Date: January 8, 2026
To: Leah Davis, Environmental Planner II
Department of Local Services
From: Bill Rehe, Senior Associate Biologist
Subject: DeGarmo: SHOR22-0032 Response to Comments

Dear Ms. Davis:

We have reviewed the Request for Information and present the following responses:

Review Comment	Response	Location of Support material
In this case, the existing shoreline stabilization appears to be a riprap revetment. Based on our review of aerial photos, we did not observe any significant change in the riprap revetment over the last 20 or more years (see Figures 1 and 2, below). The proposal is to replace the riprap revetment with a new stacked rock bulkhead. This proposal does not qualify as repair, and the proposed replacement structure is considered more impactful in shoreline code.	I apologize for not providing a clearer description of the project. The existing shoreline stabilization is angular rock built in front of a previous timber bulkhead. Our plan is to remove rock and debris from the beach and to reconstruct the existing rock bulkhead. We are also proposing to round the shoreline protection corners to reduce impacts to nearshore processes.	Please see Appendix A for additional site photos.
A data-supported geotechnical analysis is required to demonstrate the necessity of the proposed shoreline stabilization per KCC 21A.25.170.	We apologize for the delay in providing the geotechnical report. Geotechnical Engineers have a long backlog of projects, resulting in long delays in producing reports.	Please see Appendix B for the Geotechnical Report.
An assessment of impacts to critical saltwater habitats.		Please see Appendix C for the Impact Analysis.
Site plan needs to clearly delineate the OHWM and all critical areas and buffers.		Please see Appendix D for the Revised Site Plan.

Sincerely,

Bill Rehe
Senior Associate Biologist

APPENDICES

Appendix A: Site Photographs


05/01/2025
3 of 4
(Early Access)
EARLY ACCESS
© 2025 Eagleview

Kitsap County

Vashon Point

Peter Point

Dolphin Point

Puget Sound

Bunker Trail Pump Stations 1- 4 (King County)

Bunker Trail Vacuum Sewer System

Vashon Community Pump Station

SW COWAN RD
SW 110TH ST
SW 112TH ST
ASTALIN SW
98TH AVE SW
SW 116TH ST
McLeod Creek
Sliwa Beach Creek
SW 125TH ST
CUNLIFFE RD SW
BURMA RD SW
Paice Wheel Creek
SW 127TH ST
McCormick Creek
SW 140TH ST
Redjam Creek
SW CEDARHURST RD
SW 144TH ST
107TH WAY SW
Glen Acres Creek
GLEN ACRES RD SW
SW 148TH ST
119TH AVE SW
Judd Creek
Quartermaster Harbor

Appendix B: Geotechnical Report

Shoreline Geotechnical Assessment

DeGarmo Bulkhead

9918 – 9928 SW Bunker Trail
Parcel No. 8887000145 & 8887000165
Vashon, Washington

November 18, 2025
Project #25323

Prepared For:

Christopher DeGarmo
9918 SW Bunker Trail
Vashon, Washington 98070

Prepared By:

Envirotech Engineering, PLLC
PO Box 984
Belfair, Washington 98528
Phone: 360-275-9374

11/18/25

TABLE OF CONTENTS

1.0 INTRODUCTION

Envirotech Engineering, PLLC (Envirotech) has completed this shoreline geotechnical assessment in support of proposed shoreline armoring located at 9918 and 9928 SW Bunker Trail (parcel numbers 8887000145 and 8887000165) in Vashon, Washington. As presented herein, this assessment includes information pertaining to the project in this Introduction Section; observations of the property and surrounding terrain in the Surface Conditions Section; soils and geological descriptions in the Subsurface Investigation Section; and, assessments and considerations for the development of this project in the Conclusions and Recommendations Section.

1.1 Project Information

Information pertaining to the project was provided by the proponent of the property and professional representatives of the property owner. Currently, the property is fully developed with a single family residence, shed, deck, septic system, bulkhead and other ancillary features typical of this type of development.

The existing bulkhead consists of a timber with basalt rock on the waterside. The proposed project is to remove the timber bulkhead and restack the rock. It is planned to raise the height of the rock bulkhead so that it minimally matches the current timber wall with additional height as needed for flood control. Restacking the rock will also include reducing the overall footprint of the rock and restoring some beach..

The purpose of the shoreline armoring is to benefit the integrity of the existing home with an engineered wall of proper height. Approximate site development with relation to site features are illustrated in the Site Map in Appendix A.

1.2 Purpose of Investigation and Scope of Work

The purpose of this shoreline geotechnical assessment was to evaluate the proposed project with relation to erosion, geologic hazards, shoreline alternatives, site adequacy, and geological and hydrological impacts to the property and adjacent/ downstream properties.

In order to fulfill the purpose of investigation, the geotechnical program completed for the proposed improvements include:

- Review project information provided by the proponents of the property;
- Conduct a site visit to document the site conditions that may influence the construction and performance of the proposed improvements;
- Define general subsurface conditions of the site by observing near surface soils, the exposed shoreline bank, review geotechnical reports prepared by others, and review soil/ geological maps for the vicinity of the project;
- Complete an engineering assessment supported by planned site alterations and the surface and subsurface conditions that were identified by the field investigation, soil testing, and applicable project research; and,
- Establish engineering conclusions and recommendations based on findings and the anticipated development.

Vicinity Map from King County Website

2.0 SURFACE CONDITIONS

Information pertaining to the existing surface conditions for the project was gathered on November 14, 2025 by a representative with Envirotech. During the site visit, site features were documented that may influence construction or reveal potential geological or hydrologic hazards. This Surface Conditions Section provides information on general observations, vegetation, topography, drainage and slope/ erosion conditions for the project and surrounding areas.

2.1 General Observations

The parcels is currently developed with a single family residence and other features as previously mentioned. Vegetation consists mainly of landscaping, native firs, and other typical vegetation common to this area. Beach flora was not observed at the time of our site visit.

An aerial photo of the project and immediate vicinity is provided below. See the photographs in Appendix B for illustrations of site conditions.

2.2 Topography

The topographic information provided in this section was extrapolated from a public lidar source, and incorporated observations and field measurements, where necessary. Slopes are flat to relatively mild directly upland from the low bank shoreline. Steep slopes ascend just beyond the residence of over 40%.

2.3 Surface Drainage and Hydrology

Surface water such as streams or wetlands do not affect the properties. Storm runoff entering the site appears to be mild to moderate. Upland scour, sedimentation or other signs of upland drainage problems were not observed. Seepage or indications of excessive seepage along the shoreline bank was not observed.

The ordinary high water mark of the Puget Sound is approximately 2 to 3 feet up the face of the adjacent rock bulkhead from existing beach grade. It is apparent that the shoreline area is within the FEMA flood zone.

2.4 Slope and Erosion Observations

The shoreline experienced a large scale landslide encompassing the entire property and adjacent properties that is mapped to be less than 150 years old. See the landslide depiction below:

Geological Map Department of Natural Resources Washington State

Aerial Photo from King County Website

3.0 SUBSURFACE INVESTIGATION

Information on subsurface conditions pertaining to the project was gathered during research and a site reconnaissance. Our site visit was accomplished on November 14, 2025 by a representative with Envirotech. Specific information on field methods, sampling, field testing, subsurface conditions, and results from soil testing are presented in this section of the report.

3.1 Geologic Conditions

In general, soils at the project are composed of materials from glacial advances. The geologic conditions as presented in the "Geologic Map of Washington," compiled by J. Eric Schuster, 2002 indicates Quaternary sediments, Q_g. Quaternary sediments are generally unconsolidated deposits, and dominantly deposited from glacial drift, including alluvium deposits. This project is located within the Puget Lowland. Typically, "lower tertiary sedimentary rocks unconformably overlie the Crescent Formation." as revealed in the Geologic Map. Initial sedimentary rocks were formed from shales, sandstones and coal deposits from rivers. During the Quaternary period, the Puget Lowland was covered by numerous ice sheets, with the most recent being the Fraser glacier with a peak of approximately 14,000 years ago. Upon the glacial retreat, the landscape was formed by glacial erosion glacial drift deposits.

The "Interactive Geologic Map" from the Department of Natural Resources provides the following caption(s) for the project area:

Map Unit: Qgt
Age: Quaternary
Name: Till
Description: Unsorted, unstratified, highly compacted mixture of clay, silt, sand, gravel, and boulders deposited by glacial ice; may contain interbedded stratified sand, silt, and gravel.

