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**COMMUNITY PLANNING &
ECONOMIC DEVELOPMENT DEPARTMENT**

Creating Solutions for Our Future

Joshua Cummings, Director

MEMORANDUM

TO: Planning Commission

FROM: Andrew Deffobis, Associate Planner

DATE: **March 3, 2021**

SUBJECT: Bulkheads (Shoreline Armoring) and the Shoreline Master Program

Introduction

The topic of bulkheads has been raised at several Planning Commission meetings as review of the draft SMP has continued. This memo provides information about how bulkheads are treated in the draft SMP, what state law and guidelines say about bulkheads, and some basic information about lake ecology.

Bulkheads are a form of shoreline stabilization, which is defined in the draft SMP as "actions taken to address erosion impacts to property and dwellings, businesses, or structures caused by natural processes, such as current, flood, tides, wind or wave action." The definition also describes various structural and nonstructural methods of stabilization. Shoreline stabilization can range from vegetation or beach enhancement and the placement of anchor logs up to installation of bulkheads or seawalls.

How do state law and guidelines address shoreline stabilization?

There are various RCWs and WACs related to shoreline management which provide shoreline stabilization guidelines and development standards for jurisdictions to use in developing their master programs. This memo provides an overview of language in state shoreline law and guidelines that pertain to shoreline stabilization; please refer to the citations to review the full language in the WACs and RCWs. Bulkheads are considered development according to the definition of "development" in RCW 90.58.030(3)(a). This is noteworthy because many sections of the WAC speak about general principles related to development.

RCW 90.58.100(6) requires master programs to develop standards for protecting single-family residences and appurtenant structures against damage or loss due to shoreline erosion:

> Each master program shall contain standards governing the protection of single-family residences and appurtenant structures against damage or loss due to shoreline erosion. The standards shall govern the issuance of substantial development permits for shoreline protection, including structural methods such as construction of bulkheads, and nonstructural methods of protection. The standards shall provide for methods which achieve effective and timely protection against loss or damage to single-family residences and appurtenant structures due to shoreline erosion. The standards shall provide a preference for permit issuance for measures to protect single-family residences occupied prior to January 1, 1992, where the proposed measure is designed to minimize harm to the shoreline natural environment.

WAC 173-27-040 exempts normal protective bulkheads common to single family residences from the requirement to obtain a Substantial Development Permit (SDP). It is important to note that the WACs also allow jurisdictions to apply conditional use permits to shoreline uses and modifications, even if exempt from needing an SDP. This section also stipulates that uses listed as conditional uses in local master programs must obtain a Conditional Use Permit (CUP), even though they are exempt from the requirement for an SDP.

WAC 173-26-231 provides guidelines for shoreline modifications, including shoreline stabilization. Subsection 2 includes general principles for all shoreline modifications, and instructs jurisdictions to only allow structural modifications (such as bulkheads) when demonstrated necessary to protect an allowed primary structure or legally existing use in danger of loss or damage, or for shoreline restoration. It instructs master programs to reduce the adverse effects of shoreline modifications, and limit them in number and extent as much as possible. Master programs are instructed to allow modifications that are appropriate for the type of shoreline and environmental conditions of the site, and that they individually and cumulatively do not result in net loss of ecological function. See subsection WAC 173-26-231(2) for a complete list of general principles for shoreline modifications in the SMP guidelines.

WAC 173-26-231(3)(a) includes specific guidelines for shoreline stabilization, including structural and nonstructural stabilization. **The guidelines are not specific to shoreline environment; they apply to lakes, streams, and the marine shoreline.**

This section also states that shoreline erosion is a natural process that provides ecological function that sustains the natural resource and ecology of the shoreline. It discusses several negative impacts of shoreline armoring (i.e. hardening of the shoreline with stabilization structures). These include (but are not limited to) starving beaches of sediment, degrading vegetation on the shoreline, reduction of habitat, and exacerbated erosion of the beach.

When do state guidelines allow shoreline stabilization?

WAC 173-26-231(3)(a)(iii) includes standards that local SMPs must implement, including locating and designing new development and subdivisions to avoid the need for future stabilization to the extent feasible. The WACs provide for new shoreline stabilization structures under the following scenarios:

1. To protect existing primary structures from demonstrated risk of damage from erosion that is due to tidal action, current, or waves. Shoreline erosion without scientific or geotechnical analysis is not a demonstration of need. Permitted structures cannot result in a net loss of shoreline ecological function.
2. In support of new nonwater-dependent development, including single-family residences, when erosion is not being caused by upland conditions, nonstructural measures are not feasible or not sufficient, the need to protect primary structures from natural processes is demonstrated by geotechnical analysis, and the structure will not result in a net loss of ecological function.
3. In support of water-dependent development, when erosion is not being caused by upland conditions, nonstructural measures are not feasible or not sufficient, the need to protect primary structures from damage due to erosion is demonstrated by geotechnical analysis, and the structure will not result in a net loss of ecological function.
4. To protect projects for the restoration of ecological functions or hazardous substance remediation projects pursuant to chapter 70.105D RCW when nonstructural measures are not feasible or not sufficient, erosion control structures will not result in a net loss of ecological function.

