

CHAPTER 10

CRITICAL DRAINAGE AREAS

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CHAPTER 10

CRITICAL DRAINAGE AREAS

10.0 INTRODUCTION

Critical drainage areas are defined by specific site attributes, separate ordinance, the regulatory actions of other governmental entities, Public Works special studies, or the director. Chapter 12.28 of the Kitsap County Code provides a listing of the general designations (listed below in Section 10.1). Section 10.2 contains supplemental requirements and guidance for analysis and mitigation of stormwater quantity and/or quality impacts for selected types of critical drainage areas. All developments located within critical drainage areas shall conduct a Level 1 Downstream Analysis, in accordance with KCC 12.18.040.

10.1 IDENTIFICATION OF CRITICAL DRAINAGE AREAS

The areas defined as critical drainage areas in Title 12.28.020 are divided into three general categories:

- A. Specific physical site attributes
 - 1. Slopes greater than or equal to 30%
 - 2. Geologically hazardous areas & historically documented unstable slopes
 - 3. All lands that are classified as wetlands as defined by any separate Kitsap County ordinance or policy (addressed in Chapter 8 Wetland Protection).
 - 4. Lands that have existing local requirements for the management or protection of groundwater, aquifers or sole source aquifers

- B. Areas defined for protection of fish and wildlife, and/or surface water quality
 - 1. Lands within 200 ft of ordinary high water mark of bodies of water possessing fish spawning and rearing habitat for anadromous and resident fish species, as designated by the State Department of Fish and Wildlife
 - 2. Lands that have existing local or state requirements for the protection of particular fish or wildlife habitats
 - 3. Lands that are established by law as shellfish protection areas
 - 4. Fecal Coliform TMDL for Sinclair and Dyes Inlet (pending)

- C. Areas designated as having documented and/or potential drainage problems
 - 1. All lands designated critical areas in any comprehensive drainage plan, or defined as critical drainage areas by separate ordinance;
 - 2. Any lands that contain, or drain to, a closed depression.

KCC 12.28.020 also states that critical drainage areas include “any lands determined by the director to have a high potential for drainage and water quality problems, and/or are sensitive to the effects of construction or development.” Sometimes, the critical nature of these drainage areas only becomes apparent once some degree of development is planned or has already occurred. In some subdivisions constructed before stormwater regulation, for example, development of infill lots is often severely constrained by the unplanned and piecemeal drainage controls installed over time by individual lot owners. Kitsap County

may, as funding allows, evaluate areas proposed for designation as critical drainage areas and conduct such studies, as necessary, to make such designations.

10.1.1 Site Physical Attributes

The Critical Areas Ordinance (CAO) (Kitsap County Code Title 19) defines critical areas based on site conditions, such as the presence of steep slopes, geologically hazardous areas, aquifer recharge areas, wetlands, streams, shorelines and critical fish & wildlife habitat. The CAO provides measures to protect these areas through a variety of measures, including buffer zones, construction setbacks and additional studies. In many cases, special attention to post-development stormwater impacts and controls are required. The typical drainage measures that may be required and their application are contained in Section 10.2. A Site Development Activity Permit may be required under the conditions specified in Title 12.

10.1.2 Protection of Fish & Wildlife Habitat and Surface Water Quality

In addition to the CAO requirements, federal and state law require watershed scale practices to limit loading of specific contaminants to certain water bodies. The state is required under Section 303(d) of the federal Clean Water Act (CWA) and the EPA's implementing regulations (40 CFR 130.7) to periodically prepare a list of water quality limited segments, as determined through the use of the water quality standards. The criteria and guidance in this policy have been developed to guide the assignment of waters into one of five categories. The criteria for the 303(d) list were developed to identify those waters for which there is valid documentation of impairment. These waters require the preparation of water quality improvement projects, known as Total Maximum Daily Loads (TMDLs), in accordance with the CWA.

The Union River, Dyes Inlet (including the Port Washington Narrows) and Sinclair Inlet are 303(d) listed water segments, based on fecal coliform pollution. Stormwater runoff has been identified as an important contributor to the documented fecal coliform contamination observed in both the marine waters and in tributary creeks. The TMDL for Union River does not require specific stormwater related actions. The TMDL for Dyes Inlet and Sinclair Inlet is still under development by the Department of Ecology. Numeric discharge limits may not be imposed on stormwater runoff; rather, improvements will be accomplished with structural and non-structural controls. For new development or re-development, stormwater Best Management Practices (BMPs) are the primary mandated mechanism. Once these TMDLs are completed, the director may require the use of specific water quality BMPs to reduce fecal coliform loading to the tributary streams or marine shorelines. The watershed areas impacted by fecal coliform can be found on **Figures 10-2 and 10-3**.

10.1.3 Defined Critical Drainage Areas

Kitsap County has identified specific problem drainage areas that require additional attention in the design, permitting and construction for land development. Sixteen areas have been so identified within Kitsap County (**Figures 10-1, 10-2 and 10-3**). The designation of an area is typically based on problems associated with the conveyance of surface runoff and/or downstream capacity limitations, including closed depressions.

Drainage studies have been conducted for several of the areas to evaluate the extent of the problems and potential solutions: Manchester, Navy Yard City, East Port Orchard (Bethel and Lund) and Driftwood Keys.