Geological Map Department of Natural Resources Washington State

3.2 Specific Subsurface Conditions

The following subsurface conditions are estimated descriptions of the project subgrade utilizing information from the depth of penetration at all testing, sampling, observed and investigated locations. Soils for this project were described utilizing the Unified Soil Classification System (USCS). Using the USCS in conjunction with estimated relative densities and other anticipated engineering properties of the soil, susceptibility for potential landslides, erosion and seismic hazards may be assessed.

Soils within the upper 6 feet behind the bulkhead were observed to be primarily loose, silty sand with gravel (SM). The loose density indicates landslide debris, but could have been disturbed as fill during property development.

3.2.1 Groundwater and Hydrogeology

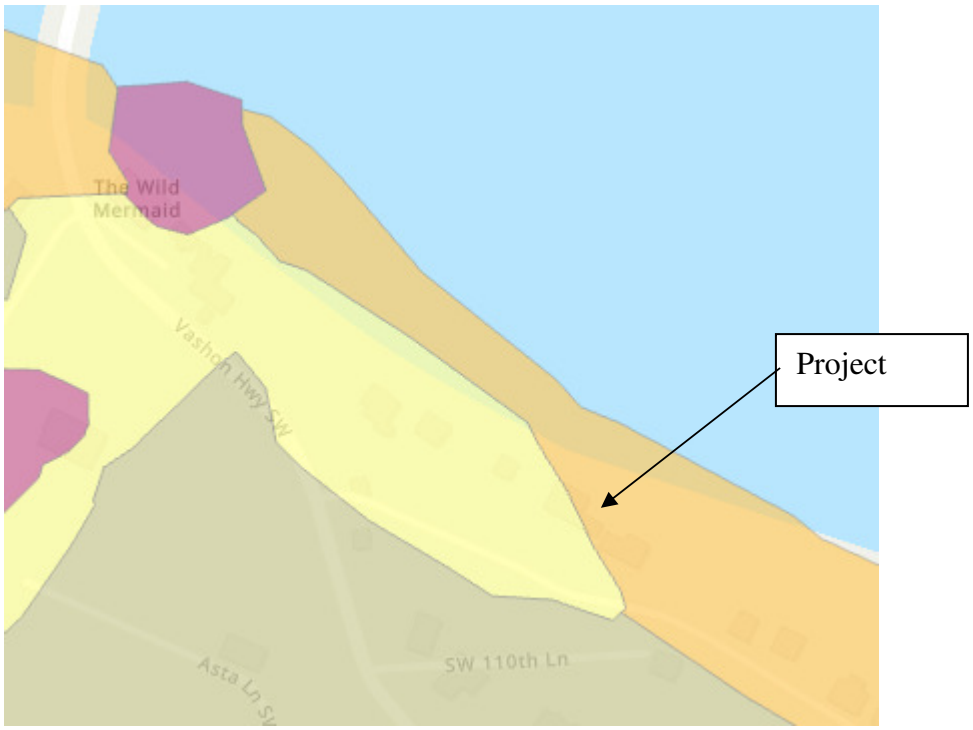
Permanent groundwater is expected to be at least 30 feet directly below the ground surface near the lowlands of the property (beach). Groundwater at shallow depths or surface seepage was not observed at the time of our site visit.

4.0 ENGINEERING CONCLUSIONS & RECOMMENDATIONS

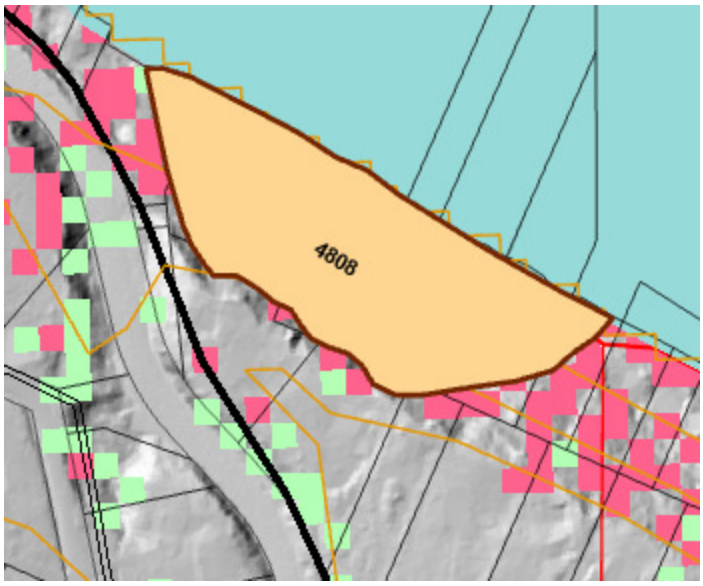
The following sections present engineering assessments and conclusions concerning the project. These conclusions have been made available based on the planned construction activities as outlined in the Introduction Section of this report; general observations of drainage and topography as summarized in the Surface Conditions Section; and, soil conditions that were identified by the field investigation and soils testing as outlined in the Subsurface Investigation Section. Conclusions for the project that is provided herein, includes pertinent information for landslide, erosion and seismic hazards.

4.1 Landslide Hazards and Effects of Proposed Development

According to the Coastal Zone Atlas of King County, Washington, the project is within and near terrain labeled 'Unstable' regarding potential landslide activity. A Stability Map from the Coastal Zone Atlas for the general area of this project may be found below.



Map from Washington State Department of Ecology Website



Map from Washington State Department of Natural Resources Website

4.2 Erosion Hazards

Based on the USCS description and soil density of the near-beach soils, the surface soils are considered highly erodible. According to the Resource Map from the Washington State DNR, the project is not within terrain labeled 'highly erodible.'

Due to the combination of loose soils and shoreline dynamics such as waves and currents, especially during storm surges, it is our opinion that this property has a high susceptibility risk of shoreline erosion where unprotected. The property is mapped as a feeder, indicating erosion would occur without a bulkhead.

4.3 Seismic Hazards

Mased on available mapping, there does not appear to be a fault within the influence of the property. This information is supported by the USGS Quaternary Fault and Fold Database for the United States.

The potential for liquefaction is believed to be low for this project. According to the Interactive Geologic Map of Washington, liquefaction susceptibility is very low within the vicinity of this project. This is also based on subsurface conditions such as soil characteristics and the lack of a permanent and substantial shallow water table. Subgrade characteristics that particularly contribute to problems caused by seismic events include submerged and confined, poorly-graded granular soils. Although gravel- and silt-sized soil particles could be problematic, fine and medium grained sands are typically subjected to these types of seismic hazards.

4.4 Shoreline Development Conclusions & Recommendations

Conclusions in this report are based on the type and location of the anticipated development, and existing on-site and off-site conditions. Site development that significantly deviates from the anticipated improvements presented in this report, or future nearby development that influences this project may require a geotechnical re-evaluation.

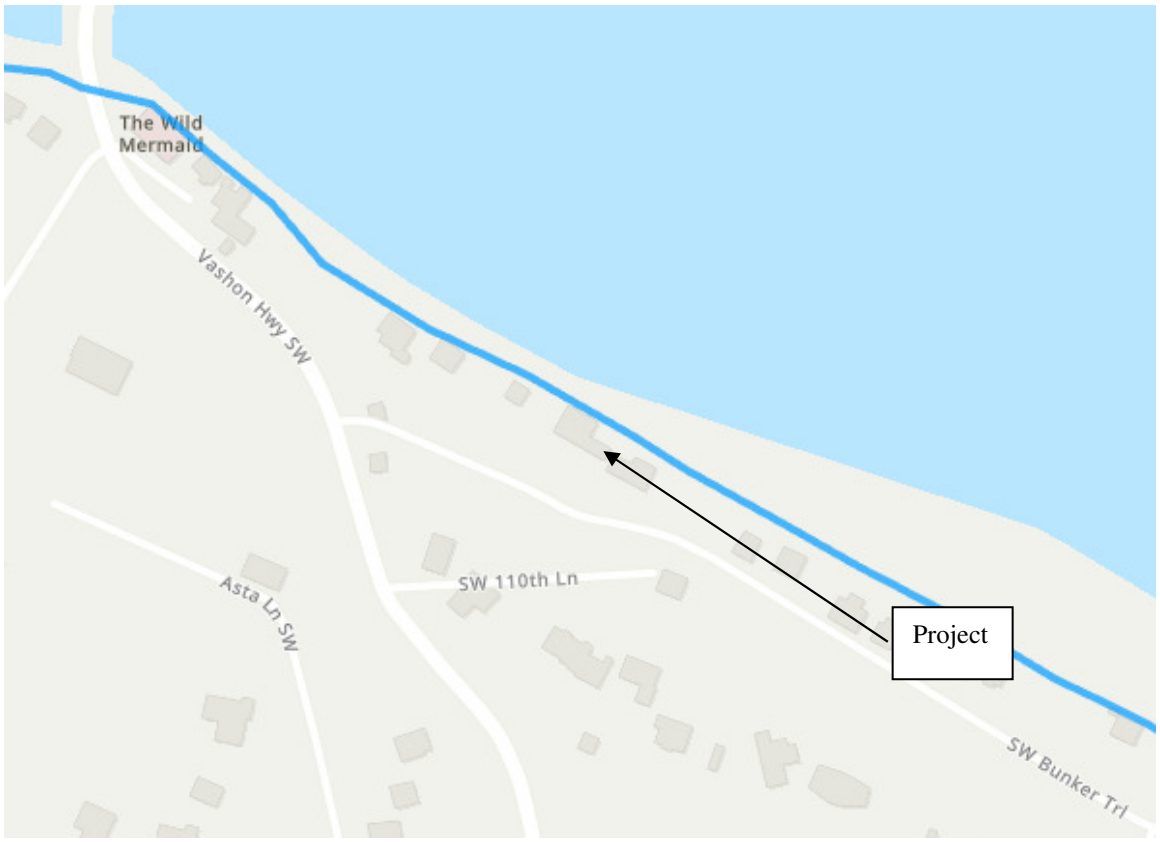
This Shoreline Development Conclusions and Recommendations Section provides our analysis and conclusions of the local shoreline process and how it relates to the existing and/ or proposed infrastructure. Envirotech analyzed alternative approaches and mitigation measures for the project site. We also included recommendations for the structural aspect and development.