Standards for replacement of stabilization structures are discussed in WAC 173-26-231(3)(a)(iii)(C). The language authorizes replacement with similar structures if there is a demonstrated need to protect principal structures or uses from erosion caused by currents, tidal action, or waves. Replacement structures are required to be designed, located, and constructed to assure no net loss of ecological function. They cannot, except in limited circumstances, encroach further waterward than the existing structure (soft stabilization measures that restore ecological function may be permitted waterward of the ordinary high water mark).

When structural stabilization is demonstrated to be necessary, the WACs require them to be limited to the minimum size necessary, to use measures designed to assure no net loss of ecological function, and to use soft approaches unless demonstrated not to be sufficient to protect primary structures, dwellings, and businesses (WAC 173-26-231(3)(a)(iii)(E)).

What does the draft SMP say?

As required by the state, the draft SMP includes development standards and permit language regarding shoreline stabilization. The general principles for shoreline modification that must be implemented according to WAC 173-26-231(2) (described above) are included in Thurston County's draft SMP in Section 19.600.102. The draft SMP also exempts normal protective bulkheads from needing a SDP if the purpose is to protect an existing single-family home and

appurtenant structures, per state guidelines (draft section 19.500.100(C). However, as written the draft SMP does require a conditional use permit (CUP) for new and replacement bulkheads, and an administrative CUP for hybrid or soft stabilization (19.600 Table Matrix and 19.600.175).

The specific provisions for shoreline stabilization found in WAC 173-26-231(3)(a) have been incorporated into the draft SMP, primarily into section 19.600.175. These include the requirement to locate and design new construction to avoid the need for stabilization, the four scenarios under which new stabilization structures may be allowed (see previous section of this memo), standards for replacement of stabilization structures, and standards for geotechnical reports.

The draft requires alternatives to structural stabilization to be utilized unless demonstrated to be infeasible or insufficient. The need for new or replacement stabilization structures must be demonstrated by a geotechnical report, and the resulting structure most not result in net loss of ecological function. Mitigation may be required to achieve this result.

Where permitted, hard stabilization such as bulkheads require a CUP. "Hybrid" or soft approaches require an administrative CUP. All CUPs—conditional or otherwise—must be approved by Ecology prior to construction. Other approvals from state and federal agencies may be required, and the County may perform State Environmental Policy Act (SEPA) review.

Ancillary Development

Questions have been raised by the Planning Commission about whether there are exceptions for shoreline stabilization to protect ancillary development, such as fire pits. The WACs do not appear to make exceptions for the protection of ancillary development by structural stabilization measures (such as bulkheads). The WACs are clear on when structural stabilization can be utilized, as described previously in this memo. This language is mirrored in the draft SMP, and generally includes protection for primary structures.

Nonstructural measures such as planting vegetation may be permitted to protect ancillary development. Structures may also be moved further back from the eroding shoreline, where applicable.

Bulkheads in Eutrophic Lakes

The topic of eutrophication in lakes has come up at past Planning Commission meetings. Over geologic time, lakes are considered to be successional environments that are in transition from open water to other types of environments, such as woodlands. A lake is considered eutrophic or "aged" when it has lower dissolved oxygen content, abundant vascular vegetation and higher plankton populations (North American Lake Management Society).

The following description of eutrophication was prepared by the U.S. Geological Service:

> Eutrophication is a natural process that results from accumulation of nutrients in lakes or other bodies of water. Algae that feed on nutrients grow into unsightly scum on the water surface, decreasing recreational value and clogging water-intake pipes. Decaying mats of dead algae can produce foul tastes and odors in the water; their decay by bacteria consumes dissolved oxygen from the water, sometimes causing fish kills. Human activities can accelerate eutrophication by increasing the rate at which nutrients enter the water. Algal growth is usually limited by the available supply of either phosphate or nitrate…(USGS).
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> *Harmful algal blooms (HABs)* can be caused by many different types of algae in freshwater ecosystems, and can be triggered by nutrient enrichment. The most frequent and severe blooms typically are caused by cyanobacteria, the only known freshwater algae with the potential for production of toxins potent enough to harm human health. CyanoHABs can threaten human and aquatic ecosystem health. Economic damages related to cyanoHABs include the loss of recreational revenue, decreased property values, and increased drinking-water treatment costs. (USGS).

In preparing this memo, staff reached out to the County's hydrogeologist and aquatic resource specialist. Eutrophication in Thurston County lakes is a complex topic. Eutrophication is a natural process but is exacerbated by human inputs to waterbodies. Water quality conditions vary by lake, and by season. The majority of the lakes in Thurston County are largely natural – few residents live nearby – and do not have eutrophication issues. Most of our lakes are also open water, and do not experience severe algal growth. In Thurston County, eutrophication issues tend to occur in lakes that have had more development in their watershed and on their shorelines. Some sources of nutrients that can fuel eutrophication include stormwater outfalls, runoff from surrounding properties, input from streams, groundwater inflow and septic tank seepage, and shoreline erosion. The relative contribution of nutrients from shoreline erosion has not been quantitatively studied in Thurston County, meaning there is not sufficient data from which to draw conclusions on this topic.

The use of shoreline stabilization structures authorized by state law and guidelines is described previously in this memo. **State shoreline guidelines do not make additional exceptions to permit bulkheads on lakes based on their eutrophic status.** Additionally, storage of sediment is included as an ecological function of lake environments in WAC 173-26-201(3)(d)(i)(C), indicating that the concept that lakes are receiving bodies for the deposition of sediment was previously contemplated by the Legislature.