaluate erosion, volcanic and mine hazards, unless the qualified expert determines that a more thorough geotechnical investigation report is necessary. A geotechnical reconnaissance is not appropriate for evaluating landslide and seismic (i.e., liquefaction) hazards, unless compelling evidence can be provided by the qualified expert. Geotechnical Reconnaissance reports are required for all development within two hundred feet of slopes between 12% and 20%.

- a. The geotechnical reconnaissance report shall be prepared, stamped, and signed by a licensed engineer or geologist. A geotechnical reconnaissance report shall typically include at a minimum the following:
 - i. A discussion of the surface and subsurface geologic conditions of the site;
 - ii. A site plan of the area delineating all areas of the site subject to landslide hazards based on mapping and criteria;
 - iii. A contour map of the proposed site, at a reasonable scale (not smaller than one-inch equals two hundred feet) which clearly delineates slopes for ranges between fifteen and twenty-nine percent and thirty percent and greater and includes figures for area coverage of each slope category on the site. If any springs or seeps are present, their location should be indicated on the map; and

iv. Evaluation of the ability of the site to accommodate the proposed activity.

b. The erosion hazard assessment of streams and hillsides shall typically include, at a minimum, the following:

i. An overview of existing channel characteristics and stream hydraulics at the subject property;

ii. An assessment of the probability for stream induced erosion to occur on the subject property and the estimated extent of the property that would be affected;

iii. A site map of the property, drawn to scale, delineating the relationship of the stream to the property, and existing erosion areas and/or potential erosion areas, and the proposed development, including structural dimensions;

iv. A cross-section map, drawn to scale and at five-foot contour intervals from the edge of the river's surface to the furthest landward boundary of the property, and including the proposed development; and

v. Evaluation of the ability of the site to accommodate the proposed activity.

c. In addition to the basic critical area report requirements, a critical area report for an erosion hazard or landslide hazard area associated with hillsides shall include the following information at a minimum:

i. The report shall include a copy of the site plan for the proposal showing:

ii. The height of slope, slope gradient, and cross-section of the project area;

iii. The location of springs, seeps, or other surface expressions of groundwater on or within two hundred feet of the project area or that have potential to be affected by the proposal. A distance of two hundred feet is suggested so that geological features that might affect the proposal are included in the critical area report. It may be necessary to include features further than two hundred feet from the project area in some instances, such as a series of related geological features that extend more than two hundred feet; and

iv. The location and description of surface water runoff