4.4.1 Bulkhead Necessity

As demonstrated in this section, shoreline armoring is needed for the protection of the single family residential property.

- An unprotected shoreline is a high erosion hazard for this property. For a failed bulkhead, shoreline erosion, if left unrestrained, will endanger the existing residence and appurtenances. The property is mapped as having a feeder bluff per the Washington State Department of Ecology. See the illustration below. By definition, a feeder bluff is actively contributing or "feeding" sediments to beaches. Based on our subsurface investigation, the soils between the home and shoreline consist of loose landslide debris/ fill which exacerbates the rate of erosion.

- The project is high risk per the Marine Shoreline Design Guidelines (MSDG) by the Washington Department of Fish & Wildlife. It is recommended by the MSDG that high risk sites maintain hard armoring for protection of the infrastructure. See Appendix C for a depiction of the cumulative risk model that pertains to this project.



Coastal Landform Map from Washington State Department of Ecology Website

- Feeder bluff exceptional
- Feeder bluff
- Transport zone
- Feeder bluff – Talus
- Accretion shoreform
- Pocket beach
- Pocket beach - artificial

4.4.2 Shoreline Stabilization Per King County Code

Shoreline Stabilization per King County Code 21A.25.170 was considered in our geotechnical assessment as outlined below. The following excerpts from the Code that are relevant to geological and shoreline hazards and the need for hard armoring is provided below as italicized type. Below each code provision, we describe how the project satisfies or dissatisfies the key criteria cited in that code provision with respect to our field of study.

21A.25.170 (A). Shoreline stabilization shall not be considered an outright use and shall be permitted only when the department determines that shoreline protection is necessary for the protection of existing legally established primary structures, new or existing non-water-dependent development, new or existing water-dependent development or projects restoring ecological functions or remediating hazardous substance discharges. Vegetation, berms, bioengineering techniques and other nonstructural alternatives that preserve the natural character of the shore shall be preferred over riprap, concrete revetments, bulkheads, breakwaters and other structural stabilization. Riprap using rock or other natural materials shall be preferred over concrete revetments, bulkheads, breakwaters and other structural stabilization. Lesser impacting measures should be used before more impacting measures.

The least impacting shoreline protection measure has been analyzed per the Alternative Approaches Section 4.4.3 of this report.

21A.25.170(B). Structural shoreline stabilization may be permitted subject to the standards in this chapter and as follows:
1. The applicant provides a geotechnical analysis that demonstrates that erosion from waves or currents is imminently threatening or that, unless the structural shoreline stabilization is constructed, damage is expected to occur within three years;
2. The erosion is not caused by upland conditions;
3. The proposed structural shoreline protection will provide greater protection than feasible, nonstructural alternatives such as slope drainage systems, vegetative growth stabilization, gravel berms and beach nourishment;
4. The proposal is the minimum necessary to protect existing legally established primary structures, new or existing non-water-dependent development, new or existing water-dependent development or projects restoring ecological functions or remediating hazardous substance discharges; and
5. Adequate mitigation measures will be provided to maintain existing shoreline processes and critical fish and wildlife habitat and ensure no net loss or function of intertidal or riparian habitat.

It is our opinion that this geotechnical analysis demonstrates that erosion from waves or currents is imminently threatening or that, unless the structural shoreline stabilization is constructed, damage is expected to occur within three years. See the Bulkhead Necessity Section 4.4.1 outlined earlier in this report for additional details.

Erosion caused by upland conditions were not observed at the time of our site visit, or expected to occur on this property.

The proposed structural shoreline protection will provide greater protection than feasible, nonstructural alternatives such as slope drainage systems, vegetative growth stabilization, gravel berms and beach nourishment. See Section 4.4.3 of this report for an analysis on nonstructural alternatives, and why they are not feasible for this project.

The proposed shoreline protection is the minimum necessary to protect existing legally established primary structures.

Adequate mitigation measures will be provided by others to maintain existing shoreline processes and critical fish and wildlife habitat and ensure no net loss or function of intertidal or riparian habitat.

21A.25.170 (C). Shoreline stabilization to replace existing shoreline stabilization shall be placed landward of the existing shoreline stabilization, but may be placed waterward directly abutting the old structure only in cases where removal of the old structure would result in greater impact on ecological functions. In critical saltwater habitats, existing shoreline stabilization shall not be allowed to remain in place if the existing shoreline stabilization is resulting in the loss of ecological functions. Adequate mitigation measures that maintain existing shoreline processes and critical fish and wildlife habitat must be provided that ensures no net loss or function of intertidal or riparian habitat.

Existing shoreline stabilization will be restacked as far landward as possible, and will be configured so that new beach will be created.

21A.25.170 (D). The maximum height of the proposed shoreline stabilization shall be no more than one foot above the elevation of extreme high water on tidal waters, as determined by the National Ocean Survey published by the National Oceanic and Atmospheric Administration, or four feet in height on lakes.

Envirotech concurs that it is not necessary to have the maximum height of the shoreline stabilization structure no more than one foot above the elevation of extreme high water. The structural engineer should take this into account during their design process.

21A.25.170 (E). Shoreline stabilization is prohibited along feeder bluffs and critical saltwater habitat, unless a geotechnical report demonstrates an imminent danger to a legally established structure or public improvement. If allowed, shoreline stabilization along feeder bluffs and critical saltwater habitat must be designed to have the least impact on these resources and on sediment conveyance systems.

This geotechnical report demonstrates an imminent danger to legally established structures if the current bulkhead fails. See the rationale and details provided in Section 4.4.1 of this report.

21A.25.170 (F). Shoreline stabilization shall minimize the adverse impact on the property of others to the maximum extent practical.

It is our opinion that the proposed shoreline stabilization is similar to the existing stabilization, that adverse impacts on the property and other properties will be avoided.

21A.25.170 (G). Shoreline stabilization shall not be used to create new lands.

New lands shall not be created when establishing the bulkhead. From a geotechnical perspective, this would not be required per our recent observations.

21A.25.170 (H). Shoreline stabilization shall not interfere with surface or subsurface drainage into the water body.

As previously stated in this report, surface for subsurface drainage is not a limiting factor for this project, and will not be interfered with. The rock bulkhead allows for free-flowing groundwater.

21A.25.170 (I). Automobile bodies or other junk or waste material that may release undesirable material shall not be used for shoreline stabilization.

Waste material will not be used for shoreline protection.

21A.25.170 (J). Shoreline stabilization shall be designed so as not to constitute a hazard to navigation and to not substantially interfere with visual access to the water.

The bulkhead designer shall design accordingly, and in our belief, will not interfere with navigation or visual access to the water.

21A.25.170 (K). Shoreline stabilization shall be designed so as not to create a need for shoreline stabilization elsewhere.

It is our opinion that the required shoreline stabilization will not be located or designed in such a manner that would create a need for shoreline stabilization elsewhere.

21A.25.170 (L). Shoreline stabilization shall comply with the Integrated Stream Protection Guidelines (Washington state departments of Fish and Wildlife, Ecology and Transportation, 2003) and shall be designed to allow for appropriate public access to the shoreline.