In many of the defined areas, conveyance and downstream problems stem from the long-ago creation of large concentrations of small lots with no consideration given to topography and drainage when the lots were created. Two of these areas have site development criteria and restrictions defined in the Zoning Code (KCC Title 17): Suquamish and Manchester. These restrictions provide upper limits on the percentage of impervious cover and conditions for engineered drainage plans (KCC 17.321A and C and 17.382). [Note: Keyport Rural Village also has impervious cover limitations, as specified in KCC 17.321D and 17.382.] Further development in these areas is often complicated by the absence of conveyance routes for stormwater discharges, and poor soils and/or limited area for infiltration.

10.2 SUPPLEMENTAL REQUIREMENTS

Title 12.28.010 allows the director to require drainage improvements in excess of those required in other sections of Title 12 in order to mitigate or eliminate potential drainage-related impacts within critical drainage areas. For particularly sensitive drainage areas, the director may specify the type of drainage analyses and mitigation required.

Drainage areas defined as critical often have more than one characteristic feature (e.g., steep unstable slopes along a shoreline or flanking a stream). The major stormwater management objective in nearly all cases is to mimic as closely as possible the natural (pre-development) hydrologic conditions to protect both environmental receptors and human life and property.

Development within critical areas requires the appropriate specialist within the specific field to provide recommendations and design for mitigation.

Slope or stability-related critical areas: A qualified geotechnical consultant shall make specific drainage mitigation recommendations. Where required, a professional engineer shall incorporate the recommendations into the stormwater management design.

Wetlands, streams and shoreline critical areas: A qualified habitat biologist shall make specific mitigation recommendations. Where required, a professional engineer shall incorporate the recommendations into the stormwater management design.

Development projects affecting critical areas typically require downstream analysis and energy dissipation design by the professional engineer, with concurrence from the appropriate critical areas specialist.

10.2.1. Closed Depressions

The analysis of closed depressions requires careful assessment of the existing hydrologic performance in order to evaluate the impacts a proposed project will have. Closed depressions generally facilitate infiltration of runoff. If a closed depression is classified

as a wetland, then Minimum Requirement #8 for wetlands applies (Chapter 8). If there is an outflow from this wetland, then the flow from this wetland must also meet the Minimum Requirement #7 for flow control (Chapter 7). An approved continuous simulation hydrologic model must be used for closed depression analysis and design of mitigation facilities. Infiltration shall be addressed where appropriate. If a proposed project will discharge runoff to an existing closed depression, the following requirements must be met:

Case 1: For closed depressions located entirely on-site, and where no runoff occurs in the pre-developed condition, no runoff may leave the site in the developed condition. If the modeling indicates the facility will overflow in the developed condition, the closed depression may be modified to provide the required storage, or may be modeled as a combination infiltration/detention facility with control structure and emergency overflow weir, access road, etc., in accordance with Chapter 7, Flow Control. The required performance shall meet the flow duration frequency standards per Minimum Requirement #7. To determine whether runoff occurs in the pre-developed condition, the pre-development runoff time series from the drainage basin tributary to the on-site closed depression shall be routed to the closed depression using only infiltration as outflow.

Case 2: For closed depressions located entirely on-site, where runoff occurs in the pre-developed condition, the closed depression shall then be analyzed as a detention/infiltration pond. The flow duration frequency standards per Minimum Requirement #7 shall be met

Case 3: If the closed depression is located partially or completely off-site, impacts to adjacent properties shall be evaluated and appropriate mitigation provided including any downstream easements. If offsite easements can be obtained, the closed depression may be modified to meet the required performance standard as in Case 1, above. If offsite easements cannot be obtained, then the total volume of runoff discharged from the project site may not be increased above the total pre-development runoff volume.

10.2.2 Steep Slopes and Geologically Hazardous Areas

Stormwater management design for projects within these critical areas shall comply with recommendations of geotechnical analysis required under KCC Title 19. The geotechnical consultant shall evaluate the minimum criteria applicable to the project and make drainage recommendations. The project engineer shall incorporate the design recommendations into the design. Proposed measures may include, but are not limited to, additional setbacks from the top of slope for infiltration facilities, outright prohibition of infiltration, collection and conveyance of surface runoff to minimize uncontrolled flow over the top of slope, preservation of existing native vegetation, or re-vegetation of cleared areas.

10.2.3 Aquifer Recharge Areas

Projects that fall within Aquifer Recharge Areas must comply with the requirements of KCC Title 19. Where a hydrogeologic study is required, the study shall address at a minimum all the criteria listed in section 7.3.4.1 of this manual.

10.2.4 Wetlands and Streams

Buffer zones are identified in the CAO for each wetland type and stream type. A construction setback from the buffer is also required. Encroachment on these mandatory buffers or setbacks can trigger the requirement for an SDAP. Additional stormwater control requirements for development in proximity to wetlands are addressed in Chapter 8.

10.2.5 Shorelines

The shorelines of Puget Sound exhibit a variety of landforms, ranging from relatively level to very steep high bluffs. With respect to stormwater management, erosion and sediment control, stormwater conveyance, and energy dissipation are of primary concern for maintenance of slope stability and habitat preservation.