From a geotechnical perspective, it is our opinion that this portion of the code will be adhered to.

21A.25.170 (M). The department shall provide a notice to an applicant for new development or redevelopment located within the shoreline jurisdiction on Vashon and Maury Island that the development may be impacted by sea level rise and recommend that the applicant voluntarily consider setting the development back further than required by this title to allow for future sea level rise. (Ord. 16985 § 41, 2010: Ord. 5734 § 5, 1981: Ord. 3688 § 413, 1978. Formerly K.C.C. 25.16.180).

The existing residence is sufficiently elevated from impacts of sea level rise over the course of the building design life. The proposed bulkhead may need further height extension in the future to account for a rise in sea level.

4.4.3 Alternative Approaches Analysis

Alternative approaches were considered in our geotechnical assessment as outlined in the Washington Administrative Code (WAC) 220-660-370 (3). Per this selection process, the

code requires the use of the least impacting technically feasible shoreline stabilization alternative, whereas feasible means available and capable of being done after taking into consideration cost, existing technology, and logistics in light of the overall project purposes. Furthermore, the WAC states that a hard armoring technique should be proposed after considering site characteristics such as the threat to major improvements, wave energy, and other factors in an alternative analysis.

The following key excerpts from that are relevant to geological and shoreline hazards and the need for to maintain a functional, hard armored bulkhead (such as what is proposed in the current plans) is provided below in italics. Below each code provision, we describe how the project satisfies or dissatisfies all of the key criteria cited in that code provision with respect to our field of study.

WAC 220-660-370(3)(c) – Common alternatives for replacement or rehabilitation of residential shoreline stabilization are, from most preferred to least preferred:

(i) Remove the existing shoreline stabilization structure and restore the beach.

This alternative is infeasible because a major improvement (existing residence) is in danger without an adequately functioning shorleline protection. As previously substantiated in this report, the home could be compromised in less than 3 years if the beach remains restored.

(ii) Remove the existing shoreline stabilization structure and install native vegetation.

This alternative is infeasible due to vegetation having a lack of shoreline bank protective qualities for this specific project.. Furthermore, the very loose shoreline soils from the talus are not conducive for resisting erosion.

(iii) Remove the existing shoreline stabilization structure and control upland drainage.

As previously outlined in Section 2.3 of this report, upland drainage issues are not a problem for this project, therefore this alternative analysis is not feasible.

(iv) Remove the existing shoreline stabilization structure and replace it with a soft structure constructed of natural materials, including bioengineering.

Unless a structural engineered system is designed, soft armoring such as logs and root wads are not advised for this project. This is due to the following:

- Stability and safety of the existing home is extremely sensitive to the mitigation technique for bank erosion. Soft armoring has not been proven to mitigate erosion over the long term as compared to hard armoring,
- Soft shore armoring will allow the loose shoreline bank soils to erode immediately because shoreline waves and currents fully penetrate soft shore

methods, and allows the loose sediments to dissipate through piping failure, and,

- The limited height of soft armoring does not protect the shoreline as would a hard bulkhead during storm surges and wave energy.

(v) Remove the existing hard structure and construct upland retaining walls.

This alternative is not feasible, mostly due to the close proximity of the home and shoreline.

(vi) Remove the existing hard structure and replace it landward with another hard structure, preferably at or above the ordinary high water line.

This alternative is feasible, and accounted for in the structural design.

4.4.4 Mitigation Measures

Measures to mitigate potential site specific and cumulative geological and hydrological impacts of the proposed development are provided herein in order to mitigate adverse impacts to adjacent and down-current properties.

Envirotech believes that the hard armoring should consist of rock over concrete. Rock will not impede groundwater flow, would be cantered, and will provide an overall positive ecological friendly configuration with relation to local beach conditions. In addition, habitat management protocols from the biologist and the reviewing authority should be implemented as per their code.

4.5 Construction Recommendations

The following recommendations are offered for the proposed project. This includes foundations, earthwork and drainage considerations.

4.5.1 Foundations

Foundations (bottom rock) shall be established on relatively undisturbed native soil. For a bearing capacity requirement of no more than 2500 psf, rock shall be placed at a minimum depth of 24 inches below beach grade or deeper if required by the structural engineer or per code. Foundation recommendations are made available based on adherence to the remaining recommendations that are provided in this report.

Total and differential settlement that a structure will undergo depends primarily on the subsurface conditions, type of structure, amount and duration of pressure exerted by the structure, reduction of pore water pressure, and in some instances, the infiltration of free moisture. Based on the expected native soil conditions, anticipated development, and construction abides by the recommendations in this report, the assumed foundation system may undergo a maximum of 0.50 inch total settlement, and a maximum differential settlement of 0.25 inch over a 50 ft span.

4.5.2 Earthwork Construction Recommendations

Founding material for building foundations shall consist of undisturbed native soils to the foundation depths previously provided in this report.

Excavation is recommended to remove any deleterious material, if present, beneath foundations and to achieve appropriate foundation depth. Additional sub-excavation will be required for this project if the soils below the required foundation depth are loose, or otherwise incompetent due to inappropriate land disturbing.

Temporary and permanent earth cuts and fill slopes exceeding 4 feet in height should be limited to a slope of 2:1 (horizontal:vertical). Utility trenches or other confined excavations exceeding 4 feet should conform to OSHA safety regulations. Permanent cut and fill slopes shall be limited to a slope of 2:1, unless otherwise approved by an engineer.

Standard crushed ballast is recommended behind the bulkhead per the requirements of a structural engineer. Standard compaction is not necessary. Fill beneath foundations should be avoided for this project.

4.5.3 Retaining Walls and Lateral Earth Pressures

The proposed shoreline protection is a rock retaining system. The lateral earth pressures exerted through the backfill of a retaining wall are dependent upon several factors including height of retained soil behind the wall, type of soil that is retained, degree of backfill compaction, slope of backfill, surcharges, hydrostatic pressures, earthquake pressures, and the direction and distance that the top of the wall moves.

An equivalent fluid unit weight used for structural design may be estimated as the product of the backfill soil unit weight and the earth pressure coefficient for at-rest pressures. Retaining walls should be designed to resist a lateral earth pressure based on an equivalent fluid unit weight of the following:

	At-Rest	Active
Native Soils	51 pcf	34 pcf
Engineered Fill Soils	45 pcf	28 pcf

The values provided above shall be increased by 1 pcf for every 1 degree of backfill/ natural slope angle. These equivalent fluid unit weight values do not include lateral earth pressures induced by earthquakes, groundwater, or surcharges from live loads. These loads should be accounted for at the discretion of the structural engineer.

Backfill may consist of engineered fill, as presented in this report, or borrow material approved by an engineer. If pavement or building loads are planned to be located within

retaining wall backfill, then 90% compaction is required per the modified Proctor. In addition, heavy construction equipment should be at a distance of at least ½ the wall height. Over-compaction and limiting heavy construction equipment should be prevented to minimize the risk of excess lateral earth pressure on the retaining structure. Envirotech recommends that retaining wall backfill is compacted with light equipment such as a hand-held power tamper. If clean, coarse gravel soils are utilized as engineered fill, and surcharges will not influence the retaining wall, compaction may be achieved by reasonably densifying granular soils with construction equipment.

4.5.4 Drainage Considerations

Rock ballast behind the planned bulkhead as designed by the structural engineer should be sufficient means for drainage behind the bulkhead.

5.0 CLOSURE

Based on the project information and site conditions as presented in this report, it is Envirotech's opinion that additional geotechnical studies are not required to further evaluate this project.

Due to the inherent natural variations of the soil stratification and the nature of the geotechnical subsurface exploration, there is always a possibility that soil conditions encountered during construction are different than those described in this report. Therefore, it is recommended that Envirotech is promptly notified if project and subsurface conditions found on-site are not as presented in this report so that we can re-evaluate our recommendations.

This report presents a geological/ geotechnical assessment, and is intended only for the owner, or owners' representative. Furthermore, this report is only valid for the project information and location described herein. Significant geological or property changes prior to the implementation of this project could render this report outdated, and will require additional geotechnical studies.

The services described in this report were prepared under the responsible charge of Michael Staten, a professional engineer with Envirotech. Michael Staten has appropriate education and experience in the field of geotechnical engineering in order to assess landslide hazards, erosion hazards, earthquake hazards, and shoreline dynamics.

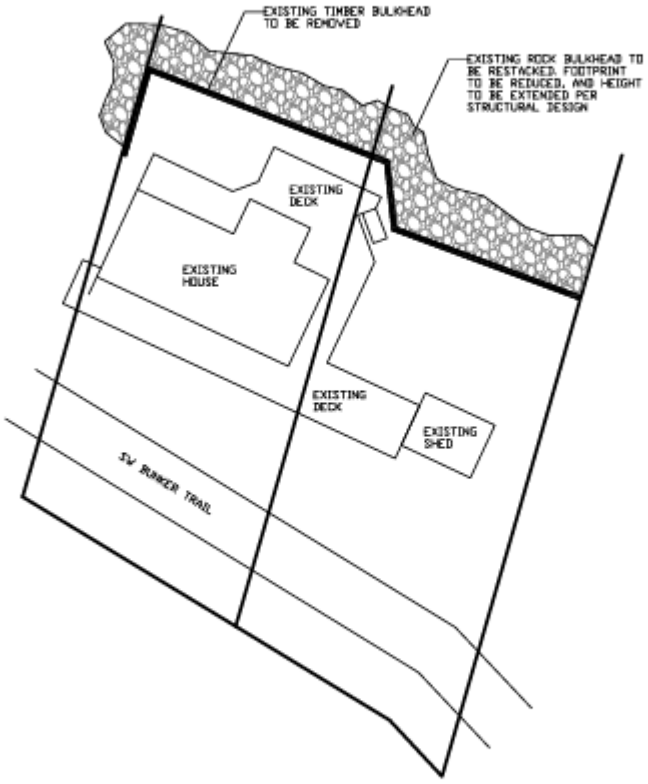
Please contact Michael Staten at 360-275-9374 if you have any questions, comments, or require additional information.

Sincerely,
Envirotech Engineering

Michael Staten, P.E.
Geotechnical Engineer

APPENDIX A

SITE PLAN



N

SCALE: 1 INCH = 30 FEET

0 15 30

ENGINEER:
ENVIROTECH ENGINEERING, PLLC.
PO BOX 984
BELFAIR, WASHINGTON 98528
360-275-9374

SITE PLAN

APPENDIX B

PHOTOGRAPHS

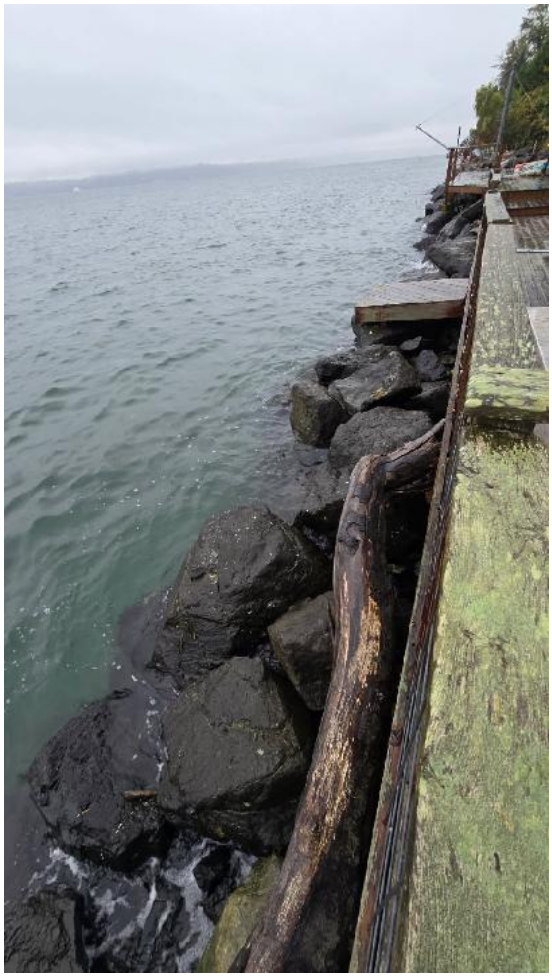


Photo 1: Timber and Rock Bulkhead

Photo 2: Backfill Area

Photo 3: House Located 3 ft From Bulkhead

APPENDIX C

CUMULATIVE RISK MODEL

CUMULATIVE RISK MODEL			
EROSION POTENTIAL			
Shoretype	**Score**	**Fetch**	**Score**
No Appreciable Drift (NAD)-Bedrock/Low Energy	0	0–1 mile	1
Modified, Accretion Shoreform, NAD-Delta	1		
NAD- Artificial , Transport Zone, Pocket Beach	2	1–5 miles	2
Feeder Bluff	3	5–15 miles	3
Feeder Bluff Exceptional	4	15+ miles	4
Erosion Potential Score =	**Shoretype Score + Fetch Score**		7
INFRASTRUCTURE THREAT			
Setback	**Score**	**Infrastructure Type**	**Score**
>60 ft	1	Property without structures	1
36–60 ft	2	Septic drainfield or unattached residential infrastructure, not lived in	2
21–35 ft	3	Home or residential building	3
0–20 ft	4	Major infrastructure	4
Infrastructure Threat Score =	**Setback Score + Infrastructure Type Score**		7
CUMULATIVE RISK TOTAL (product):	**Erosion Potential x Infrastructure Threat**		49

Table 3-4 from the Washington Department of Fish & Wildlife, Marine Shoreline Design Guidelines

- Low risk scores between 0–15
- Moderate risk scores between 16–36
- High risk scores greater than 36

Feeder bluff delination from WA State Department of Ecology Coastal Atlas Map

Fetch is measured as greatest distance of open water to project site from aerial mapping.

Appendix C: Impact Analysis

DEGARMO IMPACT ANALYSIS AND MITIGATION PLAN

Shoreline Protection Repair Project

9928 SW Bunker Trail, Vashon, WA 98070

Project Application SHOR22-0032

Prepared by

LEON Environmental, LLC

January 2026

DEGARMO IMPACT ANALYSIS AND MITIGATION PLAN

Shoreline Protection Repair Project

9928 SW Bunker Trail, Vashon, WA 98070

Project Application SHOR22-0032

January 2026

Prepared for:
Christopher DeGarmo
9928 SW Bunker Trail
Vashon, WA 98070

Prepared By:
Bill Rehe, Senior Associate Biologist
Leon Environmental, LLC
Seattle, WA

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Abbreviations and Acronyms

County	King County
CY	Cubic Yards
Ecology	Washington Department of Ecology
FEMA	Federal Emergency Management Agency
GIS	Geographic Information System
KCC	King County Code
L-E	Leon Environmental, LLC
LF	Linear Feet
OHW	Ordinary High Water
PAH	Polycyclic Aromatic Hydrocarbon
PHS	Priority Habitat and Species
SF	Square Feet/Foot
Site	9928 SW Bunker Trail, Vashon, WA 98070
WDFW	Washington Department of Fish and Wildlife

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Chapter 1. Introduction

This impact analysis and mitigation plan was requested by King County (County) to address potential impacts to the critical areas and buffers from a bulkhead repair and maintenance project located at 9928 SW Bunker Trail, Vashon, WA 98070 (Site). The property owners are proposing to repair the existing shoreline protection that has been damaged by age and storms. The proposed project includes removing the timber bulkhead, repairing the rock bulkhead, and performing minor repairs to the home's foundation. The proposed repairs will occur as far landward as possible in order to reestablish as much intertidal habitat as possible while protecting the community sewer line and the single-family residence.

The proposed project was designed to avoid and minimize new impacts to critical areas and buffers to the greatest extent practicable. To meet this goal, Leon Environmental, LLC (L-E) was hired to identify potential critical areas and buffers on Site and adjacent properties. Based off L-E's background data review and Site visits, the following critical areas and/or buffers are potentially present on the project Site:

- Potential landslide hazard;
- Erosion hazard;
- Potential steep slopes;
- Estuarine wetlands;
- Flood hazard area; and
- Aquatic area.

Project activities avoid new permanent impacts to critical areas by occurring landward of the existing bulkhead footprint. Potential impacts to aquatic buffers will be minimized by conducting project related actions in areas of previous land use impacts or areas of lawn. The proposed project will result in a net reduction of impacts to the aquatic area (Puget Sound) and the aquatic area buffer by repairing the shoreline protection as far landward as practicable. The project will reestablish approximately 300 square feet (SF) of upper intertidal habitat, remove approximately six creosote-treated timber piles, and place approximately 22 cubic yards (CY) of beach nourishment in an area with a reduced sediment budget.

The County requires a critical area restoration and enhancement plan following the guidelines of the County's *Critical Areas: Restoration & Enhancement* (2012). The purpose of the critical area restoration and enhancement plan is to fulfill the requirements of King County Code (KCC) 21A.2.

1.1 Statement of Accuracy

A critical areas reconnaissance level review was performed. No wetland delineation, rating, functional analyses, or stream delineation were conducted or prepared, because these critical areas were not present on Site. The maps included in this report were generated from field measurements, not a professional survey. The findings were based on the conditions at the time of the Site visit and information provided by the property owners and their engineer. This report is provided for the use of the named recipient only and is not intended for use by other parties for any other purposes. The conclusions in this report are based on the results of analyses performed by L-E and represent our best professional judgment. To that extent, and within the limitations of project scope and budget, we believe the information provided herein is accurate and true to the best of our knowledge. We do not warrant any assumptions or conclusions not expressly made in this report or based on information or analyses other than what is included herein.

1.2 Project Location

The proposed project is located at 9928 SW Bunker Trail on Vashon Island WA 98070 (County parcel no. 888700-0165, 888700-0169, and 888700-0170). The project is situated in Township 23 North, Range 3 East, Section 6, W.M (Figure 1).

To access the Site, take Fauntleroy-Vashon Island Ferry to Vashon Island. Take Vashon Hwy SW. Turn right onto SW Bunker Trail. The project Site is on the left.

1.3 Project Purpose

The proposed project will repair and maintain the existing, deteriorating shoreline protection on the applicant's properties in order to protect residential structures and a public sewer line from damage caused by tidal- and wind-driven erosion. Elements of the proposed project include:

- Removing a timber bulkhead;
- Repairing a rock bulkhead;
- Removing creosote-treated timber piles;
- Repairing the existing house foundation; and
- Placing 22 CY of beach nourishment material along the shoreline.

1.4 Background Data Reviewed

The background review for this project included researching existing information pertaining to the project Site, such as maps, drawings, and reports. This review focused on information related to soils, hydrology, vegetation, and previously identified wetlands and other critical areas. The following is a list of resources reviewed for this project:

- Aerial photograph and topographic maps;
- County Geographic Information System (GIS) (King County 2025);
- Washington Department of Fish and Wildlife (WDFW) Salmonscape (WDFW 2025b) and Priority Habitat and Species (PHS) (WDFW 2025a); and
- Washington Department of Ecology (Ecology) Coastal Atlas (Ecology 2025a) and Shoreline Photo Viewer (Ecology 2025b).

1.5 Field Investigation

L-E Senior Consultant, Bill Rehe, performed an initial Site visit on May 29, 2025. Conditions were cloudy with some rain. Mr. Rehe evaluated the Site conditions for approximately 1 hour. The Site visit consisted of examining overall conditions, including characterizing general soil characteristics, vegetation, potential critical habitats, and the presence of species of concern.

Mr. Rehe is a professional fisheries and wetland biologist with over 30 years of experience in the Pacific Northwest. Mr. Rehe holds 4-year and advanced degrees in fisheries science. His areas of expertise include marine and nearshore ecology, salmon biology, wetland science, and forage fish ecology. In addition to formal training at accredited universities, he has received training by Ecology, WDFW, the National Marine Fisheries Service, and the U.S. Fish and Wildlife Service.

Chapter 2. Existing Conditions

Doesn't seem to apply

KCC 21A.24.045 allows alterations within the following seven critical areas and their buffers if the alteration complies with the development standards; impact avoidance and mitigation requirements; and other applicable requirements. Those seven critical areas include: Critical aquifer recharge areas; Coal mine hazard areas; Erosion hazard areas; Flood hazard areas; Landslide hazard areas; Seismic hazard areas; and Volcanic hazard areas. Within these seven critical areas and their buffers, alterations are further limited in Severe channel migration hazard areas; Landslide hazard areas over forty percent slope; Steep slope hazard areas; Wetlands; Aquatic areas; Wildlife habitat conservation areas; and Wildlife habitat networks. The purpose of this chapter is to identify potential critical areas, and their buffers present on the subject property through the review of existing information and by Site review.

2.1 Background Review

This section describes the results of desktop review and field investigations. For the purpose of this report, the term “vicinity” describes an area approximately ¼ mile around the project Site.

2.1.1 GIS Database

The County GIS iMap (2025) identifies the following potential critical areas: aquatic areas (Puget Sound); critical aquifer recharge areas (category 3); estuarine wetlands; and Federal Emergency Management Agency (FEMA) floodplains (VE coastal flood zone); steep slopes hazard areas; erosion hazard areas; and landslide hazards. There are no known streams, seismic hazards, or coal mine hazards (Appendix A).

2.1.2 Previous Land Use

According to County records, the Site has a 1,580 SF home built in 1942. The years the bulkheads were built are unknown, but they do appear in the 1977 Ecology shoreline photos (Ecology 2025b; Appendix B). Parcel 888700-0170 also has an existing garage.

2.2 Analysis of Existing Site Conditions

There are no freshwater wetlands on or directly adjacent to the project Site. There are also no streams, ponds, or lakes. There are no intertidal estuarine wetlands present, but aerial photos appear to indicate the possible presence of subtidal estuarine wetlands adjacent to the existing bulkhead.

The County identifies a 165-foot aquatic buffer on the project property. The aquatic buffer begins at the ordinary high water (OHW) of the Puget Sound and extends landward (Figure 2). The majority of the aquatic buffer is modified due to previous developments leaving primarily landscaping species and lawn. According to Ecology aerial photos, most of these impacts appear to have occurred on or before the 1970s.

Chapter 3. Critical Areas and Buffer Impact Analysis

3.1 Potential Project Impacts

The repair of the existing shoreline protection will occur as far landward as practicable. Once complete, the shoreline protection will be of a similar size, shape, configuration, location, and general external appearance. Project activities will result in a cumulative reduction of impacts by reestablishing approximately 300 SF of upper intertidal habitat, removing approximately six creosote-treated timber piles, and placing approximately 22 CY of beach nourishment in an area with a reduced sediment budget (Table 1).

3.2 Assessment of Development Impacts

3.2.1 Critical Area Impacts

The proposed project will have no direct impacts to the previously described seven critical areas mapped on Site.

3.2.2 Buffer Impacts

The proposed project Site is adjacent to Puget Sound; an aquatic area with a 165-foot aquatic buffer (Figure 2 and Table 1). Impacts in the aquatic buffer will be minimized to the greatest extent possible but cannot be fully avoided because of the location of the repairs in relation to the existing bulkhead. The area directly upland of the existing bulkhead was originally filled with upland soils to create buildable land and planted with grass.

The proposed project will repair approximately 130 linear feet (LF) of existing rock and timber bulkhead. Maintenance and repair of the existing bulkhead will include removing the timber bulkhead and restacking the rock bulkhead as far landward as practicable. The existing house foundations will also be repaired.

Table 1. Project Action Impacts to Known Critical Areas and Aquatic Buffers

Project Action	Location of Impact	Area (SF)
Repair existing bulkhead	Aquatic buffer	300
	TOTAL	**300**

Chapter 4. Proposed Mitigation

The proposed mitigation for the project includes avoidance and minimization techniques per KCC 21A.24.125. Additional impacts to critical areas were avoided and minimized by not expanding the footprint of the bulkhead into aquatic areas or undisturbed critical areas. Compensatory mitigation to offset potential project action impacts are described below (Appendix C).

4.1 Mitigation Design Elements

Mitigation design elements consist of three primary elements (Table 2):

- Reestablishing upper intertidal habitat;
- Removing creosote-treated timber piles; and
- Placing beach nourishment material.

Table 2. Mitigation for Project Impacts to Aquatic Buffer

Impacted Area	Area (SF)	Mitigation	Area (SF)
Aquatic buffer	300	Place repaired bulkhead landward of the existing shoreline protection toe	300.00
		Remove six creosote-treated timber piles	4.74
		Place 22 CY of beach nourishment material	1,170.00
		TOTAL	**1,474.74**

Chapter 5. Mitigation Goals, Objectives, and Performance Standards

The mitigation goals of this project are to avoid and minimize new impacts to the aquatic buffer to the greatest extent possible. The project was designed to avoid and minimize adverse impacts to the aquatic environment by only performing the minimum amount of work necessary to repair the damaged bulkhead. The contractor will avoid and minimize adverse impacts to the project area by working during the authorized regulatory agency in-water work windows. The project was designed to minimize adverse impacts by only working in the work corridor, working only in the dry (i.e., at low tide), and not stockpiling fine-grained material waterward of the OHW. The barge will not ground out or spud in any aquatic vegetation, and the tug will operate in a manner to reduce prop wash.

While the work area has been limited to the smallest area possible, there will be unavoidable impacts from the proposed project actions that require compensatory mitigation. Specifically, the applicant proposes to mitigate for the approximately 300 SF of potential impacts within the aquatic buffer. The success of these mitigation goals will be evaluated through specific objectives and measurable performance standards. These objectives and performance standards are defined in subsequent sections.

5.1 Mitigation Goal and Objectives

The goal of the proposed mitigation is to offset temporary impacts to the aquatic buffer from project actions. Objectives, performance standards, and final success criteria for proposed mitigation for potential project impacts are identified in Table 3.

Table 3. Summary of Objectives, Performance Standards and Final Success Criteria

Mitigation Goal	Functional Objective	Performance Standard	Parameter Measured	Year Inspected	Sampling Method
Mitigate for temporary impacts to aquatic buffer area	Reestablish upper intertidal habitat	Remove at least 300 SF of intertidal fill	Photograph and measurements	0 (as-built)	Before and after direct measurements
Mitigate for minor impacts to aquatic buffer area	Remove aquatic source of PAHs	Remove six creosote-treated timber piles	Photograph and provide disposal receipt	0 (as-built)	Visual assessment
	Improve spawning substrate for forage fish	Place at least 22 CY of beach nourishment material	Photograph	0 (as-built)	Visual assessment

Chapter 6. Mitigation Monitoring Approach

Confirmation that the mitigation goal, objectives, and performance standards were met will be accomplished by photograph and direct measurement following construction. As required in the *Critical Areas: Restoration and Enhancement in King County* (2012), these measurements will be recorded and transmitted to the County by submission of an as-built report. The as-built report will reflect the actual impacts and placement of soil and native plants.

6.1 Monitoring and Reports

6.1.1 As-Built Report

Within 90 days of completion, the DeGarmo's or their representative will prepare and submit an as-built report to the County. This report will document the as-built conditions and describe any deviations from Table 3. The as-built report will describe any potential problems identified during construction activities and any recommended remedies to be proposed to the County. The as-built report will also include an as-built drawing (not a survey prepared by a licensed land surveyor) documenting the physical conditions of the Site after construction, and photographs of the mitigation.

6.1.2 Monitoring Reports

Annual monitoring is not being proposed for this project since all mitigation will be completed at the time of the Project construction.

6.1.3 Monitoring Schedule

A post-construction (as-built) inspection will be conducted within 90 days of completing the bulkhead repairs.

6.1.4 Mitigation Site Closeout

When the project construction is complete and the as-built report submitted, the applicant will request that the mitigation be closed out (i.e., the Site be accepted by the County as a success and further monitoring work ceased).

6.2 Adaptive Management and Contingency Plan

6.2.1 Adaptive Management Plan

No adaptive management plan will be completed, since all mitigation will be complete when the project construction is complete.

6.2.2 Contingency Plan

No contingency plan will be completed, since all mitigation will be complete when the project construction is complete.

Chapter 7. Financial Guarantees

Per the County's *Permitting Customer Information Bulletin #40, Financial Guarantees*, financial guarantees, if necessary, may be required to ensure that the mitigation plan is fully implemented (King County 2020; Appendix D).

Chapter 8. References

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WDFW. 2025b. Salmonscape. Accessed via https://apps.wdfw.wa.gov/salmonscape/map.html

Figures

DeGarmo

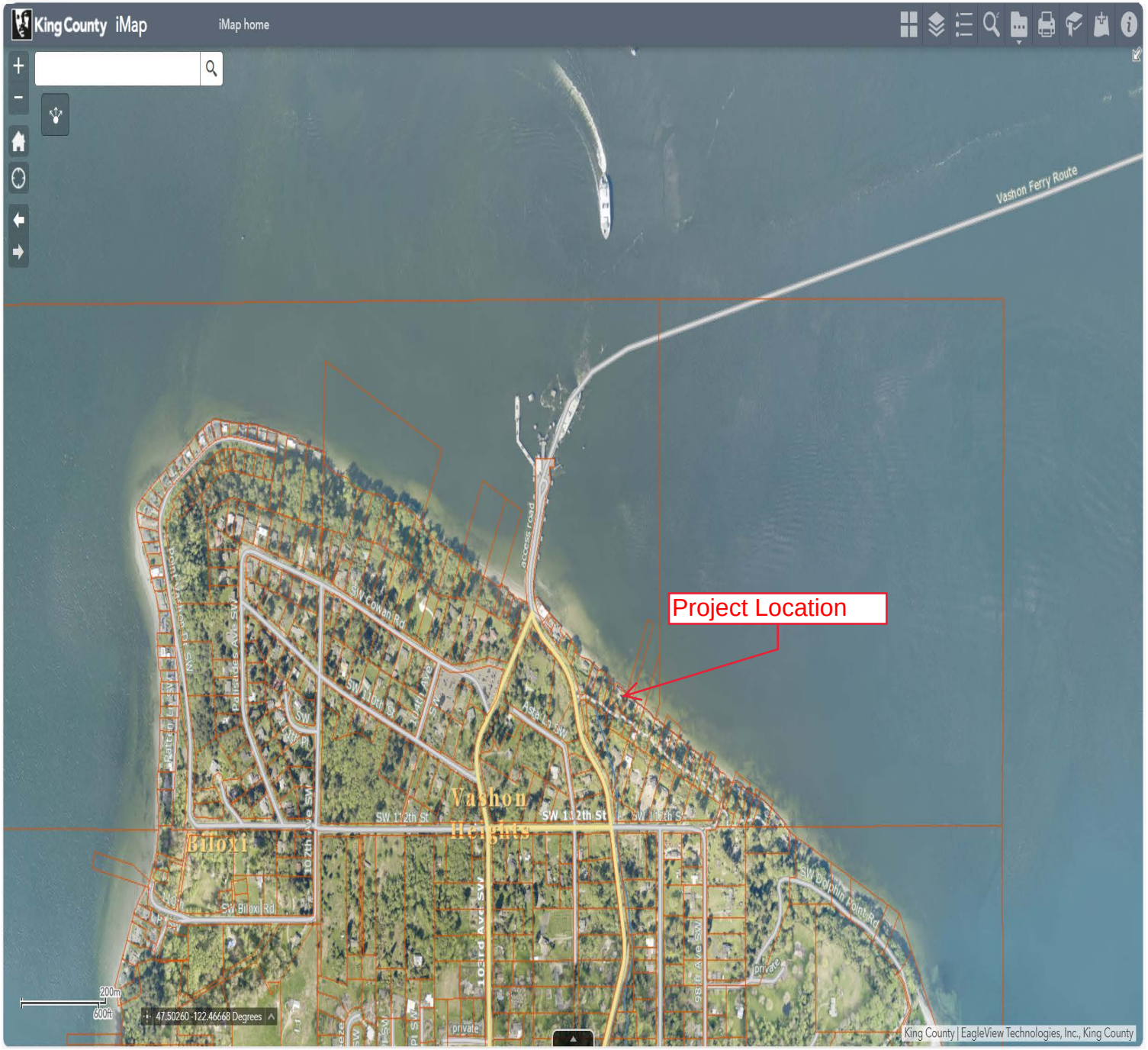
Bulkhead Repair

Figure 1. Vicinity Map

December 2025

Data Sources: Google Earth Pro (2025)

LEON Environmental, LLC



DeGarmo

Bulkhead Repair

Figure 2.

Aquatic Buffer

December 2025

Data Sources: iMap (2025)

LEON Environmental, LLC

Appendix A Background Information

DEPARTMENT OF ECOLOGY
State of Washington

Coastal Atlas Map

Legend | Zoom | Tools

Home | Theme: Coastal Atlas | Add/Remove Map Data | My Maps | Print | Share | About

- Eelgrass
  - Fringe (continuous)
  - Fringe (patchy)
  - Bed (continuous)
  - Bed (patchy)
- Dunegrass
  - Fringe (continuous)
  - Fringe (patchy)
  - Bed (continuous)
  - Bed (patchy)
- Surfgrass
  - Fringe (continuous)
  - Fringe (patchy)
- Kelp
  - Fringe (continuous)
  - Fringe (patchy)
- Salt Marsh

Data transparency 10%

King County iMap

iMap home

9928 SW BUNKER TRL 98070

Show search results for 9928 SW BU...

Legend

King County Address Points

Address points

Address labels

Property Layers

Parcels

Environmentally Sensitive Areas

Wetlands (National Wetland Inventory 2024)

- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Riverine

10823
10819
10815
10811
10824
10830
10836
10915
10350
352
10932
10018
10010
11020
10932
9928
9918
11002
9826
9820
11004
9814
9810
9804
9730
11009
11042
11100
10960
10980
11120
11124
11117
11118
9922
9916
103rd Ave SW
Vashon Hwy SW
Asta Ln SW
40m
100ft
47.50626 -122.46269 Degrees

King County iMap

iMap home

9928 SW BUNKER TRL 98070

Show search results for 9928 SW BU...

access road

10823

10819

10815

10811

10824

10830

10836

10915

10350

352

10932

10018

10010

9928

9918

11020

Vashon Hwy SW

103rd Ave SW

11009

11042

Asta Ln SW

10960

10980

11117

11118

11002

11004

11100

11120

11124

9922

9916

9810

9804

9730

40m

100ft

47.50971 -122.46577 Degrees

(2 of 3)

FEMA 100 year floodplain

Floodway:	None
Flood zone:	(AE) Areas with a 1% annual chance of flooding. Base Flood Elevations determined.
Base flood elevation:	14 ft (Uses NAVD88 datum. The base flood elevation applies to the entire polygon.)
Flood depth:	

Zoom to

Legend

King County Address Points

Address points

Address labels

Property Layers

Parcels

Flooding info

FEMA FIRM panels

FEMA floodway

FEMA 100 year floodplain

FEMA 500 year floodplain

FEMA area with reduced risk due to levee

King County iMap

iMap home

9928 SW BUNKER TRL 98070

Show search results for 9928 SW BU...

access road

10823
10819
10815
10811
10824
10830
10836
10915
10350
352

10932
10018
10010
10932
9928
9918
11002
9826
9820
11004
9814
9810
9804
9730
11020
11009
11042
11100
10960
10980
11120
11124
11117
11118
9922
9916

113rd Ave SW

Vashon Hwy SW

Asta Ln SW

40m
100ft

47.50627 -122.46371 Degrees

Legend

King County Address Points

Address points

Address labels

Property Layers

Parcels

Environmentally Sensitive Areas

Potential steep slope hazard areas (2016, see explanation--->)

King County iMap

iMap home

9928 SW BUNKER TRL 98070

Show search results for 9928 SW BU…

access road

10823
10819
10815
10811
10824
10830
10836
10915
10350
352
10932
10018
10010
10932
9928
9918
11020
11009
11042
11002
9826
9820
11004
11100
10960
9814
9810
9804
10980
11120
11124
9730
11117
9922
11118
9916
57

Vashon Hwy SW

Legend

King County Address Points

Address points

Address labels

Property Layers

Parcels

Environmentally Sensitive Areas

Erosion hazard (1990 SAO)

40m
100ft

47.50626 -122.46277 Degrees

Kitsap County

Vashon Point

Peter Point

Dolphin Point

Puget Sound

Bunker Trail Pump Stations 1- 4 (King County)

Bunker Trail Vacuum Sewer System

Vashon Community Pump Station

SW COWAN RD
SW 110TH ST
SW 112TH ST
ASTALIN SW
98TH AVE SW
SW 116TH ST
McLeod Creek
Sliwa Beach Creek
SW 125TH ST
CUNLIFFE RD SW
BURMA RD SW
Paice Wheel Creek
SW 127TH ST
McCormick Creek
SW 140TH ST
Redjam Creek
SW CEDARHURST RD
SW 144TH ST
107TH WAY SW
Glen Acres Creek
GLEN ACRES RD SW
SW 148TH ST
119TH AVE SW
Judd Creek
Quartermaster Harbor

Appendix B Aerial Photographs


1977


1992


2000


2006


2016


05/01/2025
3 of 4
(Early Access)
EARLY ACCESS
2025
© 2025 Eagleview

Community Sewer
Main

Appendix C Mitigation Information

King County iMap

Date: 1/13/2026

Notes:

N

King County

Appendix D Financial Guarantees

King County
Department of Local Services
Permitting Division
206-296-6600
www.kingcounty.gov

Landscape Bond Quantity Worksheet Form

For alternate formats, call 206-296-6600

Project Name: DeGarmo Shoreline Protection Repair Project

Permitting Project #: SHOR22-0032

Address: 9918 SW Bunker Trail, Vashon, WA 98070

Prepared By: Bill Rehe, Leon Environmental, LLC **Phone:** 253-389-0712

Bonds are based upon required landscaping and will be posted for performance and/or maintenance**.** Required landscaping includes perimeter landscaping, surface parking area landscaping, (KCC 21A.16) and any landscaping required by SEPA environmental review. **The maintenance period is for the life of the project**, however, after posting for maintenance, the performance bond will be reduced to 30% of the total performance bond price including contingency, or other amount as warranted by site specific or current market considerations at the discretion of the department ($1,000.00 minimum). Bonds will be held for a minimum two year period. Upon re-inspection of the site at the end of the monitoring period, the bond will be released if the site has been properly maintained (KCC 21A.16.180). If the project has not been maintained and there are dead trees, shrubs, ground cover, or other deficiencies noted in the required landscaping, the bond will be held until the deficiencies are corrected.

	UNIT PRICE	UNIT TYPE	QUANTITY	PRICE
SOD LAWN AREAS	$500.00	MSF (1000 SQ. FT)		
HYDROSEEDING	$50.00	MSF (1000 SQ. FT)	1	$50
SOIL PREPARATION A. TOPSOIL (6 INCHES DEEP)	$25.00	CY (CUBIC YARD)	7	$175
B. MULCH (2 INCHES DEEP)	$4.00	SY (SQUARE YARD)		
C. PEAT MOSS (TWO INCHES DEEP)	$2.30	SY (SQUARE YARD)		
D. COMPOST (3 INCHES DEEP & TILLING	$26.00	SY (SQUARE YARD)		
E. FERTILIZER	$6.67	CY (CUBIC YARD)		
PLANT MATERIALS A. DECIDUOUS TREES				
1.75 - 2.00" CALIPER (minimum height 10') PERIMETER & PARKING AREAS	$250.00 EACH	COST & LABOR		
1.5 - 1.75" CALIPER INTERIOR LANDSCAPING OR OTHER REQUIRED LANDSCAPING	$225.00 EACH	COST & LABOR		
B. EVERGREEN TREES				
FIVE (5) FEET OR ABOVE	$150.00 EACH	COST & LABOR		
C. SHRUBS	$35.00 EACH	COST & LABOR		
D. GROUND COVER	$4.00 EACH	COST & LABOR		
SUB TOTAL BOND AMOUNT			**BOND AMOUNT SUB TOTAL:**	
			$ $225	

	UNIT PRICE	UNIT TYPE	QUANTITY	PRICE
MISCELLANEOUS TREE STAKES	$2.65 EACH	PER STAKE & LABOR		
FENCING: SOLID WOOD CEDAR	$28.50	LINEAR FOOT INCLUDES LABOR		
BERMING	$17.50	LINEAR FOOT INCLUDES LABOR		
IRRIGATION	80¢	SQUARE FOOT		
RELOCATING TREES ON SITE				
36" BALL	$260.00	EACH		
60" BALL	$920.00	EACH		
RELOCATING SHRUBS ON SITE				
12" BALL	$26.00	EACH		
24" BALL	$33.00	EACH		
ADDITIONAL ITEMS: Onsite recreation facilities				

SUB TOTAL BOND AMOUNT	**BOND SUB TOTAL:** **$** 225
Add 30% of the Bond Sub-Total for Contingency in accordance with KCC 27A.30.020	**30 % CONTINGENCY:** **$** 67.50
TOTAL BOND PRICE *	**TOTAL BOND PRICE:** **$** 292.50

* NOTE: Permit inspection fees, in addition to the bond price, are required for monitoring the performance and maintenance of required landscaping**.**

Appendix D: Revised Site Plan

NOTE:
SITE PLAN HAS BEEN ESTABLISHED THROUGH KING COUNTY GIS INFORMATION, QUARTER SECTION MAP qs_SE062303, AND A 2000 SURVEY BY JEROLD D O'HARE (RECORDING NO. 20001005900004), BUT DOES NOT CONSTITUTE A LEGAL SURVEY AND SHOULD BE CONSIDERED APPROXIMATE ONLY.

SITE PLAN - EXISTING

1" = 10'-0"

0' 10' 20' 30'

General Notes

No.	Revision/Issue	Date

Firm Name and Address

ELLISPORT ENGINEERING, INC.
20501 81st Ave SW
Vashon, WA 98070
206.463.5311 - phone
206.463.2578 - fax

STATE OF WASHINGTON
STEPHEN T. KICINSKI
25752
REGISTERED PROFESSIONAL ENGINEER
7/25/22

Project Name and Address

DeGARMO BULKHEAD
9928 SW Bunker Trail
Vashon, Washington 98070

Project	Sheet
DeGARMO	C2
Date: 25 JUL 2022	
Drafter: DSD	Engineer: STK